Real Effects of Investment Banking Relationships: Evidence From the Financial Crisis[*][†]

David Oesch,[a] Dustin Schuette[a] and Ingo Walter[b]

[a]Swiss Institute of Banking and Finance, University of St. Gallen

[b]Department of Finance, Stern School of Business, New York University

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Abstract

In this paper, we investigate damage to real-sector investment spending and corporate financing activities triggered by the failure of three major investment banks during the 2007-09 financial crisis. We find that firms characterized by pre-crisis corporate investment banking relationships with troubled investment banks exhibit significantly lower post-crisis investment spending activity and securities issuance compared to corporations that were not affiliated with the troubled institutions. The effect varies systematically with the nature and strength of the investment banking relationship. Our results are robust with respect to various modifications and extensions of our empirical design and generally inconsistent with alternative explanations unrelated to investment banking relationships.

1. Introduction

Do relationships between nonfinancial corporations and investment banks have a significant impact on nonfinancial corporations' capital spending and financing activities? Research has so far provided little evidence on this question, in light of problems in observing and measuring such relationships. This issue has gained in importance in view of the ongoing restructuring of the global investment banking industry and the corresponding reconfiguration of investment banking relationships with corporate clients in the wake of the financial crisis of 2007-2009.

During 2008, three major financial firms with investment banking operations either failed (Lehman Brothers) or had to be taken over (Bear Stearns, Merrill Lynch).[1] Table 1 provides an overview of the respective underwriting market shares of these three firms during the ten years prior to the financial crisis. Using data from the SDC New Issues database on U.S. issues underwritten between 1998 and 2008, the table indicates that the market share of the underwriters that ceased to be viable in 2008 was substantial. Over this ten-year period, one of these three firms served as lead underwriter in roughly one deal out of four covered by the data.

In this paper, we analyze the disruption of underwriter relationships experienced by clients of the three aforementioned firms (hereafter "investment banks") to investigate whether a negative shock to these relationships affected corporate clients' investment expenditure and financing activities. We believe that this empirical setting is particularly appropriate for an analysis of the effects of investment banking relationships because - in contrast to cross-sectional regressions correlating measures of underwriter relationship strength with corporate outcomes -

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[1] For purposes of this paper, investment banking during the period covered by our study is defined as underwriting and dealing in fixed-income and equity securities and their derivatives, proprietary investments, and advisory mandates related to mergers and acquisitions, corporate restructurings and complementary financial and advisory activities.

it represents a possible exogenous shock to underwriter relationships introduced by the failure or near-failure of investment banks during the financial crisis.

Previous literature shows that investment banking relationships provide economic value. This appears to be associated with economies of scale and scope (James, 1992; Drucker and Puri, 2005), switching costs (Burch, Nanda and Warther, 2005), monitoring (Hansen and Torregrosa, 1992), or admission to an established investor network (Gao and Ritter, 2010).

Kovner (2012) and Fernando, May and Megginson (2012) provide empirical evidence that the economic value of investment banking activities is shared with client firms. Using stock market reactions to the failure of troubled investment banks, the authors suggest that market participants perceive these relationships to be relevant for firm value. Specifically, they document that the stocks of clients of troubled investment banks experienced significantly negative abnormal returns around the dates when the investment banks' problems became public compared to firms without such relationships.

This paper attempts to answer the question whether the disruption of underwriter relationships following the demise or merger/takeover of a company's underwriter affects client firms' investment spending and financing activities. We provide evidence that this is indeed the case.

Using a difference-in-differences approach that contrasts changes in investment spending and financing of clients of troubled underwriters to clients of other investment banks, we document that firms that had mandated a troubled underwriter as lead underwriter of a capital issue in the three years prior to September 2008 (our treatment sample) experienced a reduction in investment spending and financing that was on average 5.9% and 13.4%, respectively, larger than for control firms. Moreover, our results show that corporate clients alter their financing mix

to use sources of capital that are less information-sensitive such as internal financing, leading to a reduction in cash holdings.

We interpret these results as consistent with a certification effect of investment banking relationships as documented by Megginson and Weiss (1991), suggesting that one possible benefit of a relationship with an investment bank is the certification that it provides about the quality of clients' investment projects. Disruptions to such relationships (and the certification function provided by them) could in turn increase the firm's cost of capital, decrease investment spending and render investment more sensitive to the availability of internal funds. Consequently, firms may reduce their investment spending and substitute away from external capital to internal funding.

The effects that we document vary systematically with the nature of the established investment banking relationships. Companies with an equity underwriting relationship to a troubled investment bank overall experience stronger effects, reflected especially in a reduction in equity financing. Companies with a debt underwriting relationship to a troubled investment bank, on the other hand, experience a particularly strong reduction in debt financing and a much weaker effect on equity financing. For example, client firms that had established relationships on the basis of equity issuance experienced a change in equity issuance that was 12.8% smaller compared to control firms. In contrast, we find firms whose relationship with a troubled investment bank originates from debt issuance to be negatively affected in subsequent debt issuance, while there is no significant effect in their subsequent activity in equity issuance.

We perform a number of robustness tests that rule out alternative explanations and mitigate concerns that our results are driven by confounding factors unrelated to investment banking relationships. Specifically, we show that our documented treatment-effect decreases

with the strength of the investment banking relationship as measured by the amount of time passed since the troubled investment bank was last mandated as lead underwriter. This finding is considerably more difficult to reconcile with explanations other than established investment banking relationships. Our treatment-effect likewise does not seem to be driven by unobservable firm characteristics unrelated to investment banking relationships, such as lending relationships or counterparty risk. In this regard, we screen all SEC filings by control companies and reduce the control sample to firms with contractual exposure to the troubled investment banks. The difference-in-differences estimations using this alternative control sample are effectively unchanged compared to our baseline case.

Next, we provide evidence that our results are stronger (but not exclusively driven) by clients of Lehman Brothers, the only one of the three troubled investment banks that actually filed for protection under Chapter 11 of the US Bankruptcy Code.

Moreover, our findings seem to be unrelated to the fact that the troubled investment banks ranked among the largest investment banks prior to 2008. When we reduce the control sample to clients of investment banks with similar status in 2007, our results remain virtually unchanged. In further tests, we control for potentially different levels of firm risk in the treatment and control group. Specifically, we are able to rule out the alternative explanation that our results are based on significantly higher levels of firm risk in the treatment group.

We also examine whether our results are due to general time-trends rather than the disruption of investment banking relationships. When we perform our difference-in-differences analysis around events that are shifted one year into the future or one year into the past, the difference-in-differences coefficients in our regressions turn insignificant.

In a final step, we expand our control sample to include all non-treated companies in Compustat (as opposed to all non-treated companies in the SDC database with at least one underwritten issue in the years before the financial crisis). Taken together, our results suggest that disruptions to investment banking relationships significantly affect corporate financing activity, and they extend our understanding of the real (capital spending) effects of financial shocks.

The objective of the paper is thus to contribute to the nascent literature investigating investment banking-client relationships in the wake of the financial crisis of 2007-2009. Fernando, May and Megginson (2012) and Kovner (2012) document that clients of the affected investment banks experience larger declines in their stock prices compared to clients of other investment banks upon the announcement of their investment bank's failure. While these papers investigate the value-relevance of underwriter relationships, our focus is on the potential real effects of these relationships, and we investigate firms' actual financial and investment spending activities.

The paper therefore contributes as well to the literature investigating the real effects of financial shocks. As a result of the severe stress experienced on global financial markets during the financial crisis of 2007-2009, there has been a surge of interest in the effects of financial shocks on the real economy (e.g., see the survey paper by Bond, Edmans and Goldstein, 2012). While existing literature has investigated shocks such as the loss of a security analyst (Derrien and Kecskés, 2013) or a relationship lender (Chodorow-Reich, 2014), the introduction of credit ratings on syndicated loans (Sufi, 2009), the refinement of credit ratings on corporate bonds (Tang, 2009), and the effect of stock prices on acquisition expenditures (Edmans, Goldstein and

Jiang, 2012) and equity issuance (Khan, Kogan and Serafeim, 2012), we focus on the potential real effects brought about by the disruption of existing investment banking relationships.

Additionally, the paper contributes to the strand of literature that concentrates on the formation and characteristics of investment banking relationships. Asker and Ljungqvist (2010) document that firms' reluctance to share an underwriter with a product market rival can have detrimental effects on the firms' investment spending. Ljungqvist, Marston and Wilhelm (2006, 2009) find that co-management opportunities are positively related to corresponding analyst optimism and that this increases the probability of a future lead-management position. Whereas this literature primarily examines the development of investment banking relationships, we add the consequences of a major distortion of an already established relationship.

Finally, we contribute to understanding the real value of investment banking relationships from a regulator's point of view. For example, Diamond and Rajan (2002) analyze *ex post* crisis costs of bank bailouts in terms of a possible change in aggregate liquidity. Especially with regard to Lehman Brothers, we extend this literature by concentrating on the reverse. If a shock to relationships between investment banks and clients induces severe negative consequences for the real economy, a regulator would do well to consider possible responses to such an event and take these costs into account.

Section 2 of the paper contains a description of the data and the statistical sample employed. Section 3 presents the empirical methodology. Section 4 reports the main results, and in Section 5 we report additional analyses and robustness tests. Section 6 concludes.

2. Data and Sample

Consistent with the importance of an underwriter for firms (e.g. Asker and Ljungqvist, 2010), we use firms' equity and debt issuances to identify an investment banking relationship.

We use the Securities Data Corporation (SDC) New Issues Database to identify all capital issues in the U.S. market in the ten-year period from 16 September 1998 to 16 September 2008. We follow earlier work such as Hansen (2001), Fernando, May and Megginson (2005) and Asker and Ljungqvist (2010) and exclude all issues by utilities, financials, and government entities (SIC Codes starting with 49, 6, and 9) from our sample. In order to classify capital-issuing firms by their respective investment bank, we also exclude all issues for which the corresponding underwriter or book-runner are not disclosed. We use Compustat for financial and accounting data and CRSP for stock return data.

In our screenings for counterparty risk, we use 10-K, 10-Q, and 8-K filings obtained from the SEC EDGAR database. As discussed in Section 3 below, we assign sample companies to a "treatment" or a control group in our empirical analyses. To align these groups in terms of firm size, we drop control firms with total assets smaller than the median total assets of the control group.

In examining the real effects of a shock to a company's investment banking relationship, we apply our analyses to four sets of corporate financial variables: investment spending, financing, dividends and cash holdings. Investment spending consists of capital expenditures, research and development costs, and acquisition costs. Financing comprises gross debt and equity issuance to reflect a firm's ability to source new funds in the capital market. We also introduce a net financial cash flow variable that includes debt reductions, stock repurchases and dividend payments to account for the net financial resources available to a firm from all sources. Dividends are defined as cash payouts to shareholders, and cash holdings are defined as cash and short-term investments. Except for firm age and firm size, we scale our variables by total assets. To mitigate the influence of outliers, we winsorize our variables at the 1st and 99th percentiles.

Table 2 provides the descriptive statistics for the main variables used in the paper. The distribution of our financing variables is close to that of papers using similar dependent variables such as Derrien and Kecskés (2013).

3. Methodology

3.1 Regression model

We employ a difference-in-differences approach to analyze the real effects of the failure or virtual failure of the three aforementioned major underwriters on their clients. The treatment-effect we are interested in estimating is the impact on investment-spending and corporate financing brought about by a distortion of the investment banking relationship. To obtain this, we compare the group of companies affected by that distortion to a control sample of unaffected companies. For the identification of the treatment group, we follow Kovner (2012) by restricting the period during which a company can be classified as affiliated with a troubled underwriter.

Specifically, every company that used a troubled investment bank as lead underwriter for its last capital issue in the period between 16 September 2005 and 16 September 2008 (the three years before the failure of the three underwriters) is assigned to the treatment group. The remaining companies are assigned to the control group. This approach is also applied by James (1992) who shows that positive effects of a strong underwriter relationship decrease with a growing interval between two sequential issues. We relax this time constraint in additional tests to analyze the strength of the relationship. We then differentiate the treatment group by the strength of the underwriter relationship by also including issues where the investment bank did not hold a lead position in the underwriter syndicate. Overall, we expect the effects on our dependent corporate financial variables to increase with the intensity of this relationship.

Next, we define a pre- and post-treatment year for every sample firm. The treatment date

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of a firm is determined by the loss of its affiliated investment bank. If a firm is associated with several troubled investment banks, we adopt the conservative option and set the treatment date to the first point in time at which the relationship between client and underwriter becomes distorted.[2] For the distortion to take effect, we introduce a transition period. The pre-treatment year is the first completed fiscal year ending three months before the treatment date, while the post-treatment year is the first completed fiscal year that began three months after the treatment date. So the pre-treatment year of a Lehman Brothers client with a fiscal year-end of December 31st would be fiscal year 2007 and the post-treatment year would be 2009. There is no treatment date for our control group. However, since most of our sample firms have their fiscal year-end on December 31st, we define 2007 and 2009 as respective pre- and post-treatment years for our control group. Our difference-in-differences approach takes the form of the following regression equation:

$$CP_i = \alpha + \beta_1 treated_i + \beta_2 post_i + \beta_3 treated_i \times post_i + \bar{\gamma}\bar{C} + \varepsilon_i$$

where CP_i is the corporate financing variable of firm i, $treated$ is a dummy variable that is equal to 1 if the firm is affiliated with a troubled investment bank and 0 otherwise. $post$ is a dummy variable that is equal to 1 if the firm-year is the post-treatment year and 0 otherwise. The coefficient on the interaction variable $treated \times post$ is the difference-in-differences estimator. We are particularly interested in this coefficient because it suggests whether the pre versus post-difference in CP_i of treated companies is different from the pre versus post-difference in CP_i of

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[2] Hence, if a company was a client of Lehman Brothers and Bear Stearns, the collapse of Bear Stearns is the earlier of both treatment dates. In this specific example, we would use March 2008 as treatment date for this firm. Since underwriting activity could still be shifted to Lehman Brothers after March 2008, this is a rather conservative approach.

control companies. If this term is negative, treated firms experience a stronger decrease in CP_i than control firms We cluster standard errors at the firm level. $\bar{\gamma}$ is a vector of regression coefficients for the vector of control variables $\bar{C}$ that account for the variation in CP that can be attributed to factors unrelated to investment banking relationships such as firm size (proxied by the natural log of firm's total assets), firm age (proxied by the number of years since a company first appeared in Compustat), operational income and Tobin's Q (Fazzari, Hubbard and Petersen, 2000; Moyen, 2005). Finally, to mitigate concerns that our results reflect industry-specific factors unrelated to a distortion of underwriter relationships, we include industry-fixed effects.

In additional tests, we exclude the interaction variable $treated \times post$ and repeat the regression for treated and control firms in separate regressions. This allows for the inclusion of firm-fixed effects to control for unobservable firm-specific characteristics.

4. Results

4.1 Do distortions of client-underwriter-relationships have real effects?

Using our empirical setup, we examine the real and financial effects of a shock to a company's relationship with its lead underwriter. Table 3 presents the results of our main analysis, in which we estimate our difference-in-differences model and use the corporate finance dependent variables described in Section 2 and presented in Table 2. The focus is on the coefficient on *treated x post,* our difference-in-differences estimator, which indicates to what extent treated firms (i.e. firms experiencing a distortion of their investment banking relationship) differ in their corporate finance and real changes from pre-crisis to post-crisis compared to control firms (i.e. firms experiencing no shock to their underwriter relationship).

The first four columns report the results for *Capex*, *R&D Expenses*, *Acquisition Expenses*, and the sum of these variables, *Total Investment*. The results suggest that a distortion to a

company's investment banking relationship has considerable impact on its investment- spending. Specifically, the first four columns show that treated firms reduce their capital expenditures and acquisition outlays significantly more compared to the control firms. Whereas the coefficient on *post* indicates that all sample firms reduce their investment-spending, the total investment outlays of treated firms are reduced by roughly 5.9% more than the total investment outlays of control firms, a reduction that is significant at the 5% level. This sizeable effect suggests that shocks to investment banking relationships have real effects for companies.

Bao and Edmans (2011) find support for the hypothesis that investment banks identify synergistic targets for their clients and negotiate favorable terms. Such beneficial aspects of M&A advisory are even more pronounced for top-tier investment banks (Golubov et al., 2012). To this end, a shock to an investment banking relationship may have a negative effect on the acquisition expenses of a client. This idea is also supported by the evident cross-selling efforts of investment banks (e.g. Drucker and Puri, 2005) as well as the strong reputation of the three aforementioned investment banks. Consistent with this notion, we find that the acquisition expenses of treated firms decrease by 4.8% more than that of control firms. Since we identify investment banking relationships through clients' underwriting activities, this result suggests that underwriting relationships can extend to other investment banking services.

The next three columns report the results for *Debt Issuance (gross)*, *Equity Issuance*, and *Total Financing*. Similar to the results for corporate investment outlays above, the significant difference-in-differences coefficients suggest that a distortion of a company's investment banking relationship has considerable impact on its access to financing. Specifically, treated firms reduced both their debt and equity issuance significantly more compared to control firms. Consequently, the total net financing of treated firms declines by about 13.4% more than the

total net financing of control firms, a reduction that is significant at the 1% level. This significant effect indicates that shocks to investment banking relationships have an impact on companies' financing activities in addition to their investment outlays and suggests that companies experiencing a distortion of their investment banking relationship throughout the crisis subsequently face temporary difficulties in placing capital in the market.

Finally, we investigate corporate payouts and cash holdings in the last two columns of Table 3. We find no significant difference-in-differences effects with respect to dividend payments. However, while control firms are able to extend their cash holdings by 1.9% (significant at the 1% level), treated firms reduce their cash holdings by 2.7%. The difference of 4.6% is significant at the 5% level. These results suggest that treated firms reduced their cash holdings, possibly in an attempt to adjust to a limitation on outside funding (which presumably became harder to obtain due to the shock to the investment banking relationship) by accessing internal sources of capital. Alternatively (or additionally), treated firms may have reduced their cash holdings in order to be able to maintain previously established levels of dividend payouts. Overall, the results of the estimation of our difference-in-differences research design presented in Table 3 are consistent with an interpretation that the shock to an investment banking relationship has a significant effect on companies' corporate behavior and is associated with a substantially negative impact on corporate investment and financing.

4.2 Impact of the nature of the investment banking relationship

Underwriter relationships ought to be more valuable in markets that are susceptible to high levels of asymmetric information (e.g., Myers and Majluf, 1984), such as the equity capital market. Consistently, Fernando, May and Megginson (2012) find the negative impact of the distortion of an investment banking relationship on corresponding client firms' market

capitalization to be more pronounced for relationships that emerge from equity underwritings than debt underwritings. Consistently, we expect the effects on corporate investment and financing to be more pronounced for investment banking relationships that emerge from an equity underwriting. To test whether such heterogeneous treatment effects can also be observed in our sample under stress conditions, we split our treatment sample into firms that established their relationship on the basis of equity underwriting versus firms that base their relationship on debt underwriting. Table 4 presents the results of our previous analyses for treatment samples that are re-defined according to the nature of the investment banking relationship.

Firms with a former equity underwriting relationship do not show significant changes in debt financing, while their equity issuance activity significantly declines (12.8%) compared to control firms. In contrast, treated firms with a prior debt underwriting relationship exhibit no significant effect on equity issuance, but they do issue significantly less debt (14.0%) in comparison to the control group. Overall, the results seem to be more pronounced for an equity underwriting relationship than for a debt underwriting relationship. The change in total net financing for equity underwritings is 15.2% lower than for control firms, while it is only 10.4% lower for debt underwritings.

Interestingly, these differences are also reflected in corporate investment spending variables. While firms that experience a shock to an equity underwriter relationship exhibit a decrease in capital expenditures that is 2.7% larger compared to control firms, this change is insignificant for firms with a shock to their debt underwriting relationship. On the other hand, the relative decrease of acquisition expenditures is economically and statistically significant for firms that established a debt underwriter relationship (7.6%) whereas it is insignificant for firms that established an equity underwriter relationship. This is not only consistent with the fact that

acquisitions are predominantly financed by debt rather than equity and but also with the notion that investment banking relationships may be used to cross-sell acquisition advisory services.

Finally, the comparatively more pronounced effects of the shock to an equity underwriting relationship are also reflected in cash holdings. Although the coefficient on this variable is statistically significant for both subgroups, the reduction in cash holdings for firms with a shock to an equity underwriting relationship is twice as large (6.6%) compared to the reduction of firms that experienced a shock to their debt underwriting relationship (3.4%).

Overall, the results presented in Table 4 lend support to the negative impact of a shock to an investment banking relationship on corporate financing and investment spending, but also contribute to our understanding of the differential importance and impact of debt and equity underwriting relationships.

4.3 Impact of the strength of the investment banking relationship

If it is indeed the investment banking-relationship effect that drives the results presented so far, we should reasonably expect these results to become less pronounced with a decrease of the strength of the investment banking relationship.

In a first test, we proxy such a decrease by the role the investment bank plays in the client's underwriter syndicate. Specifically, we assign a company to the treatment group if a troubled investment bank was part of the underwriter syndicate but not mandated as the lead underwriter (we exclude observations where a troubled investment bank was lead underwriter in these estimations). In unreported results, we note that overall the coefficients on the interaction variables substantially decrease in economic magnitude and statistical power. The coefficients on *Total Investment*, *Total Financing*, as well as *Cash Position* become insignificant. Equity issuance is reduced from 8.1% to 3.8% (significant at the 10% only).

In a next step, we model the strength of an investment banking relationship by the time that has passed since the last time a troubled investment bank acted as lead underwriter. In previous tests, we constrained the time period in which a firm can become affiliated with an investment bank to the three years preceding September 2008. Relaxing this constraint, we expect the effect of a shock to an investment banking relationship to decrease over time. If investment banks can exploit economies of scale by recycling proprietary information of clients (James, 1992), these benefits will disappear over time as information become obsolete.

We gradually extend the affiliation period used to classify companies as treated by intervals of one year. In the most extreme case, we take into account all deals that fall into the 10-year period preceeding September 2008, expanding our treatment sample to a total of 386 firms. Table 5 presents the results of the estimation of our difference-in-differences model with these alternative treatment groups. For reasons of space we report only the difference-in-differences coefficient for each regression.

Overall, we observe an almost monotonic decrease in the magnitude and significance of the differences between the treatment and control groups in the number of years added to the affiliation period for our corporate investment expenditure variables. With respect to the corporate financing variables, the reduction in significance is somewhat less pronounced but the economic magnitude is substantially reduced. Companies for which more time elapsed since the last contact to their relationship investment bank seem to be less economically affected by the shock to the investment banking relationship. For example, the reduction in total investment spending of treated firms is 5.9% larger than for control firms for an affiliation period of three years. This number decreases to only 0.9% if we expand the affiliation period to 5 years. At the same time, the reduction of total debt and equity financing of treated firms is 13.4% larger than

for control firms for an affiliation period of three years. This number decreases to 3.5% and becomes insignificant when we expand the affiliation period to 10 years.

These results lend support to the notion that our main findings can be attributed to a relationship-specific channel and are indeed related to the shock to the relationship between a lead underwriter and its client firm.

5. Additional tests and robustness checks

5.1 Alternative explanation: Unobservable firm characteristics that are unrelated to underwriter relationships

One could argue that the effects documented above are not related to firms' relationships to their investment banks but rather to other investment bank-specific factors, such as the loss of a lending relationship or counterparty risk. We provide two pieces of evidence that appear to refute such an alternative explanation.

First, we assume that Bear Stearns, Lehman Brothers and Merrill Lynch cross-sell wholesale financial services (e.g., corporate credit lines) to their investment banking clients (Drucker and Puri, 2005). If our results are unrelated to the shock to an underwriter relationship, but rather driven by commercial banking services no longer available from the relationship investment bank, the impact should become substantially weaker when we exclude control firms that do not have material contractual exposure to any of the three troubled investment banks. That is, both treated and control firms may have material commercial banking exposure to one of the three troubled investment banks, and we proceed to measure the incremental effect of an underwriting relationship. To this end, we screen every 8-K, 10-Q, and 10-K filings by sample companies between July 2008 and December 2009. In total, we gather more than 30,000 documents and screen them for links to Bear Stearns, Lehman Brothers, or Merrill Lynch,

isolating 378 control firms that are dropped from the sample. Repeating our analyses on the basis of this constrained sample leaves our results basically unchanged. Treated firms still exhibit significantly sharper decreases in corporate investment, financing and cash holdings over the control group.

Second, we employ a firm-fixed effects model to account for unobservable firm-specific characteristics that may not have been picked up in our screening of SEC filings. The results are summarized in Table 6. Regressing treated and untreated firms separately and including firm-fixed effects in these regressions[3], we find that the change in capital outlays, acquisition expenditures, total investment, debt issuance, equity issuance, total financing, as well as the amount of cash holdings from pre-crisis to post-crisis levels is significantly more negative for treated firms than for control firms. All variables are significant at least at the 5% level.

To validate the difference in the coefficients from the two separate regressions, we conduct a Chow (1960) test. The coefficients are different from each other at the 5% significance level or better. The high levels of R^2 show that the fixed effects pick up substantial amounts of variance in the dependent variables that our control variables are not able to explain. The consistency of these results with our full-sample evidence corroborates our interpretation that the effects on corporate investment and financing are due to a relationship-specific channel.

5.2 Robustness: Lehman Brothers vs. Other Troubled Underwriters

Under the premise that the severity of the investment banking relationship shock is directly related to the nature of the financial crisis, it is reasonable to assume that our documented treatment effect is more pronounced for the clients of Lehman Brothers (the only one of the three troubled investment banks that actually filed for bankruptcy). To investigate this

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[3] Note that it is not possible to include firm-fixed effects in full sample estimations of our difference-in-differences model, because the firm-fixed effects for a company are collinear with the treatment dummy.

hypothesis, we differentiate treated firms according to the nature of their underwriter's collapse and divide our treatment group into two subsamples. We then repeat our analysis. The first subsample contains only clients that were affiliated with Lehman Brothers, the second subsample contains only clients affiliated with Bear Stearns and Merrill Lynch. We present the results of this analysis (focusing on the difference-in-differences coefficients) in Table 7. As expected, we find that our results are stronger in the subsample of Lehman Brothers clients (Panel A). The results for clients of Merrill Lynch and Bear Stearns (Panel B) are weaker both in size and significance. They are, however, still significant (or only borderline insignificant) for a number of corporate policies. Overall, our main results presented in Table 3 seem to be stronger for the subsample of Lehman Brothers clients but not exclusively driven by this subsample.

5.3 Alternative Explanation: Major Investment Banks

The three investment banks determining the treatment group belonged to the largest players in the investment banking industry prior to the financial crisis. The control group, however, also comprises a number of considerably smaller underwriters with potentially different reputation (Fernando, Gatchev, May and Megginson, 2013). On the one hand, the effect of the investment bank relationship might be correlated with the size of the firm. On the other hand, based on their league table standing, the three distressed investment banks may attract a more homogenous client group. Against the backdrop of a positive assortative matching process between underwriter and client (Fernando, Gatchev and Spindt, 2005), a straightforward way of increasing the homogeneity in the control group is an increase in the homogeneity of their underwriters.

We therefore constrain the control sample to clients of the top 25 underwriters based on 2007 league tables for equity and debt underwritings. In unreported results, we find that treated

companies still show a significant decrease in total investment spending, total financing and cash holdings compared to the control sample. Despite a decrease in sample size, the results remain virtually unchanged in both magnitude and levels of significance.

5.4 Alternative Explanation: Firm Risk

As a further robustness test, we analyze whether treatment and control groups differ with respect to risk. It is possible that the three distressed investment banks were attracting systematically more risky clients. In this context, a comparatively higher decline in treated firms' corporate financial and performance variables would not be related to the shock of an underwriter relationship, but rather to the consequence of a relatively more pronounced reaction to the financial crisis. Since our sample is constrained to U.S. companies and the average firm size is quite large, we proxy the systematic risk of a firm by its beta with respect to the S&P 500.

Excluding firms with less than 100 return observations, we calculate five beta values, based on the daily returns between one and five years before 2008. Comparing the average beta of treated and untreated firms for the five sample periods, we find that treated firms do not exhibit significantly higher beta coefficients for any of the calculation periods in our study.

5.5 Alternative Explanation: Time Trends

It is possible that our results do not stem from a distortion of the treated firms' relationship to their respective investment banks, but rather from alternative factors specific to our treatment group or the regression design. Accordingly, we conduct a placebo test and run our analyses under conditions wherein the shock to the investment banking relationship occurred either one year before or one year after the actual shock.[4] If a time trend among treated firms

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[4] Although we maintain all criteria for the selection of our treatment and control group, we note that small differences in the sample composition can arise due to data availability.

leads to the investment expenditure and financing effects that we have documented, we would expect our results to remain unchanged by this shift of the event-timing. If, on the other hand, the effects are the result of a disruption to treated firms' investment banking relationships, we would expect the counterfactual difference-in-differences coefficients to lose economic and statistical significance in the placebo tests. In unreported results, we indeed find this to be the case.[5]

In a further test, we hold the pre- and post-treatment years constant while randomly assigning firms to the treatment and control group. Again the results become statistically insignificant, suggesting that our findings are specific to our treatment companies and not associated with a general crisis or time-trend effect.

Overall, these additional tests shed further light on a potentially causal interpretation of our results. The findings appear to be unrelated to the time-frame around 2008 or to a general time trend among treated firms.

5.6 Robustness: Different Control Groups

As a final robustness check, we extend our control group to include the full Compustat universe. The number of untreated firm-year observations thus increases from 1,282 to over 3,600.[6]

In unreported results, we show that the coefficients on the difference-in-differences term for our key corporate policy variables continue to be negative and significant. Recall from above that companies which mandated a distressed investment bank as their lead underwriter

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[5] In unreported results, we also vary the amount of years by which we shift our sample period, including a shift back to the crisis that was caused by the dotcom bubble in 2001. The results remain unchanged showing either insignificant or borderline significant difference-in-differences estimators with changing signs.

[6] Note that this test implies the assumption that the SDC database includes all deals that were underwritten by the three distressed investment banks for our specific time period. In this case, no additional company is affiliated to a troubled investment bank, since those firms are already assigned to the treatment group.

experienced a decrease in investment spending approximately 5.9% larger than that of non-affiliated companies, while their decline in total financing is 13.2% larger than that of non-affiliated firms. In line with our previous findings, these results become almost collectively insignificant if we define an underwriter affiliation not by lead underwriter but by syndicate membership. With the exception of the coefficient on equity issuance - which decreases from 8.1% to only 4.1% but remains statistically significant at the 10% level - all other coefficients are statistically indistinguishable from zero.

6. Conclusions

In this paper, we focus on the failure of three major investment banks during the financial crisis of 2007-2009 as an empirical setting to investigate the real effects of a shock to investment banking relationships. Employing a difference-in-differences approach, our results suggest that clients of a troubled investment bank reduce their investment expenditures and financing activities significantly more than a sample of control firms whose relationships with their underwriters were unaffected. A series of robustness checks and further analysis provides evidence inconsistent with alternative explanations. We suggest that evidence gleaned from the financial turbulence of 2007-09 contributes to the literature examining the relevance of underwriter relationships and the literature documenting the real economic impact of shocks in financial markets.

References

Asker, J. and A. Ljungqvist (2010): Competition and the structure of vertical relationships in capital markets, Journal of Political Economy 118, 599 – 647.

Bao, J. and A. Edmans (2011): Do investment banks matter for M&A returns? Review of Financial Studies 24, 2286 – 2315.

Bond, P., A. Edmans, and I. Goldstein (2012): The real effects of financial markets, Annual Reviews of Financial Economics 4, 339 – 360.

Burch, T. R., V. Nanda, and V. Warther (2005): Does it pay to be loyal? An empirical analysis of underwriting relationships and fees, Journal of Financial Economics 77, 673 – 699.

Chodorow-Reich, G. (2014): The employment effects of credit market disruptions: Firm-level evidence from the 2008-2009 Financial Crisis, Quarterly Journal of Economics 129, 1 – 52.

Derrien, F. and A. Kecskés (2013): The Real Effects of Financial Shocks: Evidence from Exogenous Changes in Analyst Coverage, Journal of Finance 68, 1407 – 1440.

Diamond, D. W. and R. G. Rajan (2002): Bank Bailouts and Aggregate Liquidity, American Economic Review 92, 38 – 41.

Drucker, S. and M. Puri (2005): On the benefits of concurrent lending and underwriting, Journal of Finance 60, 2762 – 2799.

Edmans, A., I. Goldstein, and W. Jiang (2012): The real effects of financial markets: The impact of prices on takeovers, Journal of Finance 67, 933 – 971.

Fazzari, S. M., R. G. Hubbard, and B. C. Petersen (2000): Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales, Quarterly Journal of Economics 115, 695 – 705.

Fernando, C. S., V. A. Gatchev, and P. A. Spindt (2005): Wanna dance? How firms and underwriters choose each other, Journal of Finance 60, 2437 – 2469.

Fernando, C. S., A. D. May, and W. L. Megginson (2012): The value of investment banking relationships: Evidence from the collapse of Lehman Brothers, Journal of Finance 67, 235 – 270.

Fernando, C. S., V. A. Gatchev, A. D. May, and W. L. Megginson (2013), Prestige without purpose? What a top underwriter's reputation is really worth, Working Paper, University of Oklahoma

Gao X. and J. R. Ritter (2010): The marketing of seasoned equity offerings, Journal of Financial Economics 97, 32 – 52.

Gobulov A., D. Petmezas, and N. G. Travlos (2012): When it pays to pay your investment banker: New evidence on the role of financial advisors in M&As, Journal of Finance 67, 271 – 311.

Hansen, R. S. (2001): Do investment banks compete in IPOs? The advent of the 7% plus contract, Journal of Financial Economics 59, 313 – 346.

Hansen, R. S. and P. Torregrosa (1992): Underwriter compensation and corporate monitoring, Journal of Finance 47, 1537 – 1555.

James, C. (1992): Relationship-specific assets and the pricing of underwriter services, Journal of Finance 47, 1865 – 1885.

Khan, M., L. Kogan, and G. Serafeim (2012): Mutual fund trading pressure: Firm-level stock price impact and timing of SEOs, Journal of Finance 67, 1371 – 1395.

Kovner, A. (2012): Do underwriters matter? The impact of the near loss of an equity underwriter, Journal of Financial Intermediation 21, 507 – 529.

Ljungqvist, A., Marston F., and W. J. Wilhelm (2006): Competing for securities underwriting mandates: Banking relationships and analyst recommendations, Journal of Finance 61, 301 – 340.

Ljungqvist, A., Marston F., and W. J. Wilhelm (2009): Scaling the hierarchy: How and why investment banks compete for syndicate co-management appointments, Review of Financial Studies 22, 3977 – 4007.

Megginson, W. L. and K. A. Weiss (1991): Venture capitalist certification in initial public offerings, Journal of Finance 46, 879 – 903.

Moyen, N. (2005): Investment-cash flow sensitivities: Constrained versus unconstrained firms, Journal of Finance 59, 2061 – 2092.

Myers, S. C. and N. S. Majluf (1984): Corporate financing and investment decisions when firms have information that investors do not have, Journal of Financial Economics 13, 187 – 221.

Sufi, A. (2009): The real effects of debt certification: Evidence from the introduction of bank loan ratings, Review of Financial Studies 22, 1659 – 1691.

Tang, T. T. (2009): Information asymmetry and firms' credit market access: Evidence from Moody's credit rating format refinement, Journal of Financial Economics 93, 325 – 351.

Table 1 Overview of underwriting market by type of issue and syndicate role

Panel A	Troubled bookrunner		Troubled underwriter		Total	Panel B	Allotment amounts by type of underwriter		
Type of issue	no	yes	no	yes		Type of issue	untroubled	troubled	Total
Common Stocks	5,024	1,563	3,457	3,130	6,587	Common Stocks	709,112	166,570	875,682
	76.27%	23.73%	52.48%	47.52%			80.98%	19.02%	
Convertible	936	413	713	636	1,349	Convertible	87,414	21,356	108,770
	69.38%	30.62%	52.85%	47.15%			80.37%	19.63%	
Equity registration pipeline	1,183	279	1,003	459	1,462	Equity registration pipeline	0	0	0
	80.92%	19.08%	68.60%	31.40%			-	-	
Medium term note programs	242	54	108	188	296	Medium term note programs	0	0	0
	81.76%	18.24%	36.49%	63.51%			-	-	
Mortgage asset backed	1,216	612	855	973	1,828	Mortgage asset backed	10,083	1,111	11,194
	66.52%	33.48%	46.77%	53.23%			90.07%	9.93%	
Nonconvertible debt	9,636	3,147	7,807	4,976	12,783	Nonconvertible debt	2,193,476	368,640	2,562,116
	75.38%	24.62%	61.07%	38.93%			85.61%	14.39%	
Preferred stock	87	102	59	130	189	Preferred stock	16,801	7,855	24,656
	46.03%	53.97%	31.22%	68.78%			68.14%	31.86%	
Private debt	2,371	234	2,352	253	2,605	Private debt	0	0	0
	91.02%	8.98%	90.29%	9.71%			-	-	
Private equity	1,750	211	1,748	213	1,961	Private equity	73	0	73
	89.24%	10.76%	89.14%	10.86%			100.00%	0.00%	
Registration debt	152	58	124	86	210	Registration debt	130	195	325
	72.38%	27.62%	59.05%	40.95%			40.00%	60.00%	
Total	22,597	6,673	18,226	11,044	29,270	**Total**	3,017,089	565,727	3,582,816
	77.20%	22.80%	62.27%	37.73%			84.21%	15.79%	

Table 1 provides information on the market share of the following three underwriters: Bear Stearns, Lehman Brothers, and Merrill Lynch. The sample comprises all deals with an identifiable underwriter from the SDC Platinum New Issues database over the ten years preceding the collapse of Lehman Brothers on 09/16/08. Panel A refers to the participation of a troubled investment bank in underwriting syndicates as bookrunners or underwriters. Panel B refers to the specific deal amounts allotted to one of the three investment banks.

Table 2 Descriptive statistics for corporate policy and control variables

Panel A: Corporate policy variables						
Variable Name	n	mean	sd	p25	p50	p75
Capex	1,685	0.06	0.08	0.02	0.04	0.07
R&D Expenses	1,686	0.03	0.06	0.00	0.00	0.03
Acquisition Expenses	1,589	0.05	0.15	0.00	0.00	0.02
Total Investment	1,588	0.15	0.20	0.04	0.09	0.17
Debt Issuance (gross)	1,620	0.16	0.31	0.00	0.05	0.17
Equity Issuance	1,646	0.04	0.12	0.00	0.00	0.02
Total Financing	1,686	0.02	0.22	-0.06	-0.02	0.02
Cash Dividends	1,676	0.01	0.03	0.00	0.00	0.01
Cash Holdings	1,686	0.16	0.20	0.03	0.09	0.21
Panel B: Control variables						
Variable Name	n	mean	sd	p25	p50	p75
Size	1,702	8,550.45	33,432.12	1,133.21	2,172.59	6,023.60
Age	1,702	15.51	4.77	12.00	18.00	20.00
Cash flow	1,686	0.13	0.11	0.08	0.13	0.19
Tobin's Q	1,536	1.76	1.00	1.13	1.45	2.03

Table 2 reports descriptive statistics for the corporate financial and control variables. Capex denotes capital expenditures (Compustat item capx), R&D Expenses denotes research and development expenses (Compustat item xrd), Acquisition Expenses denotes acquisition expenses (Compustat item aqc), Total Investment denotes the sum of Capex, R&D Expenses, and Acquisition Expenses. Debt Issuance (gross) denotes gross long-term debt issuance (Compustat item dltis), Equity Issuance denotes the sale of common and preferred stock (Compustat item sstk), Total Financing denotes the total net cash flow from financing activities (Compustat item fincf). Dividends denotes cash dividends (Compustat item dv). Cash Holdings denotes cash and short-term investments (Compustat item che). All dependent variables are scaled by lagged total assets (Compustat item at). Size denotes total assets (Compustat item at). Age denotes firm age measured as the time since a firm first appeared in Compustat. Cash flow denotes operating income before depreciation (Compustat item oibdp) scaled by lagged total assets (Compustat item at). n denotes the number of firm-year observations. All variables are winsorized at the 1% and 99% level.

Table 3 Results of basic regression model with troubled bookrunners as identification variable for our treatment sample

Independent Variable	Capex	R&D Expenses	Acquisition Expenses	Total Investment	Debt Issuance (gross)	Equity Issuance	Total Financing	Cash Dividends	Cash Position
Cash flow	0.106 ***	-0.164 ***	0.315 ***	0.239 ***	0.663 ***	-0.138 *	-0.159	0.051 ***	-0.304 ***
	(4.737)	(-7.839)	(4.558)	(2.723)	(5.200)	(-1.921)	(-1.300)	(5.456)	(-4.004)
Age	-0.002 ***	0.000	-0.001	-0.005 ***	-0.008 ***	-0.004 ***	-0.008 ***	-0.000	-0.002
	(-3.204)	(0.415)	(-1.201)	(-3.038)	(-3.472)	(-4.321)	(-4.573)	(-0.671)	(-1.098)
Size	-0.003 *	-0.005 ***	0.001	-0.007 *	-0.006	-0.007 ***	-0.007 *	0.003 ***	-0.025 ***
	(-1.891)	(-3.404)	(0.225)	(-1.871)	(-0.885)	(-2.748)	(-1.729)	(4.983)	(-5.440)
Tobin's Q	0.007 **	0.025 ***	-0.021 ***	0.016 **	-0.026 **	0.027 ***	0.006	0.004 ***	0.091 ***
	(2.448)	(8.958)	(-3.662)	(2.058)	(-2.419)	(3.747)	(0.492)	(3.649)	(10.701)
Treated	0.014 *	0.011 **	0.067 ***	0.088 ***	0.110 ***	0.090 ***	0.145 ***	0.003	0.051 ***
	(1.680)	(2.108)	(3.091)	(3.320)	(2.908)	(4.762)	(4.557)	(1.361)	(2.783)
Post	-0.026 ***	-0.003 *	-0.038 ***	-0.070 ***	-0.042 ***	-0.009 *	-0.043 ***	0.001	0.019 ***
	(-8.218)	(-1.952)	(-5.228)	(-7.637)	(-3.105)	(-1.959)	(-4.565)	(1.158)	(2.763)
Treated*Post	-0.015 **	0.003	-0.048 **	-0.059 **	-0.103 ***	-0.081 ***	-0.134 ***	-0.001	-0.046 **
	(-1.981)	(0.589)	(-2.328)	(-2.163)	(-2.714)	(-3.730)	(-4.051)	(-0.539)	(-2.547)
Constant	0.104 ***	0.041 ***	0.063 **	0.239 ***	0.303 ***	0.114 ***	0.222 ***	-0.026 ***	0.249 ***
	(6.978)	(3.148)	(2.359)	(6.510)	(5.584)	(4.889)	(5.319)	(-4.640)	(5.822)
N	1,523	1,524	1,434	1,433	1,465	1,487	1,524	1,515	1,524
R²	0.436	0.509	0.139	0.220	0.151	0.216	0.168	0.243	0.432

Table 3 reports the results of the estimation of the difference-in-differences model. *Capex* denotes capital expenditures (Compustat item capx), *R&D Expenses* denotes research and development expenses (Compustat item xrd), *Acquisition Expenses* denotes acquisition expenses (Compustat item aqc), *Total Investment* denotes their sum. *Debt Issuance (gross)* denotes gross long-term debt issuance (Compustat item dltis), *Equity Issuance* denotes the sale of common and preferred stock (Compustat item sstk). *Total Financing* denotes the total net cash flow from financing activities (Compustat item fincf). *Cash Dividends* denotes cash dividends (Compustat item dv). *Cash Holdings* denotes cash and short-term investments (Compustat item che). All dependent variables are scaled by lagged total assets and winsorized at the 1% and 99% level.

Cash flow denotes operating income before depreciation (Compustat item oibdp) scaled by lagged total assets, *Age* denotes firm age, *Size* denotes total assets (Compustat item at). *Treated* is a dummy variable that is equal to 1 if a company has used a troubled investment bank as lead underwriter in the three years leading up to the financial crisis. *Post* is a dummy variable equal to 1 for post-crash firm-years. *Treated*Post* denotes the difference-in-differences coefficient. All specifications include industry fixed effects. The values in parentheses represent t-values based on standard errors clustered at the firm level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 4 Results of basic regression model for an established debt and equity relationship

Dependent Variable	Debt Relationship			Equity Relationship		
	Treated*Post	N	R²	Treated*Post	N	R²
Capex	0.007 (0.949)	1,311	0.463	-0.029 ** (-2.456)	1,361	0.453
R&D Expenses	-0.007 (-1.454)	1,312	0.435	0.009 (1.151)	1,362	0.495
Acquisition Expenses	-0.076 *** (-2.818)	1,229	0.171	-0.014 (-0.696)	1,277	0.124
Total Investment	-0.072 ** (-2.106)	1,228	0.250	-0.041 (-1.224)	1,276	0.241
Debt Issuance (gross)	-0.140 *** (-2.665)	1,259	0.158	-0.048 (-1.045)	1,308	0.151
Equity Issuance	-0.013 (-0.938)	1,275	0.133	-0.128 *** (-4.267)	1,332	0.291
Total Financing	-0.104 *** (-2.810)	1,312	0.157	-0.152 *** (-3.679)	1,362	0.190
Cash Dividends	0.003 * (1.716)	1,305	0.325	-0.005 (-1.058)	1,354	0.231
Cash Position	-0.034 ** (-2.025)	1,312	0.388	-0.066 ** (-2.469)	1,362	0.425

Table 4 reports the results of the estimation of the difference-in-differences model if we constrain our treatment sample to companies that established an investment banking relationship through a debt deal and an equity deal, respectively. Variables are defined in the notes of Table 3. We omit control variables for space reasons. All specifications include industry fixed effects. The values in parentheses represent t-values based on standard errors clustered at the firm level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 5 Results for different affiliation periods

Affiliation Period	Regression Specification	Capex	R&D Expenses	Acquisition Expenses	Total Investment	Debt Issuance (gross)	Equity Issuance	Total Financing	Cash Dividends	Cash Holdings
3 Years	Treated*Post	-0.015 **	0.003	-0.048 **	-0.059 **	-0.103 ***	-0.081 ***	-0.134 ***	-0.001	-0.046 **
	t-value	(-1.981)	(0.589)	(-2.328)	(-2.163)	(-2.714)	(-3.730)	(-4.051)	(-0.539)	(-2.547)
	N	1,523	1,524	1,434	1,433	1,465	1,487	1,524	1,515	1,524
4 Years	Treated*Post	-0.009	0.004	-0.024	-0.024	-0.066 *	-0.050 ***	-0.085 ***	-0.001	-0.033 *
	t-value	(-1.286)	(0.912)	(-1.222)	(-0.939)	(-1.930)	(-2.615)	(-2.731)	(-0.571)	(-1.959)
	N	1,607	1,608	1,515	1,514	1,545	1,570	1,608	1,596	1,608
5 Years	Treated*Post	-0.005	0.006	-0.015	-0.009	-0.039	-0.039 **	-0.059 **	-0.001	-0.023
	t-value	(-0.774)	(1.460)	(-0.858)	(-0.372)	(-1.219)	(-2.303)	(-2.160)	(-0.497)	(-1.536)
	N	1,674	1,675	1,580	1,579	1,610	1,636	1,675	1,663	1,675
6 Years	Treated*Post	-0.006	0.006	-0.016	-0.010	-0.043	-0.035 **	-0.058 **	-0.001	-0.023
	t-value	(-0.990)	(1.609)	(-0.916)	(-0.456)	(-1.369)	(-2.203)	(-2.205)	(-0.436)	(-1.633)
	N	1,710	1,712	1,616	1,615	1,645	1,672	1,711	1,699	1,712
7 Years	Treated*Post	-0.004	0.006	-0.016	-0.008	-0.043	-0.030 **	-0.051 **	-0.001	-0.021
	t-value	(-0.759)	(1.604)	(-0.952)	(-0.389)	(-1.455)	(-2.002)	(-1.997)	(-0.655)	(-1.550)
	N	1,748	1,750	1,652	1,651	1,683	1,709	1,749	1,737	1,750
8 Years	Treated*Post	-0.003	0.006 *	-0.010	0.001	-0.040	-0.026 *	-0.042 *	-0.002	-0.018
	t-value	(-0.459)	(1.868)	(-0.587)	(0.031)	(-1.370)	(-1.813)	(-1.696)	(-1.032)	(-1.350)
	N	1,779	1,781	1,682	1,681	1,713	1,740	1,780	1,768	1,781
9 Years	Treated*Post	-0.002	0.006 *	-0.008	0.003	-0.037	-0.024 *	-0.037	-0.002	-0.021
	t-value	(-0.388)	(1.866)	(-0.514)	(0.126)	(-1.327)	(-1.781)	(-1.573)	(-1.065)	(-1.607)
	N	1,813	1,815	1,716	1,715	1,745	1,774	1,814	1,802	1,815
10 Years	Treated*Post	-0.003	0.007 **	-0.007	0.004	-0.036	-0.022 *	-0.035	-0.002	-0.017
	t-value	(-0.547)	(2.017)	(-0.444)	(0.199)	(-1.325)	(-1.712)	(-1.500)	(-1.061)	(-1.359)
	N	1,838	1,840	1,740	1,739	1,770	1,799	1,839	1,827	1,840

Table 5 reports the results of the estimation of the difference-in-differences model with different affiliation periods used for the treatment assignment. Control variables are included but omitted for space reasons. Variables are defined in the notes of Table 3. We omit control variables for space reasons. All specifications include industry fixed effects. The values in parentheses represent t-values based on standard errors clustered at the firm level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 6 Results for separated regression model using firm-fixed effects

Dependent Variable	Panel A: Treated Firms			Panel B: Control Firms			
	Post	N	R²	Post	N	R²	Test
Capex	-0.043 ***	375	0.809	-0.027 ***	1,148	0.810	0.040 **
	(-5.334)			(-7.408)			
R&D Expenses	-0.001	375	0.944	-0.003 ***	1,149	0.960	0.636
	(-0.173)			(-3.090)			
Acquisition Expenses	-0.074 ***	363	0.609	-0.034 ***	1,071	0.632	0.054 *
	(-3.248)			(-3.894)			
Total Investment	-0.131 ***	363	0.654	-0.068 ***	1,070	0.693	0.032 **
	(-4.509)			(-6.178)			
Debt Issuance (gross)	-0.132 ***	365	0.624	-0.034 **	1,100	0.790	0.014 **
	(-3.076)			(-2.320)			
Equity Issuance	-0.075 ***	368	0.661	-0.013 ***	1,119	0.649	0.006 ***
	(-3.171)			(-3.076)			
Total Financing	-0.163 ***	375	0.686	-0.038 ***	1,149	0.631	0.000 ***
	(-4.761)			(-3.445)			
Cash Dividends	-0.003	372	0.762	-0.001	1,143	0.823	0.489
	(-1.088)			(-0.555)			
Cash Holdings	-0.039 **	375	0.905	0.027 ***	1,149	0.863	0.000 ***
	(-2.353)			(4.306)			

Table 6 reports the results of the estimation of the difference-in-differences model for the sub-sample of treated (Panel A) and control (Panel B) firms. In addition to our set of (unreported) control variables (see Table 3), we add firm-fixed effects. *Post* denotes the difference in the dependent variable from the pre-crash period to the post-crash period. *Test* denotes the p-value of a Chow (1960) test, testing the inequality of the *post* variable between the two regressions for treated and untreated firms. Variables are defined in the notes of Table 3. We omit control variables for space reasons. The values in parentheses represent t-values. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 7 Results for separated regression comparing client effects from different investmet banks

Dependent Variable	Panel A: Clients of LB			Panel B: Clients of ML and BS		
	Treated*Post	N	R²	Treated*Post	N	R²
Capex	-0.022 **	1,317	0.455	-0.009	1,354	0.451
	(-1.971)			(-1.013)		
R&D Expenses	0.003	1,318	0.456	0.003	1,355	0.479
	(0.742)			(0.408)		
Acquisition Expenses	-0.046 *	1,237	0.146	-0.051 *	1,268	0.141
	(-1.848)			(-1.738)		
Total Investment	-0.069 **	1,236	0.241	-0.047	1,267	0.219
	(-2.030)			(-1.255)		
Debt Issue (gross)	-0.142 **	1,264	0.168	-0.074	1,301	0.144
	(-2.472)			(-1.536)		
Equity Issuance	-0.065 ***	1,285	0.183	-0.068 **	1,321	0.222
	(-3.031)			(-2.316)		
Total Financing	-0.133 ***	1,318	0.160	-0.125 **	1,355	0.167
	(-3.555)			(-2.518)		
Cash Dividends	-0.001	1,310	0.244	-0.001	1,348	0.293
	(-0.318)			(-0.532)		
Cash Holdings	-0.034 *	1,318	0.408	-0.051 *	1,355	0.415
	(-1.856)			(-1.907)		

Table 7 reports the results of the estimation of the difference-in-differences model for the sub-sample of clients of Lehman Brothers (LB) (Panel A) and clients of Merrill Lynch (ML) and Bear Stearns (BS) (Panel B). Variables are defined in the notes of Table 3. We omit control variables for space reasons. The values in parentheses represent t-values based on standard errors clustered at the firm level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.