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Tee Yong Jeffrey NG
Singapore Management University, jeffreyng@smu.edu.sg

Florin P. Vasvari

Regina Wittenberg-Moerman

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Media Coverage and the Stock Market Valuation of TARP Participating Banks*

Jeffrey Ng
Singapore Management University
81 Victoria Street, 188065, Singapore
jeffreyng@smu.edu.sg

Florin P. Vasvari
London Business School
Regent's Park, London, NW1 4SA, United Kingdom
fvasvari@london.edu

Regina Wittenberg-Moerman
University of Chicago Booth School of Business
5807 South Woodlawn Avenue, Chicago, IL, USA
rwitten1@chicagobooth.edu

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Abstract

We examine the impact of media coverage of the Capital Purchase Program (CPP) under the Troubled Assets Relief Program on the equity market valuation of participating bank holding companies (CPP banks). We document substantial negative coverage of the CPP and its participants over the five quarters following the program's initiation. We find that the extent of negative media coverage about the CPP exerted substantial downward pressure on the stock returns of CPP banks, decreasing their valuation relative to bank holding companies not participating in the program. We show that our findings cannot be explained by differences in the banks' financial viability at the CPP's initiation, new information about their performance being released to the market after the CPP's initiation or preceding stock returns causing the negative media coverage. Our findings highlight the importance of investor sentiment, as reflected by the tone of media coverage, in banks' valuation during a period of high uncertainty in financial markets.

Key Words: Capital Purchase Program, Capital Infusion, Bank Performance, Bank Valuation, Investor Sentiment, Media.

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1. Introduction

The Capital Purchase Program (CPP) was one of the most prominent aspects of the Troubled Assets Relief Program (TARP), established by the U.S. government with the goal of stabilizing the financial system.[1] Under the CPP, the U.S. Treasury infused capital into qualifying financial institutions, while emphasizing that these infusions were not a bailout of poorly performing banks. However, the program was the subject of much controversy in the business press, as it was not clear whether the program's participants were actually viable or whether the program would support the U.S. economy by increasing the flow of financing to businesses and consumers.[2] Our objective in this paper is to investigate whether the extent of the negative media coverage of the CPP affected the valuation of the bank holding companies (CPP banks hereafter) participating in the program.

Our research question is motivated by the theoretical framework of DeLong et al. (1990) and Baker and Wurgler (2006), who show that investor sentiment impacts stock valuation, and by the empirical evidence of Tetlock (2007), which indicates that media tone is strongly associated with investor sentiment. Media coverage may bring important benefits with respect to the dissemination and processing of information about CPP banks, thus reducing investors' information acquisition costs and information asymmetry (e.g., Miller, 2006, Tetlock et al., 2008, Fang and Peress, 2009, and Bushee et al., 2010). However, media coverage can also exacerbate investor biases (e.g., Vega, 2006, Barber and Odean, 2008, and Solomon et al., 2014), thus intensifying investor uncertainty about the viability of CPP participants and inducing a transitory

[1] The U.S. government provided an extensive rescue package beyond the Capital Purchase Program; this included debt guarantees, short-term funding through Federal Reserve Bank facilities, the purchase of impaired assets and insurance against potential losses on specified portfolios of assets.

[2] For instance, Stephen Wilson, chairman of LCNB National Bank in Ohio, argued that the "the public perceives [participation in the CPP] as weakness" and this is "so discouraging because nothing could be further from the truth." (Satow, 2009). Douglas Elliott of the Brookings Institute reasoned that the TARP is "one of the most effective large-scale government programs that the public has vehemently decided was a bad idea" (Smith, 2010).

shift in investor demand for the CPP banks' stocks (Daniel, Hirshleifer, and Subrahmanyam, 1998, and Hong and Stein, 1999). Consistently, Tetlock (2007) demonstrates that high media pessimism predicts lower stock returns.[3] We therefore hypothesize that negative media sentiment toward the CPP and its participants exerted downward pressure on the stock returns of CPP banks, decreasing their valuation relative to bank holding companies not participating in the program (non-CPP banks hereafter).

The more pronounced effect of investor sentiment on stock prices of firms that are more difficult to value (Baker and Wurgler, 2006) further highlights the importance of investor sentiment in the equity market valuation of CPP banks. Relative to non-CPP banks, CPP banks faced significant valuation uncertainty. First, the acceptance of the capital infusion could have signalled to the market larger future losses than what CPP banks had previously disclosed (Hoshi and Kashyap, 2010). Second, there was much ambiguity regarding the program's resolution mechanisms and the extent of government's future involvement in CPP banks' affairs. The participation in the CPP increased investors' perception of the risk of future government interventions (Bayazitova and Shivdasani, 2012). This heightened uncertainty significantly increased the difficulty of valuing CPP banks, suggesting that media sentiment played a significant role in influencing the valuation of these banks.

The media can induce, amplify or simply reflect investor sentiment (Tetlock, 2007). We do not attempt to distinguish between these different avenues of media influence on stock returns, because we are interested in the overall effect of media sentiment on the valuation of CPP banks.[4] We follow Tetlock (2007) and measure media sentiment by focusing on articles

[3] Using the content from a popular *Wall Street Journal* column "Abreast of the Market," Tetlock (2007) examines the effect of media pessimism on daily returns on the Dow Jones Industrial Average Index and finds that high media pessimism predicts downward pressure on market prices.

[4] In addition, it is challenging to convincingly disentangle between different media effects (Tetlock, 2007).

published in the *Wall Street Journal*. In addition to having a strong reputation with investors, the *Wall Street Journal* has the largest circulation of any financial publication in the United States (over two million readers) and its electronic distribution reaches over 325,000 finance and investment professionals (Tetlock, 2007). Restricting the measurement of media sentiment to the *Wall Street Journal* also allows us to read and analyze each individual article without relying on computational linguistic procedures (such as keyword counting, dictionary approaches or Naive Bayes algorithms) that are likely to provide less accurate sentiment estimation.[5]

Utilizing a number of keywords, "CPP", "Capital Purchase Program", "TARP" and "Troubled Assets Relief Program," we extract from the *Wall Street Journal* 754 articles on the CPP and the program's participants over the October 2008 – December 2009 period. We classify an article as having a negative sentiment with respect to the program and its participants when it contains negative statements about the CPP, its implications and consequences, and banks participating in the program. For example, we view an article as reflecting negative sentiment when it expresses criticism about the CPP's lack of transparency, indicates that weak and unviable banks received capital infusions, suggests that the program was not able to stabilize the economy and increase lending and blames banks for causing the crisis. We estimate our media sentiment measure on a monthly basis by computing the ratio of negative sentiment articles to the total number of articles (the *Media Sentiment* variable). The average of this ratio is 39.6% over our sample period, with the program's most extensive negative coverage occurring during the last quarter of 2008 and the first quarter of 2009.

Controlling for the market beta, bank size and the book-to-market ratio, we relate *Media Sentiment* to the next month stock returns and find that media sentiment substantially decreases

[5] We acknowledge that a potential limitation of our analyses is the possibility that the coverage of the CPP and participant banks in the *Wall Street Journal* is not representative of the coverage in other media outlets.

the stock returns of both CPP and non-CPP banks. A one standard deviation increase in *Media Sentiment* results in the monthly stock returns of non-CPP banks being lower by 3.33 percentage points. This finding suggests that adverse media coverage influences investor sentiment towards the entire banking industry, not just program participants, thus adversely affecting the valuation of non-CPP banks. We further show that, consistent with our expectations, media pessimism had a significantly stronger effect on CPP banks. A one standard deviation increase in *Media Sentiment* results in CPP banks' monthly stock returns being lower by 1.59 percentage points relative to the non-CPP banks' returns. Thus, the adverse effect of media sentiment on the stock performance of CPP banks is 48% stronger than it is on the stock performance of the non-CPP banks. These findings suggest that media sentiment exerted downward pressure on the stock returns of CPP banks, adversely affecting their valuation relative to non-CPP banks.

We perform a variety of robustness analyses to support our findings and inferences. We start by addressing the concern that our measure of media pessimism does not reflect the media's sentiment towards the CPP program, but rather captures its sentiment towards banks' disappointing condition and performance over the sample period. We incorporate into our analyses a bank-specific monthly media sentiment measure, constructed based on articles covering a wide range of topics related to a bank's performance, such as its earnings announcements, financial position and credit rating changes, as reported by the RavenPack database. We find that our findings are robust to this additional control.

To further mitigate the concern that banks' financial position and/or performance may explain our findings, we conduct a number of additional tests. First, we investigate how the central aspects of banks' financial viability vary between CPP and non-CPP banks. We find that at the program initiation (i.e., the end of the third quarter of 2008), relative to non-participating

banks, CPP banks had higher profitability and better loan portfolio quality (as measured by the ratio of non-performing loans to total loans). CPP banks also had lower capital adequacy and liquidity, but higher proportions of uninsured deposits. We then incorporate these bank characteristics in our analyses of banks' stock performance and find that media sentiment continues to have a stronger effect on the stock returns of CPP banks relative to its effect on the returns of non-CPP banks. As an additional test that addresses the substantial differences in financial viability characteristics between CPP and non-CPP banks, we analyze the sample of CPP banks matched with a non-CPP bank sample constructed using a propensity score matching methodology and find similar results.

Second, we assess whether our findings can be explained by media sentiment simply reflecting new information about the banks' performance revealed over the sample period. We control for banks' equity analysts' coverage and earnings forecast revisions to proxy for the transparency of a bank's information environment and the equity market's updated expectations about banks' performance. Our findings are unchanged. We also analyse two fundamental characteristics of bank performance – profitability and the loan portfolio quality – as reported over the sample period. If CPP banks have an inferior performance following the program's initiation relative to non-CPP banks, it may drive media pessimism about the program and its participants. However, we find that CPP banks actually outperform non-CPP banks with respect to both performance dimensions, in line with their stronger performance at program initiation.

Next, we address the concern that the effect of the media's negative sentiment on CPP banks' stock returns could be due to reverse causality, i.e., prior poor stock returns drive the more negative media coverage. We perform an event study analysis of stock returns around media articles publication dates. We document negative and significant abnormal returns during

the event window around the publication of negative sentiment media articles and also find that this stock market's reaction is stronger for CPP than for non-CPP banks. Overall, our robustness analyses suggest that the negative media sentiment significantly affected the stock market valuation of CPP banks relative to non-CPP banks and that this evidence cannot be explained by differences in the banks' financial viability at program initiation, new information about their performance released to the market during the sample period or preceding stock returns causing media sentiment.

In the final set of analyses, we investigate whether the effect of media sentiment on the stock market valuation of the CPP banks relative to the non-CPP banks differs with bank size and the quality of the bank's loan portfolio. We find that media sentiment has a significantly stronger effect on large CPP banks, consistent with their higher visibility making them more susceptible to media pessimism with respect to the CPP. However, the effect of media sentiment is not significantly different between low and high asset quality CPP banks, suggesting that lower asset quality does not exacerbate the effect of media pessimism.

We contribute to the literature along several dimensions. We extend the literature on the role of the media in capital markets. A number of studies show the substantial benefits of media coverage, such as enriching the information environment, alleviating informational frictions and reducing the cost of information acquisition (e.g., Miller, 2006, Dyck et al., 2008, Bushee et al., 2010, Fang and Peress, 2009, and Tetlock, 2010). However, prior literature also documents negative implications of media coverage, such as generating temporary upward price pressure on stocks in the news (Vega, 2006, Barber and Odean, 2008, and Bhattacharya et al., 2009) and enhancing investors' chasing of past returns (Solomon et al., 2014). Our findings emphasize the important role of the media in the valuation of financial institutions, by showing that negative

media coverage can cause significant undervaluation of banks' equity. In this respect, our findings also add to the literature on the role of investor sentiment in firm valuation more generally (e.g., De Long et al., 1990, Baker and Wurgler, 2006, and Tetlock, 2007). We provide evidence suggesting that negative investor sentiment exerts significant downward pressure on the equity prices of financial institutions during a period of high uncertainty in financial markets.

We also contribute to the recent literature on government bailouts (e.g., Bernardo and Welch, 2004, Taliaferro, 2009, Hoshi and Kashyap, 2010, Veronesi and Zingales, 2010, Bayazitova and Shivdasani, 2012, Duchin and Sosyura, 2012, and Black and Hazelwood, 2012). Bayazitova and Shivdasani (2012) provide evidence on the characteristics of financial institutions participating in the CPP, while Mian et al. (2010), Duchin and Sosyura (2012) and Tahoun and van Lent (2012) focus on the role of political connections in bank bailouts. Also, Taliaferro (2009) and Black and Hazelwood (2012) examine the outcomes of capital infusion with respect to banks' lending activity. We add to these studies by highlighting the potential consequences of bank bailouts on investor sentiment with respect to the banking sector. We demonstrate that low investor sentiment, stimulated by government intervention, adversely affects the equity market valuation of both banks receiving capital infusions and banks not subject to the government intervention. These findings are important to policy makers and bank regulators that strive to enhance bank stability, in particular in periods of unrest in financial markets. To mitigate adverse valuation effects, they may consider designing more effective communication strategies to better explain the merit of bank bailouts and how the bailout decisions are made. Our study is also relevant to bank managers who have to assess the costs and benefits of government interventions.

The following section presents a brief description of the CPP. Section 3 describes the

sample and data. Section 4 discusses our empirical findings. Section 5 concludes the paper.

2. Background on the Capital Purchase Program

The Troubled Assets Relief Program (TARP) was established under the Emergency Economic Stabilization Act, which was approved by the United States Congress on October 3, 2008. TARP, as originally envisioned in the fall of 2008, would have involved the purchase, management and sale of up to $700 billion of "toxic" assets, primarily troubled mortgages and mortgage-backed securities. This framework was quickly abandoned and the program's scope was changed to 12 announced programs that included capital infusions into banks, financing for the automotive industry, asset guarantees, the provision of affordable home loans, public-private investment programs, etc. The first and most prominent initiative under TARP, the Capital Purchase Program (CPP), was announced on October 14, 2008. Initially, the CPP was allocated up to $250 billion but, by the program's close on December 9, 2009, the Treasury had infused only about $205 billion in 742 transactions involving 709 financial institutions.[6]

While the CPP aimed to increase the flow of financing to U.S. businesses and consumers and to support the U.S. economy, the U.S. government intervention via capital infusions into banks was quite controversial. On the one hand, the Treasury emphasized that the CPP was a voluntary program through which the government invested in "healthy, viable institutions that were recommended by their applicable federal banking regulator" to strengthen the capital base of these institutions and improve the stability of the financial system.[7,8] Consistent with this

[6] The Treasury announced the establishment of another program, the Capital Assistance Program (CAP) in February 2009; its intent was to ensure that banks had a sufficient capital cushion to withstand larger than expected losses in the future. CAP included a stress test to evaluate capital buffers. If capital was needed and could not be raised from private markets, the banks would have been forced to accept CAP assistance in return for mandatory convertible preferred stock. On Nov. 9, 2009, the Treasury closed this program without making any investments (SIGTARP January 2010 Report).

[7] See http://www.financialstability.gov/roadtostability/CPPfactsheet.htm.

stated objective, for instance, Valley National Bancorp mentioned in a press release in October 2009 that it was "pleased to announce that it has been chosen as one of the nation's stronger regional banks to participate in the U.S. Treasury Department's TARP Capital Purchase Program."

On the other hand, banking regulators and the Treasury did not publicly reveal the criteria used to approve the CPP applications, which amplified the uncertainty about the health of the financial institutions participating in the program. More importantly, the public and the media often characterized the capital infusion under the CPP as a government bailout of relatively weaker banks and a waste of taxpayers' money. For instance, McCall Wilson, president of the Bank of Fayette County in Tennessee, said "I knew the community at first would be upset because they perceived it [the infusion] as a bailout" (Satow, 2009). Neil Barofsky, the inspector general for TARP, after reviewing the bailouts of ten big banks in October 2008, criticized Treasury officials for misleading the public over the health of some of these banks and for undermining popular trust in rescue efforts when lending did not increase (SIGTARP October 2009 Report). Consistent with these statements, we find that during the period when the program was initiated, the vast majority of articles in the *Wall Street Journal* about the CPP or its participant banks had a negative (pessimistic) tone.

Under the CPP, capital was infused into qualifying financial institutions and investments were allocated so as to vary from one to five percent of the recipient's risk-weighted assets.[9] The investments involved the purchase of non-voting senior preferred shares; the Treasury demanded that these shares have a low initial dividend rate of 5% for 5 years and 9% thereafter. The

[8] Another program under TARP, the Target Investment Program (TIP), set up after the CPP, appeared to be more of a bailout of unhealthy banks.

[9] Qualifying financial institutions include bank holding companies, savings associations and certain savings and loan holding companies. In this paper, we focus on bank holding companies.

purchase of shares also included 10-year warrants that provided the U.S. government with the option to purchase common stock for an amount equal to 15% of the preferred equity infusion at a specified price in the future. The CPP imposed limits on executive compensation, including caps on annual compensation, limited tax deductibility of compensation for senior executives, restrictions on "golden parachutes" for departing executives and restrictions on bonus payments. The program also restricted repurchases of shares not owned by the government and dividend payment increases.

Although the eight largest investments of the program accounted for $134.2 billion, the CPP had many more modest investments: 331 of the 709 recipients had received less than $10 million each by December 2009 (SIGTARP January 2010 Report). Also, except for nine financial institutions that were "forced" to participate in the CPP on October 14, 2008, all other institutions took part in the CPP voluntarily.[10] Selection for the CPP was driven partly by banks' voluntary decision to submit an application but also by the Treasury's and direct banking regulators' approval to participate in the program. These federal banking regulators, the Federal Deposit Insurance Corporation (FDIC) and the Federal Reserve Bank (FRB), evaluated all submitted CPP applications based on factors such as capital adequacy, liquidity, earnings and sensitivity to market risks; qualifying applications were sent to the Treasury for final approval.[11] A large number of banks withdrew their applications, but because the Treasury viability criteria were not made publicly available, it was not clear how many of them withdrew voluntarily despite being qualified or how many withdrew because they were advised by the banking regulator that they did not meet the requirements.

[10] The capital infusion was initially provided to Bank of America, Bank of New York Mellon, Citigroup, Goldman Sachs, JP Morgan, Merrill Lynch, Morgan Stanley, State Street, and Wells Fargo. However, Merrill Lynch was acquired by Bank of America and its capital infusion was provided to Bank of America.

[11] The application period for publicly held financial institutions closed on November 14, 2008; the application period for privately held institutions closed on December 8, 2008.

The repayment of the capital provided by the Treasury was subject to consultation with the appropriate federal banking agency. If the agency confirmed that a bank would have sufficient capital after repayment, the bank could pay back the entire CPP investment either in a lump sum or over time, as long as each payment was at least 25% of the original total investment (unless the last payment was less by default). When returning the CPP investment, banks also had the opportunity to repurchase the warrants received by the Treasury at their fair market value.

3. Data, Sample, and Descriptive Statistics

3.1. Data sources and sample selection

We obtain bank characteristics from FR Y-C (Call Reports) and stock trading data from CRSP. Data on media coverage is retrieved from the *Wall Street Journal* and RavenPack News Analytics, which covers all news disseminated via Dow Jones Newswires. We retrieve data on state population from the Census Bureau, data on state gross domestic product from the Bureau of Economic Analysis and data on state unemployment from the Bureau of Labor Statistics.

We use the U.S. Treasury financial stability reports to get information on CPP participation; these reports can be found at http://financialstability.gov. By December 31, 2009, 709 financial institutions had received a capital infusion under the CPP (Table 1, Panel A). We restrict our analysis to bank holding companies for two reasons. First, bank holding companies were the main recipients of the capital infusions. Second, our research design requires that financial institutions have similar characteristics and common financial reporting requirements. Because we retrieve financial reporting data from Consolidated Financial Statements for Bank Holding Companies – FR Y-C (Call Reports), we limit our sample to bank holding companies

(*banks* hereafter) with total consolidated assets above $500 million.[12] In addition, because our tests employ equity market data, we analyze publicly traded banks. Our final sample includes 188 CPP banks (see Table 1, Panel A). Although the CPP banks in our sample represent only about 25% of the total number of institutions that received capital infusions, their capital infusions make up about 90% of the funds provided to banks under the CPP. For completeness, we also present descriptive data with respect to the repayment of capital infusions. Out of 188 CPP banks, 39 banks repaid the CPP capital by the end of 2009.

Panel B of Table 1 presents the selection process for our control sample. Out of 977 bank holding companies with total consolidated assets above $500 million, 346 have publicly traded equity. After removing from this sample 188 banks participating in TARP, we are left with 158 banks that did not announce their participation in the CPP by the end of the first quarter of 2009.

Table 2 reports the distribution of the capital infusions over time. We present the distribution first by the announcement date (i.e., the date when the bank announced its participation in the CPP) and then by the commitment date (i.e., the date when the funds were transferred to the bank).[13] We supplement this data in the last columns by presenting the distribution of repayments and the net outflow-inflow of funds to the Treasury. Banks started repaying the CPP funds from March 2009, with the largest repayments in June and December 2009. For our sample, about 64% of the Treasury's capital infusion had been repaid by the end of 2009. Bank executives often referred to the negative media coverage of the program as the primary motive for early repayments.

[12] Bank holding companies with total consolidated assets of less than $500 million file a Call Report called Parent Company Only Financial Statements for Small Bank Holding Companies—FR Y-9SP. The FR Y-9SP provides more limited data than FR Y-C, which prevents us from incorporating these companies into the analysis.

[13] We collected the announcement dates from Factiva. For banks that did not have a press release about their capital infusion approval, we define the announcement date as the day of the relevant TARP transaction report.

3.2. Descriptive statistics

Table 3, Panel A presents the descriptive statistics for the primary characteristics of bank financial performance and viability that we employ in our tests. We estimate these characteristics using call reports for the fiscal period ending in September 2008, the quarter prior to the program's initiation. We measure a bank's profitability by the ratio of year-to-date net income to total assets (*ROA-ytd*) (we provide detailed variable definitions in Appendix A). On average, sample banks have a return-on-assets of zero. We estimate a bank's loan portfolio quality by the ratio of non-performing loans to total loans (*NPL*). The average ratio of non-performing loans to total loans is 3.4%. The strength of a bank's capital is measured by the ratio of its total capital to risk-weighted assets (*Capital Adequacy*). The average capital adequacy of the sample banks is 12.6% (this figure is substantially above the 8% minimum capital requirement).

We also estimate a bank's liquidity, using the ratio of cash to total deposits (*Cash To Deposits*) and find it to be equal, on average, to 5.5%. We measure bank riskiness by the ratio of time deposits of $100,000 or more to total deposits (*Uninsured Deposits*),[14] the ratio of available-for-sale securities and trading securities to total assets (*Fair Value Exposure*) and the ratio of the absolute value of net assets that are sensitive to short-term interest movements to total assets (*Interest Sensitivity*). The average values of these measures are 18.4%, 14.8% and 14.1%, respectively. Bank size is estimated by its total assets and is equal, on average, to $33.757 billion.

Based on univariate tests of differences in means across CPP and non-CPP banks, CPP banks show a stronger performance in terms of higher profitability and a lower ratio of non-

[14] We define this measure based on the $100,000 threshold for uninsured deposits, which was the Federal Deposit Insurance Corporation's (FDIC) threshold on September 30th, 2008. The FDIC increased the deposit threshold up to $250,000 in October 2008. Because call reports continue to provide uninsured deposits data based on the $100,000 threshold, we use this definition in all of our tests.

performing loans, but have significantly weaker risk-based capital ratios. In addition, CPP banks are substantially bigger than non-CPP banks. There are no significant differences in liquidity or in the riskiness characteristics across the two groups of banks.

Table 3, Panel B presents descriptive statistics for media coverage. To measure media sentiment, we retrieve from Factiva *Wall Street Journal* articles (both in the print and online versions) over our sample period using the following keywords: "CPP", "Capital Purchase Program", "TARP" and "Troubled Assets Relief Program". After excluding articles unrelated to the CPP or banking institutions (e.g., articles on auto or insurance companies), we obtain 754 articles. Given the subjective nature of the task, two coauthors read and independently classified each article into one of three sentiment categories: negative, positive and neutral. In the rare instances of disagreement between co-authors, the third co-author's opinion was used to reconcile any differences.

Negative (positive) sentiment articles are defined as news items that carry negative (positive) statements about the program and its implications and/or about participant banks. For example, we classify an article as negative when it expresses criticism about the CPP's lack of transparency, suggests that the program was not able to stabilize the economy, mentions significant oversights in setting up and managing the program, suggests that the program is misusing taxpayers' money, indicates that weak and unviable banks received capital infusions, criticizes the participant banks for not increasing lending or blames banks for causing the crisis and misguiding investor and consumers. Examples of positive articles include items that praise the CPP for stabilizing the economy, suggest that the CPP supported healthy banks, praise early repayments of capital infusions or discuss the good performance of participant banks. The remaining articles were classified as neutral. It is important to note that the majority of the

articles we identified and classified are primarily devoted to the discussion of the program and its implications rather than a discussion of the performance of individual banks participating in it.

As reported in Panel B, the number of articles ranges from 24 in November 2009 to 84 in February 2009, with the most extensive coverage of the program in the first quarter of 2009. The proportion of negative sentiment articles over our sample period, measured on a monthly basis by the ratio of negative articles to the total number of articles, averages at 39.6%, highlighting the media's pessimism about the program and the participant banks. The program was subject to the most extensive negative coverage during the last quarter of 2008 and the first quarter of 2009. The average proportion of negative articles over this period is 55%. There is a significant drop in the negative media coverage starting in March 2009. Figure 1 provides a graphical illustration of the proportion of negative articles over the sample period.

4. Results

4.1. The effect of media coverage on bank valuation

In this section, we focus on the equity market valuation of CPP and non-CPP banks and how it was influenced by media coverage. We predict that media pessimism with respect to the CPP exerted substantial downward pressure on CPP banks' stock returns, decreasing their valuation relative to non-CPP banks. To examine the effect of media sentiment on the banks' stock market valuation, we estimate multivariate regressions of the banks' stock returns, controlling for the Fama-French (1992) risk factors:

$$Stock\ Returns_{i,t} = \beta_0 + \beta_1\ CPP_i + \beta_2\ Media\ Sentiment_{t-1} + \beta_3\ CPP_i * Media\ Sentiment_{t-1} + \beta_4 Beta_i + \beta_5\ Size_i + \beta_6 Book\ To\ Market_i + \varepsilon \quad (1)$$

Stock Returns$_t$ is computed as the stock return of bank *i* during month *t*. The period covered is from November 2008 to January 2010. The monthly returns are obtained from the monthly

stock file of CRSP. If a bank delists in the interim, we include its delisting return. *CPP* is an indicator variable equal to one starting with the month when a bank announces its participation in the CPP, and zero otherwise (this variable takes the value of zero for non-CPP banks during the entire sample period). To control for risk, we include *Size*, *Beta*, and *Book To Market*. *Beta* is the market beta obtained from regressing daily stock returns on daily market returns over the six months ending on 31 September 2008. *Size* is the bank's market capitalization in billions on September 31, 2008. *Book To Market* is the ratio of the book value of equity to market value of equity on September 31, 2008. Hence, the coefficient on *CPP* can be interpreted as the difference in the risk-adjusted returns between CPP and non-CPP banks.

Media Sentiment is a measure of media sentiment, estimated as the ratio of negative sentiment articles to the total number of articles in the *Wall Street Journal*. We measure media sentiment on a monthly basis over the month preceding that of the monthly return. As noted in Table 3 Panel B, *Media Sentiment* is measured from October 2008 to December 2009. Because media coverage is relatively infrequent, estimating media sentiment over a shorter horizon (weekly or daily) will substantially increase the measurement error. The coefficient on *Media Sentiment* reflects the effect of media sentiment on the stock returns of non-CPP banks; we predict a negative coefficient on this variable. While one may argue that media sentiment towards the CPP and its participants should not affect the returns of non-participating banks, it is likely that negative media coverage influences investor sentiment towards the entire banking sector, thus adversely affecting non-CPP banks as well. For example, in numerous articles covering the CPP and its participants, banks in general were blamed for causing the crisis, mishandling investor trust, exploiting naïve consumers by offering sub-prime mortgages and engaging in excessive risk-taking. This negative media coverage could induce, amplify or simply

reflect investor sentiment toward all banks, not just CPP participants. Our main variable of interest is the interaction term between *CPP* and *Media Sentiment*. We predict a negative coefficient on this variable, consistent with adverse media coverage negatively affecting the valuation of CPP banks relative to that of non-CPP banks. In line with the monthly estimation of media sentiment, we perform the analysis using bank-month observations.

In some of our analyses we also incorporate bank-specific monthly media content measure (*Overall Bank Sentiment*), constructed based on the RavenPack database. We impose two restrictions when extracting articles from RavenPack. First, we limit data to full-size articles, excluding news flashes (news articles composed only of a headline and no body text), news articles composed of a headline and mostly tabular data and firm-initiated press releases. Second, we restrict data to full-size articles with a relevance score of 75 and above. The relevance score is assigned by RavenPack to indicate when the firm is strongly related to the underlying news story. The scores range from 0 (low relevance) to 100 (high relevance). Then, for each article that satisfies the above two criteria, we utilize RavenPack's Composite Sentiment Score (CSS), which represents the news sentiment of a given story by combining various sentiment analysis techniques.[15] CSS scores also range between 0 to 100, with a score above 50 indicating positive sentiment; scores equal to 50, neutral sentiment; and scores below 50, negative sentiment.

[15] CSS combines 5 sentiment scores (PEQ, BEE, BMQ, BCA and BAM), while insuring that there is no sentiment disagreement amongst these scores. The PEQ score represents the news sentiment of a given news item according to the PEQ classifier, which specializes in identifying positive and negative words and phrases in articles about firms with publicly traded equity. The BEE score represents the news sentiment of a given story according to the BEE classifier, which specializes in news stories about earnings evaluations. The BMQ score represents the news sentiment of a given story according to the BMQ classifier, which specializes in short commentary and editorials on global equity markets. The BCA score represents the news sentiment of a given news story according to the BCA classifier, which specializes in reports on corporate action announcements. The BAM score represents the news sentiment of a given story according to the BAM classifier, which specializes in news stories about mergers, acquisitions and takeovers. PEQ and BEE classifiers are dictionary-based measures, while BMQ, BCA and BAM classifiers are based on the Bayesian learning approach. It is important to clarify that in the above descriptions of the sentiment scores "specialize" means that the score was originally developed and tested using different samples of media articles. For example, the BEE score was developed based on earnings-related articles and BMQ score was developed based on articles about global equity markets. All five sentiment scores are applied to a media article when evaluating its CSS score.

Overall Bank Sentiment is the average CSS score across all articles about the bank, estimated over the month preceding that of the return's estimation.

We present the descriptive statistics of the variables used in the regression analysis in Panel A of Table 4. The mean and median *Stock Returns* are -0.016 and -0.015, respectively. Also, Media Sentiment has an average of 39.9 suggesting a large percentage of negative articles. Risk variables *Size*, *Beta*, and *Book To Market* have averages of 0.003, 0.991 and 1.165. In Table 4, Panel B, we start by estimating model (1) without the interaction term to provide the base results with respect to the impact of media sentiment on banks' valuation (column 1). We find that, controlling for market beta, bank size and book-to-market ratios, CPP banks significantly outperformed non-CPP banks, as suggested by the positive coefficient on the CPP variable. At the same time, media sentiment is negatively associated with the bank stock returns, suggesting that the media's negative perception of the program exerts substantial downward pressure on the market prices of banks during our sample period. A one standard deviation increase in *Media Sentiment* translates into amonthly bank return that is 4.23 percentage points lower.

We present the full specification of model 1 in column 2. We find that the coefficient on *Media Sentiment*, which reflects in this specification the effect of media sentiment on non-CPP banks, is negative and significant. A one standard deviation increase in *Media Sentiment* translates into a bank return that is 3.33 percentage points lower. Thus, adverse media coverage of the CPP affects the stock returns of non-participating banks, consistent with it influencing investor sentiment toward all banks, not just program participants. More importantly, we find that negative media coverage has a significantly stronger effect on CPP banks relative to non-CPP banks, as reflected by the significant and negative coefficient on the interaction term *CPP*Media Sentiment*. A one standard deviation increase in *Media Sentiment* results in the CPP

banks' monthly stock returns being lower by 1.59 percentage points relative to the non-CPP banks' returns. Thus, in terms of economic magnitude, the effect of media sentiment on the stock performance of CPP banks is 48% stronger than it is on the stock performance of non-CPP banks. These findings suggest that the media sentiment adversely affects CPP banks' stock returns relative to the returns of non-CPP banks. In column (3) we replicate this analysis after eliminating from the CPP group eight banks that were "forced" to participate in the CPP program in October 2008.[16] This exclusion does not affect our findings: *Media Sentiment* continues to have a substantially stronger effect on the returns of the remaining CPP banks, relative to the non-CPP banks.

In the last column of Table 4, we address the concern that *Media Sentiment* does not reflect media sentiment towards the CPP, but rather captures media sentiment towards banks' condition and performance over the sample period. To mitigate this concern, we augment the model with a bank-specific monthly media content measure (*Overall Bank Sentiment*) and its interaction term with *CPP*. Because RavenPack incorporates all news disseminated via Dow Jones Newswires, this sentiment measure relies on a large number of articles covering an extremely wide range of topics about a bank, such as its earnings announcements, recent performance, financial position, credit rating changes, product market developments and CEO/CFO changes, among many others. As a result, *Overall Bank Sentiment* primarily reflects media sentiment about a bank's performance and condition, rather than its sentiment towards the CPP and/or the bank's participation in the program.

The results presented in column 4 indicate insignificant coefficients on *Overall Bank Sentiment* and its interaction term with *CPP*. Most importantly, the coefficient on our main

[16] While nine banks were "forced" to accept capital infusions, Merrill Lynch was acquired by Bank of America and is therefore not included in our stock return analyses.

variable of interest, *CPP*Media Sentiment*, remains robust to these additional controls.

4.2. Robustness analyses

In this section, we perform a number of tests to further mitigate the concern that the significantly stronger effect of media sentiment on the stock performance of CPP banks relative to its effect on stock performance of non-CPP banks can be attributed to the banks' financial position and/or the arrival of new information about their performance over the sample period. While the analyses presented in Table 4 suggest that our primary sentiment measure, *Media Sentiment*, does not reflect media sentiment with respect to banks' condition and performance, we extend our analyses to include additional controls for a bank's financial viability and the release of new information to investors.

4.2.1. Bank fundamentals associated with CPP participation

We start by investigating whether the central aspects of bank financial viability differ significantly between CPP and non-CPP banks at the time of CPP's initiation, because the differences in these aspects could potentially explain the negative media coverage for CPP banks. Specifically, we focus on the following characteristics of bank financial performance: profitability, the quality of the loan portfolio and capital adequacy,. We estimate the following logistic regression:

$$CPP_i = \beta_0 + \beta_1\, ROA\ Ytd_i + \beta_2\, NPL_i + \beta_3\, Capital\ Adequacy_i + \beta_4\, Cash\ To\ Deposits_i + \beta_5\, Uninsured\ Deposits_i + \beta_6\, Fair\ Value\ Exposure_i + \beta_7\, Interest\ Sensitivity_i + \beta_8\, Assets_i + \beta_9\, Population + \beta_{10}\, GDP\ Growth + \beta_{11}\, Unemployment + \beta_{12}\, Blue\ State + \varepsilon \quad (2)$$

CPP_i is an indicator variable equal to one for bank i which participates in the CPP, zero otherwise. In addition to measures of profitability (*ROA Ytd*), quality of the loan portfolio (*NPL*)

and capital adequacy (*Capital Adequacy*), we include controls for liquidity (*Cash To Deposits*), riskiness (*Uninsured Deposits*, *Fair Value Exposure* and *Interest Sensitivity*) and size (*Assets*). All bank characteristics are estimated for the quarter ending in September 2008.[17]

We also incorporate into the analysis state-level characteristics, as economic and political factors within the state might influence a bank's participation in the CPP (e.g., Li, 2010, and Duchin and Sosyura, 2012). For the state where the bank is headquartered, we control for its population (*Population*), the percentage change in gross domestic product (*GDP Growth*) and the percentage of unemployment (*Unemployment*). All state-level variables are estimated in 2008. Finally, we include an indicator variable that equals one if, in the 2008 presidential elections, the Democrats won in the state where the bank is headquartered (*Blue State*). Descriptive statistics on these variables are shown in Table 3, Panel A.

We present the results of model 2 estimation in Panel A of Table 5. In column (1), to preserve the largest possible sample size, we estimate the model without state controls.[18] We find a positive and statistically significant coefficient on *ROA Ytd*, suggesting that more profitable banks are more likely to participate in the CPP.[19] An increase of one standard deviation in bank profitability increases the probability of participation in the program by 13.7 percentage points. We also find that banks with a lower quality loan portfolio, as captured by a higher ratio of non-performing loans (*NPL*), have a lower likelihood of participating in the CPP. An increase of one standard deviation in *NPL* decreases the probability of participation by 11.5 percentage points. The significant difference in non-performance loans across CPP and non-CPP banks is generally

[17] In unreported robustness tests, we substitute *NPL* with a bank's book-to-market ratio and find similar results.

[18] We do not have data for the state-level characteristics for four banks that are headquartered in Puerto Rico. The decrease in the number of observations in column 2 relative to the 344 banks used in column 1 is due to the exclusion of these banks from the analyses.

[19] In unreported tests, we further analyze whether CPP-participating banks engaged in earnings management to boost their profitability and improve their perceived healthiness. We look at discretionary loan loss provisions recorded by these banks during the period prior to CPP initiation and their change during the CPP participation period and find no evidence of earnings management.

in line with Bayazitova and Shivdasani (2012), although it is not directly comparable to their findings; we examine capital infusions into bank holding companies, while they examine the infusions at the commercial bank level. Bayazitova and Shivdasani (2012) show that banks that were approved for CPP injections had significantly stronger asset quality than banks that were not approved. They interpret these results as suggesting that capital was not provided to banks with high levels of troubled assets.

In addition, we find that banks with higher capital adequacy (*Capital Adequacy*) are less likely to be part of the CPP; an increase of one standard deviation in *Capital Adequacy* decreases the probability of participation by 46.8 percentage points. There is also evidence that a bank's liquidity (*Cash To Deposits*) decreases the participation probability, while the proportion of uninsured deposits (*Uninsured Deposits*) increases this probability. Finally, we find that larger banks are more likely to participate in the CPP.

In column (2), we augment the model with state controls and find very similar results. In column (3), we exclude from the analysis the six banks that were "forced" to participate in the program. Note that while capital infusions were provided initially to nine banks, they were essentially made to only eight banks, as Merrill Lynch was acquired by Bank of America, which then received Merrill Lynch's share of the capital infusion. Also, Goldman Sachs and Morgan Stanley did not file call reports for the third quarter of 2008 because they became bank holding companies on September 21, 2008. As a result, these three banks are excluded from the estimation of model 2. Our findings remain largely unchanged, with the exception of the significance of the bank size measure in the last specification.

In unreported robustness tests, we also examine whether our findings are affected when we exclude from the analyses: 1) 90 banks that announced that they were not taking part in the CPP,

2) in addition to these 90 banks also 23 banks that withdrew their applications[20] and 3) fifteen banks that had to comply with stress tests, as defined by the Treasury on February 10, 2009, suggesting that these banks were systemically important and may have been too big to fail.[21] We continue to find similar results.

4.2.2 Controlling for banks' financial viability and new information arrival

Having established that CPP and non-CPP banks vary significantly across a number of important financial performance characteristics at the CPP's initiation, we augment model (1) with these characteristics and their interaction term with *CPP*. Specifically, we add to the model *ROA Ytd*, *NPL*, *Capital Adequacy*, *Cash To Deposits*, *Uninsured Deposits*, *Size* and the respective interaction terms to insure that the differences in these characteristics do not drive the differential effect of the media on the stock returns of CPP and non-CPP banks. We present the results of this estimation in column 1 of Table 5, Panel B. We find that media sentiment with respect to the CPP program continues to influence stock returns of both CPP and non-CPP banks, with a more significant effect on the latter. Economically, the effect of the media on the stock returns of both bank groups is similar to that reported in our primary tests in Table 4. With respect to bank characteristics, we find that banks with higher capital adequacy experience higher stock returns over the sample period, while banks with a higher level of uninsured deposits experience lower returns.

In the second column of Table 5, Panel B to further alleviate endogeneity concerns associated with substantial differences in financial viability characteristics between CPP and

[20] To identify banks that announced that they are not taking part in the CPP or withdrew their applications, for each one of 158 banks in the control sample, we perform a detailed search on Factiva, LexisNexis, Google News and the RavenPack database to identify their disclosures with respect to the participation in the program. We select relevant disclosures by searching media articles, banks' press releases and SEC filings using the following keywords: "Troubled Asset Relief Program," "TARP," "Capital Purchase Program," "CPP" or "Federal Aid."

[21] Stress tests under the Capital Assistance Program were imposed on nineteen institutions, but four of them are not included in our analysis.

non-CPP banks, we employ a propensity score matching methodology. We match treatment observations (i.e., CPP banks) with control observations (non-CPP banks) based on bank characteristics, which our analyses in Table 5, Panel A suggest are significantly different for CPP and non-CPP banks (*ROA Ytd*, *NPL*, *Capital Adequacy*, *Cash To Deposits*, *Uninsured Deposits*, *Size*). This approach allows us to retain a sample size adequate for empirical analyses (matching on all variables employed in the model 2 results in the extreme sample attrition). We use the commonly used "nearest neighbor matching" approach with the further restriction that the absolute difference in the propensity scores of the matched observations is below a pre-specified threshold (i.e., "caliper distance"). More specifically, we match without replacement and, to ensure appropriately matched samples, if no untreated observations have propensity scores within the specified caliper distance, the treated observation is left unmatched and is excluded from the matched sample. In unreported analyses, we also test the matched samples for covariate balancing. The differences in variable means between the CPP and non-CPP groups are insignificant for all firm characteristics employed in the matching procedure. We find that our results are robust despite a significant decline in the sample size: the coefficients on *Media Sentiment* and *CPP*Media Sentiment* are negative and significant, although there is a decline in the significance of the interaction term.

In the last two columns of Panel B, we investigate whether our results can be explained by media sentiment reflecting the arrival of new information about the banks' performance over the sample period. In column 3, we augment the model with the *Analyst Coverage* variable, which reflects whether the bank has equity analyst coverage. Banks with equity analyst coverage generally operate in a richer information environment, which may potentially affect the behavior of their stock returns. In column 4, we limit the sample to bank with available analysts' coverage

and add a control for the change in the analysts' consensus mean EPS forecast (*Analyst Revision*). Incorporating *Analyst Revision* allows us to control for the equity market's updated expectations about the banks' performance. In both columns 3 and 4, we report statistically and economically significant coefficients on *Media Sentiment* and *CPP*Media Sentiment*.

To further address the concern that our findings can be attributed to new information about the banks' performance that becomes available to the market over the sample period, we examine two fundamental characteristics of bank performance – profitability and the quality of the loan portfolio. While we show that CPP banks have stronger profitability and loan portfolio quality at the initiation of the program (Table 5, Panel A), it is possible that their performance is inferior following initiation, potentially contributing to the negative media coverage. In Panel C of Table 5, we examine how profitability and the quality of the loan portfolio vary over the year 2009 between CPP and non-CPP banks (we focus on bank performance in 2009 because by the beginning of that year the vast majority of sample CPP banks have announced their participation in the program).[22] We estimate the following model:

$$ROA_{i,2009}\ (NPL_{i,2009}) = \beta_0 + \beta_1\ CPP_i + \beta_2\ Capital\ Adequacy_i + \beta_3\ Cash\ To\ Deposits_i$$
$$+ \beta_4\ Uninsured\ Deposits_i + \beta_5\ Fair\ Value\ Exposure_i + \beta_6\ Interest\ Sensitivity_i$$
$$+ \beta_7\ Assets_i + \varepsilon \qquad (3)$$

All control variables are estimated for the quarter ending in September 2008, with the exception of $ROA_{i,2009}$ and $NPL_{i,2009}$, which are now measured by the end of 2009. We find that CPP banks actually outperformed non-CPP banks over this period. The return-on-assets of CPP banks is 0.005 higher than it is for non-CPP banks (column 1). This difference is economically

[22] The results are qualitatively similar when we analyze bank performance on a quarterly basis over the 5 quarters of our sample period. However, we note that the information on bank performance in the last quarter of 2008 is unlikely to affect the differential stock behavior of CPP and non-CPP banks because many CPP banks announced their participation close to the quarter's end.

significant as the mean profitability ratio for the sample banks in 2009 is -0.009. Similarly, the CPP banks' ratio of non-performing loans to total loans is lower by 0.018 (column 2). Economically, this difference represents 29% of the mean non-performing loan ratio of 0.062 for the sample banks in 2009.[23]

4.2.3 The reverse causality concern

The results we have presented so far indicate that the effect of negative media sentiment on bank stock returns is unlikely to be attributed to banks' financial performance revealed over the sample period. However, it is still possible that pessimistic media coverage may be driven by banks' poor equity market performance, raising a concern that causality may go in the opposite direction, with stock returns causing negative media sentiment. In unreported robustness tests, we add to model (1) a control for momentum in stock returns and find that our results are robust, suggesting that the effect of media coverage on stock returns is not subsumed by banks' previous returns. Although this test and the fact that we measure media coverage with a one month lag relative to the measurement of stock returns support the causal effect of the media on stock returns, we provide an event study analysis to further examine whether negative media sentiment causes downward pressure on CPP banks' stock returns.

If media pessimism indeed affects stock returns, we expect a significant market reaction to the publication of articles with negative sentiment.[24] We identify the publication date of each article in our sample and compute the cumulative abnormal stock returns over the two day event

[23] In unreported tests, we examine the frequency of bank delistings, given that delistings are typically the result of poor economic performance (Shumway, 1997). Consistent with their superior performance, we find that between October 2008 and December 2009, CPP banks were much less likely to delist, particularly for negative performance reasons, compared to non-CPP banks. Bank delistings in 2009 explain the drop in the number of non-CPP banks in Panel C, compared to CPP banks, because we are measuring ROA and NPL as at the end of 2009. Our delisting-related findings are consistent with Ng and Roychowdhury (2014), who show that banks that participate in the capital infusion program are less likely to fail (i.e., to be closed by bank regulators).

[24] In cases where more than one article is published on the same day, we estimate the average sentiment of these articles to determine whether we classify the date as having negative or non-negative media sentiment.

window around the article's publication date (from day 0 to 1). We use size-adjusted returns and beta-adjusted returns as our measures of abnormal returns. We compute size-adjusted (beta-adjusted) returns by measuring the buy-and-hold return over the event window in excess of the buy-and-hold return on a value-weighted portfolio of firms having similar market values (beta) over the same window. Membership in a market value (beta) portfolio is determined using the market value (beta) of equity at the beginning of the calendar year in which the return accumulation period begins.

We present the results in Table 6. First, we compare abnormal returns around the date when a negative media article is published across CPP and non-CPP banks and find that the abnormal returns for CPP banks are significantly lower.[25] The difference in size-adjusted (beta-adjusted) returns is -0.393% (-0.424%). Second, within the CPP bank group, we compare the stock return reactions on the days when a negative versus a non-negative sentiment article is published. We find a significant difference of -0.345% in the size-adjusted returns across the non-negative and negative sentiment article publication dates. While the difference in beta-adjusted returns is also negative at -0.157%, it is statistically insignificant. Overall, we view these results as providing support for the causal effect of the media on stock returns.

4.2.4 The effect of media sentiment as a function of bank size and loan portfolio quality

Having performed a wide variety of robustness tests supporting our proposition that media sentiment significantly affects the stock market valuation of the CPP banks relative to the non-CPP banks, in this section we investigate whether the effect of the media sentiment differs with bank size and the quality of its loan portfolio. On the one hand, larger banks have higher visibility and therefore may be more susceptible to media pessimism with respect to the CPP

[25] A bank is classified as a CPP bank if the announcement of the bank's participation in the CPP is on or before the media article date.

program. On the other hand, larger banks operate in a more transparent information environment than smaller banks do, suggesting that investors may place less weight on media sentiment when pricing these banks. With respect to the quality of a bank's assets, the adverse effect of the media sentiment may be magnified for banks with a larger proportion of non-performing loans in their portfolio. In column 1 of Table 7, we augment model 1 with the indicator variable *Large Bank*, which is equal to one if the bank's size is above the sample median, as estimated in the third quarter of 2008. We also interact this variable with *CPP*, *Media Sentiment* and the interaction term between these variable to assess the incremental effect of media sentiment on large CPP banks. We find a negative and significant coefficient on *CPP*Media Sentiment*Large Bank*, suggesting that, relative to non-CPP banks, media sentiment has a significantly stronger effect on large CPP banks. This evidence is consistent with the higher visibility of large banks, which increases their sensitivity to media coverage. At the same time, the coefficient on the interaction term *CPP*Media Sentiment* is insignificant, suggesting that the effect of media sentiment on smaller CPP banks does not differ significantly from its effect on non-CPP banks. In column 2, we augment model 1 with the indicator variable *Low Quality*, which is equal to one if the bank reports above-sample-median levels of non-performing loans in the third quarter of 2008, and zero otherwise (we also add all the relevant interaction terms). We do not find that the effect of media sentiment differs between the high and low asset quality CPP banks, suggesting that lower asset quality does not exacerbate the effect of media pessimism.

5. Conclusion

The U.S. government intervention in the economy during the financial credit crisis through its Capital Purchase Program (CPP) was unprecedented in terms of its impact and magnitude. Although the U.S. government emphasized that its capital infusions into banks were not a bailout

of poorly performing banks, the program received substantial negative media coverage as investors and the business community questioned the viability of the program's participants and the program's ability to support the U.S. economy. Using articles published in the *Wall Street Journal*, the financial publication with the largest circulation in the U.S., to capture the extent of negative media coverage about the CPP and its participant banks, we show that over the October 2008 – December 2009 period, almost 40% of published articles had a negative tone.

Motivated by the importance of investor sentiment in firm valuation and the strong link between investment sentiment and media tone, we investigate whether the extent of the negative media coverage of the CPP affected the valuation of the bank holding companies participating in the program relative to the valuation of non-participating banks. Understanding media's impact on bank valuation is relevant to policy makers, who may consider enhancing the transparency of government bailouts, as well as to bank managers who have to assess the consequences of accepting government funds. We document that the negative media sentiment substantially decreased the stock returns of both CPP and non-CPP banks, but that it had a substantially stronger effect on the valuation of CPP banks. We also show that the effect of media coverage on the CPP banks' returns is significantly stronger for larger banks, but that it does not vary with the banks' asset quality.

Our findings are robust to a series of tests. We demonstrate that they cannot be explained by our measure of media sentiment potentially capturing banks' performance over the sample period or by banks' fundamental characteristics. Additional event study analyses show that the results are also not driven by reverse causality, where a poor prior equity market performance causes the negative media sentiment.

By providing evidence that the negative media coverage surrounding government intervention in the banking sector adversely affected the banks stock market valuation during a period of high financial instability, our paper adds to the literature on the role of the media in capital markets, the importance of investor sentiment in firm valuation and the causes and consequences of government bailouts.

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Appendix A: Variable Definitions

Variable	Definition
Analyst Coverage	Indicator variable that equals one if at least one analyst is covering the bank during the month, and zero otherwise.
Analyst Revision	Change in the monthly analyst consensus mean EPS forecast scaled by the absolute value of the mean EPS forecast in the prior month.
Assets	Total assets (in $billions).
Beta	The market beta from regressions of daily stock returns on daily market returns over the six months ending on September 31st, 2008.
Blue State	Indicator variable that equals one if the Democrats won in the 2008 presidential elections in the state where the bank is headquartered, and zero otherwise.
Book To Market	Ratio of the book value of equity to the market value of equity.
Cash To Deposits	Ratio of cash to total deposits.
Capital Adequacy	Ratio of total capital to risk-weighted assets.
CPP	Indicator variable that takes the value of one if the bank announced its CPP participation, and zero otherwise.
Fair Value Exposure	Ratio of available-for-sale securities and trading securities to total assets.
GDP Growth	Percentage change in the gross domestic product of the state where the bank is headquartered, measured in 2008.
Interest Sensitivity	Ratio of the absolute value of net assets that are sensitive to short-term interest movements to total assets.
Large Bank	Indicator variable equal to one if the bank's size is above the sample median, as estimated in the third quarter of 2008, and zero otherwise.
Low Quality	Indicator variable equal to one if the bank reports above-sample-median levels of non-performing loans in the third quarter of 2008, and zero otherwise.
Media Sentiment	Ratio of the negative sentiment articles to the total number of articles in the *Wall Street Journal* related to the CPP or the participant banks, estimated on a monthly basis.
NPL	Ratio of loans that are past due 30 days, 90 days or non-interest-accruing to total loans.
Overall Bank Sentiment	Bank-specific monthly media content measure constructed based on the RavenPack database. This measure relies on a large number of articles covering an extremely wide range of topics about the bank (earnings announcements, financial position, credit rating changes, product market developments, CEO/CFO changes, etc.).
Population	Population (in millions) of the state where the bank is headquartered, measured in 2008.
ROA Ytd	Ratio of year-to-date net income to total assets.
Size	Market capitalization (in trillions).
Stock Return	Buy-and-hold stock returns on a monthly basis using daily returns from October 1, 2008 to December 31, 2009 (equally weighted).
Unemployment	Percentage of unemployment in 2008 in the state where the bank is headquartered.
Uninsured Deposits	Ratio of time deposits of $100,000 or more to total deposits.

Figure 1: Negative media coverage of the CPP and participant banks

This figure presents the proportion of the negative articles on the CPP or CPP participant banks in the *Wall Street Journal* from October 2008 to December 2009. The proportion is measured as the ratio of negative articles to the total number of articles on a monthly basis. Negative articles are defined as news items that have a negative tone about the CPP or the participant banks.

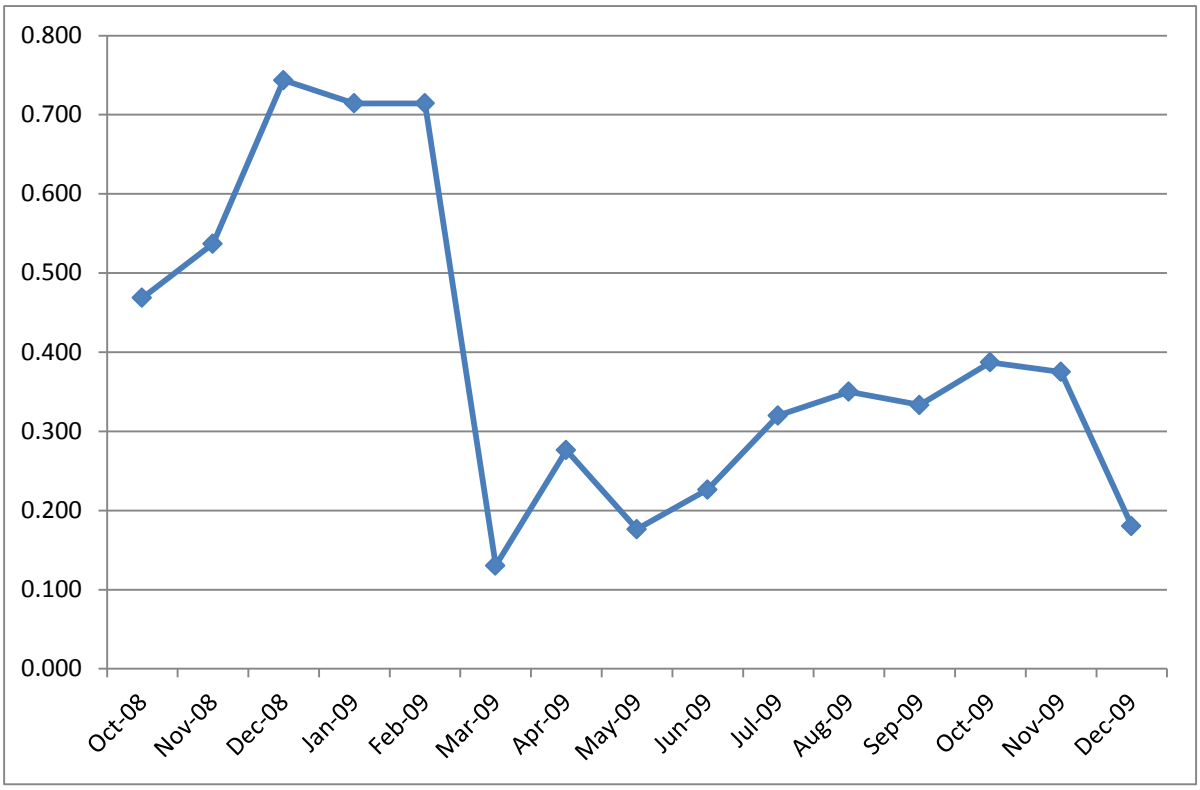

Table 1: Sample selection

This table summarizes the sample selection process. Panel A describes the construction of the sample of 188 banks that participated in the Capital Purchase Program (CPP) (i.e., CPP banks). Panel B describes the construction of the control sample of 158 banks (i.e., non-CPP banks).

Panel A: CPP banks

	Capital infusion		Repayments	
	Number	Amount ($b)	Number	Amount ($b)
Firms that received a capital infusion under the Capital Purchase Program	709	204.895	64	121.885
Retain bank holding companies only	558	194.657	50	117.775
After removing bank holding companies with total consolidated assets of less than $500 million	294	189.358	43	17.750
After removing bank holding companies that did not have ordinary shares listed on NYSE, AMEX or NASDAQ	188	184.593	39	117.676

Panel B: Non-CPP banks

Number of bank holding companies with total consolidated assets of $500 million or more as of September 30, 2008 (including Goldman Sachs and Morgan Stanley)	977
After removing bank holding companies that did not have ordinary shares listed on NYSE, AMEX or NASDAQ as at September 30, 2008	346
After removing 188 bank holding companies that participated in the CPP	158

Table 2: The distribution of capital infusions and repayments over time

This table presents the monthly distribution of capital infusions and repayments over the period from October 2008 to December 2009. Columns (1) and (2) report the distribution of the capital infusions by announcement date; the announcement date is the date when the bank announced the approval of a capital infusion or when the capital infusion is disclosed in the TARP transaction report, whichever is earlier. Columns (3) and (4) report the distribution of the capital infusion by commitment date; the commitment date is the date when the capital infusion was transferred to the bank. Columns (5) and (6) report the distribution of capital repayments by repayment date; the repayment date is the date when the capital was repaid by the bank. Column (7) reports the net capital outflow from the Treasury after taking into account the distribution of the capital infusion (by the commitment date) and the repayment (by the repayment date). For the two (one) banks that have received (repaid) capital in installments, the entire capital flow is assumed to have occurred on the date of the first infusion (repayment) transaction.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Capital infusion by the announcement date		Capital infusion by the commitment date		Repayment by the repayment date		Net outflow from Treasury to date
Year	Month	Number of banks	Amount ($b)	Number of banks	Amount ($b)	Number of banks	Amount ($b)	Amount ($b)
2008	10	29	162.614	8	125.000	0	0.000	125.000
2008	11	67	16.201	36	35.629	0	0.000	160.629
2008	12	65	4.439	81	20.601	0	0.000	181.230
2009	1	19	0.876	46	2.562	0	0.000	183.791
2009	2	5	0.401	11	0.607	0	0.000	184.399
2009	3	0	0.000	2	0.121	3	0.218	184.302
2009	4	0	0.000	1	0.011	5	0.679	183.634
2009	5	2	0.040	2	0.040	4	0.292	183.382
2009	6	0	0.000	0	0.000	10	65.164	118.219
2009	7	0	0.000	0	0.000	1	0.042	118.177
2009	8	0	0.000	0	0.000	2	0.160	118.017
2009	9	0	0.000	0	0.000	4	0.287	117.731
2009	10	1	0.022	1	0.022	0	0.000	117.753
2009	11	0	0.000	0	0.000	3	0.149	117.604
2009	12	0	0.000	0	0.000	7	50.687	66.917
Total		188	184.593	188	184.593	39	117.676	

Table 3: Descriptive statistics

The table presents descriptive statistics. Panel A presents descriptive statistics on bank characteristics and state-level controls. Panel B presents descriptive statistics with respect to the media coverage of the CPP and its participants over the sample period. Variable descriptions are presented in the Appendix. Significance levels are based on two-tailed tests. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Bank and state-level variables

Variable	All banks			CPP banks	Non-CPP banks		
	Mean	Median	Std Dev	Mean	Mean	Difference	
Bank-level characteristics (344 banks)							
ROA Ytd	0.000	0.004	0.016	0.002	-0.001	0.003	*
NPL	0.034	0.026	0.030	0.030	0.040	-0.011	***
Capital Adequacy	0.126	0.118	0.055	0.118	0.136	-0.018	***
Cash To Deposits	0.055	0.032	0.205	0.041	0.072	-0.031	
Uninsured Deposits	0.184	0.171	0.086	0.191	0.176	0.015	
Fair Value Exposure	0.148	0.136	0.089	0.144	0.153	-0.009	
Interest Sensitivity	0.141	0.115	0.115	0.145	0.137	0.008	
Assets	33.575	1.923	201.365	51.623	12.328	39.294	*
State-level characteristics (340 banks)							
Population	11.941	9.247	10.031	11.858	12.038	-0.179	
GDP growth	0.637	0.617	1.046	0.633	0.642	-0.009	
Unemployment	5.880	5.900	1.051	5.848	5.917	-0.068	
Blue State	0.744	1.000	0.437	0.777	0.705	0.072	

Panel B: Media articles

Year	Month	Articles			Proportion of Negative Articles
		Total	Positive	Negative	
2008	10	32	8	15	0.469
2008	11	54	7	29	0.537
2008	12	39	0	29	0.744
2009	1	77	3	55	0.714
2009	2	84	7	60	0.714
2009	3	69	8	9	0.130
2009	4	76	22	21	0.276
2009	5	51	11	9	0.176
2009	6	53	17	12	0.226
2009	7	50	7	16	0.320
2009	8	20	6	7	0.350
2009	9	33	2	11	0.333
2009	10	31	5	12	0.387
2009	11	24	1	9	0.375
2009	12	61	12	11	0.180

Table 4: The effect of media sentiment on bank valuation

This table presents the effect of the extent of negative media coverage of the CPP and its participants on bank valuation. Panel A presents the means and standard deviations of the variables used in this estimation. Panel B presents the regression analyses. The dependent variable is monthly returns from November 2008 to January 2010 for each bank. For banks that delist, the delisting returns are included in the month of delisting. CPP is an indicator variable equal to one starting with the month when a bank announces its participation in CPP, and zero otherwise. *Media Sentiment* is the ratio of the negative sentiment articles to the total number of articles in the Wall Street Journal related to the CPP or the participant banks, estimated on a monthly basis. The sample in column 3 excludes banks that were "forced" to participate in the CPP in October 2008. Variable descriptions are presented in the Appendix. Clustered t-statistics at the bank level are in parentheses. Significance levels are based on two-tailed tests. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Descriptive statistics (4,937 bank-month observations)

Variable			
	Mean	Median	Std Dev
Stock Return	-0.016	-0.015	0.226
CPP	0.541	1.000	0.498
Media Sentiment	0.399	0.350	0.196
Beta	0.991	1.067	0.796
Size	0.003	0.000	0.017
Book-to-market	1.165	0.915	0.983
Overall Bank Sentiment	27.017	47.750	24.970

Panel B: Regression analyses

	(1)	(2)	(3)	(4)
Constant	0.073***	0.055***	0.055***	0.162
	(8.47)	(4.73)	-4.74	-0.71
CPP	0.009**	0.041***	0.041***	-0.207
	(2.02)	(2.87)	-2.84	(-0.87)
Media Sentiment	-0.215***	-0.170***	-0.170***	-0.169***
	(-13.06)	(-6.69)	(-6.69)	(-6.61)
CPP x Media Sentiment		-0.081**	-0.082**	-0.082**
		(-2.40)	(-2.41)	(-2.42)
Beta	-0.005*	-0.005*	-0.007**	-0.005
	(-1.71)	(-1.69)	(-2.05)	(-1.51)
Size	0.264***	0.265***	1.106**	0.270***
	(3.14)	(3.14)	-2.38	-3.19
Book To Market	-0.004	-0.004	-0.004	-0.004
	(-0.88)	(-0.91)	(-0.84)	(-0.93)
Overall Bank Sentiment				-0.002
				(-0.47)
CPP x Overall Bank Sentiment				0.005
				-1.05
N	4,937	4,937	4,817	4,937
R-squared	0.037	0.038	0.038	0.039

Table 5: Controlling for banks' financial position and new information about their performance

This table presents the analysis of the effect of media sentiment on bank valuation, controlling for a bank's characteristics and its performance. Panel A presents the analysis of bank fundamentals associated with participation in the CPP. The dependent variable is CPP participation. The sample in column (3) excludes the banks that were "forced" to participate in the CPP in October 2008. In Panel B, we add additional controls for banks viability and the arrival of new information about their performance to our main specification in Table 4, where the dependent variable is *Stock Return*. In column (1) we control for a variety of bank characteristics and interact them with *CPP*. In column (2), we present the results of the propensity score matching estimation. In columns (3) and (4), we add controls for analysts' coverage and analysts' forecast revisions and their interaction terms with *CPP*. In Panel C we investigate banks' financial performance at the end of December 2009. In column (1), the dependent variable is *ROA*, while in column (2) the dependent variable is *NPL*. Variable descriptions are presented in the Appendix. The t-statistics are in parentheses (t-statistics are clustered at the bank level for Panel B analyses). Significance levels are based on two-tailed tests. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Bank fundamentals associated with CPP participation

	(1)	(2)	(3)
Constant	4.009***	4.167***	4.611***
	(4.25)	(2.96)	(3.17)
ROA Ytd	34.378***	38.626***	37.303***
	(2.80)	(2.98)	(2.88)
NPL	-15.352***	-14.643***	-14.647***
	(-3.08)	(-2.72)	(-2.72)
Capital Adequacy	-34.066***	-34.287***	-35.607***
	(-4.65)	(-4.66)	(-4.71)
Cash To Deposits	-3.903*	-3.895**	-6.212*
	(-1.95)	(-1.99)	(-1.69)
Uninsured Deposits	3.488**	4.020**	3.256*
	(2.28)	(2.36)	(1.84)
Fair Value Exposure	0.960	1.376	1.541
	(0.61)	(0.83)	(0.92)
Interest Sensitivity	0.873	1.204	1.042
	(0.80)	(1.07)	(0.92)
Assets	0.005*	0.005*	0.004
	(1.75)	(1.76)	(1.45)
Population		-0.013	-0.012
		(-0.93)	(-0.85)
GDP Growth		-0.104	-0.125
		(-0.69)	(-0.83)
Unemployment		-0.087	-0.090
		(-0.54)	(-0.56)
Blue State		0.496*	0.438
		(1.65)	(1.44)
N	344	340	334
N (CPP)	186	184	178
N (non-CPP)	158	156	156
Pseudo R-square	0.133	0.138	0.133

Panel B: Incorporating financial viability and new information arrival measures

	(1)	(2)	(3)	(4)
Constant	0.182	0.343	0.185	0.462
	(0.77)	(1.14)	(0.78)	(0.84)
CPP	-0.296	-0.428	-0.309	-0.703
	(-1.20)	(-1.39)	(-1.25)	(-1.26)
Media Sentiment	-0.166***	-0.168***	-0.166***	-0.166***
	(-6.42)	(-5.60)	(-6.42)	(-3.99)
CPP x Media Sentiment	-0.089***	-0.079*	-0.089***	-0.112**
	(-2.62)	(-1.89)	(-2.62)	(-2.04)
Beta	-0.007**	-0.008*	-0.007**	-0.002
	(-2.19)	(-1.87)	(-2.15)	(-0.31)
Size	0.419**	-0.063	0.446***	-2.582
	(2.40)	(-0.10)	(2.62)	(-1.06)
Book To Market	0.001	0.005	0.001	0.003
	(0.24)	(0.59)	(0.19)	(0.25)
Overall Bank Sentiment	-0.002	-0.006	-0.002	-0.009
	(-0.51)	(-1.03)	(-0.51)	(-0.87)
ROA Ytd	-0.065	-0.393	-0.042	0.351
	(-0.42)	(-0.52)	(-0.27)	(0.38)
NPL	-0.318*	-0.547	-0.309*	-0.357
	(-1.75)	(-1.51)	(-1.71)	(-1.41)
Capital Adequacy	0.177**	0.294**	0.175**	0.343**
	(2.09)	(2.06)	(2.05)	(2.18)
Cash To Deposits	-0.033	0.044	-0.034	0.623**
	(-1.50)	(1.01)	(-1.55)	(2.01)
Uninsured Deposits	-0.146***	-0.114	-0.144**	-0.112
	(-2.60)	(-1.64)	(-2.52)	(-1.14)
Assets	0.000**	-0.000	0.000**	0.002**
	(2.05)	(-0.02)	(1.98)	(2.32)
Analyst Coverage			-0.008	
			(-0.99)	
Analyst Revision				-0.000
				(-0.76)
CPP x Overall Bank Sentiment	0.006	0.009	0.006	0.014
	(1.16)	(1.46)	(1.16)	(1.31)
CPP x ROA Ytd	0.289	0.300	0.201	0.404
	(0.63)	(0.38)	(0.43)	(0.35)
CPP x NPL	0.326	0.446	0.308	0.584
	(1.19)	(1.06)	(1.14)	(0.98)
CPP x Capital Adequacy	0.277	0.086	0.332	0.263
	(1.28)	(0.34)	(1.49)	(0.57)
CPP x Cash To Deposits	0.063**	-0.043	0.060**	-0.601*
	(2.18)	(-0.74)	(2.01)	(-1.90)
CPP x Uninsured Deposits	0.106	0.079	0.103	0.122
	(1.60)	(1.01)	(1.54)	(1.10)

	(1)	(2)	(3)	(4)
CPP x Assets	-0.000**	0.000	-0.000**	-0.001*
	(-2.44)	(0.90)	(-2.37)	(-1.90)
CPP x Analyst Coverage			0.014	
			(1.49)	
CPP x Analyst Revision				0.001
				(0.82)
N	4,907	3,338	4,907	2,090
R-squared	0.0430	0.0422	0.0433	0.0625

Panel C: Banks' financial performance following CPP initiation

	(1)	(2)
Constant	-0.032***	0.085***
	(-4.85)	(6.17)
CPP	0.005*	-0.018***
	(1.87)	(-3.43)
Capital Adequacy	0.152***	-0.161*
	(3.56)	(-1.82)
Cash To Deposits	-0.003	0.023
	(-0.31)	(1.01)
Uninsured Deposits	-0.045***	0.125***
	(-3.03)	(4.01)
Fair Value Exposure	0.062***	-0.113***
	(4.18)	(-3.70)
Interest Sensitivity	0.005	-0.003
	(0.41)	(-0.15)
Assets	0.000	0.032**
	(0.02)	(2.42)
N	321	321
N (CPP)	184	184
N (non-CPP)	137	137
Pseudo R-square	0.219	0.133

Table 6: Event study analysis of negative media coverage

This table provides additional robustness tests to investigate whether negative media sentiment has a causal effect on CPP banks' stock returns. We identify the publication date of each article in our sample and compute cumulative abnormal stock returns over the two days event window on and after the article's publication date. We proxy for abnormal stock returns using size-adjusted returns and beta-adjusted returns. Significance levels are based on two-tailed tests. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

Abnormal returns on and after negative media days, CPP banks versus Non-CPP banks

Size-adjusted returns			Beta-adjusted returns		
CPP banks	Non-CPP banks	Difference	CPP banks	Non-CPP banks	Difference
-0.521***	-0.128*	-0.393**	-0.678***	-0.254*	-0.424**

Abnormal returns on and after negative media days versus non-negative media days, CPP banks only

Size-adjusted returns			Beta-adjusted returns		
Negative media days	Non-negative media days	Difference	Negative media days	Non-negative media days	Difference
-0.521***	-0.176**	-0.345**	-0.678***	-0.521***	-0.157

Table 7: Cross-sectional variation with size and loan portfolio quality

This table investigates whether the effect of media sentiment differs with bank size (column 1) and the quality of its loan portfolio (column 2). The dependent variable is *Stock Return*. Variable descriptions are presented in the Appendix. Clustered t-statistics at the bank level are in parentheses. Significance levels are based on two-tailed tests. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Constant	0.055***	0.055***
	(3.52)	(6.82)
CPP	-0.008	0.033***
	(-0.40)	(2.90)
Media Sentiment	-0.177***	-0.147***
	(-5.15)	(-8.46)
CPP x Media Sentiment	0.051	-0.080***
	(1.11)	(-2.95)
Beta	-0.013**	-0.005
	(-2.31)	(-1.64)
Size	0.288***	0.299***
	(3.42)	(3.66)
Book To Market	-0.003	0.001
	(-0.80)	(0.16)
Large Bank	0.015	
	(0.63)	
CPP x Large Bank	0.081***	
	(2.95)	
Media Sentiment x Large Bank	0.017	
	(0.34)	
CPP x Media Sentiment x Large Bank	-0.227***	
	(-3.49)	
Low Quality		-0.014
		(-0.57)
CPP x Low Quality		0.019
		(0.66)
Media Sentiment x Low Quality		-0.046
		(-0.88)
CPP x Media Sentiment x Low Quality		-0.002
		(-0.03)
N	4,937	4,937
R-squared	0.043	0.041