CREDIT LINE RUNS AND BANK
RISK MANAGEMENT: EVIDENCE
FROM THE DISCLOSURE OF
STRESS TEST RESULTS

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Abstract

As noted in recent literature, firms can run on credit lines due to fear of future credit restrictions. We exploit the 2011 stress test supervised by the European Banking Authority (EBA) and the Spanish Central Credit Register to explore: 1) the occurrence and magnitude of these runs after the release of negative stress test results; and 2) banks' behaviour before and after the release of this information. We find that, following the release of the results, firms drew down approximately 10 pp more available funds from lines granted by banks that had a worse performance in the stress test. Moreover, before the release date, poorer performing banks were more likely to reduce the size of credit lines, while those with more significant balances of undrawn credit lines were more likely to cut term lending.

Keywords: credit lines, bank runs, stress tests, bank risk management.

JEL classification: G01, G14, G21.

Resumen

La literatura académica reciente muestra que los bancos están expuestos a pánicos sobre sus líneas de crédito. Durante estos pánicos, las empresas retiran fondos de sus líneas de crédito por miedo a restricciones crediticias futuras. En este trabajo usamos los resultados de las pruebas de resistencia de 2011 supervisadas por la Autoridad Bancaria Europea y datos de la Central de Información de Riesgos del Banco de España para explorar: 1) la ocurrencia y magnitud de estos pánicos bancarios producidos por la publicación de información financiera negativa, y 2) la reacción de los bancos ante la publicación de los resultados. Encontramos que, tras la publicación de los resultados, las empresas retiraron en torno a 10 puntos porcentuales más de sus fondos disponibles en líneas de crédito con bancos con un resultado negativo en la prueba. Además, antes de la publicación de los resultados, los bancos con peor desempeño tendieron a disminuir más la magnitud de sus líneas de crédito y aquellos con mayores balances de líneas no usadas cortaron más otros préstamos.

Palabras clave: líneas de crédito, pánicos bancarios, pruebas de resistencia, gestión de riesgo bancario.

Códigos JEL: G01, G14, G21.

1 Introduction

The growing but still scarce empirical literature on credit lines highlights their importance as a key source of liquidity for firms. In a credit line, the lender (typically a bank) extends a promise to a borrower to provide funding on demand up to a set limit within a certain period at specific terms. Such access to funding helps firms to ease the impact of liquidity shocks, both idiosyncratic and deriving from adverse macroeconomic developments.[1] This protection against liquidity shocks explains why firms widely use them as a tool for liquidity risk management.[2] However, access to credit lines is contingent on a firm's and its bank's financial health. On the one hand, credit lines incorporate financial covenants that protect the lender from an increase in the borrower's risk profile; hence, access to funds may be limited if the borrower does not comply with a financial covenant. On the other hand, banks with balance sheet problems, such as declines in liquidity or capital, may find it problematic to accommodate increases in liquidity demand, in which case they are less likely to waive a covenant violation (Acharya et al., 2020). Consequently, if firms anticipate that a bank might have trouble accommodating liquidity demand, they might precautionarily draw down the available funds, creating a form of bank run. Evidence of credit line runs during the global financial crisis of 2007-2008 has been documented by Ivashina and Scharfstein (2010) and Ippolito et al. (2016).

This paper explores whether precautionary drawdowns from credit lines can occur due to the disclosure of negative stress test results of individual banks and, if they exist, whether affected banks take mitigation actions before news disclosure. The arrival of such information can change clients' perception of the bank's ability to honor credit lines, resulting in firms precautionarily drawing down their available funds. Moreover, the bank can act accordingly to abate the impact of the extraordinary drawdowns before the information becomes public. To the best of our knowledge, this is the first paper investigating whether the disclosure of stress test results about individual banks (or, more generally, negative idiosyncratic information) can lead to credit line runs. Additionally, the particularities of the analyzed event allow us to study affected banks' behavior prior to the disclosure date. From a macroprudential point of view, understanding the possibility of credit line runs is important because bank capital and liquidity buffers can be depleted if banks are exposed to a sudden and significant increase in drawdowns.[3] Moreover, analyzing whether these runs can occur due to disclosing individual bank information is relevant for designing regulatory stress tests and understanding their tradeoffs. Although we uncover the possibility of precautionary drawdowns, stress tests are a useful regulatory tool that can abate bank widespread uncertainty and act as a disciplining device.[4] In addition, banks' credit line risk management can neg-

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[1]For instance, after the COVID-19 outbreak, non-financial firms drew down significant amounts from their pre-existing credit lines following a sudden and sharp drop in their revenues (Greenwald et al., 2021; Kapan and Minoiu, 2020).

[2]For the U.S., Sufi (2009) and Demiroglu et al. (2009) report that 87% of public firms and 64% of large private firms have access to credit lines; in Spain, around 40% of firms' bank financing are credit lines, see Jiménez et al. (2009).

[3]Banks' capital position can deteriorate because capital requirements for undrawn but committed credit are small compared to drawn credit. For instance, as part of the post-crisis regulatory reforms, the Basel Committee on Banking Supervision (BCBS) increased the *credit conversion factor* (CFF) from 0% to 10%, that is, 10% of unused balances of credit lines is treated as on-balance-sheet exposures for the calculation of capital requirements under the standardized approach for credit risk (BCBS, 2017). In addition, the undrawn portion of credit lines represents a significant exposure for banks (see Greenwald et al. (2021)). Hence, a spike in drawdowns decreases bank capital buffers.

[4]The stress test results publication provides valuable information to all market participants, reducing uncertainty and potentially improving market functioning, which might prevent more general bank runs. Moreover, it can act as a disciplining device that provides ex-ante incentives for prudent risk management by banks.

atively affect firms. For example, liquidity pressures on the asset side due to credit line drawdowns can force banks to cut back on new credit origination (Acharya and Mora, 2015; Greenwald et al., 2021), primarily affecting smaller firms that rely less on funds from credit lines (Chodorow-Reich et al., 2021).

We exploit the disclosure of the 2011 European stress test results as an informational shock. The European Banking Authority (EBA), which coordinates stress tests in Europe, published the 2011 stress test scenarios and methodology on March 18, whereas results were announced for each participating bank on July 15. The focus was on the ratio of Core Tier 1 capital (equity and retained profits) to risk-weighted assets (CT1R) that the banks were projected to have under an adverse scenario.[5] This event timeline allows us to study (1) banks' and (2) firms' behavior before and after the disclosure date, respectively.

Our study centers on Spanish firms and banks. As opposed to other countries, all Spanish saving banks and almost all commercial banks, 25 banks accounting for nearly 93% of the assets of the Spanish banking sector, participated in this stress test.[6] Among these banks, 12 were *inadequately capitalized* according to the EBA, as their CT1R fell below 6% under the adverse scenario. The results were broadly covered in the main Spanish newspapers.[7] Furthermore, we have access to the comprehensive Spanish Credit Register, maintained by Banco de España, which covers all the outstanding credit lines extended by different banking institutions to each firm, which allows us to carry out our analysis at the bank-firm level. Finally, it is important to remark that most firms in Spain are bank-dependent; hence, having access to bank lending is crucial for them.

First, our empirical exercise examines whether, after the announcement of the results, a credit line extended by bank b to firm f was used more intensively by firm f if bank b was identified as inadequately capitalized in the stress test. That is to say, whether firms precautionarily drew down out of concern that banks with negative information may tighten future credit. Answering that question requires us to control for firm liquidity demand to address the potential problem that banks with worse performance in the exercise might have been sorted with firms with higher liquidity needs. Thus, we employ a sample with the important feature that each firm has at least two credit lines from two different banks. This allows us to control for credit demand by adding firm fixed effects in our regressions, following Khwaja and Mian (2008). Then, using a difference-in-differences approach, we compare, for the same firm, its credit line usage rate before and after the release of the results, with banks more or less affected by the adverse scenario of the stress test. Hence, we assess whether firms with credit lines from more than one bank preferentially drew down credit lines granted by inadequately capitalized banks.

Next, we examine banks' mitigating actions before (or after) the results became public. Opposite to firms, banks knew ex-ante their financial health, as they used their models to predict their hypothetical losses under the assumptions and scenarios provided by the EBA. Hence, banks could have taken actions to mitigate the expected effect of extraordinary drawdowns on their financial health even before disclosing their private information. In addition, one crucial feature of the 2011 stress test is the static balance sheet assumption, helping us in interpreting banks' actions as a response to precautionary drawdowns rather

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[5]As noted by Petrella and Resti (2013), this stress test provided relevant information to market participants, as banks with higher CT1R under the adverse scenario were rewarded with higher abnormal returns compared to banks with lower CT1R following the disclosure of the results.

[6]The EBA required that the largest banks of each country, covering at least 50% of the national banking sectors in each EU member state, participated in the stress test.

[7]The two leading Spanish newspapers, *El País* and *El Mundo*, published headlines on their front pages of July 16, 2011, about the performance of Spanish banks in the exercise. More related articles appeared in other Spanish newspapers in the following days.

than as a desire to improve their stress test results.[8] Hence, by using our credit line-level data and conditioning on firms with more than one line, we explore whether inadequately capitalized banks were more likely to not renew expiring lines or reduce their available funds than adequately capitalized banks. Moreover, using a similar approach, we examine whether inadequately capitalized banks with more significant undrawn credit line balances cut term loans to firms that did not have credit lines.

We find evidence of precautionary drawdowns after the disclosure of the results, on July 15, of the 2011 EBA EU-wide stress test. Specifically, firms with at least two credit lines extended by different banks chose to use 9.5 pp. and 1.2 pp. more of undrawn and granted (drawn plus undrawn) funds, respectively, between June and July from lines extended by banks that, according to the stress test, were not adequately capitalized, compared to lines from adequately capitalized banks. These are sizable extraordinary drawdowns considering that under the standardized approach for credit risk a 10% of the undrawn balances of credit lines is assumed to be drawn for the computation of the exposure at default (EAD). Our results suggest that an additional 10% could arise due to precautionary motives.

Precautionary drawdowns were concentrated in credit lines of firms at higher risk of violating a financial covenant. To approximate the effect of complying with them, we divide our sample of firms into different groups based on a capital (or interest coverage) ratio.[9] We find that firms with good financial ratios (highly capitalized and with low-interest burden) did not react to the disclosure of the results. Similar behavior is observed for firms with worse financial ratios, which were likely to have already violated a financial covenant. In contrast, firms with doubtful economic prospects but likely in compliance with financial covenants did react to the disclosure of the results. These findings are consistent with banks closely monitoring credit lines, leaving firms that do not comply with financial covenants without access to them. Yet, firms in compliance with covenants but at risk of violating them in the future may decide to draw down out of fear of not having access to funds later.

Bank and bank-firm characteristics also affected the size of precautionary drawdowns. We find that precautionary drawdowns were more significant for ex-ante less solvent and smaller banks, as these banks might find it more difficult to access external funds and sustain an increase in demand for drawdowns. Moreover, the size of these extraordinary drawdowns was affected by specific characteristics of credit lines, such as their residual maturity, initial usage rate, size, and whether a downsizing had happened before.

Several additional results support the interpretation that extraordinary drawdowns were driven by negative news about banks' solvency. First, we find no evidence, prior to the disclosure of the results, that credit lines extended by inadequately capitalized banks were used more intensively than lines granted by adequately capitalized banks. Second, we find that firms that precautionarily drew down after the disclosure of the results decided to return the cash a few months later. Hence, after the initial worries dissipated, liquidity returned to banks from firms that made extraordinary drawdowns. Finally, we show robustness to changes in the sample composition. Overall, evidence points to the direction that additional drawdowns were precautionary, driven by concerns about the worse performing banks, rather than by genuine immediate liquidity needs.

Furthermore, affected banks tightened their lending standards. As mentioned, banks could have predicted their performance in the stress test after knowing the assumptions in

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[8]Under the static balance sheet assumption, banks' balance sheets as of December 2010 were frozen to carry out the stress test. In this way, banks were discouraged from claiming that risk would be mitigated by selling off risky assets or changing their business model.

[9]Acharya et al. (2020) find that the most common financial covenants are related to leverage restrictions, interest coverage limitations, and capitalization and collateral requirements. Because we do not have information on compliance with financial covenants, we use the financial ratios as proxies.

the exercise. Because the EBA announced them on March 2011, there was a four-month gap until the results became public, allowing banks to take mitigating actions. We find that inadequately capitalized banks were approximately 10 pp more likely to decrease the total amount of a credit line in the second quarter of 2011. Moreover, such different behavior was not observed in the previous quarter (before the exercise's assumptions were known) and the following (after the results became public). Additionally, banks with a worse performance in the test and more significant undrawn credit line balances cut term lending more to firms without credit lines. In particular, we find that a one standard deviation increase in undrawn credit line-to-assets would have increased the probability of decreasing lending by more than 20% to these firms by such banks in 0.55 and 0.52 pp. during the second and third quarters of 2011, respectively. The impact of drawdowns on liquidity and capital buffers could explain these results, as banks potentially facing extraordinary drawdowns would prefer to save on buffers by tightening their lending standards. Moreover, our second finding suggests that banks cannot fully mitigate their exposure to undrawn credit lines by just downsizing them; hence, other adjustments are needed, such as reducing lending to other types of firms.

This paper contributes to two strands of literature. First, we add to the literature that shows that banks are exposed to credit line runs. For example, Ivashina and Scharfstein (2010), Campello et al. (2010), and Berrospide and Meisenzahl (2015) provide evidence that U.S. firms drew down their credit lines during the 2007-08 financial crisis due to concerns about banks' financial health. Similarly, Ippolito et al. (2016) show that Italian firms drew down from banks more exposed to the interbank market following the dry-up of the European interbank market in August 2007 in anticipation of tighter lending conditions. This paper investigates whether credit line runs can also arise due to the disclosure of stress test individual results. First, our shock is primarily informational, as no Spanish bank needed additional capitalization, due to country-specific instruments with the capacity to absorb losses.[10] Moreover, we uncover the possibility of credit line runs even during regular times.[11] In addition, given the implementation timeline of the 2011 stress test, we also contribute to the literature by examining banks' mitigating actions to credit line exposure before the disclosure date. Finally, we contribute by providing additional evidence that credit line drawdowns can reduce credit to firms without access to credit lines (Greenwald et al., 2021).

The paper is also related to the literature that explores the reaction of financial markets and banks to the disclosure of regulatory stress tests. On the one hand, a strand of the literature studies the effect of the information content of stress tests on financial markets (Petrella and Resti, 2013; Morgan et al., 2014; Alves et al., 2015; Flannery et al., 2016; Borges et al., 2019; Fernandes et al., 2020). Specifically, by mostly using event-study techniques, it explores whether information disclosed in stress tests has an impact on prices (e.g., equity prices). Another strand of the literature investigates the effect of stress tests on participating banks' behavior, such as their effect on lending, bank capital, dividend payments, or lending to small businesses (Acharya et al., 2018; Gropp et al., 2018; Berrospide and Edge, 2019; Cornett et al., 2020; Nguyen et al., 2020; Cortés et al., 2020; Doerr, 2021). We contribute to this literature by investigating whether users of credit lines, in particular non-financial firms, react to the information disclosed in stress tests.

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[10]Such components included general provisions, convertible bonds that were not part of the EBA's definition of core tier 1 capital, plans on equity security sales made before April 30th, and unrealized gains in the portfolio of listed equities available for sale in the period 2011-2012. The EBA's main results did not consider them to preserve the exercise's homogeneity across countries.

[11]As noted by Banco de España (2017), during the first half of 2011, the Spanish economy exhibited modest but positive growth rates and a favorable outlook. However, turbulences in European financial markets in the year's second half spread toward the Spanish economy, affecting its initial favorable recovery prospects in 2011. Finally, the Spanish financial system was bailed out on June 2012.

The rest of the paper is organized as follows: section 2 describes the main features of credit line contracts, provides details about the 2011 stress test, and presents the theoretical background; section 3 describes our data; section 4 explains our identification strategy; results are discussed in section 5; extensions are explored in section 6; and section 7 concludes.

2 Background

2.1 Credit Line Contracts

A credit line is a commitment in which a borrower receives a promise from a bank to provide funding, within a certain period, up to a set amount, and at pre-arranged terms.[12] Their flexibility provides firms with funding to address sudden liquidity urges. For instance, after a sudden and sharp drop in revenues due to the COVID-19 crisis, U.S. non-financial firms drew significant amounts from their pre-existing credit lines (Greenwald et al., 2021; Kapan and Minoiu, 2020). Thus, firms widely use them as a tool for their liquidity risk management.[13]

However, borrowing from credit lines might be difficult depending on the firm's credit quality and the bank's financial health. On the one hand, these contracts incorporate financial covenants to protect banks against borrowers' creditworthiness deterioration.[14] Thus, the bank can restrict the usage of credit lines if a firm does not comply with a financial covenant by raising spreads, shortening maturities, tightening covenants, reducing the line size, or even canceling it (Acharya et al., 2020). On the other hand, banks with balance sheet problems, such as declines in liquidity or capital, find it difficult to meet credit line drawdowns, leading to tougher responses to covenant violations, as shown by Huang (2010) and Acharya et al. (2020). Thus, the possibility of losing access to funds may lead firms to precautionarily use credit lines, creating a form of bank run (Ivashina and Scharfstein, 2010; Ippolito et al., 2016).

2.2 Stress Testing

In the aftermath of the Global Financial Crisis, stress testing of banks has become a key element of the bank supervisory toolkit. They assess whether banks maintain adequate capital levels to withstand a hypothetical adverse macroeconomic scenario. Those with stressed capital ratios below a benchmark chosen by the supervisor are expected to adopt remedial actions to strengthen their capital levels.[15] In the European Union (EU), the European Banking Authority (EBA) is in charge of coordinating the EU-wide stress test exercise, which is conducted following a bottom-up approach and using consistent methodologies, scenarios, and assumptions.

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[12] Advantages such as special monitoring abilities and synergies in lending and deposit-taking make banks the main suppliers of credit lines (Kashyap et al., 2002; Gatev and Strahan, 2006; Acharya et al., 2014).

[13] According to Sufi (2009) and Demiroglu et al. (2009), 87% of public firms and 64% of large private firms have access to credit lines in the U.S.

[14] Acharya et al. (2020) find that the most common financial covenants are related to leverage restrictions, interest coverage limitations, and capitalization and collateral requirements.

[15] As pointed out by Baudino et al. (2018), "the emphasis on stress tests to assess and replenish bank solvency was justified by the fact that capital is at the core of a bank's ability to absorb losses and continue to lend."

2.2.1 The 2011 EBA EU-Wide Stress Test

The first exercise coordinated by the EBA, and the only one before 2014, happened in 2011.[16] The EBA published the methodology and assumptions on March 18, 2011. As a result, banks incorporated such guidelines into their internal models to predict their hypothetical losses under the stressed scenarios. Moreover, it announced that banks with a ratio of Core Tier 1 capital (equity and retained profits) to risk-weighted assets (CT1R) below 5% under the adverse scenario should take remedial measures to cover the shortfall. Consequently, banks could know their performance in the stress test months before the disclosure date. The results were published for each participating bank on Friday, July 15, 2011, by the end of the day. Due to growing concerns about the European economy, on the publication date (July 15), the EBA strongly recommended that banks with a CT1R above but close to the 5% threshold in the adverse scenario should also strengthen their capital position. In particular, when the results were announced, the EBA highlighted the number of banks with a CT1R under the adverse scenario below 5% (8 banks) and between 5%-6% (16 banks) (EBA, 2011).[17] Therefore, based on the EBA's announcements before the disclosure date, market participants might have found it difficult to anticipate that the latter group of banks also had to strengthen their capital positions.

The results for the 25 Spanish banks participating in the 2011 stress test can be found in Appendix A. On the one hand, five banks had a CT1R under the stress scenario below the 5% benchmark: one commercial bank and four saving banks. On the other hand, seven banks had a CT1R between 5% and 6%: three commercial banks and four saving banks. Thus, based on the EBA's announcement on July 15, 2011, twelve Spanish banking institutions were expected to strengthen their capital position.

The 2011 EU-wide stress test provided valuable information to market participants that helped them distinguish between sound and fragile banking institutions. For instance, Petrella and Resti (2013) find that the release of the stress test results affected the stock prices of participating banks differently. In particular, after the publication of the results, the authors show that banks with a lower CT1R under the adverse scenario were penalized with lower abnormal returns compared to banks with higher stressed CT1R. Moreover, such a difference in abnormal returns between banks with lower and higher stressed CT1R was not significant before the announcement of the results, which is consistent with bank opaqueness before the disclosure of the results. In Appendix B, we follow a similar approach as in Petrella and Resti (2013) to show that banks with a worse performance in the exercise (CT1R < 6%) were penalized with 2.4 pp lower CARs compared to banks that performed better (CT1R ≥ 6%) following the release of the results, indicating that the informational content of the stress test provided valuable information to *sophisticated* investors (stock market participants).

2.3 Theoretical Implications

The empirical literature shows that banks needing recapitalization tend to increase their capital ratios, particularly in the short term, by partially reducing lending to their borrowers. For instance, Gropp et al. (2018) find that large European banks increased their capital ratios in 2012 by reducing their lending rather than raising their equity levels to reach a mandatory target set by the EBA. Similar evidence is presented by Berrospide and Edge (2019), who

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[16]Previously, the Committee of European Banking Supervisors (CEBS) coordinated the 2009 and 2010 stress test exercises. On the one hand, only aggregate results were released for the former exercise. On the other hand, as opposed to the 2011 stress test, the 2010 exercise was poorly received due to the relatively mild stressed scenario considered and other methodological concerns (Hardy and Hesse, 2013).

[17]For a more detailed description of the 2011 EBA stress test, see Appendix A.

find that large U.S. banks significantly decrease C&I lending to satisfy the quantitative component of the Federal Reserve's CCAR stress tests.

Also, capital-constrained banks actively manage their exposure to unused credit lines. Under the current regulatory framework, funds drawn from credit lines are backed up with more bank capital than undrawn funds.[18] Thus, a spike in credit line usage can further decrease the capital ratio of a bank in need of recapitalization; hence, the bank may have incentives to reduce its exposure to credit lines.[19] For instance, Acharya et al. (2020) and Chodorow-Reich and Falato (2022) show that, following a covenant violation, distressed banks are more likely to restrict access to loan commitments. Similarly, Pelzl and Valderrama (2020) find that capital-constrained Austrian banks managed their exposure to credit lines during the 2008-09 financial crisis by cutting little-used credit lines.

Firms that depend on liquidity from credit lines can draw down funds in advance if tighter credit conditions are expected from their banks. Credit lines are an important tool for firms' liquidity management. For instance, in our sample, available funds at bank credit lines represented 9.6% of Spanish firms' assets as of June 2011. Hence, losing access to undrawn funds can negatively impact firms if lost liquidity is difficult to substitute. For example, evidence from the Global Financial Crisis shows that firms that lost access to liquid funds reduced investment spending (Campello et al., 2011; Almeida et al., 2012). Consequently, firms may draw down funds precautionarily from their credit lines if they are concerned about future credit constraints. This situation is called a *credit line run* because fear instead of a genuine cash need drives drawdowns (Ivashina and Scharfstein, 2010; Campello et al., 2010; Ippolito et al., 2016).[20]

First, this paper aims to determine whether firms drew down more from credit lines granted by inadequately capitalized banks after stress results became public. In particular, such banks, CT1R below 6% in the adverse scenario, were suggested by the EBA to raise their capital ratios. Consequently, after processing the information of the stress test results, which were widely publicized, firms may have drawn down from inadequately capitalized banks (stressed CT1R < 6%) due to a precautionary reason, motivated by the fear that such banks might restrict credit in the future.[21]

Next, we examine whether inadequately capitalized banks behaved differently before disclosing the results. Recall that the EBA had announced the stress test methodology and scenarios four months before the results publication date, allowing banks to predict their performance in the stress test and potentially take actions to mitigate the impact of precautionary drawdowns. Therefore, we also explore the possibility that inadequately capitalized banks had reduced credit line balances before the EBA announced the results.

3 Database Construction & Summary Statistics

Our main datasets are constructed from three sources: (i) the Spanish Credit Register (CIR), which is managed by the Banco de España (BdE), the regulator and supervisor of the Span-

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[18]Under the standardized approach for credit risk, a *credit conversion factor* (CCF) of 10% is applied to convert unused balances of credit lines into on-balance-sheet exposures for the calculation of capital requirements (BCBS, 2017).

[19]For large U.S. commercial banks, committed but undrawn balances on credit lines are more than 40% larger than the total used balances on bank credit lines and term loans combined (Greenwald et al., 2021)

[20]For instance, by using a multi-country survey of CFOs, Campello et al. (2010) report that a significant fraction of constrained firms drew down funds during the 2008-09 financial crisis because of concerns that banks would limit their access to their credit lines soon.

[21]The stress test results were broadly covered in the main Spanish newspapers. For instance, the main Spanish newspaper, *El País*, published on their front page on July 16, 2011, an article about the performance of Spanish banks in the stress test exercise. In addition, more articles related to the exercise results appeared in other newspapers and the following days.

ish banking system, (ii) the stress test results of the 2011 EU-wide stress test, which was coordinated by the European Banking Authority (EBA), and (iii) Spanish banks' financial statements as of December 2010, which are available at BdE for each banking group. Furthermore, to analyze the effect of firm heterogeneity on precautionary drawdowns, we employ firms' balance-sheet information as of December 2010, which is available from the Spanish Mercantile Register.

The information on credit lines, available at the bank-firm level, is obtained from the CIR. This supervisory credit register contains information on any loan commitment above €6,000 granted by any bank operating in Spain, that is, the CIR is an exhaustive database containing almost all credit commitments granted to Spanish firms by different banks. Specifically, we observe drawn and undrawn amounts at the bank, firm, instrument type, maturity, collateral, default status, and currency level, which are reported on a monthly basis.[22] One important caveat of our database is that we do not explicitly observe whether an observation is a credit line or not. Moreover, the drawn and undrawn amounts of two different products (e.g., a credit line and a fixed-term loan) that share the same characteristics are aggregated into a single observation. Thus, to identify a credit line in our database, the following conditions must be satisfied: (i) the undrawn amount in month t has to be greater than zero, (ii) the granted amount, which is the sum of the drawn and undrawn amounts, between t and $t + 1$ must remain equal.[23] The first condition keeps only loan commitments that have available funds that can be requested from banks by firms, and it does not take into account fully used credit lines (i.e., undrawn amount equals zero), which cannot be distinguished from fixed-term loans. However, our interest is to determine whether credit lines were used more intensively after the publication of the stress results, which could not be feasible for credit lines that were already fully used before the results became public. The second condition discards observations whose granted amount decreases in the following month, which can be driven by the risk management practice of the bank or the repayment of a fixed-term loan that shares the exact characteristics of a credit line. However, the former possibility is less likely to occur within a short period, in our case a month, because contractual terms in credit lines remain largely fixed unless a financial covenant is violated. For instance, among all the observations that satisfy condition (i), approximately 10% experience a drop in their granted amount.[24] The identified credit line could still correspond to an existing credit line plus a term loan if the term loan was not amortized between months. The effect of including this "line" would be to bias downwards our results since our primary variable normalizes the change in credit line usage by the total size of the "line", which in this case would be the actual line's size plus the term loan's size; see below. After credit lines are identified, we proceed to aggregate all the credit lines, drawn and undrawn amounts, in euros and with residual maturity of less than three years that each firm has with any bank in the banking group.[25,26]

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[22]For a more detailed explanation of the CIR database, see Jimenez and Saurina (2004).

[23]We control for mergers and acquisitions to keep track of credit lines when bank identifiers vary.

[24]Observations whose granted amount increase in the next month are interpreted as a new credit line contract, whereas our analysis focuses on credit lines that were already conceded at month t. Moreover, as part of our robustness checks, we also estimate our main specification including those observations whose granted amount diminishes.

[25]Credit lines in a currency different from euros represent just around 1% of our original sample. Most credit lines offered by banks have maturities between 1 and 3 years; loan commitments with maturities of more than three years are mostly related to real estate activities and the construction sector, in which drawdowns typically occur as construction work progresses. The results remain robust to the inclusion of such commitments and are available upon request.

[26]Aggregation at the banking group is a necessary step as stress test results and bank information are only available for banking groups.

One variable of interest is the change in the credit line usage rate of firm f from bank b between June 30 and July 31, 2011. That is, two weeks before and after the release of the stress results, which occurred on July 15, 2011. In particular, the change in usage rate for month $t + 1$ is computed as

$$\Delta Usage_{f,b,t+1} = \frac{Drawn_{f,b,t+1} - Drawn_{f,b,t}}{Granted_{f,b,t}}, \tag{1}$$

where $Granted_{f,b,t} = Drawn_{f,b,t} + Undrawn_{f,b,t}$. Hence, the change in usage rate for July allows us to analyze whether, for existing credit lines in June that were not fully used, firms chose to use more intensive credit lines granted by worse-performing banks in the stress test after the disclosure date. Moreover, we extend our analysis for months before July to discard pre-event trends or anticipation of the stress results. In addition to the variable defined in (1), we also analyze the change in credit line usage for month $t + 1$ as a percentage of the undrawn balances at t.

To analyze banks' behavior before (or after) the information release, we employ credit lines with available funds to be drawn and quarterly data, as banks may find it harder to modify credit line terms in a shorter period. Then, we examine whether bank b reduced the line's size of firm f within the quarter. Such analysis allows us to study whether inadequately capitalized banks reduced their exposure to credit lines before (or after) the stress test results became public.

Our primary sample is composed of non-financial firms that have at least two credit lines from two different banks that participated in the 2011 stress test exercise.[27] This sample of firms enables the addition of firm fixed effects in our main specifications, which is part of our identification strategy, explained in the next section. For instance, our primary sample of credit lines in June is comprised of 93,010 lines granted to 34,773 non-financial firms by Spanish banks that participated in the 2011 stress test. These credit lines represent more than 60% of the total amount granted to non-financial firms via credit lines as of June 2011.

Finally, we match our dataset to bank information from the 2011 stress test results, available on the EBA's website, and banks' financial statements, accessible to the Bank of Spain in its supervisor role. Bank variables contain the outcome in the 2011 stress test, assets, profitability, liquidity, NPL, and CT1 capital ratios, and a commercial bank dummy. Moreover, we use firm data from financial statements available at the Spanish Mercantile Register to analyze heterogeneous effects based on firms' compliance with financial covenants in section 6. We only use such information for this analysis, and our sample size decreases when using it.[28] All variables used in our analysis are defined in Table C.8, and their descriptive statistics are reported in Table C.1.

4 Empirical Strategy

4.1 Identification Strategy

First, we are interested in analyzing whether precautionary drawdowns from credit lines occur following information disclosures of individual stress results. Such analysis faces important empirical challenges. For instance, the possibility that banks with worse financial health might be matched with firms that frequently demand funds from their credit lines for business-related purposes (e.g., paying wage bills), which complicates the identification of precautionary drawdowns.

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[27]As part of our extension section, the analysis is redone to include firms with a credit line from a single bank.

[28]Our main dataset contains 34,773 firms, whereas the dataset with firm characteristics has 24,256 firms.

To address such concerns, our identification strategy of precautionary drawdowns relies on two crucial ingredients: (i) the disclosure of the 2011 European stress test results, in which almost every Spanish banking institution participated; (ii) an exhaustive credit register that records all credit lines granted by different banks to each firm, which allows, by the addition of firm fixed effects, to control for observed and unobserved firm characteristics that may drive demand for liquidity.

As mentioned in section 2, the EBA disclosed the results of the 2011 stress test in mid-July. As opposed to other countries, all Spanish savings and almost all commercial banks participated, accounting for 25 banks. These banking institutions performed differently under the adverse scenario of the stress test. Specifically, 12 Spanish banks had a CT1R in the adverse scenario below 6%. According to the EBA, such institutions, featured as *inadequately capitalized*, were expected to strengthen their capital position. Moreover, the bigger surprise occurred for banks with stressed CT1R above 5% but below 6% (7 banks), as the EBA considered that these banks should also take recapitalization measures on the disclosure date.

The Spanish Credit Register covers all the outstanding credit lines extended by different banking institutions to each firm. In particular, we conduct our analysis at the bank-firm level and employ a sample with the important feature that the same firm has at least two credit lines from two different banks before and after the stress results were announced. This feature helps, by adding firm fixed effects, to control for credit demand (Khwaja and Mian, 2008). Hence, after isolating shocks to credit demand, precautionary drawdowns can be observed if a particular firm chooses to use more intensive credit lines extended by inadequately capitalized banks (CT1R<6%) over lines granted by adequately capitalized banks. This approach helps to address the potential problem that banks that performed worse in the stress test were sorted with firms that may have higher liquidity needs. Moreover, our monthly analysis helps better identify whether precautionary drawdowns happened after disclosing the results. For instance, it could happen that a firm withdrew extra funds from banks that appeared weak in the test right after the announcement but returned the funds a few months later. Such events might be missed if the observation frequency is too coarse.

The aforementioned ingredients permit us to exploit an identification strategy based on a difference-in-differences approach: we compare for the same firm its credit line usage before and after the release of the stress test results for banks more or less affected by the adverse scenario. Our analysis will point to the existence of precautionary drawdowns following the disclosure of stress tests if, after the announcement, a firm prefers drawing down from its lines granted by worse-performing banks over lines extended by its other banks.

Additionally, we are interested in whether banks took mitigating actions in anticipation of potential precautionary drawdowns. The event (the disclosure of the stress test results) has a key feature for analyzing such a possibility. Banks, as opposed to firms, could predict their performance in the test as they used their models to calculate hypothetical losses under the assumptions and stress scenarios provided by the EBA. Note that there was a four-month gap between the announcement of the assumptions and the results; see section 2. Consequently, banks could have taken actions to mitigate the impact of precautionary drawdowns before their private information was disclosed to financial markets. Moreover, due to the 2011 stress test's static balance sheet assumption, we can closely associate a bank's actions with a response to precautionary drawdowns rather than a desire to obtain a better stress test result.[29] These stress test features allow us to analyze banks' reactions to credit line drawdowns before the disclosure date. Thus, we examine whether banks with poor performance in the stress exercise were more likely to downsize credit lines. Additionally, we

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[29]To carry out the stress test, banks' balance sheets as of December 2010 were assumed frozen, discouraging banks from selling off risky assets or changing their business model to mitigate their risk.

explore whether banks with poor performance and larger exposure to undrawn credit lines were more likely to cut term lending to firms without credit lines. As in the previous case, for our analysis, firms with multiple lending relationships are employed to control for credit demand by adding firm fixed effects.

4.2 Empirical Models

First, we regress the change in usage rate between the end of June and the end of July 2011 for a credit line extended by bank b to firm f on a stress test performance variable, bank and relationship controls, and controlling for credit demand by adding firm fixed effects. Formally, we estimate the following specification:

$$\Delta Usage_{f,b,July} = \alpha_f + \beta \times Inadequately\ Capitalized_b + \underbrace{\gamma' bank_b + \delta' credit\ line_{f,b}}_{controls} + \varepsilon_{f,b}. \quad (2)$$

The dependent variable is the change in usage rate between June and July and is defined in (1). The stress test performance variable is represented by the *Inadequately Capitalized* dummy, which takes value one if the bank had a CT1R below 6% under the adverse scenario of the stress exercise, and 0 otherwise. Recall that, according to the EBA, such banks were required to strengthen their capital position promptly and were highlighted in the disclosed results. Thus, if precautionary drawdowns occurred after the disclosure of the results, the coefficient β should be positive and significant only when the results became public and not before unless important anticipation effects occurred.[30] Recall that precautionary drawdowns are driven by firms' fear that banks identified by the stress test as not adequately capitalized may reduce their lending to firms in the following months. It is important to remark that our dependent variable only increases if more funds are requested by the firm and not because the granted amount is decreased by the bank.[31]

In our specification, we control for other possible sources explaining firms' credit line usage. As we previously pointed out, a key feature of our identification strategy relies on the inclusion of firm fixed effects α_f, which allows us to control for relevant, yet unobservable, firm characteristics that can drive demand for liquidity (e.g., a drop in revenues and thus a need for liquidity).

Additionally, we include bank controls, such as a dummy variable for whether the bank is a commercial bank, the logarithm of assets, the return on assets, the liquidity, CT1 capital, and non-performing loan ratios. These controls are meant to isolate the part of the informational shock that firms were not able to predict. Also, firms could have reacted to weaker bank fundamentals, hence, the need for adding bank controls.

Furthermore, we add relationship and credit line controls. Specifically, we include a dummy for whether the firm has a past-due loan with its bank, the line's initial usage rate, the share of its line that is collateralized, the share of its line that matures within a year, and the share of the line out of the firm's total committed funds. These variables could also explain firms' drawdown behavior. For instance, Jiménez et al. (2009) find that a line's default status is a key determinant of its usage as firms with prior defaults access them less, suggesting that banks monitor firms and, through this, influence firms' usage decisions. They also find that firms draw down less on credit lines granted by their main banks, which indicates that banks limit funding to their most dependent borrowers. Thus, the need to include lending relationship variables. All control variables are defined in Table C.8.

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[30]Equation (2) is estimated for other months to observe whether anticipation or lagged responses occurred.

[31]In our robustness section, we also estimate equation (2) including observations whose granted amount decreased in July. Even for those, the dependent variable is built such that it can only increase if more funds are drawn.

To analyze banks' behavior before the disclosure of the stress results, we estimate the following linear probability model

$$\mathbb{1}(Downsized_{f,b}) = \alpha_f + \theta \times Inadequately\ Capitalized_b + controls_{f,b} + \varepsilon_{f,b}, \qquad (3)$$

where the dependent variable is a dummy variable that takes value one if bank b reduced the line's size of firm f by $x\%$ within the quarter, and the explanatory variables are the *Inadequately Capitalized* dummy, bank, and credit line/relationship controls, which were defined before.[32] In particular, we are interested in determining whether inadequately capitalized banks were more likely to reduce their exposure to credit line balances in anticipation of the disclosure of their private information. Again, such analysis requires us to control for firms' credit demand; hence, we add into the regression firm fixed effects. If banks actively managed their exposure to credit lines, we expect a positive and significant coefficient for θ in equation (3).

Finally, we also analyze whether inadequately capitalized banks with more significant undrawn credit line balances originated fewer loans to other types of firms, in particular firms without credit lines. For that purpose, we estimate the following equation

$$\mathbb{1}(\Delta Lending_{f,b,t+1} < x\%) = \alpha_f + \rho_0 \times Inadequately\ Capitalized_b + controls_{f,b} + \varepsilon_{f,b}$$
$$+ \rho_1 \times Inadequately\ Capitalized_b \times \left(\frac{CreditLines}{Assets}\right)_b, \qquad (4)$$

where the dependent variable is a dummy that takes value one if the quarterly percentage change in term loans granted by bank b to firm f is lower than $x\%$.[33] To the previous set of explanatory variables in (3), we add the interaction between the *Inadequately Capitalized* dummy and the ratio of total undrawn credit line balances-to-assets of bank b as of December 2010. In particular, we want to explore whether banks mitigated the impact of precautionary drawdowns on bank capital and liquidity buffers by tightening their lending standards in anticipation or due to the disclosure of stress test results. We expect the coefficient ρ_1 to be positive if banks implement this mitigating action. As before, we must add firm fixed effects to control for credit demand appropriately.

5 Results

5.1 Evidence on Precautionary Drawdowns

This part analyzes whether precautionary drawdowns occurred once the stress test results became public in July 2011. Additionally, we explore anticipated or lagged responses of firms by performing our analysis for other months around the announcement date of the results. Finally, we run a number of robustness checks.

Table 1 shows the estimate for the coefficient of the *Inadequately Capitalized* dummy in our main specification; see equation (2). For comparison, we include the OLS estimation results (without firm fixed effects). However, to ensure that our results are not driven by firm characteristics related to banks' stress test performance (sorting effect), we primarily focus on the estimation results that include firm fixed effects. In column 1, the dependent variable is the change in credit line usage rate between June and July, which is computed

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[32]Different thresholds of x are explored to secure that banks' risk management indeed drives our results.

[33]We explore different thresholds of x to guarantee that the results are not driven by repayments of the principal of term loans, that we could erroneously identify as part of credit lines. Further details of how credit lines are identified in our data can be found in section 3

Table 1: Effect of the 2011 Stress Test on Credit Line Usage

	Change in Drawn June/July 2011			
	Fixed Effects		OLS	
	Over Granted	Over Available	Over Granted	Over Available
	(1)	(2)	(3)	(4)
Inadequately Capitalized	0.012***	0.095**	0.015**	0.098**
	(0.003)	(0.044)	(0.007)	(0.037)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	N	N
Observations	93,010	90,375	93,010	91,092
R-squared	0.5468	0.4460	0.1083	0.0501

This table contains a set of regressions of the change in drawn funds from credit lines over the period June/July 2011, which includes the announcement date of the stress results (July 15, 2011), on a stress test performance variable, bank and credit line control variables (detailed in Table C.8). In columns 1 and 3, the change in drawn funds is measured relative to the granted (drawn and undrawn) amount by bank b to firm f, as in Equation 1. Columns 2 and 4 measure the change in drawn funds relative to available funds in June 2011. *Inadequately Capitalized* is a dummy variable that takes value one if a bank was inadequately capitalized according to the 2011 stress test exercise (CT1R < 6%). The sample only includes firms that have at least two outstanding and not fully used credit lines in June from two different banks. Additionally, to avoid extreme negative values of the dependent variable, column 2 does not include credit lines whose initial usage is above 99%. Columns 1 and 2 present the results including firm fixed effects, whereas columns 3 and 4 the OLS estimates. Standard errors are double clustered at the bank and firm levels and reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

as the difference in drawn funds over the period divided by the total granted amount, see equation (1). As it can be appreciated, the coefficient is positive and statistically significant at the 1% level. Specifically, after the announcement of the stress results on July 15, firms with two (or more) lines provided by different banks chose to draw down on average 1.2 pp more of their credit lines extended by banks that, according to the stress test, were not adequately capitalized compared to adequately capitalized banks. Note that the inclusion of firm fixed effects in our main identification allows us to isolate credit demand factors. Thus, the results suggest the existence of precautionary drawdowns following the disclosure of negative stress test results about individual banks.

The next remarks are helpful for understanding the economic significance of the estimated coefficient. First, it is worth noting that the mean and median change in credit line usage between June and July were relatively low, at 2.5% and 0%, respectively, see Table C.1. Our results indicate that the additional usage of credit lines extended by inadequately capitalized banks is about 50% of the average increase during that month. Second, a considerable share (72%) of credit lines with an initial usage rate equal to zero remained unused in July, accounting for nearly 25% of our sample. It is important to highlight that little-used credit lines are the only ones whose change in usage rate can be potentially significant. For instance, a credit line with an initial usage rate of 90% can only increase its usage 10pp. more. Our analysis of heterogeneous effects on credit line characteristics in section 6 shows that precautionary drawdowns were more significant in lines with an initial usage rate above its median (52%).

The observed increase is substantially larger when measuring the change in drawn funds over the period relative to available funding in June (undrawn funds) rather than the granted amount (drawn plus undrawn). Note that, when defined in this way, the dependent variable

can increase up to 100% independently of the initial usage rate, indicating that the firm draws down all the funds left in the credit line. Column 2 in Table 1 shows that the magnitude of the estimated coefficient increases for the alternative definition of the dependent variable. Specifically, compared to adequately capitalized banks, firms drew down 9.5pp more of the available funding (undrawn funds) from their credit lines extended by inadequately capitalized banks.[34] We note that currently, under the standardized approach for credit risk, only a 10% of the undrawn balances of credit lines is assumed to be drawn for the computation of the *exposure at default* (EAD); whereas, this result suggests that almost an additional 10% could arise due to precautionary motives.

Table 1 shows that firms drew down more from inadequately capitalized banks. Two alternatives could be behind the result. First, firms reallocated their demand for drawdowns from adequately capitalized banks towards inadequately capitalized banks without an overall increase in their demand for liquidity. Alternatively, firms increased their demand for funds and focused such additional demand on their inadequately capitalized banks. To distinguish between these two possibilities, Table 2 shows the firm-level regressions of the change in aggregate drawn funds between June and July on a dummy (*Treated*) that indicates whether a firm has a line granted by an inadequately capitalized bank and controls. Column 1 shows for the same sample of firms as in Table 1 that a firm with at least one line from an inadequately capitalized bank used 0.8 pp. more of its total granted funds. To better control for credit demand, column 3 includes firm observables in the regression, though the sample size decreases as not all firms in our initial sample have balance sheet information. In this case, a *treated* firm used 1 pp. more of its total granted funds; see column 4. Likewise, when using our alternative dependent variable, *treated* firms drew down 5.7 pp. more of their available funds; see column 6. Consequently, these complementary results suggest that inadequately capitalized banks met an increase in total drawdowns instead of a reallocation of credit from adequately towards inadequately capitalized banks. Hence, part of banks' liquidity was in the hands of firms, presumably in cash, without being intermediated to the real sector for more productive use.

Inadequately capitalized banks did not experience additional drawdowns before the announcement of the results in July 2011. Table 3 shows placebo tests for our specification in column 1 of Table 1.[35] Specifically, we run equation (2) for months prior to July 2011. As it can be appreciated, the coefficient of interest is not statistically different from zero for any month before July. Similarly, for the same period in 2010, the coefficient of the *Inadequately Capitalized* dummy is not statistically significant. Thus, there is no evidence that firms used more intensively lines extended by inadequately capitalized banks over lines granted by adequately capitalized banks before the stress results became public (July 15). The findings help to discard the possibility that firms found it easier to use their lines with inadequately capitalized banks due to fewer financial covenants set by these banks. Moreover, the results point to the direction that no information leakage of the results happened. Therefore, there is no evidence of either pre-event trends or anticipation of the results, which helps to alleviate concerns that our findings might be spurious and not truly due to the release of the stress test results.

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[34]The sample size in column 2 of Table 1 decreases because it does not include credit lines with an initial usage rate above 99%. This step is needed to avoid extreme negative values of the dependent variable, which would unduly affect the results. Note that a decrease in the used amount in July can generate substantial negative values if the undrawn amount available in June is close to zero. In contrast, positive values are bounded by 1.

[35]The results of the alternative dependent variable (change in drawn funds over available funds) are similar and can be found in the Appendix C.

Table 2: Effect of the 2011 Stress Test on the July-2011 Demand for Credit Line Drawdowns

| | Multibank Firms | | Multibank Firms with Firm Observables | | | |
| | ΔDrawn-to-Granted | ΔDrawn-to-Available | ΔDrawn-to-Granted | | ΔDrawn-to-Available | |
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.008***	0.053**	0.011***	0.010***	0.069***	0.057**
	(0.003)	(0.021)	(0.003)	(0.003)	(0.025)	(0.025)
Industry FE	Y	Y	Y	Y	Y	Y
Province FE	Y	Y	Y	Y	Y	Y
Credit Line Controls	Y	Y	Y	Y	Y	Y
Firm Controls	N	N	N	Y	N	Y
Observations	34,764	34,632	24,250	24,250	24,188	24,188
R-squared	0.0925	0.0498	0.0971	0.1079	0.0552	0.0612

This table reports firm-level regression of the change in aggregate drawn funds of firm f between June and July from its credit lines granted by stress-tested banks on a dummy *Treated*, controls, and province and industry fixed effects. In columns 1, 3, and 4, we normalize the change in drawn funds over aggregate granted (drawn and undrawn) funds, whereas in columns 2, 5, and 6 over available (undrawn) funds. *Treated* is a dummy variable that takes value one if firm f has at least one credit line granted by an inadequately capitalized bank. Credit line controls are aggregated at the firm level and weighted by the size of each firm's f credit line. Credit line and firm controls are defined in Table C.8. In columns 1 and 2, we use the entire sample of firms with more than one credit line granted by a stress-tested bank. To add firm controls, we employ the previous sample but exclude firms without balance sheet information as of December 2010. Additionally, to avoid extreme negative values of the dependent variable, column 2, 5, and 6 exclude credit lines whose initial usage is above 99%. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3: Placebo Tests

	Change in drawn over granted funds						
	2010	2011					
	Jun-Jul	Mar-Apr	Apr-May	May-Jun	Jun-Jul	Jul-Aug	Aug-Sep
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inadequately	0.005	0.004	0.004	-0.005	0.012***	-0.007	-0.019**
Capitalized	(0.004)	(0.003)	(0.004)	(0.006)	(0.003)	(0.008)	(0.007)
Controls	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
Observations	108,718	98,238	94,437	93,403	93,010	92,723	88,873
R-squared	0.542	0.528	0.535	0.522	0.547	0.548	0.541
Within R-squared	0.193	0.179	0.188	0.179	0.202	0.187	0.182

This table replicates column 1 of Table 1 on data from months before and after the announcement of the stress test results. For each month, we regress the change in usage rate on *Inadequately Capitalized*, bank (computed as of December 2010) and credit line controls (calculated with information available at month t), and firm fixed effects. As a reference, column 5 (June-July) coincides with column 1 of Table 1. Standard errors are double clustered at the bank and firm levels and reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Between August and September, firms used credit lines granted by inadequately capitalized banks less intensively than those granted by adequately capitalized banks; see the last column of Table 3. A possible explanation is that firms concerned with losing access to liquidity returned drawn funds months after their initial worries relating to particular banks did not materialize.[36] Such a possibility would reinforce the idea that drawdowns following the disclosure date were related to concerns about banks' soundness rather than genuine liquidity needs.

[36]Due to interest payments on drawn amounts, drawing down to create cash reserves is costly.

We explore this possibility by checking whether it was the firms that *run* in July the ones that returned funds in September. To do this, we run our main specification for July-August and August-September adding an interaction term between *Inadequately Capitalized* and a dummy variable (*Run*) that identifies those firms that incurred in precautionary drawdowns after the announcement of the stress test results. In particular, we consider that a firm *run* in July if its average change in credit line usage with inadequately capitalized banks is strictly positive and larger than its average change with adequately capitalized banks.

Table 4 shows that a reversal in precautionary drawdowns explains the decrease in the September usage rate of credit lines granted by inadequately capitalized banks. Specifically, the negative and significant sign of the interaction term *Inadequately Capitalized* × *Run* indicates that firms that run in July used less intensive their lines with inadequately capitalized banks, suggesting that they returned drawn funds to their banks within the two months following the disclosure of the results. Note as well that once we consider the interaction term, the coefficient of *Inadequately Capitalized* is no longer statistically significant for July-August or August-September.[37]

The reversion of drawdowns could be a consequence of no Spanish bank needing recapitalization once other loss-absorbing instruments were considered. In particular, country-specific loss-absorbing instruments permitted Spanish banks to survive the EBA's adverse scenario.[38] Following the publication of the results, the Bank of Spain highlighted such specificities of the Spanish banking system that the EBA's main results did not sufficiently emphasize to secure the exercise's homogeneity across countries.

Table 4: Reversal in Precautionary Drawdowns

	Change in drawn over granted funds		
	Jun-Jul (1)	Jul-Aug (2)	Aug-Sep (3)
Inadequately Capitalized	0.012***	0.006	-0.006
	(0.003)	(0.008)	(0.006)
Inadequately Capitalized × Run		-0.044***	-0.027***
		(0.005)	(0.003)
Controls	Y	Y	Y
Firm FE	Y	Y	Y
Observations	93,010	92,723	88,873
R-squared	0.547	0.549	0.541

The table contains the regression results for the monthly change in credit line usage rate on *Inadequately Capitalized*, *Run*, their interaction, bank and credit line controls, and firm fixed effects for July-August and August-September. For comparison, column 1 replicates the results of column 1 in Table 1. *Run* is a dummy variable that takes value one if the firm's average change in credit line usage rate with inadequately capitalized banks is strictly positive and larger than the average change with adequately capitalized banks in July (column 2) or July or August (column 3). Standard errors are double clustered at the bank and firm levels and reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

To sum up, the analysis in this section shows that, after the announcement of the stress results in mid-July, firms drew down more funds from credit lines extended by banks that were featured as inadequately capitalized in the stress test. Such increase in credit line usage was associated to an increase in the demand for drawdowns as opposed to a credit reallocation from adequately to inadequately capitalized banks. Moreover, there is no evidence of such drawdown behavior prior to the release of the results. Finally, a reversal in precautionary

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[37]If we use the alternative dependent variable (change in drawn over available funds), the results are similar and are detailed in tables (C.2) and (C.3) in appendix C.

[38]Such components included general provisions, convertible bonds, plans on equity security sales, and unrealized gains in the portfolio of listed equities available for sale.

drawdowns was found in the months following the publication of the results, presumably once worries about bank safety did not materialize. It is important to remark that our analysis controls for credit demand factors by including firm fixed effects in the analysis, which is necessary to identify precautionary drawdowns.

5.1.1 Robustness Checks

We start by addressing the possibility that firms could have substituted a decrease in term funding from inadequately capitalized banks by drawing down lines in July 2011. In particular, banks with poor performance in the test could have tightened term loans before the disclosure of the results (e.g., by not renewing maturing loans). Hence, firms with access to credit lines could have substituted such a decrease in funding by drawing down from their existing credit lines, preferentially from the banks that decreased term funding. Thus, our findings could be associated with firms rebalancing their funding sources rather than precautionarily using their lines. We study this possibility by regressing at the bank-firm level the change in log term loans on the *Inadequately Capitalized* bank dummy, together with bank and credit line controls, and firm fixed effects. The results are shown in Table 5. The coefficient for the change in the log of term loans in July is small and insignificant (column 2), while that of the change in the third quarter of 2011 is positive (column 4). This indicates that firms did not see their term loans significantly reduced from banks with poor performance in the stress test, and therefore this mechanism cannot explain our main results. It is still possible that firms saw their term funding decreased by these banks *before* the results were known since presumably banks could have anticipated the results; hence, the increase in credit line usage from these banks could have been a delayed response to this event. We see no evidence of this effect, as the coefficient of the *Inadequately Capitalized* dummy is positive (and significant) for the month or quarter before the release of the stress test (columns 1 and 3). So, if anything, firms saw their term funding preferentially increasing from banks with poor performance in the stress test before the results were released. Thus, the results indicate that firms did not have an additional need to substitute a drop in term funding coming from poorly performing banks, which supports the idea that the extraordinary drawdowns in July 2011 were motivated by precautionary reasons.

Next, we consider variations in our sample and statistical model to examine whether the results are robust. We start by estimating our specification in (2) including commitments whose granted decreased in the period of analysis. Recall that our definition of a credit

Table 5: Effect of Performance in the Stress Test on Lending via Term Loans - Firms with Multiple Credit Lines in June 2011

	Log Difference in the Amount of Term Loans			
	Jun-2011	Jul-2011	2Q-2011	3Q-2011
	(1)	(2)	(3)	(4)
Inadequately Capitalized	0.017**	-0.005	0.028**	0.018*
	(0.008)	(0.006)	(0.011)	(0.010)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	68,990	68,990	62,803	62,803
R-squared	0.2786	0.2857	0.3191	0.3175

This table reports the regression results for the change in the log of the amount of term loans on *Inadequately Capitalized*, bank and credit line controls, and firm fixed effects for the sample of firms in column 1 of Table 1. The dependent variable is the difference of the logarithm of the amount of term loans granted to firm f by bank b over the selected period. In order to have constant samples, only observations available in June and July (columns 1 and 2) or 2Q-2011 and 3Q-2011 (columns 3 and 4) are included in the regressions. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

line relies on the assumption that the granted amount extended in a credit line (drawn plus undrawn funds) remains fixed within a month; see section 3. Consequently, such an assumption reduces our sample because it does not include other loan commitments whose granted amount decreased between June and July 2011. Although the assumption is reasonable and permits us to identify credit lines better, we might be ruling out credit lines that were downsized in that period, generating a potential problem of sample selection.

Table 6 reports the regression results for our specification in (2) after adding credit lines whose granted amount decreased less than 40%, 80%, or decreased any amount, respectively. To avoid an artificially increase in the usage rate of those lines whose granted diminished in July, we compute the dependent variable as the change between June and July in the drawn funds by firm f from bank b over the granted funds on June to firm f by bank b (i.e., prior to the downsizing). For comparison, the first column in Table 6 replicates the results of column 1 in Table 1. As it can be appreciated, the coefficient of *Inadequately Capitalized* remains positive and statistically significant across all samples.

Additionally, we investigate whether firms with downsized credit lines in July behaved differently after the release of the stress results. To do so, we add the interaction term *Inadequately Capitalized × Drop*, where *Drop* is a dummy variable that takes value one if the credit line extended by bank b to firm f is downsized in July. A priori, the sign of the coefficient of this term is unclear. On the one hand, a line that is downsized will mechanically restrict the amount of funds that can be drawn.[39] On the other hand, a firm that experiences a downsizing might react by drawing down available funds if a future downsizing is expected. The results in Table 6 suggest that firms with downsized lines drew down more from inadequately capitalized banks after the release of the results than firms that did not experience a downsizing; see columns 3, 5, and 7. Similar evidence is presented in column 8, though the effect is lower for firms that experienced large drops in their granted amounts. Thus, results suggest that firms with downsized lines in July drew down more after the release of the results than other firms, which is consistent with extraordinary drawdowns being driven by fear that inadequately capitalized banks may further downsize their lines in the future.

Next, to address concerns that a particular group of banks could drive the results, we explore if our results are robust to changes in the sample of banks. First, we remove from the sample lines extended by banks with stressed CT1R below 5%. Recall that before results became public, the EBA initially announced as a benchmark a CT1R of 5%; see Table A.1. However, on the disclosure date, the EBA recommended that banks close to but above the initial threshold strengthen their capital positions. Thus, according to our underlying mechanism, firms should also respond to the stress test results of banks falling into this second category. Second, we keep only lines extended by banks whose CT1R under the adverse scenario of the stress test fell between 5% and 7%, that is, banks near the CT1R threshold of 6% for being considered inadequately capitalized. In this way, by analyzing banks close to the threshold, we can better associate our findings with the informational content of the stress test, as it would have been more difficult to separate these banks into adequately and inadequately capitalized before the stress test. Third, we exclude credit lines granted by banks that resulted from an Institutional Protection Scheme (IPS).[40] Fourth, we

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[39]For instance, for a credit line whose granted amount was reduced to almost zero, the drawn amount in July could not surpass this new limit, making it more likely that the drawn amount decreased between June and July.

[40]During 2009-2011, many restructuring and integration processes of saving banks were carried out in Spain. One particular merging process was the IPS. From an economic, but not legal, perspective, an IPS was equivalent to a merging process, and it was promoted by savings banks for their restructuring. The most well-known example of a successful IPS is Bankia; wherein seven savings banks were integrated into a single entity.

do not include credit lines extended by banks that received government support.[41] Fifth, we do not consider credit lines extended by the two largest Spanish banks as they could have been regarded as *too-big-to-fail*. Such robustness checks are presented in Table 7. As it can be appreciated, the coefficient of *Inadequately Capitalized* remains positive and statistically significant across all the different samples, which indicates that our findings remain robust to these exclusions.

Table 6: Effect of the 2011 Stress Test on Usage Rate - Including Lines whose Granted Diminished

	Change in drawn over granted funds (June-July)							
	$|\Delta\%\text{Granted}| \leq$							
	0 %	40%		80%		100%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inadequately Capitalized	0.012***	0.014***	0.012***	0.015***	0.014***	0.017***	0.016***	0.013***
	(0.003)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
Inadequately Capitalized × Drop			0.019*		0.018*		0.016	0.024*
			(0.010)		(0.010)		(0.011)	(0.012)
Inadequately Capitalized × Drop × |ΔGranted|/Granted								-0.144***
								(0.037)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	93,010	105,290	105,290	107,165	107,165	107,683	107,683	107,683
R-squared	0.5468	0.5381	0.5394	0.5369	0.5409	0.5358	0.5417	0.5576
Within R-squared	0.2020	0.1982	0.2003	0.2001	0.2070	0.1998	0.2099	0.2373

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. As part of our robustness checks, we add lines whose granted amount decreased between June and July 2011. Column 1 replicates, for comparison, our main results, which only include credit lines whose granted amount remained fixed between June and July 2011; see Table 1. In columns 2-3, we add lines whose granted amount decreased by less than 40%. Additionally, in columns 4-5, we add lines whose granted amount decreased by less than 80%. Finally, columns 6-8 include any loan commitment independently of whether the granted amount decreased or not. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the granted funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a CT1R below 6% in the adverse scenario of the stress test, and *Drop* is a dummy variable that takes value one if the credit line extended by bank b to firm f is downsized. All regressions include bank and credit line controls and firm fixed effects. Standard errors are double clustered at the bank and firm levels and reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Finally, we exclude public banks from the main sample, in order to provide more supporting evidence that the negative informational content of the stress test results led to precautionary drawdowns. Stress test results could have been more informative about private banks' financial soundness. Therefore, an increase in the usage of lines granted by private and inadequately capitalized banks can be more clearly associated with precautionary drawdowns driven by banks' unfavorable information in the stress test results. As it can be appreciated in Table 7, the coefficient of our variable of interest is significant and positive for this sample.

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[41]To enhance the strength and solvency of credit institutions, the Bank of Spain required 12 banking institutions to take recapitalization measures on March 10, 2011. To cover the shortfall, some of these requested public support from the Fund for Orderly Bank Structuring (FROB); see FROB (2019).

Table 7: Effect of the 2011 Stress Test on Usage Rate - Different Samples of Banks

	Change in Drawn to Granted (June-July)					
	Excluding:					
	Banks with CT1R<5%	Banks with CT1R<5% & CT1R>7%	IPS merged banks	Banks that received public funds	Top 2 banks	Listed banks
	(1)	(2)	(3)	(4)	(5)	(6)
Inadequately Capitalized	0.014***	0.020*	0.036*	0.056**	0.015***	0.016***
	(0.004)	(0.010)	(0.020)	(0.020)	(0.004)	(0.005)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Observations	82,780	41,975	75,023	64,878	56,677	22,945
R-squared	0.5531	0.5840	0.5602	0.5703	0.5689	0.5868
Within R-squared	0.1990	0.2036	0.2075	0.2099	0.2067	0.2132

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. As part of our robustness checks, we exclude credit lines extended by certain banks. First, we exclude lines extended by banks whose stressed CT1R fell below 5%. Second, we only maintain in the sample lines extended by banks whose stressed CT1R fell between 5% and 7%. Third, we exclude lines that were the result of an Institutional Protection Scheme (IPS). Fourth, we exclude lines extended by banks that received government support. Fifth, we exclude lines granted by the two largest Spanish banks. Finally, we excluded lines granted by listed banks. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the granted funds on June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. All regressions include bank and credit line controls, and firm fixed effects. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

5.2 Bank Risk Management Before and Response to the Information Disclosure

In this section, we investigate the implications of credit line drawdowns on the behavior of the affected banks. A feature of the 2011 stress test important for our analysis is the static balance sheet assumption, which discouraged banks from selling off risky assets or changing their business model to improve their position in the stress test. Hence, findings in this section are more likely to be associated with banks taking actions to mitigate the effect of precautionary drawdowns rather than with an effort to obtain better results in the test. We pay particular attention to banks' behavior after the announcement of the stress test methodology but prior to the disclosure of their stress test results. First, we explore whether inadequately capitalized banks cut on their existing credit lines. Second, we examine whether inadequately capitalized banks with more significant undrawn credit line balances reduced lending to other types of firms.

We start exploring credit line risk management by banks around July 15, when stress test results became public. Specifically, we examine whether credit lines granted by inadequately capitalized banks were more likely to be downsized. To do so, we estimate a linear probability model, in which we regress a dummy that takes value one if bank b downsized the credit line extended to firm f by an $x\%$ (1%, 10%, and 20%) within a quarter on *Inadequately Capitalized*, bank and credit line characteristics, and firm fixed effects.[42] It is important

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[42]Different thresholds are chosen to deal with the drawback that we do not observe credit lines, and a decrease in the granted amount could be associated with principal repayments of term loans. Further details on how credit lines are identified in our data can be found in section 3.

to remark that, differently from before, we carry out this analysis quarterly rather than monthly because, as we pointed out before, contractual terms of credit lines remain largely fixed within a short period.

Table 8: Banks' Credit Line Risk Management

	Downsized Dummy: 1 if credit line was decreased more than								
	1%			10%			20%		
	1Q-11	2Q-11	3Q-11	1Q-11	2Q-11	3Q-11	1Q-11	2Q-11	3Q-11
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Inadequately Capitalized	0.034	0.100***	0.018	0.006	0.082***	-0.019	-0.005	0.073***	-0.028
	(0.021)	(0.022)	(0.020)	(0.018)	(0.021)	(0.022)	(0.017)	(0.020)	(0.022)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	129,110	126,221	121,950	129,110	126,221	121,950	129,110	126,221	121,950
R-squared	0.4475	0.4425	0.4380	0.4486	0.4364	0.4354	0.4494	0.4330	0.4358

This table reports a linear probability model regression of whether a credit line is downsized an $x\%$ on the stress test performance variable, bank and credit line controls, and firm fixed effects. The dependent variable is a dummy that takes value one if bank b downsized the credit line extended to firm f by $x\%$ during the quarter. Columns 1-3, 4-6, 7-9 consider downsizings larger than 1, 5, and 10%, respectively. Column 1, 4, and 7 cover the first quarter of 2011, prior to the announcement of the assumptions. Columns 2, 5, and 8 cover the second quarter of 2011 after the exercise's assumptions were known but before the results became public. Columns 3, 6, and 9 consider the third quarter of 2011 after the results were disclosed. The Inadequately Capitalized dummy takes value one if the bank's CT1R under the adverse stress test scenario is below 6%. All control variables are defined in Table C.8. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 8 reports the results. As can be appreciated, credit lines extended by inadequately capitalized banks were roughly 10pp more likely to be downsized during the second quarter of 2011; see column 2. Furthermore, such mitigating actions were only observed after the methodology's announcement and before the release of the results; note that coefficients in the first and third quarters of 2011 are not statistically significant (columns 1 and 3). Similar conclusions are obtained when we consider downsizings larger than 10 and 20%, respectively. Recall that, as opposed to firms, banks knew their financial condition before the announcement of the results. Thus, affected banks could take advantage of their private information before sharing it with market participants by reducing credit lines before the disclosure date. Therefore, firms' fears of losing access to funds available on their credit lines were justified, as inadequately capitalized banks were more prone to downsize lines. Such findings are consistent with the literature that shows that stress-tested banks reduce lending (Acharya et al., 2018; Gropp et al., 2018; Berrospide and Edge, 2019; Cortés et al., 2020). It is important to remark that banks' anticipated reaction to the results may have limited the size of precautionary drawdowns, implying that our results are a lower bound of the effect that could be expected after the release of truly unexpected negative news about banks.

Additionally, we study whether banks adjusted their lending standards besides downsizing credit lines due to the implementation of the stress test. In particular, banks might be reluctant to downsize credit lines due to reputational costs or contractual restrictions; hence, they could have adjusted other forms of lending to mitigate their exposure to undrawn credit lines. Furthermore, the additional liquidity demand created by the run on credit lines could lead banks to reduce term lending after the publication of the stress test results. Consequently, we explore whether banks' exposure to undrawn credit lines could have affected

lending to firms that rely entirely on term loans (firms without credit lines). Particularly, we assess whether inadequately capitalized banks with higher exposure to undrawn credit lines were more likely to decrease lending to this type of firm.

Table 9 shows the regression results of a dummy that takes value one if bank b reduced lending to firm f by an $x\%$ (20, 40, and 60%) within the quarter on *Inadequately Capitalized*, its interaction with bank's b undrawn credit line balances-to-assets, bank and relationship controls, and firm fixed effects for the sample of firms with no credit lines.[43] The results show that inadequately capitalized banks with more significant undrawn balances were likelier to reduce lending by more than 20% to these firms after the disclosure of the methodology and the results; see columns 2 and 3, respectively. For instance, one standard deviation increase in undrawn credit line-to-assets would have increased the probability of an inadequately capitalized bank decreasing lending by more than 20% by 0.55 percentage points during the second quarter of 2011 and of similar effect during the third quarter. For decreases in lending larger than 40 and 60% to this type of firm, we only find a statistically significant effect after the disclosure of the results; see columns 6 and 9, respectively. These results indicate that the reduction in term lending is more evident after the disclosure of the results, likely due to the additional drawdowns triggered by the stress test, rather than before their release,

Table 9: Stress-Tested Banks' Lending to Firms without Credit Lines

	Dummy variable: 1 if lending was decreased more than								
	20%			40%			60%		
	1Q-11	2Q-11	3Q-11	1Q-11	2Q-11	3Q-11	1Q-11	2Q-11	3Q-11
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Inadequately Capitalized	-0.005	-0.015***	-0.015**	0.001	-0.005	-0.012**	0.001	-0.002	-0.005*
	(0.006)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)
× Undrawn Credit	0.077	0.306***	0.290**	-0.040	0.050	0.197**	-0.035	0.032	0.100*
Lines over Assets	(0.125)	(0.092)	(0.127)	(0.090)	(0.085)	(0.093)	(0.048)	(0.041)	(0.049)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	248,923	255,300	260,850	248,923	255,300	260,850	248,923	255,300	260,850
R-squared	0.4676	0.4529	0.4532	0.4374	0.4252	0.4175	0.4053	0.3986	0.3981

This table reports a linear probability model regression of the probability that bank b reduces lending to firm f by an $x\%$ within a quarter as a function of the stress test performance variable, its interaction with bank's b undrawn credit line balances-to-assets, bank and credit line controls, and firm fixed effects. The sample contains only firms with no credit line at the beginning of quarter t. Columns 1-3, 4-5, and 7-9 consider drops in lending larger than 20, 40, and 60%, respectively. Columns 1,4, and 7 cover the first quarter of 2011, that is, prior to the announcement of the assumptions; columns 2, 5, and 8 cover the second quarter of 2011, that is, after the exercise's assumptions were known but before the results became public; whereas, columns 3, 6, and 9 consider the third quarter of 2011, after results were disclosed. The Inadequately Capitalized dummy takes value 1 if the bank's CT1R under the adverse scenario of the stress test is below 6%. Undrawn credit lines-to-assets is measured as bank's b undrawn credit line balances over its total assets as of December 2010. All control variables are defined in Table C.8. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

which could be seen as an ex-ante measure to accommodate the expected increase in credit demand.

Our results suggest that, in addition to downsizing credit lines, banks mitigate their exposure to precautionary drawdowns by originating fewer credits. Furthermore, this evidence points to the possibility that downsizing credit lines may not be sufficient to reduce

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[43]For thresholds smaller than 20%, we do not find significant effects.

exposure to undrawn credit lines due to contractual and reputational costs (Thakor, 2005). Such an alternative is consistent with findings in Greenwald et al. (2021), in which credit line drawdowns during the COVID-19 crisis crowd out lending to firms without credit lines. Moreover, banks more exposed to credit line runs seem to reduce term lending ex-post, which we interpret as a side effect of the increase in funding demand suffered via credit lines.

6 Extensions

6.1 Heterogeneous Effects on Bank & Credit Line Characteristics

In this section, we investigate whether the effect of stress test results on firms' credit line usage is heterogeneous across bank and credit line/relationship characteristics.

First, we explore whether certain bank characteristics affect the size of precautionary drawdowns. In particular, whether drawdowns on inadequately capitalized banks differed. To this end, we estimate our specification in (2), but adding interactions between the *Inadequately Capitalized* dummy and bank characteristics, such as the logarithm of assets, liquidity ratio, ROA, Non-performing loan ratio, CT1R, and a Commercial Bank dummy. Table 10 reports these results. As it can be appreciated, the coefficient of bank size (measured by the logarithm of bank book assets as of December 2010) is negative and statistically significant, indicating that precautionary drawdowns were larger in lines granted by smaller inadequately capitalized banks. This result is consistent with large banks having easier access to external finance to sustain an increase in firms' demand for liquidity, possibly abating their clients' fear of tighter credit conditions. The interaction with CT1R is not significant when added on its own but is negative and statistically significant when added together with the other bank characteristics. This result shows that precautionary drawdowns were more significant in lines granted by ex-ante less solvent banks. Recall that the 2011 EBA stress test indicated what would a bank's CT1R have been if macroeconomic conditions had significantly deteriorated. Therefore, a bank inadequately capitalized according to the stress test might find it more difficult to access external funds if it additionally has a low CT1R to start with, making it harder to sustain an increase in the demand for drawdowns. These results, however, should be interpreted with caution, given that our sample only includes 12 inadequately capitalized banks according to the 2011 EBA stress test.

Next, we analyze whether drawdowns on lines extended by inadequately capitalized banks are affected by specific contractual terms of the credit lines or relationship characteristics. To do so, we add to our main specification in (2) an interaction term of *Inadequately Capitalized* with each one of the considered bank-firm characteristics. Table 11 reports these results. First, precautionary drawdowns were more significant in highly used credit lines. In this regard, Jiménez et al. (2009) find that as a firm's financial condition worsens, its credit line usage increases. Thus, considering that firms with highly used lines might face, on average, a worsening of their financial conditions, this group may especially worry about losing access to their credit lines since banks can withhold funds due to an increase in their risk profile; hence the positive sign of the interaction of *Inadequately Capitalized* with *Initial Usage Rate*. Second, precautionary drawdowns were more sizable in credit lines with large granted amounts. This is because firms may precautionary use these lines granted by inadequately capitalized banks in anticipation of potential downsizing of these lines, as large credit lines can expose fragile banks to higher liquidity risk. Finally, precautionary

Table 10: Heterogeneous Effects on Bank Characteristics

	Change in drawn over granted funds (June/July)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inadequately Capitalized	0.217**	0.016	0.018***	0.005	0.051*	0.014***	0.719***
	(0.097)	(0.025)	(0.006)	(0.024)	(0.030)	(0.004)	(0.225)
× Log(Assets)	-0.011**						-0.033***
	(0.005)						(0.010)
× Liquidity ratio		-0.042					0.601
		(0.219)					(0.356)
× ROA			-2.802				-6.524
			(2.312)				(4.180)
× Non-performing loan ratio				0.153			-0.393
				(0.536)			(0.368)
× CT1R					-0.561		-1.696***
					(0.425)		(0.537)
× Commercial Bank Dummy						-0.010	0.047
						(0.013)	(0.028)
Controls	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
Observations	93,010	93,010	93,010	93,010	93,010	93,010	93,010
R-squared	0.5469	0.5468	0.5468	0.5468	0.5469	0.5468	0.5473

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the granted funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. Regressions include interactions between *Inadequately Capitalized* and bank characteristics. The last column includes all interactions. All variables are defined in Table C.8. All regressions include bank and credit line controls and firm fixed effects. Standard errors are double clustered at the bank and firm levels and reported in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

drawdowns were concentrated in credit lines with larger maturity. Note that if a credit line is close to expiring, any drawdown must be paid back to the bank before maturity. Hence, any drawdown on a nearly expired line will be of little use since the firm must almost immediately return the funds to its bank. Thus, the negative sign of the interaction term between *Inadequately Capitalized* and *Short Term Maturity*.

6.2 Heterogeneous Effects Based on Financial Covenants

Financial covenants in credit line contracts permit banks to restrict the usage of credit lines. Acharya et al. (2020) find, for their sample of U.S. stock exchange listed firms, that the most common financial covenants are related to leverage restrictions, interest coverage limitations, and capitalization and collateral requirements. Hence, high-leverage firms may find it harder to draw down funds from their credit lines, whereas low-leverage firms can easily dispose of funds available at their lines, as they are more likely to comply with financial covenants.

To capture the effect of complying with financial covenants, we employ firm balance sheet data to construct leverage and interest coverage ratios. The leverage and interest coverage ratios are computed as the book debt over book assets and net interest payments over revenues, respectively. We do not have data on the covenants applied to each credit line, but we employ the value of these ratios as proxies for covenant compliance. In this way, we expect firms will find it more difficult to access their credit lines if they use a significant fraction of their revenues to pay their debt or are highly indebted. Next, we divide our

Table 11: Heterogeneous Effects on Credit Line/Relationship Characteristics

	Change in drawn over granted funds (June/July)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inadequately Capitalized	0.012***	0.029***	0.012***	0.017**	0.002	0.005	0.021**
	(0.004)	(0.008)	(0.003)	(0.007)	(0.005)	(0.005)	(0.010)
$\times$ Collateralized	-0.004						-0.013
	(0.014)						(0.013)
$\times$ Short term maturity		-0.020**					-0.019*
		(0.010)					(0.010)
$\times$ Past due			-0.016				-0.016
			(0.039)				(0.039)
$\times$ Share of credit line				-0.016			-0.017
				(0.015)			(0.014)
$\times$ Initial usage rate					0.019***		0.018**
					(0.007)		(0.006)
$\times \mathbb{1}(\text{Granted} \geq \text{P}_{50})$						0.013***	0.011**
						(0.004)	(0.004)
Controls	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
Observations	93,010	93,010	93,010	93,010	93,010	93,010	93,010
R-squared	0.5468	0.5469	0.5468	0.5468	0.5469	0.5469	0.5472

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the granted funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. Regressions include interactions between *Inadequately Capitalized* and credit line/relationship characteristics. The last column includes all interactions. All variables are defined in Table C.8. All regressions include bank and credit line controls and firm fixed effects. Standard errors are double clustered at the bank and firm levels and reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

sample of firms into quintiles for each of our measures. Regarding their response to the stress test results release, we expect firms at the top quintiles to be unable to react as banks might have restricted access to credit lines by not waiving a covenant violation. On the other extreme, firms at the bottom quintiles will tend not to react since they might be less worried about losing access to liquidity, as banks would not be contractually able to withhold funds from them. Contrary, firms in the middle of the distribution may be more likely to react to the results if they fear failing to comply with a financial covenant soon and, consequently, losing access to their credit lines. Those are, however, only rough expectations, as we lack data on covenant compliance.

Table 12 presents the regression results for our specifications in Table 1, but interacting the stress test variable with whether a firm belongs to a given quintile of the coverage ratio distribution. We find that firms at the top quintiles of the distribution did not react to the disclosure of the results, presumably due to banks not waiving a covenant violation. Likewise, firms at the bottom of the distribution did not react, likely due to solid financial performance measures that secure credit line access. On the contrary, firms in the third quintile reacted to the information disclosure, in line with our hypothesis that firms in compliance with covenants but doubtful prospects are at risk of losing access to funding due to a future covenant violation. Similar conclusions can be obtained for the measure based on the leverage ratio. Again, no effect is observed at the bottom or top quintile, whereas quintiles in the middle did react; see Table 12.[44]

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[44]Similar conclusions are found for our alternative dependent variable, which results can be found in Table C.6. However, firms with lower leverage seem to respond more strongly when using this alternative variable.

6.3 Analysis of Single-Bank Firms

As discussed, our identification strategy relies on firms with more than one bank credit line. However, this type of firm may behave differently from single-bank firms. A priori it is unclear whether multi-bank firms are more sensitive to information disclosures. On the one hand, multi-bank firms are, on average, less financially constrained, allowing them to substitute lost funds more easily; hence, they may react less to information disclosures. On the other hand, they could potentially be better informed or more sophisticated, leading them to respond more strongly to the release of the stress test results. In this subsection, we explore whether multi- and single-bank firms behave differently.

We extend our sample to include firms with one credit line from banks participating in the 2011 stress test. Table 13 presents the results for this expanded sample. As a reference, we include in column 1 the results of column 1 in Table 1. Next, in column 2 for the initial sample of multi-bank firms, we control for credit demand factors via firm observables and industry-province fixed effects rather than firm fixed effects.[45] As it can be appreciated, the

Table 12: Heterogeneous Effects Based on Covenants

	Interest Coverage Ratio	Leverage Ratio
	(1)	(2)
Inadequately Capitalized ×		
Quintile 1	0.005	0.010
	(0.005)	(0.006)
Quintile 2	0.010	0.017***
	(0.007)	(0.005)
Quintile 3	0.016**	0.007
	(0.007)	(0.005)
Quintile 4	0.010	0.010*
	(0.007)	(0.006)
Quintile 5	0.008	0.005
	(0.006)	(0.006)
Controls	Y	Y
Firm FE	Y	Y
Observations	64,873	64,873
R-squared	0.5479	0.5479

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the granted funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. Regressions include interactions between *Inadequately Capitalized* and categories based on proxies of firms' compliance with financial covenants. In column 1, the sample is divided into quintiles based on the distribution of firms' interest coverage ratio, whereas in column 2, quintiles are based on the distribution of firms' leverage ratio. All regressions include bank and credit line controls and firm fixed effects. All variables are defined in Table C.8. Standard errors are double clustered at the bank and firm levels and reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

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[45]Note that firm fixed effects cannot be used when we include firms with a single credit line since the fixed effect would completely capture the observation. For this reason, we drop firm fixed effects and add firm controls in the primary sample (firms with multiple credit lines) to examine whether this specification makes a material difference. We quantify industry at the three-digit CNAE level. Together with the 50 provinces of Spain, this leads to 8,949 groups, providing a relatively tight set of controls.

coefficient of interest remains practically unchanged, indicating that this way of controlling for demand factors is similar to adding firm fixed effects. Next, we add single-bank firms to our sample in columns 3-6. Columns 3 and 4 include firm observables and industry-province fixed effects. In contrast, columns 5 and 6 only consider industry-province fixed effects, allowing us to increase the sample as not all firms have balance sheet information. Moreover, columns 4 and 6 add an interaction term between *Inadequately Capitalized* and a dummy variable (*Single-bank*) that takes value one if the firm only has one credit line.

Table 13: Expanding the sample to include single-bank firms

| | June/July 2011, Change in Drawn to Granted | | | | | |
| | Multi-bank Firms | | All Firms | | | |
	(1)	(2)	(3)	(4)	(5)	(6)
Inadequately Capitalized	0.012***	0.014**	0.015**	0.019**	0.013*	0.017**
	(0.003)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
x Single-Bank				-0.007		-0.007
				(0.006)		(0.005)
Credit line and bank controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	N	N	N	N	N
Firm controls	N	Y	Y	Y	N	N
Industry x Province FE	N	Y	Y	Y	Y	Y
Observations	93,010	64,873	149,173	149,173	225,433	225,433
R-squared	0.5468	0.2042	0.1407	0.1416	0.1202	0.1210

This table contains a set of regressions for analyzing the effect of the 2011 stress test on credit line usage. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the granted funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. Column 1 repeats, for ease of comparison, column 1 of Table 1. Column 2 drops firm fixed effects, using firm observables and industry-province fixed effects instead. Columns 3 and 4 use the same controls as column 2 but increases the sample to include firms with credit lines with a single bank. Columns 5 and 6 further expand the sample by dropping firm observables as controls. Additionally, columns 4 and 6 include an interaction term between *Inadequately Capitalized* and a dummy variable (*Single-bank*) that takes value one if the firm only has one credit line. All regressions include bank and credit line controls and firm fixed effects. All variables are defined in Table C.8. Standard errors are double clustered at the bank and firm levels and reported in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

As seen from columns 3 and 5, the coefficient of our variable of interest does not exhibit a significant change once single-bank firms are included. Furthermore, as indicated by the non-significance of the interaction between Inadequately Capitalized and Single-bank, multi- and single-bank firms did not draw down differently when the stress test results were announced.[46]

7   Conclusions and Policy Implications

Credit lines are fundamental instruments for firm financing and banks' business model. The flexible nature of these instruments, whereby firms can borrow funds at will (up to a prede-

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[46]As shown in the Appendix, the results also hold for our alternative dependent variable (the change in drawn over undrawn funds); see Table C.7.

termined amount), expose banks to potential credit line runs. This paper provides evidence that banks can be subjected to extraordinary credit line drawdowns when information questioning their solvency is released. Using loan-level data from the Spanish Credit Registry and the release of the results of the 2011 EBA stress test, we show that, after controlling for demand factors via firm fixed effects, firms drew down on average 1.2 pp more of their credit lines granted by banks that were inadequately capitalized according to the stress test following the release of the stress results. The increase climbs to 9.5 pp when normalizing by the unused part of the credit line. Additionally, we find that these extraordinary drawdowns reverted in September, confirming that they were precautionary, that is, driven by concern about banks´ prospects rather than genuine immediate liquidity needs. We also show that precautionary drawdowns were concentrated in credit lines of firms at risk of violating a financial covenant, on smaller and less solvent banks, and in lines with long residual maturity, high usage rate, large in size, and that already experienced a downsizing. These findings are consistent with precautionary drawdowns being driven by firms' fear that more vulnerable banks may tighten their lending standards as a result of the disclosure of the stress test results. Finally, we provide evidence that banks adjusted their exposure to credit lines before the disclosure date of the results, as banks took advantage of their private information before sharing it with market participants.

These findings contribute to the literature on credit line runs and bear important implications for the calibration of liquidity and capital requirements of credit lines, particularly from a macroprudential perspective. For instance, our results show that precautionary drawdowns were more sizable for inadequately capitalized banks with lower initial capital ratios. Along the same line, the unused part of credit lines might need to be subjected to higher capital requirements, as credit line runs can occur when a bank is perceived to be under solvency stress. Currently, the unused part of a credit line is subjected to a 10% capital requirement in the standardized approach of credit risk. Our results indicate that if information about a bank under capital stress becomes public, the bank could expect to see an additional 9.5 pp of its unused credit lines drawn. This would come on top of increases in usage due to other reasons, which suggests that the current 10% requirement could be low.

Our results also add to the literature studying the financial effects of the public release of stress test results. The evidence in this paper indicates that there are costs associated with that publication in the form of possible credit line runs for weaker banks. However, the stress test results publication also provides valuable information to all market participants, reducing uncertainty and improving market functioning, which might prevent more general bank runs. Furthermore, stress test disclosures can act as a disciplining device that provides ex-ante incentives for prudent risk management by banks. By contributing to a better understanding of the cost-benefit trade-offs associated with this policy tool, this article can help to improve the planning and execution of stress tests. In particular, supervisors should communicate results for weaker banks carefully and consider the announcement of complementary measures that address their weaknesses at the time of publication of the stress tests, which in some cases might entail more supervisory flexibility. The study also suggests that regulators may consider ex-ante stricter liquidity and capital requirements on unused credit lines to ameliorate the possibility of runs in these products when negative financial news emerges for some banks.

Finally, our results suggest that banks cannot fully mitigate exposure to undrawn credit lines by only using financial covenants. In particular, banks with significant undrawn credit line balances can take additional measures to abate the impact of runs on bank buffers beyond restricting access to credit lines. As shown in the paper, a side-effect of precautionary drawdowns is that inadequately capitalized banks with large undrawn credit line balances can reduce term lending to firms with no credit lines, affecting credit allocation.

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A   The 2011 EBA Stress Test

A.1   Key dates

The following table summarizes the main dates in the implementation of the 2011 stress test.

Table A.1: Key Dates of the 2011 EBA EU-Wide Stress Test

Date	Events
Jan. 13, 2011	The stress test exercise was announced by the EBA.
Mar. 2, 2011	An overview and timeline of the exercise were provided.
Mar. 18, 2011	Stress test scenarios (baseline and adverse) and methodology were published.
Apr. 8, 2011	The sample of participating banks was announced. A Core Tier 1 capital ratio (CT1R) of 5% was chosen as benchmark.
Jul. 15, 2011	Results became public at the end of the day. EBA recommended that banks with CT1R between 5%-6% should also strengthen their capital position.
May 2, 2012	A report on the fulfilment of the EBA's recommendation was published.

A.2   Assumptions

The exercise was carried out using financial data as of December 2010. In its implementation, a static balance sheet was assumed. That is, balance sheets as of the end of 2010 were frozen, which discouraged banks from claiming that risk would be mitigated by selling off risky assets or changing their business model. As in most stress testing practices, both baseline and adverse scenarios covered two years (2011 and 2012). Due to the uncertainty about a macroeconomic recovery of the EU, the adverse scenario incorporated a further aggravation of the EU sovereign debt crisis as of early 2011. Such a scenario affected each member country differently. For instance, under the adverse scenario, GDP in the EU would shrink by 0.4% in the period of analysis (2011 and 2012), whereas the Spanish GDP would decrease by 2.2%. Moreover, concerns were also focused on banks' exposure to sovereign risk. Consequently, in the adverse scenario, sovereign exposures in the trading book were subject to valuations haircuts, which depend on the maturity and issuing country.

Table A.2: Results for Spanish banks in the 2011 EBA EU-wide stress test

| | Core Tier 1 capital ratio | | | Core Tier 1 capital ratio | |
| | | Adverse Scenario | | | Adverse Scenario |
Bank	2010	2012	Bank	2010	2012
Santander	7.1	8.4	Ibercaja	9.7	6.7
BBVA	8.0	9.2	Unicaja	12.5	9.4
Bankia	6.9	5.4	Effibank	8.3	6.8
Caixa	6.8	6.4	Pastor	7.6	3.3
Popular	7.1	5.3	BBK	10.2	8.8
Sabadell	6.2	5.7	Unnim	6.3	4.5
Catalunyacaixa	6.4	4.8	Kutxa	13.2	10.1
NCG	5.2	5.3	Caja3	8.6	4.0
Civica	8.0	5.6	March	22.2	23.5
CAM	3.8	3.0	Vital	12.5	8.7
BMN	8.3	6.1	Ontinyent	8.9	5.6
Bankinter	6.2	5.3	Pollensa	11.2	6.2
Espiga	8.2	7.3			

This table contains the CT1R as of December 2010 and the CT1R under the adverse scenario of the 2011 EBA EU-wide stress test for each of the 25 Spanish banks that were part of the exercise.

A.3 Scope

The largest banks of each country, covering at least 50% of the national banking sectors in each EU member state (measured as total consolidated assets as of the end of 2010), were required to participate. However, national supervisors could add other banks to the sample. In total, 90 banks from 21 countries were part of the stress test exercise, representing more than 65% of the total assets in the EU banking system. Contrary to other countries, Spain included almost all commercial and all saving banks in the exercise (25 banks in total), representing nearly 93% of the Spanish banking sector by assets. According to the EBA's requirement, only the four largest Spanish banks, representing more than half of the Spanish banking assets, were required to participate.

A.4 Results

Table A.2 reports the CT1R under the adverse scenario of the participating Spanish banks in the 2011 EU-wide stress test.

B Effect of the 2011 EBA Stress Test on Bank Stock Performance

We follow the methodology in Petrella and Resti (2013). Price information is obtained from Bloomberg for 46 European banks with stock price information that participated in the 2011 EBA stress test, which 8 of them were Spanish.

Let t^* be the event date, that is, the next trading day after the stress results became public (Monday July 18th, 2011).[47] First, we estimate a one-factor model (CAPM) using the 200-trading day window ranging from $t^* - 210$ to $t^* - 11$. Specifically, we estimate the following model

$$R_{j,t} = \alpha_j + \beta_j R^M_{c(j),t} + \varepsilon_{j,t}, \tag{5}$$

where $R_{j,t}$ is the logarithmic return of security j at time t, α_j is the average CAPM pricing error for security j, and $R^M_{c(j),t}$ is the return of a country-specific stock market index. For instance, in the case of Spanish banks, we use the IBEX-35.

Next, we compute abnormal returns $(AR_{j,t})$ as the difference between the actual stock return and the expected stock return generated by the model estimated in equation (5). Cumulative abnormal returns (CAR_j) are computed as the sum of $AR_{j,t}$ over an interval.

Finally, we compute the Weighted Least Square (WLS) regression of CAR for a given window on the Inadequately Capitalized dummy, which takes value one if the stressed CT1R fell below 6%, using as weights the inverse of the root-mean-squared error from the one-factor model estimated in (5).

Table B.1 shows the effect, before and after the results were public, on cumulative abnormal returns (CAR) of having a CT1R below 6% under the adverse scenario. As it can be seen, only after the announcement of the stress test results, banks with a worse performance in the exercise (CT1R < 6%) were penalized with 2.4 pp lower CARs compared to banks that performed better (CT1R ≥ 6%). Overall, market returns indicate that the 2011 EBA EU-wide stress test provided valuable information to *sophisticated* investors (stock market participants) who could not anticipate such results.

Table B.1: Effect of the 2011 EBA EU-wide Stress Test on Bank Stock Prices

	Cumulative Abnormal Returns (CAR)	
	Before Release Date (1)	After Release Date (2)
Inadequately Capitalized $\mathbb{1}$(CT1R < 6%)	0.007 (0.008)	-0.024*** (0.009)
No of Banks	46	46
R^2	0.019	0.146

This table shows the Weighted Least Square (WLS) regressions of Cumulative Abnormal Returns (CAR) on the Inadequately Capitalized dummy. The sample contains 46 European banks with stock price information that participated in the 2011 EBA EU-wide stress test, 8 of them are Spanish. The Inadequately Capitalized dummy takes value 1 if the bank's CT1R under the adverse scenario is below 6% and 0 otherwise. In the first column, CARs are computed over the window Jul. 14 − Jul. 15, 2011, before the results were announced. In the second column, CARs are computed over the window Jul. 18 − Jul. 20, 2011, after the results were public (note that the stress tests results were released on Friday July 15, after markets closed). The weights are calculated as the inverse of the root MSE from the one-factor model estimation stage.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

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[47]Note that the stress results were released on Friday July 15th after markets had closed.

C Additional Tables

Table C.1: Descriptive Statistics

	Mean	Median	St. dev.	Obs.
Credit Line Variables				
Change in Drawn-to-Granted June/July (pp)	2.50	0.00	25.53	93,010
Change in Drawn-to-Granted May/June (pp)	0.64	0.00	24.38	93,403
Dummy if past-due loan w/ bank b	0.02	0.00	0.13	93,010
Collateralized	0.03	0.00	0.18	93,010
Maturity $\leq$ 1 y	0.86	1.00	0.35	93,010
Share of firm's f line granted by bank b	0.37	0.35	0.22	93,010
Initial usage rate	0.48	0.52	0.38	93,010
Bank Variables				
Inadequately capitalized dummy	0.29	0.00	0.46	25
Log(Assets)	19.65	20.11	1.26	25
ROA (%)	0.55	0.76	0.44	25
Liquidity ratio (%)	14.49	17.47	4.61	25
Non-performing loan ratio (%)	3.40	2.84	1.47	25
CT1R (%)	7.35	7.07	1.49	25
Commercial dummy	0.62	1.00	0.49	25
Undrawn credit line balances over Assets	0.04	0.03	0.02	25

Firm Variables

	Stressed CT1R					
	< 6		≥ 6			
	Mean	SD	Mean	SD	Diff.	SD
Assets (thousand €)	23,463	310,914	26,194	331,385	-2,731	3,185
Liquidity ratio (%)	5.84	9.09	5.73	8.92	0.11	0.09
Capital ratio (%)	31.91	25.10	32.40	24.80	-0.49**	0.25
ROA (%)	0.95	9.52	1.02	9.21	-0.07	0.09
Dummy if past due loan	0.086	0.281	0.086	0.281	0.000	0.003
No. Obs.	20,192		20,495		40,687	

Table C.2: Placebo Tests

	2010	2011					
	Jun-Jul (1)	Mar-Apr (2)	Apr-May (3)	May-Jun (4)	Jun-Jul (5)	Jul-Aug (6)	Aug-Sep (7)
Inadequately Capitalized	0.017 (0.029)	0.023 (0.029)	0.100** (0.040)	-0.026 (0.054)	0.095** (0.044)	0.048 (0.056)	-0.116* (0.059)
Controls	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
Observations	105,566	95,197	91,454	90,618	90,375	89,866	86,132
R-squared							
Within R-squared	0.0564	0.0519	0.0556	0.0575	0.0591	0.0497	0.0579

This table replicates column 2 of Table 1 on data from months before and after the announcement of the stress results. For each month, we regress the monthly change in used over available funds on *Inadequately Capitalized*, bank (computed as of December 2010) and credit line controls (computed with information available at month t), and firm fixed effects. As reference, column 5 (June-July) coincides with column 2 of Table 1. In order to avoid extreme negative values of the dependent variable, credit lines whose initial usage is above 99% have been dropped. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table C.3: Reversal in Precautionary Drawdowns

	Change in drawn to available funds		
	Jun-Jul (1)	Jul-Aug (2)	Aug-Sep (3)
Inadequately Capitalized	0.095** (0.044)	0.1392** (0.052)	-0.024 (0.060)
Inadequately Capitalized $\times$ Run		-0.318*** (0.052)	-0.186*** (0.041)
Controls	Y	Y	Y
Firm FE	Y	Y	Y
Observations	90,375	89,866	86,132
R-squared	0.446	0.433	0.444
Within R-squared	0.059	0.051	0.058

This table contains the regression results for the monthly change in credit line usage on *Inadequately Capitalized*, *Run*, their interaction, bank and credit line controls, and firm fixed effects for July-August and August-September. For comparison, column 1 replicates the results of column 2 in Table 1. *Run* is a dummy variable that takes value one if the firm's average change in credit line usage with inadequately capitalized banks is strictly positive and larger than the average change with adequately capitalized banks in July (column 2) or July or August (column 3). In order to avoid extreme negative values of the dependent variable, credit lines whose initial usage is above 99% have been dropped. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table C.4: Effect of the 2011 Stress Test on Usage Rate - Including Lines whose Granted Diminished

	Change in drawn over available funds (June-July)							
	$|\Delta\%\text{Granted}| \leq$							
	0 %	40%		80%		100%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inadequately Capitalized	0.95**	0.106**	0.084*	0.132**	0.128**	0.156***	0.162***	0.128**
	(0.044)	(0.046)	(0.048)	(0.053)	(0.053)	(0.053)	(0.052)	(0.052)
Inadequately Capitalized $\times$ Drop			0.21		0.11		0.047	0.279*
			(0.13)		(0.14)		(0.158)	(0.156)
Inadequately Capitalized $\times$ Drop $\times$ $|\Delta\text{Granted}|/\text{Granted}$								-2.78***
								(0.97)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	90,375	102,204	102,204	104,017	104,017	104,509	104,509	104,509
R-squared	0.446	0.4373	0.4376	0.4305	0.4325	0.4258	0.429	0.4496
Within R-squared	0.0591	0.0610	0.0614	0.0619	0.0652	0.0612	0.0664	0.1002

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. As part of our robustness checks, we add lines whose granted amount decreased between June and July 2011. Column (1) replicates, for comparison, our main results, which only include credit lines whose granted amount remained fixed between June and July 2011, see Table 1. In columns 2-3, we add lines whose granted amount decreased by less than 40%. Additionally, in columns 4-5, we add lines whose granted amount decreased by less than 80%. Finally, columns 6-8 include any loan commitment independently of whether the granted amount decreased or not. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the available funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a CT1R below 6% in the adverse scenario of the stress test and *Drop* is a dummy variable that takes value one if the credit line extended by bank b to firm f is downsized. All regressions include bank and credit line controls, and firm fixed effects. In order to avoid extreme negative values of the dependent variable, lines with an initial usage rate larger than 99% have been dropped. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table C.5: Effect of the 2011 Stress Test on Usage Rate - Different Samples of Banks

	Change in drawn over available funds (June-July)				
	Excluding				
	Banks with CT1R<5%	Banks with CT1R<5% & CT1R>7%	IPS merged banks	Banks that received public funds	Top 2 banks
	(1)	(2)	(3)	(4)	(5)
Inadequately Capitalized	0.120***	0.062	0.21*	0.27**	0.129**
	(0.042)	(0.166)	(0.12)	(0.12)	(0.055)
Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Observations	80,316	40,757	72,927	63,008	56,677
R-squared	0.45	0.48	0.46	0.47	0.47
Within R-squared	0.059	0.061	0.062	0.064	0.060

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. As part of our robustness checks, we exclude credit lines extended by certain banks. First, we exclude lines extended by banks whose CT1R fell below 5% under the adverse scenario of the stress test. Second, we only maintain in the sample lines extended by banks whose CT1R fell between 5% and 7% under the adverse scenario of the stress test. Third, we exclude lines that were the result of an Institutional Protection Scheme (IPS). Fourth, we exclude lines extended by banks that received government support. Fifth, we exclude lines granted by the two largest Spanish banks. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the available funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a CT1R below 6% in the adverse scenario of the stress test. All regressions include bank and credit line controls, and firm fixed effects. In order to avoid extreme negative values of the dependent variable, lines with usage rate in rate larger than 99% have been excluded. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table C.6: Heterogeneous Effects Based on Covenants

	Interest Coverage Ratio	Leverage Ratio
	(1)	(2)
Inadequately Capitalized $\times$		
Quintile 1	0.059	0.199***
	(0.073)	(0.070)
Quintile 2	0.040	0.139**
	(0.065)	(0.063)
Quintile 3	0.111*	0.016
	(0.064)	(0.055)
Quintile 4	0.140*	0.029
	(0.077)	(0.069)
Quintile 5	0.064	0.043
	(0.076)	(0.068)
Controls	Y	Y
Firm FE	Y	Y
Observations	63,325	63,325
R-squared	0.4497	0.4498

This table reports the difference-in-differences regression estimates for analyzing the effect of the 2011 stress test on credit line usage. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the available (undrawn) funds in June to firm. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. Regressions include interactions between *Inadequately Capitalized* and categories based on proxies of firms' compliance with financial covenants. In column 1, the sample is divided into quintiles based on the distribution of firms' interest coverage ratio, whereas in column 2, quintiles are based on the distribution of firms' leverage ratio. All variables are defined in Table C.8. All regressions include bank and credit line controls and firm fixed effects. Standard errors are double clustered at the bank and firm levels and reported in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table C.7: Expanding the sample to include single-bank firms

| | June/July 2011, Change in Drawn to Available | | | | | |
| | Multi-bank Firms | | All Firms | | | |
	(1)	(2)	(3)	(4)	(5)	(6)
Inadequately Capitalized	0.095**	0.112***	0.101***	0.094***	0.089***	0.075***
	(0.044)	(0.037)	(0.018)	(0.026)	(0.018)	(0.022)
x Single-Bank				0.011		0.023
				(0.031)		(0.022)
Credit line and bank controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	N	N	N	N	N
Firm controls	N	Y	Y	Y	N	N
Industry x Province FE	N	Y	Y	Y	Y	Y
Observations	90,375	63,690	147,221	147,221	221,940	221,940
R-squared	0.4460	0.1402	0.0935	0.0935	0.0761	0.0761

This table contains a set of regressions for analyzing the effect of the 2011 stress test on credit line usage. The dependent variable is the change between June and July in the drawn funds by firm f from bank b over the available (undrawn) funds in June to firm f by bank b. *Inadequately Capitalized* is a dummy variable that takes value one if a bank had a stressed CT1R below 6%. Column 1 repeats, for ease of comparison, column 1 of Table 1. Column 2 drops firm fixed effects, using firm observables and industry-province fixed effects instead. Columns 3 and 4 use the same controls as column 2 but increases the sample to include firms with credit lines with a single bank. Columns 5 and 6 further expand the sample by dropping firm observables as controls. Additionally, columns 4 and 6 include an interaction term between *Inadequately Capitalized* and a dummy variable (*Single-bank*) that takes value one if the firm only has one credit line. In all cases, credit lines with a usage rate larger than 99% in June are excluded, to avoid extreme negative values of the dependent variable. Standard errors are double clustered at the bank and firm levels and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table C.8: Definitions of All Variables Used in the Estimations

Bank-Firm Variables	Description	Source
Drawn over granted funds	Monthly change in drawn funds over initial granted funds of firm f with bank b	Credit Register
Drawn over available funds	Monthly change in drawn funds over initial available (undrawn) funds of firm f with bank b	Credit Register
Past-due	Dummy variable equal to 1 if firm f has past due loans with bank b	Credit Register
Collateralized	The fraction of the granted amount of the credit line that is collateralized	Credit Register
Short Maturity	The fraction of the granted amount of the credit line that expires within a year	Credit Register
Share of credit line	Share of the line with bank b out of the granted amount to firm f via credit lines.	Credit Register
Initial usage rate	Drawn-to-granted ratio of credit line granted by bank b to firm f	Credit Register
Granted	Total committed funds (drawn plus undrawn) extended by bank b to firm f	Credit Register
Firm Variables		
Assets	Total assets of firm f	Mercantile Register
ROA	Ratio of profits over total assets of firm f	Mercantile Register
Liquidity ratio	Ratio of cash over total assets of firm f	Mercantile Register
Capital ratio	Ratio of own funds over total assets of firm f	Mercantile Register
Interest coverage ratio	Net interest payments over revenues of firm f	Mercantile Register
Past-due in the system	Dummy variable equal to 1 if firm f had past due loans with any bank	Credit Register
Bank Variables		
Inadequately Capitalized	1 if bank b had a CT1R < 6% in the 2011 stress test adverse scenario; 0 otherwise.	EBA
CT1R	Core Tier 1 capital (equity and retained profits) to risk weighted assets of bank b.	EBA
Log(Assets)	The log of the total assets of bank b.	Supervisory Reports
ROA	The total net income over assets of bank b.	Supervisory Reports
Liquidity ratio	The ratio of liquid assets (cash and balance with central banks, and loans and advances to governments and credit institutions) held by bank b over its total assets.	Supervisory Reports
Non-performing loan ratio	Doubtful loan ratio of bank b.	Supervisory Reports
Commercial Bank Dummy	1 if bank b is a commercial bank; 0 otherwise.	Supervisory Reports
Undrawn Lines-to-Assets	Bank's b undrawn credit line balances over its total assets.	Credit Register

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