The impact of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 Repo 'Safe harbor' provisions on investors

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Abstract

The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005 significantly expanded the exemptions from the normal workings of the U.S. Bankruptcy Code. Using a large sample of U.S. banks, we study investors' reaction to news about the promulgation of the BAPCPA repo 'safe harbor' provisions and the influence extending such exemptions to repos collateralized by riskier collateral had on equity market information asymmetry. We find a negative market reaction to news events about the promulgation of BAPCPA, which subsequent cross-sectional analysis suggests is at least partly driven by repo exposure. This finding suggests that investors perceived the increase in finance risk from the extension of the 'safe harbor' provisions as dominating the perceived gain from accessing cheaper finance. Further, we find that the promulgation of BAPCPA gave rise to increased information asymmetry for banks with repo exposure.

Keywords: Repurchase agreements; Bankruptcy Code; Safe harbor

Data Availability: Data used in this study are available from the public sources identified in the study.

JEL Classification: M41, G21, G32

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1. Introduction

We analyze the equity market reaction to the promulgation of the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005 and banks' market information asymmetry following the extension of the "safe harbor" provisions to repurchase agreements (repos) collateralized by risky assets. 'For most financial institutions that actively trade in the debt markets on a day-to-day basis, cash needs are met by borrowing through repurchase agreements' (Krishnamurthy 2010, 8). This establishes the repo market as one of the main sources for the provision of short-term wholesale funding. Given insufficient information about bilateral repo agreements, there are no estimates of the actual size of the total U.S. repo market. Rough estimates of the amount of repo transactions entered by U.S. primary dealers suggest that repos are a significant source of finance. Specifically, data derived from Federal Reserve's Form FR 2004, suggests that in 2015 U.S. primary dealers[1] entered around $2.2 trillion of repos (Baklanova 2015).

The importance and growth of the repo market can at least be partly attributed to its preferential treatment under bankruptcy law, resulting from the so-called 'safe harbor' provisions. These provisions which first appeared for repo agreements in the 1984 amendments

[1] As of August 2015, the following institutions were designated as primary dealers: Bank of Nova Scotia, New York Agency, BMO Capital Markets Corp., BNP Paribas Securities Corp., Barclays Capital Inc., Cantor Fitzgerald & Co., Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, Daiwa Capital Markets America Inc., Deutsche Bank Securities Inc., Goldman, Sachs & Co., HSBC Securities (USA) Inc., Jefferies LLC, J.P. Morgan Securities LLC, Merrill Lynch, Pierce, Fenner & Smith Incorporated, Mizuho Securities USA Inc., Morgan Stanley & Co.LLC, Nomura Securities International, Inc., RBC Capital Markets, LLC, RBS Securities Inc., SG Americas Securities, LLC, TD Securities (USA) LLC, and UBS Securities LLC.

to the Bankruptcy Code[2] 'exempt the bankrupt debtor's financial-contract counterparties from the base rules that halt creditor collection efforts when the bankruptcy begins, and claw back preferential and fraudulent pre-bankruptcy transfers that harm creditors overall, thus facilitating an orderly liquidation or reorganization' (Morrison et al. 2014, 1016). As further discussed in the following sections, over the years these exemptions have been extended to encompass a variety of repo agreements.

Previous research has raised various concerns about the repo market with Gorton and Metrick (2010) describing the recent financial crisis as a 'run on repo'. In this regard, 'lenders of funds, worried about the value of collateral as well as the credit risk of counterparties, became increasingly concerned about losses on repurchase agreements' (Fleming et al. 2009, 2). In view of this, various authors have questioned whether repo agreement 'safe harbor' provisions have exacerbated the run on the repo market and whether thus, such exemptions should at least be narrowed (e.g. Lubben 2009; Roe 2011; Duffie and Skeel 2012).

Similarly, various authors have questioned whether the accounting for such transactions is adequate (Chircop et al. 2012) and whether disclosures on such transactions adequately inform shareholders about the riskiness of these transactions. In this regard, Adrian et al. (2012) conclude that it is particularly difficult to determine the risks arising from repo transactions entered by a specific firm. The Financial Accounting Standards Board (FASB) has recently noted stakeholder concern 'about the need to improve existing disclosure requirements for repurchase agreements, linking those needs to the credit crisis and the need to better understand the nature of these transactions, the use of funding obtained through these transactions, and the associated credit and liquidity risks' (FASB 2013).

[2] The Bankruptcy Amendments and Federal Judgeship Act of 1984 extended 'safe harbor' provisions to repo agreements. This bill was signed into law on July 10, 1984.

To explore the effect of 'safe harbor' exemptions on shareholders and on the overarching information asymmetries that plagues repos we focus on a particular amendment to the US bankruptcy statute brought about by the enactment of the Bankruptcy Abuse Prevention and Consumer Act of 2005. This Act significantly increased the array of repo agreements which could avail of the 'safe harbor' exemptions. Particularly the Act makes repos collateralized by risky collateral, such as mortgage backed securities, eligible for such exemptions. By expanding the scope of the 'safe harbor' exemptions, the Bankruptcy Code makes this source of financing more attractive to companies. Therefore, the BAPCPA exemptions likely resulted in a substitution effect where long-term sources of finance are substituted by cheaper short-term repo agreements. Exploiting this change in regulation, we analyze investor market reaction to news about the promulgation of the BAPCPA and the resulting changes in bank information asymmetry.

We acknowledge that the BAPCPA made several significant changes to the U.S. Bankruptcy Code including to force borrowers to move from Chapter 7, bankruptcy filing, to Chapter 11, reorganization. However, prior literature (e.g. Ayotte and Skeel 2013; Duffie and Skeel 2012; Infante 2012; Roe and Tung 2013) purports that the new rules on repo transactions included in the Act played a particularly important role and deeply affected the banking sector.

One of the challenges to our empirical analyses consists in isolating the impact of the repo 'safe harbor' provisions from the impact of other contemporaneous regulatory changes introduced by the BAPCPA on investor market reaction. To mitigate such concern, we benchmark our results to banks without any repo exposure and control for several bank specific characteristics that likely affect repo exposure. These analyses are particularly important in our research design since they allow us to link the investors' market reaction to the bank's repo exposure, thereby providing some confidence that the market effect documented throughout the paper is not capturing a general effect due to the introduction of the BAPCPA.

The widening of the repo 'safe harbor' provisions likely influences investor market reaction because of two offsetting factors. The substitution of long-term financing with cheaper shorter-term collateralized financing reduces bank finance costs and should be perceived positively by shareholders (finance cost factor). Offsetting this effect is the increased finance risk[3] the company exposes itself to by substituting stable long-term sources of finance with mostly overnight repo agreements. This is likely to be perceived negatively by shareholders (finance risk factor). In our analyses, we find negative market reactions to news about the promulgation of the BAPCPA suggesting that the finance risk factor dominates any benefit derived from the reduction in finance costs. A common limitation of such event studies is the identification of a control group to control for confounding events not related to the regulatory change under study. To address this limitation, we use banks without any repo exposure during our sample period as our control and find that the observed negative market reaction is statistically significant for banks with repo exposure *only*. While such an analysis allows us to control for confounding events, there is still the possibility that the observed results are due to the effect of changes in bankruptcy law on bank characteristics correlated with repo exposure. To control for such possibility, in subsequent cross-sectional analyses we control for firm characteristics which prior literature have shown to be related to repo exposure and, find that the previously observed market reaction is at least partly driven by repo exposure.

Given that the widening of the 'safe harbor' provisions brought about by the BAPCPA expanded the heterogeneity of repo transactions, and this change was not accompanied by enhanced disclosures, it is likely that it caused an increase in market information asymmetry. We measure information asymmetry using equity market bid-ask spreads. Using a difference-

[3] Finance risk is sometimes referred to as roll-over risk. It is the risk that repo financing is not rolled over on maturity. Moreover, repos expose companies to counterparty risk. This risk refers to the possibility that the counterparty either fails to satisfy margin calls or fails to honour the agreement to repurchase the underlying assets.

in-differences approach, which controls for heterogeneity in the sampled banks, we find that following the enactment of the BAPCPA of 2005 the bid-ask spreads increased for banks with repo exposure when compared to a control group of banks with no repo exposure. To increase the likelihood that the treatment group is orthogonal with respect to the outcome variable we identify banks involved in repo transactions before the passage of the BAPCPA of 2005 and use banks that were not involved in repo transactions before and after the passage of the BAPCPA of 2005 as our control group. Moreover, we undertake tests to show that the treated and control groups satisfy the parallel trend assumption prior to the enactment of the BAPCPA of 2005. Finally, we employ bank fixed effects to mitigate concerns about the heterogeneity between banks with repo and without repo transactions.[4]

Our paper contributes to two streams of literature. First, we contribute to the literature analyzing the effects of the BAPCPA of 2005 expansion of the repo agreements 'safe harbor' provisions. While the repercussions of such changes on the incentives of creditors and on the functionality of the normal Bankruptcy Code procedures have been thoroughly discussed (e.g. Lubben 2009; Roe 2011; Duffie and Skeel 2012), this is to our knowledge the first study that examines the economic consequences of this change in bankruptcy law from a shareholder perspective. Specifically, to assess whether the expected benefits of the new regulation were outweighed by unexpected costs due to finance risk we study shareholder reaction to events leading to the propagation of the BAPCPA, and capital market effects in the aftermath of the BAPCPA becoming effective. Secondly, we add to the literature on the effects of the BAPCPA by showing that the increased heterogeneity of repurchase agreements arising from the widening of the type of collateral exempted from the 'automatic stay' gave rise to increased

[4] We acknowledge that the ideal control group for our difference-in-differences analysis would be composed of banks to which all regulations except for the BAPCPA regulations relating to repo transactions apply. This control group does not exist since all US banks fall within the scope of the BAPCPA.

information asymmetry. This is an important unintended capital market effect of the BAPCPA arising from changes in the legal framework which are not accompanied by changes in the disclosure requirements set out in accounting regulation. In this way, we add to the literature examining the consequences of asynchronous changes in company regulations and we contribute to prior research that highlights the necessity of close coordination between different sets of accounting and bank regulation (e.g. Cerbioni et al. 2015; Fabrizi and Parbonetti 2015). We feel that this is the main policy implication of our study.

This study is structured as follows: Section 2 sets out the institutional background and discusses extant literature relevant to this study. Section 3 discusses the major congressional news events leading to the passage of the BAPCPA of 2005 while Section 4 sets out our hypotheses. Section 5 discusses the research design, sample and empirical results relating to the market event and subsequent cross-sectional analyses. Similarly, Section 6 discusses the research design, sample and empirical results relating to the information asymmetry analyses. Section 7 concludes.

2. Background and Literature Review

2.1. Institutional background

Repos are two-legged transactions which combine a spot market sale with a simultaneous forward agreement to repurchase the underlying instrument at a later date, often the next day (Duffie 1996, 497). The party undertaking the spot market sale of the underlying instruments is said to be entering into a repo transaction, while the party purchasing the underlying instruments while simultaneously agreeing 'to resell the same or equivalent securities at a specific price at a later date' (Ong and Yeung 2011), is said to be undertaking a reverse repo transaction. Moreover, since each leg of the transaction is a true sale, it is often[5]

[5] Sometimes provisions are inserted in the repurchase agreement which prohibits the sale and/or rehypothecation of the collateral to third parties.

the case that the party acquiring the underlying financial instruments may sell or rehypothecate such collateral to third parties.

The repo market plays an important role in the efficient allocation of capital (Fleming et al. 2009). Banks and dealers 'use repurchase transactions to finance inventories, to cover short positions, to create leverage and to hedge or speculate on interest rate movements' while pension funds and insurance companies use repos 'to invest surplus cash, to earn incremental returns on their portfolios or to raise cash for investment' (Hördahl and King 2008, 38).

In 2005 when the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) was signed into law, accounting for repurchase agreements was regulated by SFAS 140[6] which set out the repo transaction disclosure requirements in §17 (FASB 2000). SFAS 140 required an entity entering into a repo agreement:

1) to disclose 'its policy for requiring collateral or other security';

2) 'if the entity has pledged any of its assets as collateral that are not reclassified and separately reported in the statement of financial position…' it should disclose '…the carrying amounts and classifications of those assets as of the date of the latest statement of financial position presented';

3) 'if the entity has accepted collateral that is permitted by contract or custom to sell or repledge, the fair value as of the date of each statement of financial position presented of that collateral and of the portion of that collateral that it has sold or repledged, and information about the sources and use of that collateral' (FASB 2000 §17).

[6] SFAS 140, 'Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities' was issued in September 2000. It was amended by SFAS 166 (FASB, 2009) 'Accounting for Transfers of Financial Assets an amendment of FASB Statement No. 140' and more recently FASB issued Accounting Standard Updated (ASU) 2014-11 Transfers and Servicing (Topic 860) (FASB,2014) 'Repurchase-to Maturity Transactions, Repurchase Financings, and Disclosures' which expand disclosures on repurchase agreements.

The significance of the repo market as a source of short-term funding for banks and the fact that the repo market is opaque to most financial statement users makes disclosures about banks' exposure to the repo market especially important for financial statement users to be able to price bank risk.

2.2 Literature review

One of the most important objectives of Bankruptcy legislation is to set priority rules, which are central to business reorganizations. Specifically, based on these rules value is distributed among creditors by the bankrupt firm. The importance of such rules is highlighted by the fact that a firm in bankruptcy lacks sufficient value to honor all its obligations, and thus priority rules ultimately determine which of the firm creditors are to be paid (Roe and Tung 2013).

The importance of such priority rules, have resulted in different creditors, among which parties to the repo market, lobbying the U.S. Congress to achieve super-priority in bankruptcy proceedings. This super-priority alters bankruptcy distributions, where payment to certain creditors is prioritized to the detriment of other firm creditors. Specifically, the Bankruptcy Code exemption of repos from automatic stay incentivizes creditors supplying collateralized loans to undertake repo agreements. Indeed, while the automatic stay typically prohibits the immediate liquidation of the collateral in favor of the loan, repos are exempt from such stay and thus repo creditors can in the event of a bankruptcy event, immediately liquidate any collateral (Ibid.). In other words, such exemption allows for the resolution of repo obligations out of the bankruptcy court proceedings.

The primary argument for the introduction of these exemptions is that the repo market is major source of systemic risk and that such exemptions help in reducing such risk (Bliss and Kaufman 2006). Systemic risk is the risk that major financial institutions fail at the same time

resulting in market illiquidity. The costs and benefits of these exemptions have been the subject of various studies. For example, Edwards and Morrison (2005) examine the effect the exemptions from 'automatic stay' afforded to derivative and repo contracts had on the collapse of hedge fund Long Term Capital Management (LTCM) in the Fall of 1998. They conclude that the exemptions afforded to derivative and repo contracts by the Bankruptcy Code not only failed to reduce systemic risk, but exacerbated such risk, forcing the Federal Reserve to intervene and support LTCM. Specifically, the authors suggest that in a forced liquidation, the exemption of derivative and repo contract counterparties from 'automatic stay' would have enabled these counterparties to close-out and seize LTCM assets to the detriment of other creditors. This "would not only have [had] a significant distorting impact on market prices, but also in the process could produce large losses – or worse – for a number of creditors and counterparties, and for other market participants who were not directly involved with LTCM..." (Greenspan 1998).

More recently, Roe (2011) examines the failure of AIG, Bear Stearns and Lehman Brothers within the ambit of the exemptions afforded by the Bankruptcy Code to derivative and repo counterparties. By exempting derivative and repo counterparties from the normal bankruptcy proceedings, the Bankruptcy Code gives preference to these parties over other creditors. Such preference waters down the market discipline incentives for prioritized creditors and enhances the market discipline incentives for nonprioritized creditors. Notwithstanding this, nonprioritized creditors, such as the US tax payer, are poorly positioned to replicate the degree of counterparty market discipline that would have been afforded by prioritized creditors. The author concludes that the reduced incentives for repo counterparties to monitor their debtors likely contributed to the recent collapse of major financial institutions.

Preferential treatment of repo counterparties also contributes to the inefficient substitution of funding away from traditional sources of finance (Duffie and Skeel 2012). This

cost stems from the fact that the exemption from automatic stay makes short term repo financing cheaper when compared to traditional finance. Indeed, suppliers of traditional finance will likely charge higher interest rates than repo finance in response to the increase default losses arising from the loss of priority to repos (Bolton and Oehmke 2015). Such a cost is particularly pertinent, given that repo financing is a fragile source of finance, typically consisting of transactions with overnight maturities which must be rolled over every day. Given this, such financing might easily be withdrawn by counterparties (Gorton and Metrick 2012).

Besides the above mentioned costs, the repo exemption from automatic stay also has a number of benefits, the most sizeable of which is that it discourages repo counterparties from running on the firm as soon as the firm's financial condition is suspect. This given that the repo exemption from automatic stay gives added flexibility to repo counterparties to quickly exit a repo agreement, even after the initiation of bankruptcy proceedings (Duffie and Skeel 2012).

The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005, the legislation at the center of this study and which we discuss further in the next section, expanded the range of repurchase agreements that could avail from the exemption from automatic stay. There is a paucity of literature examining the effect of the BAPCPA at the firm level. An exception to this, is Ganduri (2017) who studies the impact of the 2005 bankruptcy reform act on mortgage origination by Mortgage Companies (IMCs). The study finds that post-BAPCPA, IMCs increased the issuance of risky mortgages which ultimately resulted in an increase in ex-post defaults. The author attributes this IMC response to the availability of cheaper finance resulting from the increased creditor protection offered by the BAPCPA. Our study complements Ganduri (2017) by examining the equity market effects of BAPCPA. While prior literature discussed previously has looked at the effects of changes in bankruptcy statute on financial institutions and their creditors, we are the first to examine the impact of the BAPCPA on investors. Examining the effect of the BAPCPA on the equity market is

particularly important given that the equity market consists of public banks' ultimate owners, the shareholders.

3. The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005

The enactment of the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) significantly altered the US bankruptcy statue. Among other changes, by widening the array of repos that could take advantage of the 'safe harbor' exemptions, this legislation significantly altered the functioning of the US repo market. In Section 3.1 we provide a detailed overview of the effect of the BAPCPA on the repo market while in Section 3.2 we list the main events leading to the enactment of the BAPCPA.

3.1 The effect of Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005 on the repo market

A repo is a hybrid contract between a sale of securities and a secured loan (Stigum 1989). In the past, this hybrid nature led to uncertainty about whether the automatic stay should be applied if a repo borrower files for bankruptcy. In 1982, in the case of Lombard-Wall the court ruled that the securities purchased in a repo transaction were subject to the automatic stay. The sentence was contrary to market expectations and Stigum (1989, 219) quotes a market participant who said that the sentence "scared the hell out of the industry". As a consequence of the Lombard-Wall case, there was an effort to change the Bankruptcy Code exempting repo collateral from automatic stay. The Treasury department did not champion this change arguing that the exemption from automatic stay would reduce the oversight incentive of repo lenders over repo borrowers. However, in 1984 the Bankruptcy Code was amended providing a 'safe harbor' (the exemption from the automatic stay) to repos collateralized by treasury and agency securities, bank certificates of deposits and banker's acceptances.

In the mid '90s repo financing was extended to riskier and non-traditional collateral such as mortgage backed securities and asset backed securities (Acharya et al. 2010). However, given that only "traditional" securities were exempted from automatic stay "repo contracts were written to represent the transaction as a true sale, so that if the borrower filed for bankruptcy, the lender could retain the possession of the securities" (Maclachlan 2014, 519). However, another court sentence ruling the bankruptcy of Criimi Mae in 2002 surprised market participants creating uncertainty in the repo market (Schroeder 2002). The court sentenced that the repo used by Criimi Mae was equivalent to a secured loan and that the collateral was not exempted from automatic stay. Similar to Lombard-Wall, this case, gave new impetus to amend the Bankruptcy Code to widen the 'safe-harbor' provision to include non-traditional securities. Indeed, the BAPCPA of 2005 widened the range of 'safe-harbored' repos. In this respect §907 of the BAPCPA amended the definition of repurchase agreement in paragraph 47, Title 11, of the US Bankruptcy Code to include transfers of the following instruments:

- Mortgage related securities (as defined in Section 3 of the Securities Exchange Act of 1934).
- Mortgage loans.
- Interests in mortgage related securities or mortgage loans.
- Qualified foreign government securities (defined as a security that is a direct obligation of, or that is fully guaranteed by, the central government of a member of the Organization for Economic Cooperation and Development).[7]

The relevant Bankruptcy Code procedures which allow repurchase agreement counterparties exemptions from the normal bankruptcy proceedings are §559 which exempt repo agreement counterparties from the automatic stay, §362(b)(7) and §362(o), 'which protect

[7] Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, Pub. L. No. 109-8, §907, 119 Stat. 23, 171-72

repo counterparties' setoff rights and their rights to realize against margin or other collateral posted by the debtor' (Morrison et al. 2014, 1022) thus buttressing the exemption from automatic stay set out in §559, and §546(f) and §548(d) "which shield repo counterparties from preferential or fraudulent transfer actions seeking to recover margin, settlement, or other payments made in connection with repo agreements" (Ibid., 1022).

3.2 News Events Leading To The Passage Of The Bankruptcy Abuse Prevention And Consumer Protection Act (BAPCPA) Of 2005

The Bankruptcy Abuse and Consumer Protection Act (BAPCPA) of 2005 was a highly controversial piece of legislation which makes the most significant changes to the Bankruptcy Code since its enactment in 1978 (Benton, 2005). The main driver for the passage of this bill was the perceived ease by which petitioners (in particular individuals) could apply for and initiate bankruptcy procedures. "In 1979… debtors filed 225,000 individual petitions. By 2004, filings increased dramatically to more than 1.5 million petitions" (Ibid, CC1). In this regard, the main goal of the BAPCPA of 2005 was to prevent perceived abuse of the bankruptcy provisions by enforcing means testing and promoting credit counselling to incentivize borrowers with the ability to repay to move from Chapter 7 bankruptcy filing to Chapter 11 reorganization.

Given the controversial nature of this Act, its enactment was a long difficult process which saw its beginning in 1997 when it was first drafted. In December 2000, both Congress and the House of Representatives approved an amended draft titled Bankruptcy Reform Act of 2000, however President Clinton employed a 'pocket veto' and left this bill unsigned (Riechmann 2000).

From 2000 to 2005 there were various attempts to pass amended forms of this legislation through Congress but it was only on February 1, 2005 that the bill in its current

format was introduced as S.256 in the Senate by Republican Senator Charles Grassely of Iowa in his name and that of seven original cosponsors. On February 9, 2005 the Chairman of the House Committee on the Judiciary, F. James Sensenbrenner Jr., for himself and 60 other cosponsors introduced an identical bill in the House of Representatives (H.R. 685). On March 10, 2005 the bill was passed through the Senate by a vote of 74 in favor and 25 against (Record Vote No.:44) and was subsequently passed through the House of Representatives on April 14, 2005 by a vote of 302 in favor and 126 against (Roll No.108). The bill was signed into law by President Bush on April 20, 2005 and most of its provisions took effect on October 17, 2005 (Dickerson, 2006). [8]

<<Insert table 1 about here>>

4. Hypotheses Development

4.1. Market Reaction

The market reaction to news about the passage of the BAPCPA depends on the weighting bank shareholders place on two offsetting effects. As suggested by Duffie and Skeel (2012) an expansion of the type of collateral that could be used in repurchase agreements to avail from the 'safe harbor' provisions is likely to facilitate financing through the repo market thus facilitating firm growth. Moreover, given that the 'safe harbor' provisions for repo agreements essentially give preferential treatment to the repo market when compared to other funding markets, it is likely that financing through the repo market is cheaper than sourcing financing through other markets (Roe 2011; Duffie and Skeel 2012). These factors likely contributed to the continuing growth in the repo market as evident in Figure 1. Considering

[8] Vide Table 1 for the major Congressional events in 2005 that led to the passage of the Bankruptcy Abuse and Consumer Protection Act (BAPCPA) of 2005.

these effects, we would expect equity market participants to have viewed news about the passage of the BAPCPA positively. We call this effect the finance cost factor.

<<Insert Figure 1 about here>>

The finance cost factor is likely offset by the finance risk factor. The latter factor arises from the incentive provided by the BAPCPA to substitute more stable long-term financing with short-term runnable repo financing (Duffie and Skeel 2012). In a similar vein, given that lenders have a preference to provide longer-term financing against higher quality collateral and that the widening of the scope of the 'safe harbor' provisions set out by the BAPCPA facilitate the use of riskier collateral, it is likely that the BAPCPA resulted in an incentive to substitute term repo with overnight repo transactions (Gorton and Metrick 2012). As shown in Figure 2, after the BAPCPA became effective overnight repos comprised an increasing percentage of total repos. As shown in Figure 3 this is possibly due to the increasing use of riskier collateral in repo transactions following the promulgation of the BAPCPA. Such changes in the financing arrangements of banks likely increase bank finance risk (Gorton and Metrick 2009; 2012). The market perception that the promulgation of the BAPCPA will increase bank finance risk would give rise to a negative market reaction to any news increasing the probability of the passage of the BAPCPA.

<<Insert Figure 2 and Figure 3 about here>>

It is unclear what weighting investors attribute to each factor. Market participants attributing a higher weighting to the finance cost factor would have a positive market reaction to news increasing the probability of enacting the BAPCPA. Conversely, we would expect negative reactions to these news events if investors attribute a higher weight to the finance risk factor. Given that *ex-ante* we do not have a prediction as to which factor will dominate we express our first hypothesis in its null form:

H1: There is no equity market reaction to news about the passage of the BAPCPA.

4.2 Information Asymmetry

There is a rich literature examining the role of company disclosures in mitigating the agency conflict between shareholders and management (Leftwich 1980; Watts and Zimmerman 1986; Beaver 1998). Specifically, this literature finds that "financial reporting and disclosure are potentially important means for management to communicate firm performance and governance to outside investors" (Healy and Palepu 2001, 405). Since the widening of the 'safe harbor' provisions to different types of collateral likely expanded the heterogeneity of repo transactions, and this change was not accompanied by enhanced disclosures about the type of repo transactions undertaken by banks, we posit that the BAPCPA caused an increase in equity market information asymmetry. We express our second hypothesis as follows:

H2: The BAPCPA increased equity market information asymmetry for banks undertaking repurchase agreements.

5. Market reaction

5.1 Variable measurement and research design

Our study infers investor perceptions to the BAPCPA by examining equity market reactions to events leading to the promulgation of the said regulation. In this respect, we follow a similar approach to prior studies which have examined investor perceptions to new regulations. This approach entails first determining the abnormal return for a three-day event window using a multifactor model controlling for market returns and change in treasury rates, and subsequently regressing this abnormal return on firm specific characteristics to determine which firm characteristics explain the observed abnormal returns. Prior literature using a

similar approach to ours include Beatty et al. (1996) who study investor perceptions to the promulgation of fair value accounting; Dechow et al. (1996) who study investor perceptions to stock based compensation accounting; Jain and Rezaee (2006), Zhang (2007) and Li et al. (2008) who study investor perceptions to the Sarbanes Oxley Act and Armstrong et al. (2010) who study investor perceptions to the adoption of IFRSs in Europe.

Though popular in prior literature there are various alternatives to the methodology used in this study. For example Brown and Warner (1980) have proposed the following three different methods how to calculate abnormal returns when event dates are known: 1) mean adjusted returns, 2) market adjusted returns and 3) market and risk adjusted returns. Dyckman et al. (1984) and Brown and Warner (1985) assess the accuracy of these different event study methodologies when daily returns are used and find that the different measures of abnormal returns perform similarly. Chandra et al. (1990) re-examine the Brown and Warner (1985) results and conclude that the market- and market-and risk- adjusted return methodology perform better than the mean-adjusted return methodology. They conclude that the strong performance of the mean-adjusted return methodology in the Brown and Warner (1985) study is a statistical artifact. Finally, Brown and Weinstein (1985) examine abnormal returns produced using multifactor models and conclude that multifactor models perform better than the one factor market model provided that the multifactor model is correctly specified. Given the above literature, Binder (1998, 122) concludes that if the sample consists of firms from unrelated industries, the one factor market model "works at least as well as the alternatives". Given that the sample for this study consists exclusively of banks, we calculate abnormal returns using a multifactor model which apart from controlling for market returns, also controls for changes in interest rates. For the banking industry, a change in interest rates has a direct impact on what banks charge borrowers and what banks pay for funding (Noonan, 2017).

Another alternative to the Beatty et al. (1996) model would be an event study that computes cumulative abnormal returns around each event date and then regresses the abnormal returns for each event date separately on a vector of explanatory variables. This approach assumes that the event dates are independent of each other, and that different firm characteristics drive the abnormal returns observed on different event dates. We used the Beatty et al. (1996) approach because in our setting we have multiple event dates, all related to the enactment of the BAPCPA. In this ambit, the Beatty et al. (1996) methodology allows us to identify the bank characteristic which is on average driving abnormal returns for all the identified event dates.

In the first set of tests we investigate our first research hypothesis concerning the market reaction around news events that led to the passage of the BAPCPA. To do so, we begin with a multifactor model in which firm-specific returns are regressed on market return, on a variable capturing interest rate changes, and on an event indicator variable. The event indicator variable allows for mean shifts in returns on event days. For each company *i*, the following process is assumed to hold:

$$RET_{it} = \beta_1 + \beta_2 MKT\_RET_t + \beta_3 CHG\_TREAS_t + \beta_4 EVENT\_ALL_t + \varepsilon_{it} \quad (1)$$

RET is daily stock price return for firm *i* in day *t*, *MKT_RET* is CRSP equally-weighted daily return, *CHG_TREAS* is the daily change in the Barclays US treasury index, and *EVENT_ALL* is an indicator variable that tags the event days listed in Table 1. We use a three-day event window[9] to test for nonzero excess returns for the events listed in Table 1, i.e., the variable *EVENT_ALL* assumes a value of 1 on the day preceding, the day of, and the day after

[9] The use of three-day event windows is well established in the literature. For example, Bushee and Goodman (2007); Krishnamurthy et al. (2006); Pinnuck (2005) and Ali et al (2004) all use three-day time windows in their research design.

the event dates (where days are defined as CRSP trading days). The sign and statistical significance of β_4 captures the average abnormal returns arising from events related to the passage of the BAPCPA.

Given that any observed market reactions in Equation 1 might be due to confounding events unrelated to the widening of the repo 'safe harbor' provisions, in subsequent analysis we use banks without repo exposure as our control group by interacting *EVENT_ALL* with an indicator variable which takes the value of 1 if the bank had any repo exposure during our sample period, and 0 otherwise. Such an approach allows us to control for any other changes implemented by BAPCPA which affect banks, but which are unrelated to repo exposure.

Even though the above approach allows us to control for confounding events, there is still the possibility that the observed market reactions are driven by other bank characteristics correlated with repo exposure. This concern is particularly pertinent given that as previously discussed the BAPCPA introduced significant changes in both personal and corporate bankruptcy law. To address this concern, we examine cross-sectional determinants of event market reactions. This test is based on the premise that the *REPO* variable is orthogonal to changes brought about by the BAPCPA except for the widening of repo 'safe harbor' provisions. To do so, we use a two-stage regression where in the first stage, we run Equation 1 for each bank in our sample over the sample period and in the second stage we regress the firm-specific coefficient obtained on the dummy *EVENT_ALL*, on a vector of bank characteristics to control for the heterogeneity of our sampled banks. Thus, Equation 2 is:

$$BETA_i = \beta_1 + \beta_2 REPO_i + \beta_3 REV\_REPO_i + \beta_4 MKT\_VAL_i + \beta_5 DERIV_i + \beta_6 LOANS\_REAL_i + \beta_7 LOANS\_DEP_i + \beta_8 LOANS\_AGRIC_i + \beta_9 LOANS\_COMM_i + \beta_{10} LOANS\_IND_i + \beta_{11} LOANS\_FOREIGN_i + \beta_{12} SI_i + \beta_{13} NI_i + \beta_{14} CAPITAL\_RATIO_i + \varepsilon_i \quad (2)$$

This equation is a purely cross-sectional test, where *BETA* is the firm-specific coefficient obtained on the indicator variable *EVENT_ALL* when estimating Equation 1 for each sampled bank and the explanatory variables are the mean values over the sample period. *REPO* is an indicator variable which takes the value of 1 if the bank engages in repo transactions, 0 otherwise; *REV_REPO* is an indicator variable which takes the value of 1 if the bank engages in reverse repo transactions, 0 otherwise;[10] *MKT_VAL* is the logarithm of market capitalization that controls for size; *DERIV* is the amount of derivatives; *LOANS_REAL* is the amount of loans secured by real estate; *LOANS_DEP* is the amount of loans to depository institutions; *LOANS_AGRIC* is the amount of loans to finance agricultural production; *LOANS_COMM* is the amount of commercial and industrial loans; *LOANS_IND* is the amount of loans to individuals; *LOANS_FOREIGN* is the amount of loans to foreign governments; *SI* is securitization income[11]; *NI* is net income[12] and *CAPITAL_RATIO* is the bank's capital ratio[13]. All continuous variables with the exception of *MKT_VAL* and *CAPITAL_RATIO* are scaled by total assets. Further, all variables are computed as the average of the figures for the quarter ending December 31, 2004 and the quarter ending March 31, 2005. In order to control for the effect of outliers, all continuous variables are winsorized at the 1st and 99th percentile.[14]

In addition to Equation 2 we also implement the approach suggested by Sefcik and Thompson (1986). This methodology gives coefficients equal to the two-stage regression but yields valid standard errors since it accounts for heteroskedasticity and residual cross-correlation which arise when events impact all sampled firms at the same time. Specifically, the two-stage regression model assumes homoscedasticity of residuals and the absence of

[10] Another approach is to include net repurchase agreement (calculated as the difference between *REPO* and *REV_REPO)* instead of including *REPO* and *REV_REPO* separately in our model. While such an approach would allow us to measure the association between net repo exposure and market reaction, it would average out the magnitude and direction of the association between both repo measures and the market reaction.
[11] Variable bhckb493 of the FRY-9C statements
[12] Variable bhck4340 of the FRY-9C statements
[13] Variable bhck7205 of the FRY-9C statements
[14] In untabulated results we obtain the same inferences when we run the analyses without winsorizing the data.

contemporaneous correlations across firms. The presence of time dependence in stock returns (Akgiray, 1989) and event-date clustering likely violate such assumptions in our research setting, thus resulting in biased coefficient estimates (Bernard 1987; Froot 1989; Kolari and Pynnonen 2010). To use the Sefcik and Thompson methodology, we create fourteen-weighted portfolio returns, one for each firm characteristic and the intercept, which we subsequently use as the dependent variables in Equation 2. To create the weighted-portfolio of returns we create two matrices: Matrix R is a *n* x *j* matrix, where *n* is the number of trading days in our sample period and *j* the number of firms and Matrix F is a *j* x *k* matrix, where *k* consists of the thirteen different firm characteristics plus the intercept. Finally, the weighted-portfolio of returns is calculated as $(F`F)^{-1}F`R`$.[15]

5.2 Sample and data

We obtain data on bank characteristics from the FR-9YC reports from the Federal Reserve Bank of Chicago and market data from CRSP. In order to estimate Equation 1 we use all trading days available on CRSP from January 1st, 2005 to April 30th, 2005 for all bank holding companies for which we can retrieve data on repo transactions from the FR-9YC reports. Importantly, to apply the Sefcik and Thompson (1986)'s adjustment, we require banks to have data for all trading days in our sample period in CRSP. These data requirements give us a final sample of 36,818 firm-day observations for 449 unique bank holding companies[16].

5.3. Empirical Results

We use Equation 1 to examine market reactions to the major congressional news events in Table 1 leading to the passage of the BAPCPA. Table 2 provides distributional statistics of the variables used in Equation 1which shows a mean *RET* of -0.1% over the sample period.

[15] Further detail on this approach is provided in Sefcik and Thompson (1986)

[16] Prior to data refinement that is based on the Sefcik and Thompson (1986) adjustment we have 459 unique bank holding companies. Thus, the use of the Sefcik and Thompson (1986) adjustment leads to the loss of 10 banks.

The Pearson correlation matrix reported in Table 3 shows that variable *EVENT_ALL* is significantly negatively correlated with *RET*, which suggests that the finance risk factor may have dominated the finance cost factor.

<<Insert Table 2 and Table 3 about here>>

When we run Equation 1 for the 449 banks in our sample, in line with the results in Table 3, we find a statistically significant negative association between *EVENT_ALL* and *RET*. Specifically, column (1) in Table 4 shows that this association is significant at the 5% level. Given the wide scope of the sweeping changes brought about by the BAPCPA it is debatable to what extent such market reactions can be attributed to the provisions relating to repo agreements. To investigate the incremental effect having exposure to the repo market has on market reactions, we interact *EVENT_ALL* with *REPO*. Column (2) in Table 4 shows that the coefficient on the interaction term is negative and significant at the 1% level suggesting that the incremental effect of having repo exposure is highly negative. Furthermore, given that the main effect is insignificantly different from zero, the results suggest that only firms which undertake repos experience a negative market reaction to news increasing the probability that the BAPCPA is enacted, further suggesting that our results are driven by banks having exposure to the repo market.

When interpreting the results in the table, note that the single-event results reflect an average return during the event window. The overall sample's abnormal return can be obtained by multiplying each of these reported figures (i.e., the coefficients on EVENT_ALL) by the number of days in the event window (three days in our study). Column (1) shows that banks experienced an average –0.12 percent cumulative abnormal return during each three-day event window. Moreover, column (2) suggests that banks with repo exposure experienced an average incremental negative abnormal return of -0.42 percent during each three-day event window.

<<Insert Table 4 around here>>

To address the concern that the observed market reactions are driven by aspects of the BAPCPA other than the extension of the repo 'safe harbor' provisions we undertake a cross sectional analysis where we control for firm specific characteristics. Table 5 shows distributional statistics of the variables used in the cross-sectional analysis (Equation 2). 68.6% of our sampled banks have repo exposure (*REPO*) while 11.6% undertake reverse repo transactions (*REV_REPO*). Our sampled banks have mean derivatives scaled by total assets (*DERIV*) of 12.3% and most of the loans are either loans secured by real estate (*LOANS_REAL*) or commercial and industrial loans (*LOANS_COMM*). Our proxy for securitization, *SI* is very small suggesting that most of our sampled banks do not undertake securitizations, while the mean *CAPITAL_RATIO* of our sampled banks is 13.9%.

<<Insert Table 5 around here>>

The correlation matrix reported in Table 6 suggests that *REPO* is positively correlated with *REV_REPO* suggesting that firms undertaking repo transactions tend to also undertake reverse repo transactions. Moreover, both *MKT_VAL* and *DERIV* are positively correlated with *REPO* suggesting that larger firms and firms with derivative exposure undertake repo transactions. Interestingly, Table 6 shows a strong negative correlation between *REPO* and *CAPITAL_RATIO* suggesting that banks with repo exposure are weaker than their peers.

<<Insert Table 6 around here>>

Results for the two-stage regression reported in panel A of Table 7 show a statistically significant negative association between *REPO* and the market reaction coefficient, *BETA*. This result buttresses our prior results and suggests that firms with repo exposure had a more negative market reaction than firms without repo exposure. Interestingly, we find a statistically

significant positive association between *REV_REPO* and *BETA* suggesting a positive market reaction for firms undertaking reverse repo transactions. This is possibly the result of the BAPCPA confirmation of the repo 'safe harbor' provisions, which enable providers of finance to the repo market exemptions from the normal bankruptcy procedures.

These inferences are confirmed when we control for heteroscedasticity and residual cross-correlation by adjusting returns using the Sefcik-Thompson methodology. As shown in panel B of Table 7, the negative association between *REPO* and *Adj_RET* is statistically significant, further confirming that repo exposure is driving the observed negative returns around our event dates. Considering that the average value of *BETA* in our sample is -0.0004, the coefficient in Table 7 on the variable *REPO* shows that banks with repo exposure experienced a market reaction that is twice as negative as the market reaction of banks without repo exposure, *ceteris paribus*. This result is consistent with estimates reported in Table 4.

<<Insert Table 7 around here>>

5.4 Robustness tests

As previously discussed, the presence of time dependence in stock returns (Akgiray, 1989) and the event-date clustering that occurs in our research setting likely result in the violation of the assumptions of homoscedasticity of residuals and the absence of contemporaneous correlations across firms on which the two-stage regression approach builds. Therefore, it is crucial for our study to correct for such biases. In the main analysis we used the Sefcik-Thompson methodology to correct for heteroscedasticity and residual cross-correlation, while in this section we explore alternative approaches to solve this issue and make sure that our results are not driven by specific research design choices. Specifically, to test for the sensitivity of our results to alternative approaches to correct for heteroscedasticity and cross-

correlation we undertake the following three additional tests: 1) the Patell (1976) test, 2) the Boehmer et al. (1991) test, and 3) the Kolari and Pynnonen (2010) test.

Patell (1976) proposes a test statistic where the event period abnormal returns are standardized by the standard deviation of the estimation period abnormal return. This test is immune to the way in which abnormal returns are distributed across event windows but it is prone to cross-sectional correlation and event induced volatility. The Boehmer et al. (1991) test, apart from being immune to the way in which abnormal returns are distributed across event windows also adjusts for serial correlation and event induced volatility. Indeed, the Boehmer et al. (1991) test has gained popularity over the Patell (1976) statistic because it has been found to be more robust with respect to possible volatility changes associated with the event. Nonetheless, a weakness of this test is that it doesn't control for cross-sectional correlation. Finally, the Kolari and Pynnonen (2010) test is not only immune to the way in which abnormal returns are distributed over event windows, but it also adjusts for cross-sectional correlation. Specifically, Kolari and Pynnonen (2010) propose a new test statistic that modifies the Boehmer et al. (1991) t-statistic to take into account cross-correlation. Moreover, the Kolari and Pynnonen (2010) statistic is readily useable to test multiple-day cumulative abnormal returns.

As evident from Table 8, our results are statistically significant on the event date irrespective of which test is used, suggesting that the documented negative reaction around the even date is not driven by bias arising from event date clustering and that it is robust to different methodologies used to correct for heteroscedasticity and cross-correlation.

<<Insert Table 8 around here>>

6. Information Asymmetry

6.1 Variable measurement and research design

In our second set of tests we analyze whether the 'safe harbor' provisions brought about by the BAPCPA caused an increase in market information asymmetry. To do so, we employ a difference-in-differences approach where the treatment group consists of banks involved in repo transactions while the control group consists of banks that did not engage in repo transactions at any point during the sample period. To increase the likelihood that the treatment is orthogonal with respect to the outcome variable, we identify as treated banks those banks that at the end of 2004 (i.e. before the adoption of the BAPCPA) used repo transactions and that continue to use repos throughout our sample period. Thus, our analysis compares changes in information asymmetry before and after the BAPCPA adoption for banks exposed to repo transactions vis-à-vis banks that did not engage in repo transactions. Specifically, we employ the following multivariate regression model:

$$SPR_{iq+1} = \beta_1 + \beta_2 POST_{iq} + \beta_3 TREATED_{iq} + \beta_4 POST_{iq} * TREATED_{iq} + \beta_5 REV\_REPO_{iq} + \beta_6 MKT\_VAL_{iq} + \beta_7 DERIV_{iq} + \beta_8 LOANS\_REAL_i + \beta_9 LOANS\_DEP_i + \beta_{10} LOANS\_AGRIC_i + \beta_{11} LOANS\_COMM_i + \beta_{12} LOANS\_IND_i + \beta_{13} LOANS\_FOREIGN_i + \beta_{14} SI_{iq} + \beta_{15} NI_{iq} + \beta_{16} CAPITAL\_RATIO_{iq} + \varepsilon_{iq} \quad (3)$$

where *SPR* is the average bid-ask spread standardized by the average stock price. This measure is meant to proxy general equity market information asymmetry. *SPR* is computed quarterly and the estimation window runs from the quarter announcement date to the following quarter reporting date. *POST* is an indicator variable that takes the value of 1 for observations after the BAPCPA was enacted and 0 otherwise, while *TREATED* is an indicator variable that takes the value of 1 if the bank engaged in repo transactions before and after the BAPCPA was enacted

(treatment group) and 0 otherwise (the control group).[17] Thus, the interaction term between *TREATED* and *POST* provides a formal test for our second research hypothesis and tests whether information asymmetry among investors increased for banks exposed to repo transactions when compared to banks that do not undertake repo agreements.

6.2 Sample and Data

For our second set of analyses, we retrieve firm-quarter data from the FR-9YC reports for all bank holding companies with no missing data on repos for each quarter from 2004 to 2006. Since the BAPCPA was signed into law on April 20, 2005 but most of its provisions took effect on October 17, 2005, bank behavior in the second and third quarter of 2005 could be influenced by both the bankruptcy regulations effective at the time and the bankruptcy provisions applicable ones the BAPCPA is effective. Given that these two quarters are likely to be noisy, to attain a cleaner identification strategy to enable us to better compare bank behavior post-BAPCPA to bank behavior pre-BAPCPA, we drop from this analysis these quarters. Thus, we define the pre-period as consisting of the five quarters starting in first quarter of 2004 and ending in the first quarter of 2005 and the post period as consisting of the five quarters starting in the fourth quarter of 2005 and ending in the fourth quarter of 2005.[18] Next, we merge data with CRSP and compute average bid-ask spread for each quarter. The final sample for this analysis consists of 3,137 firm-quarter observations for 374 unique banks. 1,217 firm-quarter observations are treated observations (i.e. banks with repo transactions at the end of 2004, and thereafter) and 1,920 are control observations (i.e. banks with no repo transactions throughout the sample period).

[17] We recognize that due to limited data availability we are unable to control for the type of repo agreements the company engages into. As previously discussed it is only after ASU 2014-11 became effective in 2015, that companies were required to disclose detailed information about the type of repo agreements they engage in.

[18] Given that the choice of the beginning and end of sample period is 'ad-hoc' in robustness tests we test for the sensitivity of our results to this research design choice.

6.3 Empirical Results

Table 9 shows distributional statistics for the variables used in Equation 3 (both for treated and control observations, in Panels A and B respectively) while Table 10 presents the Pearson correlation matrix for the variables of interest. As evident from Table 9, treated banks (i.e. banks undertaking repo transactions) are larger (mean *MKT_VAL* of 14.052 *vs* 12.196) and more profitable (mean *NI* of 0.007 *vs* 0.006) than banks which do not undertake repo agreements. In terms of capital ratios, the two groups of banks are quite similar (mean *CAPITAL_RATIO* of 13.108 vs 13.895). The correlation matrix shown in Table 10 suggests that larger banks and banks with better performance have lower information asymmetry as evident by the negative correlation of *MKT_VAL* and *NI* with *SPR.*

<<Insert tables 9 and 10 around here>>

Table 11 formally tests the existence of a parallel trend between treated and control banks in the pre-adoption period, which is one of the underlying assumptions of the difference-in-differences model. To do so, we estimate model (3) by including interaction terms between the variable *TREATED* and dummy variables for each of the five pre-adoption periods (although not tabulated, interaction terms are also included for the post-period dummies). The existence of a parallel trend in the pre-adoption period requires that none of the interaction terms is statistically significant (we exclude the first interaction term and use it as benchmark group). Results reported in Table 11 support the existence of a parallel trend in the pre-adoption period as none of the interaction terms is statistically significant at conventional levels.

Having ascertained the existence of a parallel trend, Table 12 shows the results for Equation 3 where a differences-in-differences approach is used to analyze the effect of the BAPCPA on market information asymmetry. The coefficient of interest in Table 12 is the coefficient for *POST*TREATED*, which is statistically significantly positively associated with

SPR, suggesting that following the passage of the BAPCPA firms exposed to repo agreements experienced an increase in bid-ask spreads when compared to the control group. The coefficient reported for *POST*TREATED* in Table 12 shows that the increase in *SPR* after the passage of the BAPCPA is on average the 77 percent higher for banks exposed to repo agreements than for banks not exposed to repos.[19]

<<Insert Table 12 around here>>

6.3 Robustness tests

In this section, we test whether our results are robust to changes in the empirical analysis. First, we investigate whether the documented increase in information asymmetry after the passage of the BAPCPA is sensitive to the number of quarters in the pre- and post-period used in the analysis. In Table 13, columns 1 and 2 we estimate Equation 3 using only four and three quarters in the pre- and post-period, respectively, and we document that our results are not sensitive to the choice of time window used in the analysis. In Table 13 column 3, we show the results when we adjust Equation 3 so that we control for bank size using the natural logarithm of total assets instead of market value, *MKT_VAL*. These, results are similar to those previously reported. Next, in column 4 we change the estimation model and we use a generalized linear model (GLM) in place of an OLS model to estimate Equation 3 to gain asymptotic efficiency and obtain similar results to those reported in the main analysis. Finally, in the last column of Table 13 we winsorize all variables at 5% instead of 1%, to make sure that outliers are not driving our results. As evident in Table 13, the interaction terms between *POST* and *TREATED* remains positive and statistically significant, thus corroborating the main findings.

<<Insert Table 13 around here>>

[19] The economic significance is calculated as the coefficient on the interaction term (0.0019) divided by the mean *SPR* for the sample (0.00248).

6.4 Further analyses

As discussed previously a major change brought about by the passage of the BAPCPA was to extend repo 'safe harbor' provisions to repo agreements collateralized by mortgage-backed securities. As banks with large holdings of mortgage backed securities are most likely to take advantage of the changes introduced by BAPCPA, as they can use such holdings as collateral in repo agreements, we expect companies with repo agreements *and* higher mortgage backed securities to experience higher information asymmetry following BAPCPA.

To test our prediction, we construct a variable *HIGH_MBS* which is a binary variable that takes the value of 1 for banks with amortized cost of mortgage backed securities scaled by total assets[20] above median and 0 otherwise. We interact this variable with the dummy variable indicating the period post the passage of BAPCPA (*POST*) and a dummy variable identifying treated banks (*TREATED*). As shown in Table 14, the two-way interaction between POST and TREATED remains positive and statistically significant and the three-way interaction (POST*TREATED*HIGH_MBS) is statistically significantly positively associated with *SPR* indicating that the higher the mortgage backed security holdings, the higher is the increase in information asymmetry among investors for banks with repo exposure after the passage of BAPCPA.

<<Insert Table 14 around here>>

Finally, we test whether empirical evidence supports our story that the widening of the repo 'safe harbor' provisions brought about by the BAPCPA incentivized banks to substitute long term stable financing with short term repo financing. Specifically, in this analysis we use

[20] This is a rough proxy of total holdings of mortgaged backed securities since this variable is only based on recognised mortgage backed securities. Banks might have other such securities held as collateral on repo and similar arrangements with counterparties and which are not recognised in the financial statements. Unless otherwise specified, these might be rehypothecated in other repo agreements. Information about such collateral is not publicly available.

deposits as our proxy for long term stable financing and test whether the relative amount of short term repo financing when compared to deposits increased post BAPCPA. For this analysis, we only keep those observations for banks that increased repurchase agreements post-BAPCPA.

The results for this analysis are shown in Table 15 and the variable of interest is *POST*. The sign and statistical significance of the coefficient on *POST* indicates whether the dependent variable has increased post BAPCPA. In model (1) of Table 15 we test whether the banks which increased the amount of repo agreements post BAPCPA also increased their deposits, where the variable *DEPOSITS* is calculated as total deposits scaled by total assets. In model (2) we test whether the relative amount of deposits to the sum of repo agreements and deposits has changed post-BAPCPA. To undertake the latter analysis, we construct a new variable *DEPOSITS_REPO* which is calculated as total deposits scaled by the sum of repo agreements and total deposits. *Ex-ante* we expect a statistically significant negative coefficient on *POST* for model (2) suggesting that the relative amount of deposits to repo agreements has decreased post-BAPCPA. Such a result would buttress our story that post-BAPCPA there was a shift from stable long-term financing to short term repo financing. All controls used in this analysis are as previously defined.

<<Insert Table 15 around here>>

As shown in Table 15 model (1), *POST* is positive and statistically significant suggesting that banks that increased repo agreements post-BAPCPA, also increased their deposits. More importantly in model (2), *POST* is negative and statistically significant at the 1% level of significance suggesting that the relative amount of deposits to the sum of deposits and repo agreements has decreased post-BAPCPA. Specifically, this result indicates that the rate of increase in repo financing was higher than the rate of increase in deposit financing post-

BAPCPA. This result vindicates our story that there was a shift from long term deposit financing to short term repo financing.

7. Conclusion

The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005 brought about significant changes to the US Bankruptcy Code. While some of these changes related to personal bankruptcy law, changes were also made to business bankruptcy law. Particularly, the BAPCPA extended the so-called 'safe harbor' provisions, which exempt repo agreements from the normal workings of the Bankruptcy Code to repo agreements collateralized by riskier collateral. In this regard, while prior to the BAPCPA repo agreements availing of the 'safe harbor' provisions had to be collateralized by US government backed securities, following the BAPCPA repo agreements collateralized by riskier collateral such as mortgage backed securities were eligible for 'safe harbor' provisions.

While extending the preferential treatment afforded to repo agreements facilitates funding arrangements through this market, thus potentially reducing finance costs (finance cost factor), it potentially results in a substitution effect where stable long-term financing is substituted with runnable short-term financing (finance risk factor). While both factors were evident following the passage of the BAPCPA which factor dominates is an empirical question.

To address this research question, we identify major congressional events related to the passage of the BACPCPA and calculate abnormal market reactions in the three-day event windows around these events. Results indicate that the perceived finance risk arising from this change offsets the effect of any reduction in finance costs. Moreover, subsequent cross-sectional analysis indicates that such market reaction is at least partly driven by repo exposure.

Further, the undertaking of riskier repurchase transactions likely resulted in increased information asymmetry post-BAPCPA. Using a difference-in-differences approach, and measuring information asymmetry using the bid-ask spread, we find that firms which were exposed to repo agreements experienced increased information asymmetry following BAPCPA. Although the use of a difference-in-differences approach helps in mitigating endogeneity concerns, we acknowledge that our analysis lacks an ideal control group that would be made of US banks that are outside the scope of the BAPCPA.

Finally, further linking our results to the BAPCPA, we find that information asymmetry among market participants increased for firms with repo agreements *and* above average mortgage backed securities post BAPCPA. This result is particularly interesting since repo agreements collateralized with mortgage backed securities were the major type of repo agreements for which 'safe harbor' provisions were extended.

The unintended consequence of BAPCPA documented in this study is primarily driven by asynchronous changes in the bank regulatory framework. Specifically, in this case, it is the result of changes in bankruptcy legislation which are not accompanied by changes in accounting regulations requiring enhanced disclosures. This finding has significant policy implications since it suggests that policy makers need to account for how different regulations interact with each other, when proposing regulatory changes.

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Figure 1

Primary Dealers' Outstanding Repos July 6, 1994 to July 22, 2009

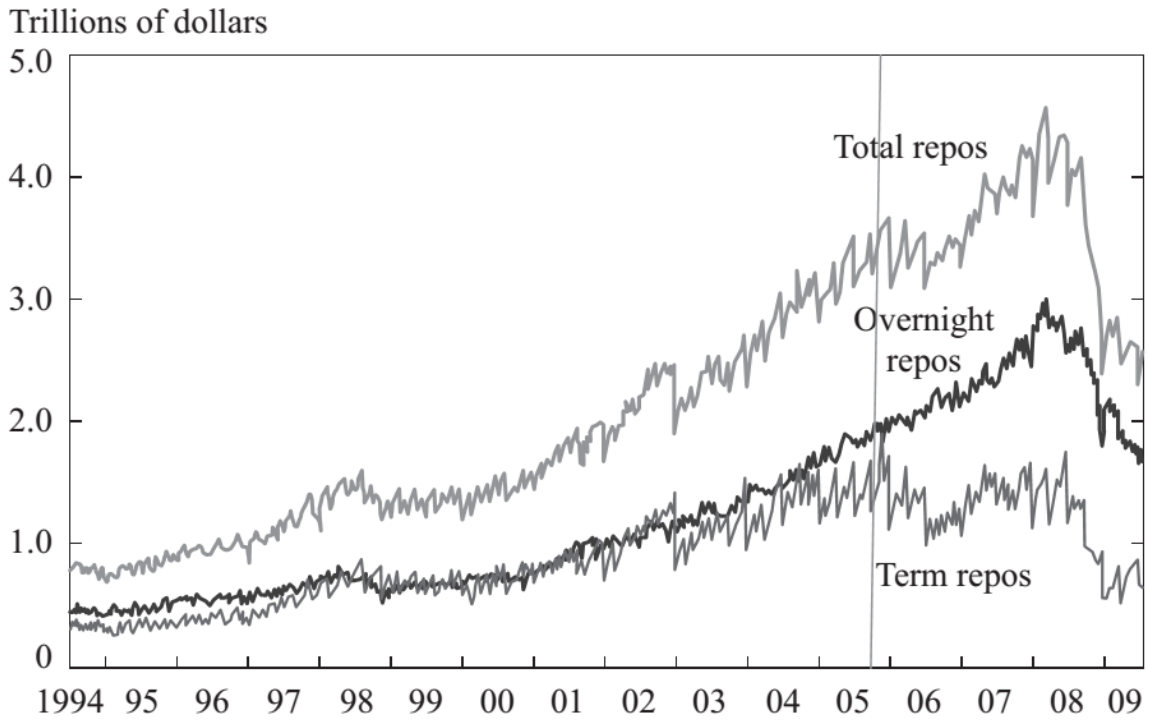

Figure 1: This figure shows the increase in repo agreements from July 6, 1994 to July 22, 2009. This figure is sourced from Adrian et al. (2009), Chart 1 in original, and a vertical line was added to show October 2005, the date the provisions of the BAPCPA became effective.

Figure 2

Overnight Repos as a Percentage of Total Primary Dealer Repo Financing January 5, 2005 to July 22, 2009

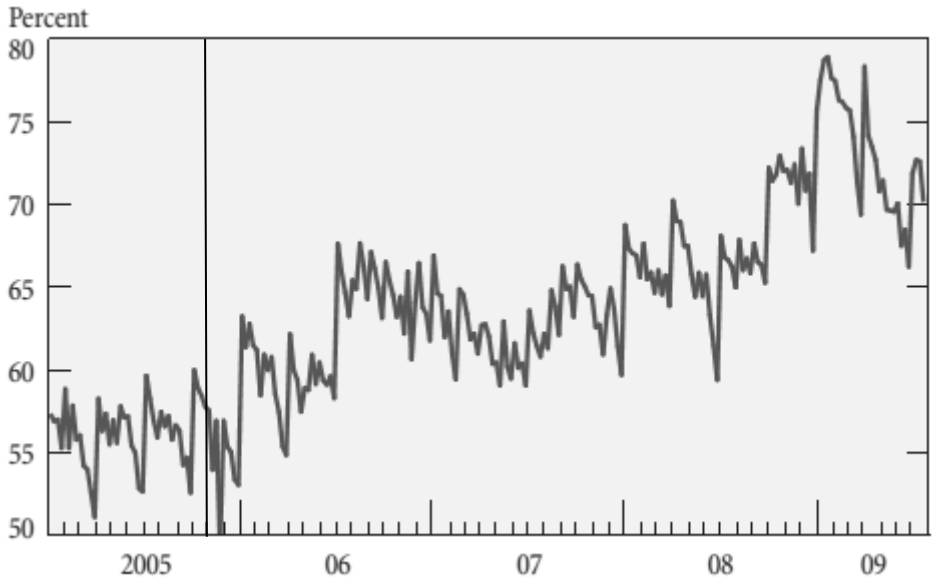

Figure 2: This figure shows the percentage of primary dealer overnight repo agreements as a percentage of total primary dealer repo agreements for the period January 5, 2005 to July 22, 2009. This figure is sourced from Adrian et al. (2009), Chart 2 in original, and a vertical line was added to show October 2005, the date the provisions of the BAPCPA became effective.

Figure 3

Prevalance of Less Liquid Collateral in Primary Dealers' Repo Transactions January 5, 2005 – July 22, 2009

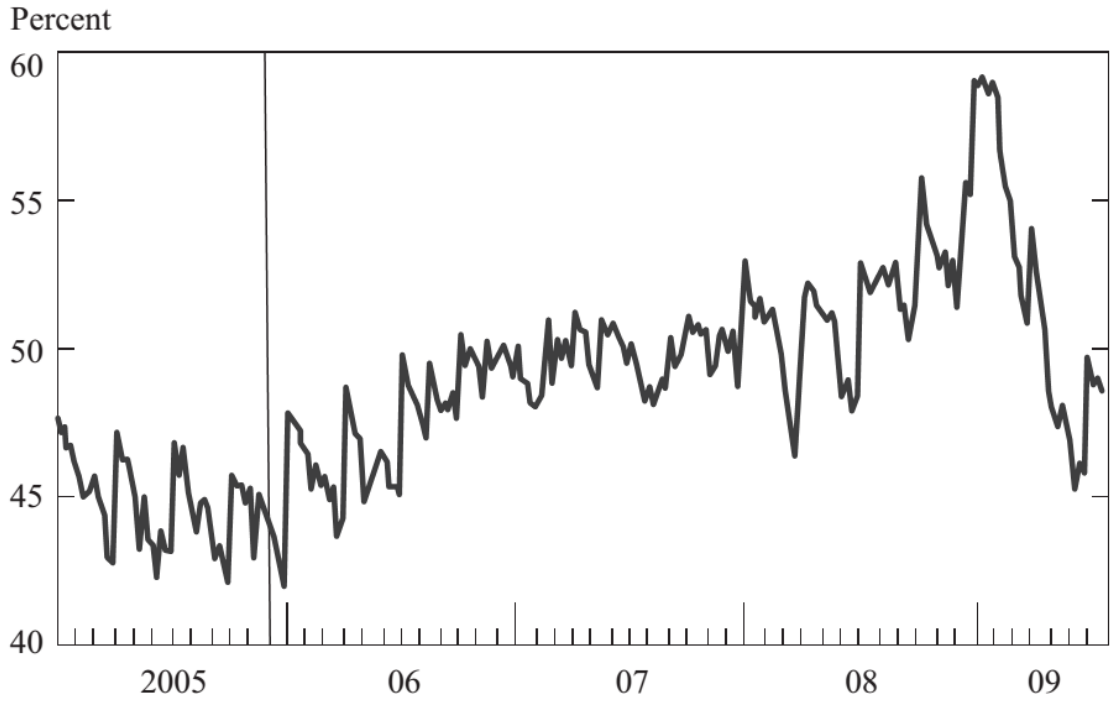

Figure 3: This figure shows the prevalence of less liquid collateral (e.g. corporate securities and mortgage backed securities) for the period January 5, 2005 to July 22, 2009. This figure is sourced from Adrian et al. (2009), Chart 3 in original, and a vertical line was added to show October 2005, the date the provisions of the BAPCPA became effective.

Table 1

News events leading to the passage of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005

Date	Details of event
February 1, 2005	Republican Senator Charles Grassley of Iowa (for himself together with seven original cosponsors) introduced S.256, the 'Bankruptcy Abuse Prevention and Consumer Protection Act of 2005' in the Senate.
February 9, 2005	F. James Sensebrenner Jr., Chairman of the House Committee on the Judiciary (for himself together with 60 original cosponsors) introduced legislation identical to S.256 in the House of Representatives (H.R. 685).
March 10, 2005	Passed/ agreed to in Senate with 74 votes in favour and 25 against. Record Vote No.: 44
April 14, 2005	The House of Representatives passed the bill (S.256) with 302 votes in favour and 126 against (Roll No. 108). The Bill was subsequently cleared for White House.
April 20, 2005	Bill signed by President and became Public Law No: 109-008

Table 1: A list of major congressional events leading to the passage of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005. Events sourced from https://www.govtrack.us/congress/bills/109/s256.

Table 2

Distributional statistics for the variables used in Equation 1

Variable	N	p25	mean	p50	p75	sd
RET	36818	-0.010	-0.001	0.000	0.007	0.016
MKT_RET	36818	-0.006	-0.001	-0.001	0.003	0.007
CHG_TREAS	36818	0.000	0.000	0.000	0.000	0.000

Table 2: Distributional statistics for the variables used in Eq. 1. *RET* is the daily stock price return; *MKT_RET* is the CRSP equally-weighted daily return; *CHG_TREAS* is the daily change in the Barclays US treasury index and *EVENT_ALL* is an indicator variable that assumes a value of 1 on the day preceding, the day of, and the day after the event dates listed in Table 1 (where days are defined as CRSP trading days). The sample period runs from January 1, 2005 to April 30, 2005.

Table 3

Pearson correlation for variables used in Equation 1

Variable	RET	MKT_RET	CHG_TRES	EVENT_ALL
RET	1.000			
MKT_RET	0.293***	1.000		
CHG_TREAS	0.022***	0.099***	1.000	
EVENT_ALL	-0.016**	-0.021***	0.056***	1.000

Table 3: Pearson correlation matrix for the variables used in Eq. 1. *RET* is the daily stock price return; *MKT_RET* is the CRSP equally-weighted daily return; *CHG_TREAS* is the daily change in the Barclays US treasury index and *EVENT_ALL* is an indicator variable that assumes a value of 1 on the day preceding, the day of, and the day after the event dates listed in Table 1 (where days are defined as CRSP trading days). The sample period runs from January 1, 2005 to April 30, 2005. *, ** and *** denote significance at the 5%, 1% and 0.1% level of significance respectively.

Table 4

Multivariate regression analyzing market reactions to news events leading to the passage of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005.

	RET	
Variable	**(1)**	**(2)**
MKT_RET	0.7079***	0.7079***
	[22.373]	[22.373]
CHG_TREAS	-0.2664	-0.2664
	[-1.414]	[-1.414]
EVENT_ALL	-0.0004**	0.0005
	[-2.375]	[1.597]
EVENT _ALL* REPO		-0.0014***
		[-3.525]
REPO		-0.0000
		[-0.318]
Constant	-0.0001*	-0.0001
	[-1.680]	[-0.669]
(EVENT_ALL + EVENT_ALL *REPO) = 0		F-test: 18.81 p-value < 0.01
Observations	36,818	36,818
No. of Banks	449	449
R-squared	0.086	0.086

Table 4: Regression (1) shows the results when running Equation 1 while regression (2) shows the results when Equation 1 is adjusted so as to include an interaction term between *EVENT_ALL* and *REPO*. *RET* is daily stock price return for firm *i*, *MKT_RET* is CRSP equally-weighted daily return, *CHG_TREAS* is the daily change in the Barclays US treasury index, and *EVENT_ALL* is an indicator variable that assumes a value of 1 on the day preceding, the day of, and the day after the event dates listed in Table 1 (where days are defined as CRSP trading days). *REPO* is an indicator variable that takes the value of 1 if the bank entered in repo agreements during the sample period, 0 otherwise. The sample period runs from January 1, 2005 to April 30, 2005. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.

Table 5

Distributional statistics of the variables used in the cross-sectional analysis

Variable	N	p25	mean	p50	p75	sd
REPO	449	0.000	0.686	1.000	1.000	0.465
REV_REPO	449	0.000	0.116	0.000	0.000	0.320
MKT_VAL	449	11.379	12.622	12.212	13.446	1.684
DERIV	449	0.000	0.123	0.000	0.028	0.575
LOANS_REAL	449	0.409	0.496	0.507	0.600	0.149
LOANS_DEP	449	0.000	0.000	0.000	0.000	0.001
LOANS_AGRIC	449	0.000	0.005	0.000	0.004	0.011
LOANS_COMM	449	0.056	0.101	0.089	0.135	0.064
LOANS_IND	449	0.010	0.042	0.026	0.059	0.045
LOANS_FOREIGN	449	0.000	0.000	0.000	0.000	0.000
SI	449	0.000	0.000	0.000	0.000	0.000
NI	449	0.002	0.003	0.003	0.003	0.001
CAPITAL_RATIO	449	11.780	13.895	12.980	14.810	3.313

Table 5: Distributional statistics for the variables used in the cross-sectional analysis. *REPO* is an indicator variable that takes the value of 1 if the bank entered in repo agreements during the sample period, 0 otherwise. *REV_REPO* is an indicator variable that takes the value of 1 if the bank entered in reverse repo agreements during the sample period, 0 otherwise. *MKT_VAL* is the logarithm of market capitalization; *DERIV* is the amount of derivatives; *LOANS_REAL* is the amount of loans secured by real estate; *LOANS_DEP* is the amount of loans to depository institutions; *LOANS_AGRIC* is the amount of loans to finance agricultural production*; LOANS_COMM* is the amount of commercial and industrial loans; *LOANS_IND* is the amount of loans to individuals; *LOANS_FOREIGN* is the amount of loans to foreign governments; SI is securitization income; NI is net income; *CAPITAL_RATIO* is the bank's capital ratio. All continuous variables with the exception of *MKT_VAL* and *CAPITAL_RATIO* are standardized by total assets and winsorized at the 1st and 99th percentile. All continuous variables are calculated as the mean values for the quarters ending December 31, 2014 and March 31, 2015.

Table 6

Pearson correlation matrix of the variables used in the cross-sectional analysis

Variable	REPO	REV_REPO	MKT_VAL	DERIV	LOANS_ REAL	LOANS_ DEP	LOANS_ AGRIC	LOANS_ COMM	LOANS_ IND	LOANS_ FOREIGN	SI	NI
REPO	1.000											
REV_REPO	0.140**	1.000										
MKT_VAL	0.273***	0.529***	1.000									
DERIV	0.113*	0.464***	0.503***	1.000								
LOANS_REAL	-0.168***	-0.274***	-0.422***	-0.300***	1.000							
LOANS_DEP	0.058	0.226***	0.248***	0.283***	-0.045	1.000						
LOANS_AGRIC	-0.042	-0.085	-0.088	-0.072	-0.081	-0.027	1.000					
LOANS_COMM	0.048	0.039	0.079	-0.061	-0.148**	0.090	0.144**	1.000				
LOANS_IND	0.128**	0.03	0.211***	0.071	-0.301***	0.005	0.03	0.019	1			
LOANS_FOREIGN	0.07	0.267***	0.295***	0.437***	-0.148**	0.218***	-0.061	0	0.082	1		
SI	0.01	0.255***	0.341***	0.482***	-0.209***	0.100*	-0.053	-0.065	0.189***	0.269***	1	
NI	0.033	0.158***	0.433***	0.113*	-0.112*	0.069	0.000	0.085	0.082	-0.022	0.099*	1
CAPITAL_RATIO	-0.142**	-0.016	-0.110*	-0.054	-0.344***	-0.057	-0.067	-0.287***	-0.035	-0.054	0.056	-0.034

Table 6: Pearson correlation matrix for the variables used in model (2). *REPO* is an indicator variable that takes the value of 1 if the bank entered in repo agreements during the sample period, 0 otherwise. *REV_REPO* is an indicator variable that takes the value of 1 if the bank entered in reverse repo agreements during the sample period, 0 otherwise. *MKT_VAL* is the logarithm of market capitalization; *DERIV* is the amount of derivatives; *LOANS_REAL* is the amount of loans secured by real estate; *LOANS_DEP* is the amount of loans to depository institutions; *LOANS_AGRIC* is the amount of loans to finance agricultural production*; LOANS_COMM* is the amount of commercial and industrial loans; *LOANS_IND* is the amount of loans to individuals; *LOANS_FOREIGN* is the amount of loans to foreign governments; SI is securitization income; NI is net income; *CAPITAL_RATIO* is the bank's capital ratio. All continuous variables with the exception of *MKT_VAL* and *CAPITAL_RATIO* are standardized by total assets and winsorized at the 1st and 99th percentile. All continuous variables are calculated as the mean values for the quarters ending December 31, 2014 and March 31, 2015.*, ** and *** denote significance at the 5%, 1% and 0.1% level of significance respectively.

Table 7

Cross-sectional analyses

Panel A: 2- Stage Regression

Variable	BETA
REPO	-0.0008**
	[-2.173]
REV_REPO	0.0013*
	[1.960]
MKT_VAL	-0.0007***
	[-4.768]
DERIV	0.0008**
	[2.074]
LOANS_REAL	0.0005
	[0.326]
LOANS_DEP	-0.0053
	[-0.036]
LOANS_AGRIC	-0.0116
	[-0.763]
LOANS_COMM	0.0032
	[1.114]
LOANS_IND	0.0003
	[0.063]
LOANS_FOREIGN	-0.7987
	[-0.467]
SI	-3.0764
	[-1.630]
NI	0.2114
	[1.377]
CAPITAL_RATIO	-0.0000
	[-0.219]
Constant	0.0084***
	[3.042]
Observations	449
R-squared	0.104

Panel B: Sefcik and Thompson Adjustment

Variable	Adj_RET
REPO	-0.0008*
	[-1.776]
REV_REPO	0.0013
	[1.565]
MKT_VAL	-0.0007
	[-1.580]
DERIV	0.0008*
	[1.683]
LOANS_REAL	0.0005
	[0.265]
LOANS_DEP	-0.0053
	[-0.028]
LOANS_AGRIC	-0.0116
	[-0.615]
LOANS_COMM	0.0032
	[1.005]
LOANS_IND	0.0003
	[0.052]
LOANS_FOREIGN	-0.7987
	[-0.553]
SI	-3.0764
	[-1.542]
NI	0.2114
	[1.245]
CAPITAL_RATIO	-0.0000
	[-0.182]
Constant	0.0084
	[1.429]
Observations	82

Table 7: Results for the cross-sectional analyses. Panel A, shows the results of the two-stage regression, while Panel B shows the results of the Sefcik and Thompson (1986) which controls for heteroscedasticity and residual cross-correlation. In Panel A we have one observation for each bank (449 banks), while due to the methodological requirements of the Sefcik and Thompson (1986) adjustment in Panel B we have one observation for each trading day in our sample period (82 days). *REPO* is an indicator variable that takes the value of 1 if the bank entered in repo agreements during the sample period, 0 otherwise. *REV_REPO* is an indicator variable that takes the value of 1 if the bank entered in reverse repo agreements during the sample period, 0 otherwise. *MKT_VAL* is the logarithm of market capitalization; *DERIV* is the amount of derivatives; *LOANS_REAL* is the amount of loans secured by real estate; *LOANS_DEP* is the amount of loans to depository institutions; *LOANS_AGRIC* is the amount of loans to finance agricultural production; *LOANS_COMM* is the amount of commercial and industrial loans; *LOANS_IND* is the amount of loans

to individuals; *LOANS_FOREIGN* is the amount of loans to foreign governments; SI is securitization income; NI is net income; *CAPITAL_RATIO* is the bank's capital ratio. All continuous variables with the exception of *MKT_VAL* and *CAPITAL_RATIO* are standardized by total assets and winsorized at the 1st and 99th percentile. All continuous variables are calculated as the mean values for the quarters ending December 31, 2014 and March 31, 2015. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.

Table 8

Additional tests to address the inferential problems arising from event date clustering

Day	RET	Patell (1976)	Boehmer, Musumeci & Poulsen (1991)	Kolari & Pynnönen (2010)
-1	-0.0012	***	**	
0	-0.0111	*****	*****	******
+1	0.0012			

Table 8: Results for the robustness tests on the event study. *RET* is the daily average return for sample banks on the day prior to the event (-1), the day of the event (0), and the day after the event (+1). *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively.

Table 9

Distributional statistics of variables used in Equation 3

Panel A: Treated group

Variable	N	p25	mean	p50	p75	sd
SPR	1217	0.001	0.002	0.002	0.003	0.003
MKT_VAL	1217	12.892	14.052	13.787	14.913	1.606
DERIV	1217	0.000	0.288	0.018	0.112	0.850
LOANS_REAL	1217	0.366	0.441	0.458	0.532	0.143
LOANS_DEP	1217	0.000	0.001	0.000	0.000	0.002
LOANS_AGRIC	1217	0.000	0.005	0.001	0.006	0.010
LOANS_COMM	1217	0.067	0.116	0.105	0.153	0.070
LOANS_IND	1217	0.015	0.051	0.038	0.079	0.044
LOANS_FOREIGN	1217	0.000	0.000	0.000	0.000	0.000
SI	1217	0.000	0.000	0.000	0.000	0.000
NI	1217	0.003	0.007	0.006	0.010	0.004
CAPITAL_RATIO	1217	11.610	13.108	12.510	13.980	2.323
REV_REPO	1217	0.000	0.005	0.000	0.000	0.019

Panel B: Control group

Variable	N	p25	mean	p50	p75	sd
SPR	1920	0.003	0.010	0.007	0.015	0.009
MKT_VAL	1920	11.426	12.196	11.934	12.718	1.140
DERIV	1920	0.000	0.066	0.000	0.013	0.412
LOANS_REAL	1920	0.426	0.528	0.533	0.631	0.142
LOANS_DEP	1920	0.000	0.000	0.000	0.000	0.002
LOANS_AGRIC	1920	0.000	0.006	0.000	0.005	0.013
LOANS_COMM	1920	0.056	0.098	0.086	0.127	0.060
LOANS_IND	1920	0.011	0.037	0.024	0.048	0.039
LOANS_FOREIGN	1920	0.000	0.000	0.000	0.000	0.000
SI	1920	0.000	0.000	0.000	0.000	0.000
NI	1920	0.003	0.006	0.005	0.008	0.004
CAPITAL_RATIO	1920	11.680	13.895	12.915	14.860	3.596
REV_REPO	1920	0.000	0.002	0.000	0.000	0.011

Table 9: Distributional statistics for the variables used in Equation 3 for treated (Panel A) and control (Panel B) groups. *SPR* is the average bid-ask spread standardized by the average stock price; *MKT_VAL* is the logarithm of market capitalization; *DERIV* is the amount of derivatives ; *LOANS_REAL* is the amount of loans secured by real estate; *LOANS_DEP* is the amount of loans to depository institutions; *LOANS_AGRIC* is the amount of loans to finance agricultural production*; LOANS_COMM* is the amount of commercial and industrial loans; *LOANS_IND* is the amount of loans to individuals; *LOANS_FOREIGN* is the amount of loans to foreign governments; SI is securitization income; *NI* is net income; *CAPITAL_RATIO* is the bank's capital ratio; *REV_REPO* is the amount of reverse repo agreements. All continuous variables with the exception of *MKT_VAL* and *CAPITAL_RATIO* are scaled by total assets. Variables are winsorized at the 1st and 99th percentile. All variables are calculated quarterly for the five quarters 2004Q1 to 2005Q1 representing the period pre BAPCPA and the five quarters 2005Q4 to 2006Q4 representing the period post BAPCPA.

Table 10

Pearson correlation matrix of the variables used in Equation 3

Variable	SPR	MKT_VAL	DERIV	LOANS_ REAL	LOANS_ DEP	LOANS_ AGRIC	LOANS_ COMM	LOANS_ IND	SI	NI	CAPITAL_ RATIO	REV_ REPO
SPR	1											
MKT_VAL	-0.667***	1										
DERIV	-0.177***	0.509***	1									
LOANS_REAL	0.177***	-0.426***	-0.295***	1								
LOANS_DEP	-0.132***	0.226***	0.230***	-0.142***	1							
LOANS_AGRIC	0.072***	-0.128***	-0.083***	-0.080***	-0.040*	1						
LOANS_COMM	-0.078***	0.083***	-0.067***	-0.193***	0.108***	0.118***	1					
LOANS_IND	-0.078***	0.164***	0.028	-0.231***	0.017	0.034	0.004	1				
LOANS_FOREIGN	-0.114***	0.307***	0.407***	-0.143***	0.153***	-0.049**	0.014	0.055**	1			
SI	-0.119***	0.287***	0.396***	-0.062***	0.082***	-0.052**	-0.026	0.007	0.173***	1		
NI	-0.290***	0.356***	0.106***	-0.063***	0.066***	-0.011	0.03	0.053**	0.048**	0.100***	1	
CAPITAL_RATIO	0.073***	-0.068***	-0.003	-0.309***	-0.023	-0.079***	-0.279***	-0.082***	-0.076***	-0.037*	0.02	1
REV_REPO	-0.128***	0.387***	0.647***	-0.266***	0.118***	-0.067***	-0.088***	-0.002	0.272***	0.389***	0.054**	0.011

Table 10: Pearson correlation matrix for the variables used in Equation 3. All variables defined as in Table 9. *, ** and *** denote significance at the 5%, 1% and 0.1% level of significance respectively.

Table 11

Effect of BAPCPA on information asymmetry: Parallel trend assumption

	SPR
Dummy_2004q1 * TREATED	//
	//
Dummy_2004q2 * TREATED	0.0001
	[0.248]
Dummy_2004q3 * TREATED	0.0001
	[0.216]
Dummy_2004q4 * TREATED	0.0007
	[1.590]
Dummy_2005q1 * TREATED	-0.0002
	[-0.311]
	F-test: 1.75
	p-value > 0.1
Main effects included	YES
All controls	YES
Bank Fixed Effects	YES
Observations	3,137

Table 11: Results from testing the parallel trend assumption. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.

Table 12

Effect of BAPCPA on information asymmetry: Results from the diff-in-diff approach

Variable	(1) SPR
POST	-0.0029***
	[-6.293]
TREATED	-0.0011
	[-0.376]
POST*TREATED	0.0019***
	[5.705]
MKT_VAL	-0.0037***
	[-5.499]
DERIV	0.0002
	[1.143]
LOANS_REAL	-0.0041
	[-1.032]
LOANS_DEP	-0.0239
	[-0.623]
LOANS_AGRIC	-0.0072
	[-0.220]
LOANS_COMM	0.0102*
	[1.777]
LOANS_IND	0.0119
	[0.891]
LOANS_FOREIGN	-0.9937
	[-1.231]
SI	0.4731
	[0.662]
NI	0.0975**
	[1.992]
CAPITAL_RATIO	-0.0002**
	[-2.471]
REV_REPO	0.0051
	[0.304]
Constant	0.0691***
	[5.586]
Quarter Fixed Effects	YES
Bank Fixed Effects	YES
Observations	3,137
R-squared	0.871

Table 12: Results for the information asymmetry models. All variables defined as in Table 9. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.

Table 13

Robustness tests

Variable	(1) SPR *Only 4 quarters pre and post*	(2) SPR *Only 3 quarters pre and post*	(3) SPR *Controlling for size using total assets*	(4) SPR *Using GLM*	(5) SPR *Winsorization at 5%*
POST	-0.0031***	-0.0020***	-0.0018***	-0.0039***	-0.0024***
	[-6.470]	[-4.514]	[-4.412]	[-8.071]	[-6.931]
TREATED	-0.0027	0.0088*	0.0029**	0.0044*	-0.0015
	[-0.472]	[1.792]	[2.060]	[1.664]	[-0.674]
POST*TREATED	0.0017***	0.0015***	0.0019***	0.0019***	0.0015***
	[5.270]	[4.408]	[5.481]	[6.102]	[5.363]
Constant	0.0610***	0.0404***	0.0747***	0.0577***	0.0668***
	[4.765]	[4.314]	[5.126]	[7.294]	[6.577]
All Controls	YES	YES	YES	YES	YES
Quarter Fixed Effects	YES	YES	YES	YES	YES
Bank Fixed Effects	YES	YES	YES	YES	YES
Observations	2,557	1,886	3,173	3,137	3,137
R-squared	0.877	0.893	0.862	//	0.896

Table 13: Robustness tests for results for the information asymmetry model. All variables defined as in Table 9. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.

Table 14

Effect of increase in repo and high MBS on information asymmetry

Variable	(1) SPR
POST	-0.0027***
	[-5.885]
TREATED	-0.0112**
	[-2.505]
POST*TREATED*HIGH_MBS	0.0007*
	[1.839]
POST*TREATED	0.0016***
	[4.788]
HIGH_MBS	0.0011**
	[2.920]
POST*HIGH_MBS	-0.0000
	[-0.104]
TREATED*HIGH_MBS	-0.0015***
	[-4.237]
MKT_VAL	-0.0035***
	[-6.107]
DERIV	0.0001
	[1.065]
LOANS_REAL	-0.0113***
	[-5.192]
LOANS_DEP	-0.0080
	[-0.226]
LOANS_AGRIC	-0.0206
	[-0.828]
LOANS_COMM	0.0243**
	[2.462]
LOANS_IND	0.0062
	[0.742]
LOANS_FOREIGN	-0.9162
	[-1.780]
SI	0.4340
	[1.034]
NI	0.0705
	[0.937]
CAPITAL_RATIO	-0.0002***
	[-3.384]
REV_REPO	0.0043
	[0.238]
Constant	0.0750***
	[10.566]
Quarter Fixed Effects	YES
Bank Fixed Effects	YES
Observations	3,137
R-squared	0.847

Table 14: Results for the information asymmetry model when we control for mortgage backed securities (MBS) holdings. *HIGH_*MBS is an indicator variable that takes the value of 1 if the amortized cost of mortgage backed securities is above mean, 0 otherwise. All other variables defined as in Table 9. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.

Table 15

Repos vs Deposits in the Post-Period

Variable	(1) DEPOSITS	(2) DEPOSITS vs REPO
POST	0.0078*	-0.0066***
	[2.067]	[-3.915]
MKT_VAL	-0.0331***	-0.0149***
	[-5.440]	[-5.470]
DERIV	-0.0112**	-0.0109***
	[-2.338]	[-3.888]
LOANS_REAL	0.1354***	0.0704***
	[5.508]	[3.857]
LOANS_DEP	3.5419**	3.5678***
	[2.809]	[3.744]
LOANS_AGRIC	0.4034	0.0303
	[1.297]	[0.142]
LOANS_COMM	0.0480	0.0733**
	[0.754]	[2.278]
LOANS_IND	0.1839	0.1102***
	[1.774]	[3.675]
LOANS_FOREIGN	30.7643**	45.3688***
	[2.326]	[5.888]
SI	-31.8133**	-16.9241***
	[-2.465]	[-3.601]
NI	0.3250	-0.3754
	[0.469]	[-1.656]
CAPITAL_RATIO	-0.0018	0.0009**
	[-1.322]	[2.538]
REV_REPO	0.5490***	0.0912
	[3.306]	[0.400]
Quarter Fixed Effects	YES	YES
Bank Fixed Effects	YES	YES
Observations	1,458	1,458
R-squared	0.939	0.964

Table 15: Results for the substitution effect between repos and deposits post-BAPCA. For this analysis our sample consists of only those banks which increased their repo agreements post-BAPCPA. In regression (1) the dependent variable is the amount of deposits standardized by total assets while in regression (2) the dependent variable is the amount of deposit over the sum of deposits and repos. *POST* is an indicator variable that takes the value of 1 for the period 2005q4 – 2006q4 and 0 for the period 2004q1-2005q1. All other variables defined as in Table 9. *, ** and *** denote significance at the 10%, 5% and 1% level of significance respectively. Robust t-statistics shown in brackets.