Does investor sentiment affect bank stability? International evidence from lending behavior

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Abstract:

We study the impact of investor sentiment on bank credit and how changes in lending may affect bank stability. We analyze a sample of 2,673 banks from 127 developed and developing countries during the 1997–2016 period. Our results indicate that periods of high investor sentiment positively affect bank lending and encourage bank risk-taking through the increase in the amount of loans granted which, in fact, reduces bank stability. We find that the impact of investor sentiment on bank stability through changes in growth in bank loans is less negative in countries where creditor rights protection is greater, in terms of both collateral and bankruptcy. During systemic banking crises, the negative effect on bank stability was weaker since any increase in bank credit supply provoked by investor sentiment was counteracted by the crisis.

Keywords: Investor sentiment; Bank credit; Bank stability; Creditor protection; Systemic banking crises

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We study the impact of investor sentiment on bank credit and how changes in lending may affect bank stability. We analyze a sample of 2,673 banks from 127 developed and developing countries during the 1997–2016 period. Our results indicate that periods of high investor sentiment positively affect bank lending and encourage bank risk-taking through the increase in the amount of loans granted which, in fact, reduces bank stability. We find that the impact of investor sentiment on bank stability through changes in growth in bank loans is less negative in countries where creditor rights protection is greater, in terms of both collateral and bankruptcy. During systemic banking crises, the negative effect on bank stability was weaker since any increase in bank credit supply provoked by investor sentiment was counteracted by the crisis.

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1. INTRODUCTION

After several years of recession caused by the Global Financial Crisis, the reactivation of credit and the control of bank risks are two of the main challenges that many economies face (Fratzscher et al., 2016). This paper attempts to contribute to recent financial literature on the determinants of bank credit supply and bank risk-taking from a behavioral finance perspective. In particular, in this research we consider investor sentiment as a potential explanatory factor of both the provision of financing by banks and the level of risk associated with their practices during the last years.

Some authors have examined how changes in investor sentiment and perception of the economic situation affect banks' stock returns (Irresberger et al., 2015; Kadilli, 2015). To our best knowledge, only Delis et al. (2014) and Caglayan and Xu (2016) have analyzed how certain aspects of investor perception may influence the amount of credit that banks are willing to lend. However, they do not test the potential related effects on risk-taking and bank stability. Changes in credit supply, as a consequence of more optimistic investor sentiment, may also affect banks' behavior in terms of risk-taking and, thus, their stability. In-depth examination of this is especially relevant given the potential negative consequences of excessively imprudent bank behavior on the real economy.

Our paper contributes to previous research in the following terms. First, it expands the literature that links behavioral finance and banking by using different sentiment variables from those used by Delis et al. (2014) and Caglayan and Xu (2016). Delis et al. (2014) focus on the identification of the so-called *anxious periods*, which are defined according to how consumers, CEOs (firms), and analysts perceive the economy. Caglayan and Xu (2016) use the sentiment volatility of economic agents. In this paper, we use a proxy capturing the sentiment of investors. Second, we methodologically isolate the direct effect of investor sentiment on bank stability from the indirect effect of changes in credit supply in response to a higher demand for funds among debtors for investment projects. We estimate a model of two equations where the annual variation in bank loans and the bank stability proxy are the dependent variables, and investor sentiment is an

explanatory variable in both equations. This procedure allows us to control for potential endogeneity and joint influence of investor sentiment on bank credit and stability. Third, the use of an international bank-level database allows us to control for differences across countries in terms of creditor rights protection, and to check its potential effect on the relationships between investor sentiment, credit supply, and bank stability. Fourth, given our sample period (1997-2016), we are able to examine the role that different episodes of banking crises have played on these relationships.

The results obtained using a sample of 2,673 banks from 127 developed and developing countries indicate that periods of high investor sentiment positively affect the amount of credit that banks are willing to lend. Our findings also show that sentiment has a significant effect on bank risk-taking through credit growth, which encourages banks to take more risks and, in consequence, worsens bank stability. This result is less relevant, however, in countries with stronger creditor rights protection and during the years of banking crises.

In terms of policy implications, our empirical findings highlight the relevance of mechanisms that help to control bank risk behaviour, particularly when investors' perception of the economy and financial markets is optimistic. Such mechanisms should aim to prevent the credit growth that takes place in response to a higher demand for funds from leading to excessive bank risk-taking. Moreover, the evidence provided in this paper also points to the important role played by legal and institutional quality, through creditor rights protection, in guaranteeing a more stable banking system.

The rest of the paper is organized as follows. Section 2 presents in more detail the theory behind our empirical study and testable hypotheses. Section 3 describes the sample and the methodology used in the empirical analysis. Section 4 presents the empirical results. Finally, Section 5 concludes.

2. LITERATURE REVIEW

Our research relates to some important strands of the finance literature. First, it is related to the wide set of studies analyzing the finance-growth nexus. Researchers

in this field of knowledge state that the positive relationship between financial development and economic growth relies, in part, on the supply of funds provided by both financial markets and intermediaries.

Classic papers, such as Rajan and Zingales (1998), have examined the extent to which the skillfulness of banks, in terms of allocation of resources, mobilization of savings, and risk management, helps minimize ex-ante and ex-post information asymmetries between investors and managers, and facilitates access to credit for the sectors that are most dependent on external financing (*lending channel*).

Likewise, literature has analyzed whether the negative effects of financial instability periods on the real economy are associated with the above-mentioned *lending channel*. Kroszner et al. (2007) find that the negative effects of banking crises on economic growth are particularly great in countries with more consolidated financial systems. Dell'Ariccia et al. (2008) provide evidence of a more negative impact on economic growth in sectors that are more dependent on the services provided by banks when the latter suffer a sudden adverse shock that obliges them to reduce their credit supply.

Second, our paper also relates to studies on bank risk and the fragility it causes in the financial system (Bernanke, 1983; Keeley, 1990; Calomiris and Manson, 1997, 2003). Numerous researchers have focused on analyzing the reasons why banks engage in risky behaviors. Literature has pointed to deposit insurance and franchise value as the two main determinants of bank risk-taking (Keeley, 1990; Demirgüç-Kunt and Detragiache, 2002; González, 2005).

There is also empirical evidence that loan losses increase after phases of rapid credit growth as a consequence of the high risks taken by banks during these periods (Salas and Saurina, 2002; Hess et al., 2009; Foos et al., 2010). Examination of the factors explaining credit growth might shed light on when the flow of bank credit to the economy is no longer good because it worsens the stability of entities operating in the financial system. The search for these factors leads to the third strand of literature to which our paper relates: behavioral finance and, more precisely, investor sentiment.

Investor sentiment can be defined as the investors' opinion, usually influenced by emotion, on future cash flows and the risk of investments (Baker and Wurgler, 2006). First, analyses of investor sentiment regarding financial markets aim to show whether it predicts stock returns (Neal and Wheatley, 1998). In parallel, there are similar studies for markets other than securities such as the futures market (Wang, 2003) or the options market (Ahn et al., 2002). The financial literature also studies the effect of investor sentiment on other areas of interest that were analyzed previously without considering it. Some examples are an explanation of stock market crises through the potential effect of sentiment (Zouaoui et al., 2011), the relationship between sentiment and *herding* behavior (Hwang et al., 2018), or the influence of sentiment on the performance of analysts (Qian, 2009, Hribar and McInnis, 2012).

The profitability and stability of financial firms and insurance companies may be affected by their macroeconomic situation (Hippler and Hassan, 2015; Ahmed et al., 2020, among others). Likewise, banks may be affected by the optimism or pessimism latent in the market, modifying their behavior in key aspects of their activity. The relationship between investor sentiment and its influence on banking behavior, however, has not been studied in depth. Delis et al. (2014) and Caglayan and Xu (2016) analyze this relationship focusing on the supply of credit. Results obtained by Caglayan and Xu (2016) for a panel of commercial, cooperative, and savings banks from G7 countries show that the sentiment volatility of economic agents affects bank lending negatively. Previously, Delis et al. (2014) examined the lending behavior of US banks during anxious periods for consumers, CEOs (firms), and financial analysts. Their results show that banks' lending falls when consumers and analysts are anxious. However, these studies do not consider investor sentiment from an optimistic perspective. They neither examine the direct effect of sentiment on bank stability nor analyze how changes in credit supply -in response to periods of high investor sentiment- may affect the stability of banks.

Therefore, in this paper, we aim to answer four specific research questions: (I) Does investor sentiment in financial markets affect banks' lending behavior? (II) Does investor sentiment in financial markets influence the stability of entities directly or indirectly through its potential effect on bank credit supply? (III) Does

the degree of creditor rights protection shape these effects? (IV) Do systemic banking crises play some role in the above relationships?

According to the results found by Delis et al. (2014) and Caglayan and Xu (2016), bank credit decreases during anxious periods and episodes of high sentiment volatility. When investor perception is optimistic, we expect an increase in bank lending in response to a higher demand for credit for investment projects. We thus pose our first hypothesis:

> *H1: High investor sentiment positively affects the amount of credit that banks are willing to lend.*

The relationship between investor sentiment and bank risk-taking may result *a priori* in contradictory predictions. On the one hand, from a short-term perspective, greater optimism in markets may lead banks to show a more positive attitude regarding credit investment and to relax loan conditions. Therefore, we would expect higher risk-taking by banks. On the other hand, banks are sophisticated investors with a superior capacity to collect and analyze information. If they anticipate that optimistic investor sentiment is temporary and not sustainable in the long term, they may even tend to reduce risks and adopt more prudent behavior. Moreover, if there is an improvement in the investors' economic perception, depositors will not demand high interest rates for their deposits, since they will seek to obtain returns via markets. As a result, banks will not need to apply high prices to their loans to maintain their interest margin and will be able to reduce the risk taken in their loan-based investments. Given the different arguments and the lack of empirical evidence in this regard, we will consider the effect of investor sentiment on bank risk-taking as an empirical question.

If our first hypothesis is confirmed, we can go further and think about the consequences it would have in terms of bank stability. There are many important reasons why individual banks may increase their lending. According to our first hypothesis, one of them could be to respond to a higher demand for credit among investors with an optimistic perception of the economic situation. Potential mechanisms to increase lending aim to relax collateral requirements and credit standards (Dell'Ariccia and Marquez, 2006; Ogura, 2006). Assuming that new loans

are granted to borrowers that were previously rejected, unknown or non-existent, or to whom too little collateral relative to their credit quality is required, loan growth may have adverse effects on bank stability.

For a large data set from Spanish commercial and savings banks from the period 1985–1997, Salas and Saurina (2002) find that loan growth in savings banks is significantly and positively associated with loan losses three and four years ahead. Hess et al. (2009) analyze determinants of credit losses in 32 Australasian banks during the period 1980–2005. They show that strong loan growth translates into higher credit losses with a lag of two to four years. Using data from more than 16,000 individual banks in 16 countries during 1997–2007, Foos et al. (2010) also find results suggesting that loan growth is an important driver of bank riskiness. According to these arguments and previous empirical evidence, we establish our second hypothesis:

> *H2: The positive effect of high investor sentiment on credit supply negatively influences bank stability.*

Therefore, regardless of the positive or negative direct effect of investor sentiment on bank risk-taking, we would expect a negative indirect effect on bank stability from the growth of credit that takes place in response to a higher demand for bank financing among more optimistic investors.

In our analysis, we also control for differences across countries in terms of creditor rights protection (collateral and bankruptcy regimes). The strength of creditor rights is of paramount importance for lenders in determining the degree of their exposure to borrower insolvency. In environments where there is high protection of creditor rights, bank lenders will have a greater ability to force repayment or take control of debtor's assets in the event of default. They will control borrower risk better if they know they could seize collateralized assets, or credibly threaten to take them. Therefore, the degree of protection of creditor rights may also influence the effect of investor sentiment on credit supply and consequently, on bank stability. The use of a database of banks from 127 developed and developing countries allows us to test the role played by this measure of institutional quality. Finally, consideration of a broad sample period (1997-2016) allows us to examine

whether the systemic banking crises occurred during these years significantly affected the impact of investor sentiment on the level of bank stability through changes in bank loans.

3. DATA AND EMPIRICAL METHODOLOGY

3.1. Sample

We use several main data sources. Bank-level information comes from the ORBIS Bank Focus Database (Bureau Van Dijk), which contains comprehensive information on banks' financial statements, ratings, and intelligence across the globe. When available, we use consolidated bank balance sheets and income statement data. We delete any unconsolidated entries to avoid double counting and only include the unconsolidated data of banks for which this is the only type of information available in the ORBIS Bank Focus Database. The data for constructing our sentiment measures are taken from Datastream database (Thomson Financial), and from the Organization for Economic Cooperation and Development (OECD).

Country-level data on bank market characteristics, creditor rights protection, and macroeconomic variables come from the World Bank Global Financial Development database, and the Institute's Governance Group (Doing Business Database).

Our final sample is made up of an unbalanced panel for a maximum of 2,673 banks in 127 developed and developing countries during the 1997-2016 period. This makes a total of 16,953 bank year observations in our sample. Table 1 reports the number of banks and observations per country.

INSERT TABLE 1 ABOUT HERE

3.2. Econometric model

Our empirical analysis considers that investor sentiment may affect banks' loans growth and bank stability simultaneously and that changes in the amount of loans

provided by banks may be an indirect channel leading to changes in bank stability during the same period. That is to say, investor perception of the economic situation may have an effect on the level of risk taken by banks, not only directly, but also through the potential increased amount of credit that they are willing to lend. This analysis requires a procedure in two stages to control for potential endogeneity in banks' credit supply and bank stability and for their potential simultaneous dependence on investor sentiment. Therefore, we use instrumental variables in a Two-Stage Least Squares (2SLS) procedure for panel-data models.

We regress our proxy for bank stability on investor sentiment variables and on our measure of banks' loan growth, controlling for other relevant factors at both bank- and country-level. The structural equation to be estimated is defined as follows:

$$RISK_{\mathrm{i,j,t}} = \beta_0 + \beta_1 SENT\_GPCA_{j,t-1} + \beta_2\, \Delta LOANSp_{i,j,t} + \beta_3 BANK_{i,j,t-1} + \beta_4 COUNTRY_{j,t-1} + \pi_j + \lambda_{j,t} + \mu_i + \varepsilon_{i,j,t} \quad [1]$$

where i, j, t refer to the bank, country, and year, respectively. As dependent variables, we use three different variables that measure the risk level of bank i in country j at a specific period of time t. These are the bank Z-score, the loss loans to total gross loans ratio and the impaired and non-performing loans to total gross loans ratio. $\mathrm{SENT\_GPCA_{j,t-1}}$ is our proxy of investor sentiment. We include additional bank- ($\mathrm{BANK_{i,j,t-1}}$) and country- ($\mathrm{COUNTRY_{j,t-1}}$) level control variables[1]. π_j is a set of country dummy variables to control for characteristics that are specific to each country, as long as these are persistent over time. These specific controls allow us to capture any unobserved bank-invariant effects that are specific to each country and are not included in the regression. $\lambda_{j,t}$ is a set of year dummy variables to capture any unobserved bank-invariant time effects not included in the regression. μ_i is a bank-specific effect, which is assumed to be constant for bank i over t. $\varepsilon_{i,j,t}$ is a white-noise error term.

[1] Our estimates use winsorized values of the variables at 1% and 99% levels in order to avoid the potential effect of outliers.

$\Delta LOANS_{i,j,t}$ is the variable that approximates growth in bank loans. In order to capture if the effect of investor sentiment on bank stability could be shaped by the different lending behavior of banks resulting from a specific period of high investor sentiment, we consider ΔLOANS as an instrumental variable obtained in a first-stage regression.

This first-stage equation includes all the explanatory variables in model [1], but moreover, it has its own predetermined variables or instruments, which should affect the second-stage variable only through their effect on the first-stage endogenous variable. These instruments are $\Delta CUSTOMDEP_{i,j,t-1}$ and $TGLTA_{i,j,t-1}$. ΔCUSTOMDEP defined as the lagged value of the annual growth rate in customer deposits. If deposits collected by a bank grow, more funds are available to increase its credit supply. TGLTA defined as the lagged value of the total gross loans to total assets ratio. The size of a loan portfolio will depend not only on the amount of credit that a bank is willing to lend, but also on other factors outside the entity, such as the competition level in the sector or the demand of borrowers who could get funds from alternative sources. As the proportion of loans over total assets cannot increase unlimitedly, the greater the loan portfolio of the previous year over total assets, the more difficult it is to increase lending at a high rate. Regarding bank risk, since quantity and quality are two different things, experiencing an increase of deposits or having a large loan portfolio do not imply that a bank is adopting risky lending behaviors. If loans are aimed to finance safe investment projects, there is no reason for stability of the entity to decrease. Therefore, we expect ΔCUSTOMDEP to affect banks' loan growth positively whereas TGLTA should affect it negatively. To check the validity of these instruments, we compute the Sargan-Hansen test of overidentifying restrictions (orthogonality conditions).

The 2SLS approach allows us to separate different effects of investor sentiment in the equation explaining bank stability. Therefore, coefficient β_1 in model [1] would indicate the direct effect of investor sentiment on the level of bank stability regardless of potential changes in the amount of loans granted by our sample of banks. Coefficient β_2 would capture the extent to which investor sentiment influences bank stability through changes in the amount of bank loans.

Our empirical approach may be affected, however, by a potential reverse causality problem. The increased bank credit supply during periods of high investor sentiment might result from a greater bank risk taking. If banks do not expect severe consequences from assuming excessive risks, the amount of credit that they are willing to lend may increase. It could be the case of too-big-to-fail banks, banks with a high capacity to absorb losses or banks operating in countries with low levels of competition in their banking systems. If causality runs from bank risk taking to lending, the relationship between the variable that approximates growth in loans and the proxies of bank stability should be more relevant. We attempt to address this question by replicating our model for different subsamples. Specifically, we split our international sample of banks around the median values of three variables: bank assets size, the equity to total assets ratio and the Lerner index in the country. Cubillas and Suárez (2018) carry out a similar analysis to empirically examine a potential reverse causality problem in the relationship between the level of monopoly power of banks during the Global Financial Crisis and the amount of funds available to lend.

In an extended version of our basic model [1], we analyze how differences in the level of protection of creditor rights across countries could shape the impact of investor sentiment on bank stability through changes in bank loans.

We consider three proxies for the legal protection of creditor rights. We first use the legal rights index developed by the World Bank to measure a borrower country's overall creditor rights (CREDITOR). The strength of the legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. Next, following Haselmann et al. (2010) and Fernández et al. (2018), we break down the overall index of creditor rights into its two main components: 1) legal rules designed to protect individual creditors' claims outside bankruptcy (COLLATERAL), and 2) the collective enforcement regime established for bankruptcy (BANKRUPTCY). The index for the collateral regime is the sum of seven indicators measuring: 1) if a general, rather than specific, description of assets is permitted in collateral agreements; 2) if a general, rather than specific, description of debt is offered in collateral agreements; 3) if any legal or natural person may grant or take security in the property; 4) if a unified registry that

includes charges over movable property operates; 5) if secured creditors have priority outside of bankruptcy; 6) if parties may agree on enforcement procedures by contract; 7) if creditors may seize and sell collateral out of court. As an indicator of the bankruptcy regime, we use the traditional index developed by Djankov et al. (2007). This index is the sum of four indicators: 1) creditor consent for reorganization; 2) no automatic stay; 3) secured creditors first, and 4) management out. Higher values of these indexes indicate higher protection of creditor rights.

The sequential inclusion of each one of these three indicators and its interaction with ΔLOANS, allow us to examine whether the impact of investor sentiment on bank stability through changes in the amount of loans provided by banks differs depending on the level of protection of creditor rights.

The coefficient of the interaction term would capture how the impact of the estimated values of bank loans on bank stability changes when the level of protection of creditor rights is stronger. Other variables are the same as in model [1].

Finally, we analyze the impact of a systemic financial crisis on the effects tested. We use the dummy provided by World Bank in its Global Financial Development database. This dummy variable is constructed from the definition of systemic crisis given by Laeven and Valencia (2012), which is as follows: a banking crisis is defined as systemic if two conditions are met: a. Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations), b. Significant banking policy intervention measures in response to significant losses in the banking system. The first year that both criteria are met is considered as the year when the crisis start becoming systemic. The end of a crisis is defined the year before both real GDP growth and real credit growth are positive for at least two consecutive years. A total of 45 systemic banking crises are registered in our sample[2]. We include this

[2] Austria (2008-2012), Belgium (2008-2012), China (1998), Colombia (1998-2000), Croatia (1998-1999), Cyprus (2011-2015), Denmark (2008-2009), Dominican Rep (2003-2004), Ecuador (1998-2002), France (2008-2009), Germany (2008-2009), Greece (2008-2012), Hungary (2008-2012), Iceland (2008-2012), Indonesia (1997-2001), Ireland (2008-2012), Italy (2008-2009), Japan (1997-2001), Kazakhstan (2008), Latvia (2008-2012), Luxembourg (2008-2012), Malaysia (1997-

dummy in the model, individually and also interacted with ΔLOANS. Its coefficient would capture the impact of a crisis on bank stability and the coefficient of its interaction with ΔLOANS would capture how the crisis influenced the indirect effect of investor sentiment on bank stability through the growth in bank loans. Other variables are the same as in model [1].

3.3. Variables

3.3.1. Key variables: loan growth, bank stability, and investor sentiment

We use the natural logarithm of the ratio of gross bank loans over their value in the previous year to measure the annual variation in bank credit supply (ΔLOANS). We use the Z-score of a bank (ZSCORE) as a proxy for bank stability. Previous papers have traditionally used this variable as an inverse measure of bank risk (see Laeven and Levine, 2009; Hadad et al., 2011; Cubillas and Suárez, 2018, among others). This variable is computed by the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A 3-year moving window is used to estimate standard deviations for each bank in each year. A higher Z-score indicates that a bank is more stable because it is inversely related to the probability of bank insolvency. Given that the Z-score is highly skewed, we use the natural logarithm of the Z-score, which is normally distributed. As other proxies of bank risk, we use the proportion of loss loans over total gross loans (TLLTGL) and the ratio of impaired and non-performing loans to gross loans (IMPAIRED).[3]

Previous studies have used various indicators to measure the sentiment variable, although there is no consensus on the best way to measure this unobservable variable. In recent papers, the tendency is to construct global sentiment indexes, which include local sentiment proxies. Baker et al. (2012) construct investor

1999), Mongolia (2008-2009), Netherlands (2008-2009), Nigeria (2009-2012), Philippines (1997-2001), Portugal (2008-2012), Rep. of Korea (1997-1998), Rep. of Moldova (2014-ongoing), Romania (1998-1999), Russia (1998; 2008-2009), Slovakia (1998-2002), Slovenia (2008-2012), Spain (2008-2012), Sweden (2008-2009), Switzerland (2008-2009), Thailand (1997-2000), Turkey (2000-2001), Ukraine (1998-1999; 2008-2010; 2014-ongoing), United Kingdom (2007-2011), United States (2007-2011), Uruguay (2002-2005), Vietnam (1997).

[3] The use of IMPAIRED as a proxy of bank risk reduces our sample to 12,937 observations (2,280 banks from 123 countries). The use of TLLTGL substantially reduces the sample, to 2,947 observations (740 banks from 67 countries).

sentiment indexes for six major stock markets and use them to compose a single global sentiment index. Chang et al. (2012) use the first main component of US, UK, French and German sentiment as a measure of global investor sentiment to analyze the impact of investor sentiment in 23 different stock markets[4]. We follow this proposal and construct a global investor sentiment index, because not only is this the current trend in studies analyzing market sentiment but we consider it particularly relevant given the global nature of our sample. Our global sentiment proxy (henceforth, SENT_GPCA) collects information on the investor sentiment of six key global markets. In line with Baker et al. (2012), we include Canada, France, Germany, Japan, the UK and the US. Following the proposals given in Baker and Wurgler (2006) and Baker et al. (2012), we use principal components analysis to isolate the common component of the individual proxies of investor sentiment included in the construction. To construct our index, an indicator of local sentiment for each market is required. We then build a composite sentiment index for Canada, France, Germany, Japan and the UK markets (SENT_CA, SENT_FR, SENT_GE, SENT_JP, and SENT_UK, respectively). The variables included in each local sentiment index are: turnover, volatility premium and consumer confidence index[5].

As a proxy of US sentiment (SENT_US), we use the composite index constructed by Baker and Wurgler (2006), consisting of six sentiment indicator variables: closed-end fund discount, stock turnover, number of initial public offerings (IPOs) and average IPOs' first-day returns, equity share in new issues, and dividend

[4] The mechanism by which sentiment spreads across markets is under debate in the literature. As Chang et al. (2012) states, sentiment can be spread across markets by (either or both of) two means: physical and psychologically. Baker et al. (2012) finds that private capital flows appear to be one mechanism by which sentiment spreads across markets and forms global sentiment, but there are surely others, including word-of-mouth and the media that contribute to sentiment propagation across markets. In this vein, Corredor et al. (2013) confirm that capital flows from US to Spain is not the channel by which global sentiment spreads to local markets, thus raising the possibility that the contagion is through variables relating to investor sentiment. In this paper, we consider appropriate to construct a global sentiment proxy that affects domestic markets. We do not go further in the transmission channel as it is an open question in the literature and previous findings are consistent with the existence of, at least, one of the mechanisms related with cognitive bias and not explained by international capital flows.

[5] The reason for the consideration of these three variables is their relationship with the level of sentiment. Details of the construction of the volatility premium and turnover are available in Baker et al. (2012) and Jones (2002) respectively. Consumer confidence has been used in numerous studies such as Lemmon and Portniaguina (2006), Schmeling (2009) and Antoniou et al (2013), among others. The index of consumer confidence data come from the website: https://data.oecd.org/leadind/consumer-confidence-index-cci.htm

premium[6]. Finally, as a measure of global sentiment, we form a composite index that captures the common component in these six local indexes. The resulting index is:

$$SENT\_GPCA = 0.248*SENT\_CA + 0.296*SENT\_FR + 0.030* SENT\_GE + 0.248*SENT\_JP + 0.310* SENT\_UK + 0.174* SENT\_US \quad [2]$$

This first principal factor explains 43% of the sample total variance. This figure resembles the 49% reported in Baker and Wurgler (2006) for a six-factor index of US. All local sentiment indexes show positive and significant correlations with the SENT_GPCA[7].

Given that our sentiment index is likely to include a common economic cycle component, is important to consider macroeconomic variables as controls in our model. Since these variables capture aspects related to the moment of economic cycle, the coefficient obtained for our measure of sentiment will show only the effect that is really due to the perception of investors.

In Table 2, descriptive statistics and correlations are reported for the proxy capturing investor perception of the economic situation, bank-level variables and macroeconomic controls. The variable measuring the annual variation in bank credit supply (ΔLOANS) presents a mean value of 0.0529. Since it is expressed in logarithms, this means that, on average, the amount of bank loans in a year is 1.2 times the amount of bank loans in the previous year.

Panel B shows high positive correlations between ΔLOANS and our measure of investor sentiment (SENT_GPCA), which is statistically significant at the one percent level. It anticipates a potential positive effect of optimistic investor sentiment on annual growth in bank loans. Correlation between the investor sentiment variable and ZSCORE is also positive and statistically significant. It

[6] The BW index data are available on the website of J. Wurgler http://www.stern.nyu.edu/~jwurgler. We are constrained by the availability of data and cannot employ these measures in the rest of local sentiment indicators.

[7] The sentiment index coefficients for each country are computed as follows:
SENT_CA=0.522*consumer_confidence+0.527*turnover+0.437*volatility_premium;
SENT_FR=0.598*consumer_confidence+0.389*turnover+0.477*volatility_premium;
SENT_GE=0.519*consumer_confidence+0.260*turnover+0.580*volatility_premium;
SENT_JP=0.471*consumer_confidence+0.486*turnover+0.336*volatility_premium;
SENT_UK=0.575*consumer_confidence+0.282*turnover+0.574*volatility_premium

suggests an increase in bank stability when investor sentiment in markets is high. This is in line with the argument that, as sophisticated investors, banks may adopt a more prudent behavior if they anticipate that the optimistic sentiment in markets is temporary. It is also consistent with the intuition that, during episodes of optimistic market sentiment, depositors will not demand high interest rates for their deposits since they will seek to obtain returns via markets. Consequently, banks will not need to apply high prices to their loans to maintain their interest margin so will be able to reduce the risk taken in their loans-based investments. Negative correlation between investor sentiment variable and IMPAIRED confirms the previous one. Finally, the negative correlation between ΔLOANS and ZSCORE might reflect a reduction in bank stability after phases of rapid credit growth due to high risks assumed during them. This is not consistent with the negative correlation between ΔLOANS and the other proxies of bank risk (TLLTGL and IMPAIRED). However, the use of these two variables restricts the number of sample observations.

INSERT TABLE 2 ABOUT HERE

Figures 1, 2 and 3 show the evolution of our main variables during our sample period. Figure 1 shows the evolution of our proxy of investor sentiment (SENT_GPCA). It reflects a negative investor sentiment at the beginning of the 2000s and during the years of the Global Financial Crisis, that is followed by recovery periods during which investor sentiment shows a positive trend. Figure 2 presents the dynamics followed by the growth in bank loans during the same period of time. Our intuition suggests that, precisely during periods of high investor sentiment, the growth in bank credit supply is greater. Finally, evolution of the average annual values of the ZSCORE in Figure 3 reflects that periods with lower bank stability coincide with the years of higher investor sentiment and higher growth in credit supply.

INSERT FIGURES 1, 2 AND 3 ABOUT HERE

In Table 3, we present a mean difference test among the main variables of interest. In Panel A, we show the average values of the natural logarithm of the ratio of gross bank loans over their value in the previous year (ΔLOANS) when sentiment

investor proxy (SENT_GPCA) take low values (below 0) and high values (above 0). In Panel B, we compute the mean value of the ZSCORE across the median of annual growth in bank loans. According to the results shown in Panel A, we find that the average value of ΔLOANS is 0.0566 when the market is characterized by high investor sentiment, proxied by the SENT_GPCA variable. During periods of low investor sentiment, the mean value of ΔLOANS is 0.0474. From the results of the test we can confirm that the difference is statistically significant at the 1% confidence level. Results in Panel B show that in the subsample of bank-year observations below the median value of the annual growth of bank loans, the average value of the bank ZSCORE is 1.7811; whereas it is 1.6926 in the subsample of observations above the median value of the annual variation of loans. Similarly to the results presented in Panel A, the difference is statistically significant at conventional levels and suggests a reduction in bank stability, proxied by the ZSCORE, which might be associated with a higher level of growth of bank loans.

INSERT TABLE 3 ABOUT HERE

In order to better understand the relationship between investor sentiment and bank credit and how changes in bank lending, motivated by investor sentiment, may affect the level of bank stability, it is necessary to perform a multivariate analysis. This allows us to include all bank- and country-level explanatory variables simultaneously and to control for any potential endogeneity problems, which is necessary to test the main hypotheses.

3.3.2. Control variables

In all estimates, we include a set of bank- and country-level control variables. Bank-specific characteristics used are asset size (SIZE), overhead costs (OVERHEAD), return on assets (ROA) and leverage (LEVERAGE). These control variables have been traditionally considered to explain both bank risk-taking and the amount of credit provided by banks (Cubillas and González, 2014; Delis et al., 2014; Caglayan and Xu, 2016). SIZE is defined as the natural logarithm of total bank assets. OVERHEAD is defined as non-interest bank expenses (personnel, administrative and other non-interest expenses) expressed as a proportion of net revenues. Differences across banks in the values of this variable should capture

differences in employment or wage levels as well as banks' product mixes and quality of services provided. Higher values of this variable would be therefore associated with less efficient banks. ROA is the bank return on assets ratio. LEVERAGE is the total liabilities on total assets ratio.

We use a wide set of country control variables to rule out the possibility that effects attributed to investor sentiment are not caused by alternative country-level characteristics. We specifically control for the Lerner index (LERNER), that proxies for the level of market power in each country and year. It is calculated as the difference between price (interest rate) and marginal cost expressed as a percentage of price. It assumes that the divergence between product price and marginal cost of production is the essence of monopoly power. The Lerner index takes value zero in the case of perfect competition and value one under perfect monopoly. We include the ratio of private credit by deposit money banks to GDP as a proxy of financial development (FINDEV) and the annual growth in the consumer price index of each country (INFLATION).

The granted loans do not depend only on elements relating to the supply but also to the demand of credit. Investor sentiment may affect the balance-sheet structure of banks, causing changes in both the supply and demand for bank loans. During optimistic periods, firms could be more prone to invest more and could resort more to banks for borrowing. At the same time, banks might find more profitable customers, at least in the short term, and being more willing to lend more funds during the expansion periods of the cycle. All these arguments may justify the distinction between potential supply and demand effects, although it is difficult to carry out in empirical studies. Following Kashyap and Stein (1995) among others, the literature has opted for the use of disaggregated data at bank-level. They assume that banks face identical loans demand. So, if changes in lending differ across banks, is because different types of banks adjust their supplies of credit in a different way.

The assumption of homogenous loan demand could be relaxed with the availability of loan level data (Khwaja and Mian, 2008; Jimenez et al., 2012). However, loan-level data are not available for our international sample of banks. Therefore, to take into account the potential demand effects in our empirical analysis, we

proceed in a double way. First, following previous studies, in all of the estimates, we include the growth in GDP as a macroeconomic control variable (ΔGDP). Second, we define a dummy variable identifying the economic recessions years on each country. RECESSION takes the value 1 if country j is experiencing a recession episode in period t. Otherwise, it takes the value 0. Expansion periods may also affect the amount of bank loans, as bank-dependent borrowers are affected disproportionally more positively during the growth phases of the cycle (Braun and Larrain, 2005). Bank insolvency and/or liquidity problems may also be reduced during expansion phases and the estimates simply reflect this fact. If bank stability spikes during expansion years and we do not control for a dummy variable capturing the phase of the business cycle, changes in the amount of loans may be capturing the effects of the business cycle rather than causality from banks to the real economic sector. For this reason, we control for the dummy RECESSION to avoid confounding effects from the economic cycle. We identify recessions in each country following the methodology applied by Braun and Larrain (2005)[8].

4. MAIN EMPIRICAL RESULTS

4.1. Investor sentiment and bank stability: the effect of growth in bank loans

Table 4 reports estimates analyzing how investor sentiment affects the stability of banks, not only in a direct way but also indirectly through changes in annual growth in bank loans. Column (1) reports results for the first stage equation explaining how optimism among market investors affects annual growth in bank loans.

[8] The identification of recession periods follows a peak-to-trough criterion. A trough occurs when current GDP is more than one standard deviation below its trend level (or alternatively, when cyclical GDP is more than one standard deviation below zero), computed using the Hodrick-Prescott filter with smoothing parameter of 100. We use the standard deviation of the cyclical GDP of each country. Once the trough is identified, a local peak will be defined as a year where cyclical GDP is higher than the previous and subsequent years. The recession variable takes a value of 1 for all the years between peak and trough (excluding the peak year), and 0 otherwise. The recession dummy is assigned a missing value whenever there are no GDP data or if a trend cannot be reliably constructed.

Coefficient for our proxy of investor sentiment (SENT_GPCA) is positive and statistically significant. This finding indicates that, on average, annual growth in bank loans increases as a consequence of an optimistic investor perception of the economic situation. This confirms our hypothesis that high investor sentiment positively affects the amount of credit that banks are willing to lend (H1). It is also in line with the results found by Delis et al. (2014) and Caglayan and Xu (2016). These authors provide evidence of the reduction that takes place in bank credit during anxious periods and phases of high sentiment volatility. As we expected, bank credit increases in response to a higher demand in periods of high investor sentiment, as the effect on bank credit supply is the opposite during these periods.

The lagged value of the annual growth in customer deposits (ΔCUSTOMDEP) shows a positive and significant coefficient. This result also is in line to our expectations. If deposits grow, more funds are available to increase bank credit supply. The lagged value of the total gross loans-to-total assets ratio (TGLTA) presents a negative and significant coefficient. Our intuition supports that the greater the bank's loan portfolio in the previous year, measured as a proportion of its total assets, the more difficult it is to increase lending at a high rate. For two of the three second stage specifications, the p-value of Sargan-Hansen is non-significant. Consequently, the null hypothesis that the instruments are valid cannot be rejected. A rejection would cast doubt on the validity of the instruments.

Regarding the remaining control variables, SIZE presents a negative and statistically significant coefficient. We associate this result with the fact that large banks have more incentives to perform new activities apart from the traditional business of credits and deposits. According to this reasoning, their investments in loans and credits could be relatively lower. Coefficients for OVERHEAD, ROA and LEVERAGE are positive and statistically significant, suggesting that less efficient banks, with higher returns and more leveraged, are more prone to increase their credit supply.

In relation to country-level variables, LERNER shows negative and statistically significant coefficients suggesting that in countries with less competitive banking systems the growth in credit supply is smaller. Coefficient for the proxy of financial

development (FINDEV) is negative and significant, indicating a negative association between more developed financial systems and annual growth in bank loans. INFLATION and ΔGDP show positive coefficients. This may suggest that, precisely in countries with higher inflation and GDP growth rates, a greater increase in bank credit takes place. Finally, the RECESSION dummy shows non-significant coefficients.

Columns (2), (3) and (4) report results for the second stage equations explaining how investor sentiment affects the stability of banks. ΔLOANS presents a negative and statistically significant coefficient in column (2) where the dependent variable is Z-SCORE, the inverse proxy of bank risk. Coefficient for ΔLOANS is positive and statistically significant in the remaining specifications; specifically in column (3) where the dependent variable is TLLTGL and in column (4) where the IMPAIRED variable is used as the proxy for bank risk. These results indicate that the increase in the annual growth of loans resulting from a period of high investor sentiment reduces bank stability by increasing the level of risk taken by banks. This confirms our second hypothesis that the positive effect of investor sentiment on credit supply negatively influences bank stability. It is also consistent with the presumption that less collateral requirements and laxer credit standards are used as mechanisms to increase lending (Dell'Ariccia and Marquez, 2006; Ogura, 2006). If new loans are granted to borrowers that were previously rejected, unknown or non-existent, or to whom too little collateral relative to their credit quality is required, the amount of credit that banks provide may be growing at the expense of higher levels of risk. So, consistently with Salas and Saurina (2002), Hess et al. (2009), Foos et al. (2010), loan losses increase and this damages bank stability.

The variable of investor sentiment presents a non-statistically significant coefficient in two of the three specifications. This finding may be explained by contradictory predictions around the relationship between investor sentiment and bank risk-taking. From a short-term perspective, greater optimism in markets may lead banks to show a more positive attitude regarding credit investment and to relax loan conditions. However, if banks, as sophisticated investors, anticipate that the optimistic sentiment of investor is temporary, they may tend to reduce risks and adopt a more prudent behavior. The latter might explain the negative and

significant coefficient at 10% for SENT_GPCA found in column (4). It would also be in line with the intuition that, during periods of optimistic market sentiment, depositors will not demand high interest for their deposits since they will seek to obtain returns via markets. Therefore, banks will not need to apply high prices to their loans to maintain their interest margin, so will be able to reduce the risk in their loans.

In relation to bank-level control variables, coefficient for SIZE only is statistically significant in column (4). Its negative sign could be explained by the fact that larger entities are abler to diversify and manage risks than smaller ones. OVERHEAD shows a negative sign in column (4) to explain IMPAIRED. This significant coefficient indicates that banks with a higher proportion of personnel and other non-interest expenses costs maintain higher levels of stability. Coefficient for OVERHEAD is not significant in the remaining of specifications.

Coefficients for ROA and LEVERAGE are negative and statistically significant; whatever the proxy of bank risk we use. The negative sign of these two variables to explain TLLTGL and IMPAIRED seem to indicate that banks with higher return on assets do not need the high interest of risky investments and that banks with more level of leverage cannot afford to take much risk. In the case of ZSCORE, one may expect that higher ROA leads to lower default risk (higher ZSCORE) since it increases the probability that equity falls short of losses. However, opposite conclusions might be reached once the simultaneity of capital adequacy ratio (CAR) and ROA is taken into account. In other words, if a bank improves its ROA by increasing its debt, it is entirely possible that the increase in ROA brings this bank closer to default (Giordana and Schumacher, 2017).

Regarding country-level variables, coefficient for LERNER is positive when ZSCORE is used as the dependent variable. This result is consistent with the "competition-fragility" view, suggesting that more bank competition reduces banks' charter value and, therefore, their incentives to behave prudently (Keeley, 1990; Hellmann et al., 2000; Repullo, 2004; Cubillas and González, 2014). The financial development seems to favor the incentives of banks to take risks since the coefficient for the proxy FINDEV is negative and significant to explain ZSCORE in

column (2) and positive and significant to explain IMPAIRED in column (4). INFLATION presents statistically significant coefficients in two of the three specifications. The negative and statistically significant coefficient for ΔGDP in column (4) suggests that banks have less proportion of impaired and non-performing loans in periods of higher economic growth. Finally, the RECESSION dummy shows non-significant coefficients.

INSERT TABLE 4 ABOUT HERE

According to our results, the increase in the annual growth of loans resulting from a period of high investor sentiment reduces bank stability by increasing the level of risk taken by banks. However, a problem of reverse causality might arise. The increased bank credit supply during periods of higher investor sentiment might result from a greater bank risk taking. The consequences of assuming an excessive level of risk are not the same in any bank. These will depend on aspects such as the importance of the entity in the banking system of its country, the availability of a large enough buffer to absorb losses or the competition level in the banking sector. If a bank is considered too-big-to-fail, is more capitalized than others or enjoys a high market power, is expected to be more prone to increase the amount of credit that it lends since the probability of failure is low. Therefore, *ceteris paribus*, if causality runs from bank risk taking to lending, the relationship between the variable that approximates growth in loans and the proxies of bank stability should be more relevant in the case of: (1) larger banks, (2) banks with a higher equity-to-total assets ratio, and (3) countries with less competitive banking systems.

To empirically address this question, we replicate our basic model for different subsamples of bank-year observations. Specifically, we split our international sample of banks around the median values of three variables: bank assets size, the equity to total assets ratio, and the Lerner index in the country. Cubillas and Suárez (2018) carry out a similar analysis to address a potential reverse causality problem in the relationship between the level of monopoly power of banks during the Global Financial Crisis and the amount of funds available to lend.

In Table 5 we present the results of this analysis. To save space we focus on ZSCORE as measure of bank stability[9]. We run our basic equation (1) testing how investor sentiment affects the stability of banks through changes in annual growth in bank loans. We obtain a negative and significant coefficient for ΔLOANS in all specifications. However, the statistical significance of this coefficient is higher (at a level of 1%) in columns (1) and (3) than in columns (2) and (4) respectively. The magnitude of the coefficients for ΔLOANS also reflects an economically more important effect in the subsamples corresponding to columns (1), (3) and (6). More specifically, an increase of one standard deviation in ΔLOANS (0.1279) would reduce bank ZSCORE by more than 7% of its mean value in the specifications of columns (1), (3) and (6), whereas that reduction would be only of 4,4%, 3,2% and 6,3% respectively in the specifications of columns (2), (4) and (5).

These results indicate that the negative effect of an increase in lending on bank stability during periods of high investor sentiment does not depend on these aspects or it is even more relevant in smaller and less capitalized banks and in high competitive banking systems, where the consequences of a more aggressive bank risk taking behavior are expected to be more severe.

In light of this analysis, it can therefore be assumed that the role of bank lending on the increase in bank risk during high investor sentiment periods is independent of how the type of bank or the competitive structure of the banking sector affects risk taking behavior by banks and, thus, of how bank risk may affect lending.

INSERT TABLE 5 ABOUT HERE

4.2. Investor sentiment and bank stability: the role of creditor protection

We now analyze how a country's legal protection of creditor rights could shape the impact of investor sentiment on bank-level stability through the changes observed in the amount of loans that banks in our sample are willing to lend. Results are shown in Table 6.

[9] The results hold if we consider the alternative proxies of bank risk-taking behavior.

We use both the indicator of the overall legal protection of creditor rights (CREDITOR) and its two components (COLLATERAL and BANKRUPTCY). Sequential inclusion of interaction terms between ΔLOANS and each of these three indicators allows us to examine whether the impact of investor sentiment on bank stability through changes in the amount of loans provided by banks differs depending on the level of protection of creditor rights. As in the above regressions, we control for other firm- and country-level variables potentially affecting bank stability.

As can be seen from the first three specifications, where ZSCORE is used as the dependent variable, the interaction terms between ΔLOANS and each of the measures capturing creditor rights protection present positive coefficients, while the individual coefficient of ΔLOANS remains negative. Likewise, coefficients for the interaction terms in the other columns (with TLLTGL and IMPAIRED as dependent variables) are negative and statistically significant (excepting in column (9)), while the individual coefficient of ΔLOANS remains positive and significant at conventional levels.

This finding may suggest that, although the increase in the annual growth of bank loans that results from high investor sentiment reduces the level of bank stability, the effect is less negative in the case of institutional environments where creditor rights protection, in terms of both collateral and bankruptcy, is higher. Individual coefficients for CREDITOR, COLLATERAL and BANKRUPTCY are not statistically significant at conventional levels. The coefficients of the remaining explanatory variables are similar to those in Table 4 and even more consistent. In fact, LERNER is now statistically significant also in columns (4) and (5) to explain TLLTGL. The negative sign of its coefficient is in line with the positive one obtained when ZSCORE is the dependent variable and with the "competition-fragility" view. And the proxy of financial development (FINDEV) shows statistically significant coefficients in all specifications.

INSERT TABLE 6 ABOUT HERE

4.3. Investor sentiment and bank stability: the effect of systemic banking crises

We now examine whether and to what extent the systemic banking crises occurred during the analyzed period, significantly affected the impact of investor sentiment on the level of bank stability through changes in bank loans. Moreover, inclusion of episodes of financial distress as an additional control variable enables us to check the robustness of the estimated impact of investor sentiment on bank stability through its effect on bank loan supply. For instance, if the predicted values for growth in bank loans proxy for the effect of the crisis years, then controlling for the crisis period will rule out the possibility that the significant effect of investor sentiment on bank stability is due to the crisis rather than to a relationship between the two variables.

Columns (1) and (2) of Table 7 report the results of the first stage estimations explaining the growth in bank loans while taking into account the impact of systemic banking crises. Apart from including the individual effect of the dummy variable, we define an interaction term between it and our proxy of investor sentiment and introduce it in the specification of column (2). Despite the inclusion of the CRISIS dummy variable, the findings already reported for the association between investor sentiment and ΔLOANS remain invariant. In column (2), moreover, we can observe that the interaction term between investor sentiment and the CRISIS dummy variable presents a negative and statistically significant coefficient. This finding suggests that the episodes of systemic banking crises, such as the Global Financial Crisis of 2008, counteracted the increase in bank credit supply provoked by the optimistic investor perception of the economic situation. It is consistent with previous literature examining the real effects of banking crises through the lending channel (Kroszner et al., 2007; Dell'Ariccia et al., 2008; among others).

Columns (3), (4) and (5) of Table 7 report the results of the second stage estimations analyzing how investor sentiment affects bank stability, not only in a direct way but also indirectly through changes in annual growth in loans. As we can see in column (3), ΔLOANS remains negatively associated with ZSCORE, which confirms that the positive effect of investor sentiment on credit supply negatively influences bank stability. The CRISIS dummy variable is negative and significant; suggesting that bank stability was reduced during these periods of financial

distress. However, the interaction term between ΔLOANS and CRISIS presents a positive and statistically significant coefficient. Since the crises seem to have counteracted the increase in bank credit supply resulting from investor optimism, it seems logical for the indirect effect of the latter on bank stability through changes in the growth rate of bank loans to also be weaker. Consistently, the coefficient for ΔLOANS remains positively associated with TLLTGL (column (4)) and IMPAIRED (column (5)). The positive and significant individual coefficient for the CRISIS dummy variable in these two columns suggests that, during the crisis years, banks reduced the proportion of loss loans, impaired and non-performing loans. The interaction term between ΔLOANS and CRISIS only presents a negative and statistically significant coefficient when IMPAIRED is used as the dependent variable. This confirms that the indirect effect of the investor optimism on bank risk-taking through changes in the growth rate of loans is weaker during crisis years.

Moreover, coefficients for our proxy of investor sentiment is statistically significant in column (3), showing a direct effect of investor perception on bank stability. The negative sign of this coefficient to explain ZSCORE would be consistent with a more positive attitude regarding credit investment by banks when there is greater optimism in markets. In consequence, they relax loan conditions and their instability increases. The coefficients of the remaining explanatory variables are similar to those in Table 4.

INSERT TABLE 7 ABOUT HERE

4.4. Robustness

In further analysis, we perform additional robustness checks on our results. First, since the consumer confidence emerges in the literature as one of the most used sentiment proxies (Lemmon and Portniaguina, 2006; Schmeling, 2009; Antoniuo et al., 2013; Qiu and Welch, 2006; Fisher and Statman, 2003; Chang et al., 2012, among others), we have checked the robustness of our results by using an alternative proxy to our global investor sentiment index. Specifically, we calculate an index capturing the level of consumer confidence from the indicators that are provided by OECD database for the six global markets. They are seasonally

adjusted and collect opinions on future developments in household consumption and savings, based upon answers regarding household sentiment. Additionally, we have run a robustness check specifically including a country-specific sentiment index. We construct a local sentiment index for each local market as the principal component analysis of three individual measures of investor sentiment considered in our paper: turnover, consumer confidence, and volatility premium. Although in this analysis our sample is restricted to only 33 countries[10], the results are consistent with the obtained by using the global index of investor sentiment.

Second, given the sample of observations for each country is diverging, we have also estimated all specifications excluding those countries that have less than 20 observations[11]. Our results are robust to the exclusion of these countries and to the consideration of standard errors clustered at bank level. Moreover, we follow Chava et al. (2013) and run specifications that control for the bank-specific time trends in our regressions in addition to our main bank characteristics and time fixed effects that control for other unmeasured idiosyncratic effects across time. Our results remain invariant and are available upon request.

5. CONCLUSIONS

This paper analyzes the impact of investor sentiment on both the amount of loans provided by banks and on the level of bank stability. We use a bank-level database from 127 countries to capture potential differences across countries depending on the level of creditor rights protection, in terms of both collateral and bankruptcy.

We apply a two-step standard panel data approach to distinguish the direct impact of investor sentiment on bank risk-taking from the effect that takes place through changes in the amount that banks are willing to lend. Our results show that the increase in annual growth in bank loans resulting from high investor sentiment reduces the level of bank stability.

[10] There are measures of consumer confidence for many countries. However, the way in which these are constructed is not homogeneous. For this reason, we use the OECD consumer confidence index. By using it, we assure that the proxy to measure consumer confidence is the same for all countries from OECD. Therefore, the local sentiment index only is available for 38 countries. Moreover, for five countries, we have not been able to collect enough market data to construct the rest of the individual proxies based on market trading.

[11] Afghanistan, Botswana, Estonia, Finland, Gambia, Iceland, Kyrgyzstan, Malawi, Mauritania, Mongolia, Montenegro, Rep. of Korea, Rwanda, Sierra Leone, Uruguay.

Moreover, the results indicate that the relations between investor sentiment, bank lending, and bank stability are not homogenous across countries and years. Our findings indicate that the impact on bank stability of the increase in loans that takes place during periods of high investor sentiment is moderated in countries with strong creditor rights protection, in terms of both collateral and bankruptcy. The negative effect on bank stability was also moderated during the years of the systemic banking crises, when increases in bank credit supply provoked by optimistic investor perceptions were counteracted.

In terms of policy implications, our results shed some light on the importance of appropriate mechanisms to control the level of bank risk taking. The development of bank risk-control tools is particularly important during periods of high investor sentiment, because of the higher provision of loans during such periods, as shown. Therefore, it is important to prevent the credit growth that takes place in response to greater bank and economic activity in terms of the provision of funding, from leading to excessive bank risk taking.

Moreover, our paper also clarifies the institutional characteristics that might reduce the negative impact on bank stability of the increased level of loans during periods of high investor sentiment. Specifically, our results point to additional benefits from creditor rights protection, in terms of both collateral protection and in bankruptcy situation, as such protection leads to a lower increase in bank risk-taking during periods of optimistic investor sentiment. The positive effect of creditor rights protection adds to the positive influence on bank credit supply and economic growth found by previous studies.

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Table 1: List of countries and banks and observations per country

This table shows the list of countries and the number of banks and observations per country.

Country	# Banks	# Obs.	Country	# Banks	# Obs.	Country	# Banks	# Obs.
AFGHANISTAN	1	3	GERMANY	84	596	OMAN	6	53
ALBANIA	6	30	GHANA	17	65	PAKISTAN	12	85
ALGERIA	16	116	GREECE	6	24	PANAMA	41	228
ANGOLA	10	60	GUATEMALA	14	115	PARAGUAY	10	55
ARMENIA	10	37	HAITI	4	33	PERU	14	135
AUSTRALIA	14	50	HONDURAS	12	135	PHILIPPINES	21	130
AUSTRIA	38	264	HONG KONG	22	169	POLAND	30	188
AZERBAIJAN	17	90	HUNGARY	16	105	PORTUGAL	8	21
BAHAMAS	10	34	ICELAND	2	6	QATAR	5	50
BAHRAIN	7	61	INDIA	42	475	REP. OF KOREA	1	2
BANGLADESH	28	203	INDONESIA	52	465	REP. OF MOLDOVA	8	39
BELARUS	11	44	IRELAND	7	21	ROMANIA	16	86
BELGIUM	18	120	ISRAEL	10	140	RUSSIAN FEDERATI	262	606
BENIN	4	36	ITALY	53	270	RWANDA	6	16
BOLIVIA	7	58	JAMAICA	6	35	SAUDI ARABIA	9	150
BOSNIA & HERZRG.	19	80	JAPAN	112	440	SENEGAL	9	80
BOTSWANA	6	14	JORDAN	11	133	SERBIA	16	68
BRAZIL	72	463	KAZAKHSTAN	21	150	SIERRA LEONE	2	4
BULGARIA	15	110	KENYA	25	88	SINGAPORE	5	40
BURKINA FASO	7	46	KUWAIT	6	55	SLOVAKIA	9	67
BURUNDI	4	20	KYRGYZSTAN	3	11	SLOVENIA	9	85
CAMBODIA	8	36	LATVIA	14	65	SOUTH AFRICA	12	74
CAMEROON	7	58	LEBANON	21	68	SPAIN	25	108
CANADA	16	90	LITHUANIA	4	34	SRI LANKA	8	74
CHILE	15	61	LUXEMBOURG	46	315	SUDAN	10	50
CHINA	130	551	MADAGASCAR	5	35	SWEDEN	18	118
COLOMBIA	13	107	MALAWI	5	9	SWITZERLAND	95	801
COSTA RICA	16	173	MALAYSIA	13	120	THAILAND	18	112
CROATIA	22	212	MALI	7	45	TOGO	3	23
CYPRUS	9	60	MALTA	4	29	TRINIDAD & TOBAGO	6	67
CZECH REP.	14	116	MAURITANIA	5	13	TUNISIA	11	57
DEM. REP. CONGO	6	28	MAURITIUS	10	65	TURKEY	19	111
DENMARK	29	279	MEXICO	25	60	UGANDA	13	46
DOMINICAN REP.	11	70	MONGOLIA	4	17	UKRAINE	29	142
ECUADOR	9	79	MONTENEGRO	7	17	UNITED ARAB EMIRAT.	16	94
EGYPT	18	87	MOROCCO	8	45	UNITED KINGDOM	76	412
EL SALVADOR	9	79	NEPAL	18	141	UNITED REP TANZANIA	20	78
ESTONIA	3	14	NETHERLANDS	17	79	UNITED STATES	214	2577
ETHIOPIA	5	42	NEW ZEALAND	6	22	URUGUAY	2	2
FINLAND	6	18	NIGER	4	24	VENEZUELA	10	44
FRANCE	81	532	NIGERIA	13	69	VIETNAM	33	173
GAMBIA	2	15	NORWAY	9	33	ZAMBIA	9	56
GEORGIA	8	64						

Total #Countries	Total #Banks	Total #Observations
127	2,673	16,953

Table 2: Descriptive statistics and correlations

Panel A shows the descriptive statistics of the main variables. Panel B reports the correlation matrix. SENT_GPCA is the global sentiment index, constructed from the first principal component of the first factors obtained for Canada, France, Germany, Japan, the UK and the US. ΔLOANS is the natural logarithm of the ratio of gross bank loans over their value in the previous year. ZSCORE is the natural logarithm of the Z-score. Z-score is the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A three-year moving window is used to estimate the standard deviation of asset returns for each bank in each year. TLLTGL is the ratio of total loss loans to total gross loans. IMPAIRED is the ratio of impaired and non-performing loans to gross loans. ΔCUSTOMDEP defined as the annual growth rate in customer deposits. TGLTA is the ratio of total gross loans to total assets. SIZE is the natural logarithm of total bank assets. OVERHEAD is personnel, administrative and other non-interest expenses over net revenues. ROA is the return on assets ratio. LEVERAGE is the ratio of total liabilities on total assets. LERNER is the Lerner index at sector level. It is defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. FINDEV is the ratio of private credit by deposit-money banks to GDP. INFLATION is measured as annual growth rate in the consumer price index. ΔGDP is the annual growth rate in real GDP. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Panel A. Descriptive statistics

	SENT_GPCA	ΔLOANS	ZSCORE	TLLTGL	IMPAIRED	ΔCUSTOMDEP	TGLTA	SIZE	OVERHEAD	ROA	LEVERAGE	LERNER	FINDEV	INFLATION	ΔGDP
Mean	0	0.0529	1.7368	0.0170	0.0459	0.5146	0.5721	6.3617	0.5692	0.0133	0.8845	0.2763	0.6652	4.5174	3.4671
Std. Dev.	1	0.1279	0.4908	0.0288	0.0717	4.0102	0.1984	0.9106	0.1685	0.0126	0.0758	0.1212	0.4287	5.5118	3.3513
Median	0.0596	0.0430	1.6211	0.0074	0.0252	0.1056	0.6047	6.3115	0.5717	0.0105	0.9038	0.2700	0.5291	2.8527	3.2095
Minimum	-2.3873	-2.1522	-0.6686	0	0	-1	0.0067	3.8459	0.1328	0	0.2263	0	0.0349	-1.4015	-7.8209
Maximum	1.4273	1.6733	5.2023	0.3896	1.4424	100.0627	0.9807	8.6823	1.9749	0.2413	0.9746	0.9400	1.8903	85.7465	13.1863

Panel B. Correlations

	SENT_GPCA	ΔLOANS	ZSCORE	TLLTGL	IMPAIRED	ΔCUSTOMDEP	TGLTA	SIZE	OVERHEAD	ROA	LEVERAGE	LERNER	FINDEV	INFLATION	ΔGDP
ΔLOANS	0.0570***	1													
ZSCORE	0.0493***	-0.0766***	1												
TLLTGL	0.0002	-0.1550***	-0.0937***	1											
IMPAIRED	-0.0372***	-0.1262***	-0.1362***	0.6819***	1										
ΔCUSTOMDEP	-0.0420***	0.0598***	-0.0113	0.0044	-0.0177**	1									
TGLTA	-0.0180**	0.0624***	0.1358***	-0.1208***	-0.0695***	-0.0104	1								
SIZE	-0.1446***	-0.0197**	0.0765***	-0.2143***	-0.1672***	0.0112	0.0604***	1							
OVERHEAD	0.0338***	-0.0361***	0.0494***	0.1133***	0.0077	-0.0248***	-0.0185**	-0.1821***	1						
ROA	0.0485***	0.0534***	-0.2140***	0.0968***	0.0387***	0.0641***	-0.0852***	-0.1996***	-0.3574***	1					
LEVERAGE	-0.0010	0.0728***	0.0170**	-0.2425***	-0.1866***	-0.0346***	0.0858***	0.3844***	0.0635***	-0.4507***	1				
LERNER	0.0207***	-0.0173**	0.0229***	-0.0825***	-0.0124	-0.0067	0.0338***	0.0843***	-0.1895***	0.0993***	-0.0564***	1			
FINDEV	-0.0616***	-0.1305***	0.1818***	-0.1603***	-0.0982***	-0.0122	0.0196**	0.2095***	0.0145*	-0.2739***	0.0867***	-0.1181***	1		
INFLATION	-0.1228***	0.0705***	-0.2030***	0.0897***	0.0894***	0.0044	-0.0849***	-0.1859***	-0.0680***	0.2244***	-0.1224***	0.0567***	-0.3834***	1	
ΔGDP	0.1416***	0.2820***	-0.0632***	-0.1389***	-0.0635***	0.0189**	-0.0552***	-0.0214***	-0.1647***	0.1497***	0.0337***	0.1610***	-0.2710***	0.1371***	1

Table 3: Mean difference analysis

This Table shows the analysis of mean difference for the main dependent variables. Panel A reports average values of the natural logarithm of the ratio of gross bank loans over their value in the previous year (ΔLOANS) when sentiment investor proxy (SENT_GPCA) take low values (below 0) and high values (above 0). Panel B reports the mean value of bank Z-score (ZSCORE) when annual growth in bank loans (ΔLOANS) takes low values (below its median: 0.0430) and high values (above its median: 0.0430). The last column reports mean difference and its significance. *** indicate statistical significance at 1 percent.

PANEL A: Annual growth rate of bank net loans depending on investor sentiment			
	$SENT\_GPCA_{low}$	$SENT\_GPCA_{high}$	Diff Test
Mean value of ΔLOANS	0.0474	0.0566	0.0092*** (4.58)
PANEL B: Bank Z-score depending on the annual growth rate of bank net loans			
	$\Delta LOANS_{low}$	$\Delta LOANS_{high}$	Diff Test
Mean value of ZSCORE	1.7811	1.6926	-0.0884*** (-11.78)

Table 4: Investor sentiment and bank stability: the effect of the growth in bank loans

This table presents results examining the effect of investor sentiment on bank risk through changes in the annual growth rate of bank net loans. The dependent variable in column (1) is the natural logarithm of the ratio of gross bank loans over their value in the previous year (ΔLOANS). The dependent variables are the natural logarithm of the Z-score (ZSCORE) in column (2); the ratio of total loss loans to total gross loans (TLLTGL) in column (3); and the ratio of impaired and non-performing loans to gross loans (IMPAIRED) in column (4). SENT_GPCA is the variable that proxies for investor sentiment. ΔCUSTOMDEP defined as the annual growth rate in customer deposits. TGLTA is the ratio of total gross loans to total assets. SIZE is the natural logarithm of total bank assets. OVERHEAD is personnel, administrative and other non-interest expenses over net revenues. ROA is the return on assets ratio. LEVERAGE is the ratio of total liabilities on total assets. LERNER is the Lerner index at sector level. It is defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. FINDEV is the ratio of private credit by deposit-money banks to GDP. INFLATION is measured as annual growth rate in the consumer price index. ΔGDP is the annual growth rate in real GDP. RECESSION is a dummy variable that takes value 1 if, according to the Braun and Larrain (2005) methodology, it is a year classified as a recession year. T-statistics are in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Dependent variable:	***ΔLOANS***	***ZSCORE***	***TLLTGL***	***IMPAIRED***
	(1)	(2)	(3)	(4)
$SENT\_GPCA_{t-1}$	0.0106***	0.0010	-0.0002	-0.0013*
	(7.88)	(0.19)	(-0.38)	(-1.75)
$\Delta CUSTOMDEP_{t-1}$	0.0005***			
	(2.84)			
$TGLTA_{t-1}$	-0.1588***			
	(-19.92)			
$\Delta LOANS$		-0.9313***	0.0395**	0.0602*
		(-5.11)	(2.47)	(1.95)
$SIZE_{t-1}$	-0.0227***	0.0011	0.0001	-0.0054***
	(-8.59)	(0.12)	(0.10)	(-2.85)
$OVERHEAD_{t-1}$	0.0250***	0.0146	0.0025	-0.0260***
	(2.94)	(0.48)	(0.60)	(-4.93)
ROA_{t-1}	0.5879***	-7.5755***	-0.1366***	-0.6382***
	(5.48)	(-19.36)	(-3.17)	(-9.30)
$LEVERAGE_{t-1}$	0.0476**	-0.8549***	-0.0229**	-0.0619***
	(2.34)	(-12.26)	(-1.99)	(-4.46)
$LERNER_{t-1}$	-0.0873***	0.2565***	-0.0103	0.0003
	(-7.00)	(5.41)	(-1.43)	(0.04)
$FINDEV_{t-1}$	-0.0765***	-0.2185***	0.0128	0.0452***
	(-8.52)	(-6.11)	(1.53)	(7.53)
$INFLATION_{t-1}$	0.0009***	-0.0013*	-0.0002	-0.0004***
	(4.18)	(-1.66)	(-1.32)	(-3.00)
ΔGDP_{t-1}	0.0055***	0.0027	-0.0003	-0.0031***
	(12.74)	(1.53)	(-1.47)	(-11.53)
RECESSION	-0.0069	0.0061	0.0088	0.0026
	(-0.70)	(0.17)	(1.39)	(0.52)
Country Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
R^2	0.1439	0.2762	0.4093	0.2118
Sargan-Hansen test (p-value)	-	0.9032	0.9968	0.0181
#Observations	16,953	16,953	2,947	12,937
#Banks	2,673	2,673	740	2,280
#Countries	127	127	67	123

Table 5: Investor sentiment and bank stability: potential reverse causality problem

This table presents results examining potential reverse causality between investor sentiment and bank stability. In columns (1) and (2), we classify banks according to their size. Columns (3) and (4) present the results splitting our sample according the equity-to-assets ratio. In columns (5) and (6), we split the sample of banks according to the median value of the Lerner index in the country. The dependent variable is the natural logarithm of the Z-score (ZSCORE). SENT_GPCA is the variable that proxies for investor sentiment. ΔLOANS is the natural logarithm of the ratio of gross bank loans over their value in the previous year. SIZE is the natural logarithm of total bank assets. OVERHEAD is personnel, administrative and other non-interest expenses over net revenues. ROA is the return on assets ratio. LEVERAGE is the ratio of total liabilities on total assets. LERNER is the Lerner index at sector level. It is defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. FINDEV is the ratio of private credit by deposit-money banks to GDP. INFLATION is measured as annual growth rate in the consumer price index. ΔGDP is the annual growth rate in real GDP. RECESSION is a dummy variable that takes value 1 if, according to the Braun and Larrain (2005) methodology, it is a year classified as a recession year. T-statistics are in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Dependent variable:	***ZSCORE***					
	BANK SIZE		BANK EQUITY RATIO		BANK COMPETITION	
	SMALL	LARGE	LOW	HIGH	LOW	HIGH
	(1)	(2)	(3)	(4)	(5)	(6)
SENT_GPCA $_{t-1}$	0.0074 (0.91)	-0.0063 (-0.91)	-0.0018 (-0.27)	-0.0019 (-0.25)	0.0082 (1.10)	0.0052 (0.59)
ΔLOANS	-1.0203*** (-4.91)	-0.6041** (-2.01)	-0.9598*** (-3.62)	-0.4294* (-1.87)	-0.8542*** (-2.97)	-1.0174*** (-4.16)
$SIZE_{t-1}$	-0.0622** (-2.36)	0.0208 (1.10)	0.0051 (0.33)	0.0251** (2.00)	0.0062 (0.55)	-0.0238 (-1.56)
$OVERHEAD_{t-1}$	0.0229 (0,52)	0.0069 (0.16)	0.0173 (0.37)	0.0224 (0.57)	-0.0418 (-1.01)	0.0547 (1.24)
ROA_{t-1}	-6.9872*** (-14.50)	-8.9861*** (-13.28)	-11.6368*** (-11.03)	-7.6505*** (-17.98)	-6.5469*** (-12.28)	-8.8694*** (-15.50)
$LEVERAGE_{t-1}$	-0.6130*** (-6.80)	-1.4839*** (-10.68)	-2.2545*** (-7.88)	-0.7106*** (-9.38)	-0.9411*** (-10.05)	-0.7631*** (-7.11)
$LERNER_{t-1}$	0.2976*** (3.93)	0.2403*** (3.96)	0.3285*** (5.15)	0.2684*** (3.94)	0.1925*** (2.60)	0.1143 (1.26)
$FINDEV_{t-1}$	-0.3202*** (-6.33)	-0.1163** (-2.11)	-0.1486*** (-3.01)	-0.2347*** (-4.48)	-0.1019 (-1.45)	-0.3275*** (-7.34)
$INFLATION_{t-1}$	-0.0004 (-0.45)	-0.0023 (-1.49)	-0.0031** (-2.56)	-0.0007 (-0.61)	0.0003 (0.33)	-0.0014 (-1.10)
ΔGDP_{t-1}	0.0049* (1.87)	0.0018 (0.77)	0.0055** (2.19)	-0.0004 (-0.17)	0.0027 (1.24)	0.0044 (1.51)
RECESSION	-0.1875** (-2.55)	0.0657* (1.65)	-0.0109 (-0.24)	0.0504 (0.91)	0.0285 (0.68)	-0.2134*** (-2.69)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.2258	0.3480	0.3648	0.2616	0.3001	0.2662
Sargan-Hansen test (p-value)	0.1015	0.5166	0.3621	0.9786	0.6257	0.2795
#Observations	6,616	10,337	9,483	7,470	8,883	8,070
#Banks	1,433	1,660	1,797	1,685	2,341	1,859
#Countries	116	110	120	121	122	108

Table 6: Investor sentiment and bank stability: the role of creditor protection

This table presents results examining the effect of quality of protection of creditor rights on the relationship between investor sentiment and bank risk. The dependent variables are the natural logarithm of the Z-score (ZSCORE) in columns (1), (2) and (3), the ratio of total loss loans to total gross loans (TLLTGL) in columns (4), (5) and (6) and the ratio of impaired and non-performing loans to gross loans (IMPAIRED) in columns (7), (8) and (9). SENT_GPCA is the variable that proxies for investor sentiment. ΔLOANS is the natural logarithm of the ratio of gross bank loans over their value in the previous year. CREDITOR is the index of the protection of creditor rights. COLLATERAL measures the protection of collateral before bankruptcy. BANKRUPTCY measures the protection of creditor rights in bankruptcy. SIZE is the natural logarithm of total bank assets. OVERHEAD is personnel, administrative and other non-interest expenses over net revenues. ROA is the return on assets ratio. LEVERAGE is the ratio of total liabilities on total assets. LERNER is the Lerner index at sector level. It is defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. FINDEV is the ratio of private credit by deposit-money banks to GDP. INFLATION is measured as annual growth rate in the consumer price index. ΔGDP is the annual growth rate in real GDP. RECESSION is a dummy variable that takes value 1 if, according to the Braun and Larrain (2005) methodology, it is a year classified as a recession year. T-statistics are in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Dependent variable:	***ZSCORE***			***TLLTGL***			***IMPAIRED***		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SENT_GPCA $_{t-1}$	-0.0035 (-0.68)	-0.0031 (-0.60)	-0.0025 (-0.49)	-0.0001 (-0.16)	-0.0003 (-0.49)	-0.0006 (-0.97)	-0.0009 (-1.26)	-0.0010 (-1.34)	-0.0010 (-1.38)
ΔLOANS	-3.4333*** (-4.29)	-2.7446*** (-4.39)	-2.9649*** (-4.27)	0.2474*** (2.95)	0.1193*** (3.25)	0.2710*** (3.95)	0.3101*** (3.01)	0.2562*** (2.87)	0.3665*** (3.39)
*ΔLOANS*CREDITOR*	0.4644*** (4.24)			-0.0408*** (-3.40)			-0.0459*** (-3.66)		
*ΔLOANS*COLLATERAL*		0.6437*** (4.34)			-0.0306*** (-4.11)			-0.0661*** (-3.59)	
*ΔLOANS*BANKRUPTCY*			0.8183*** (4.22)			-0.1027*** (-4.46)			0.0282 (0.89)
CREDITOR	-0.1520 (-0.78)			0.0106 (0.46)			-0.0132 (-0.40)		
COLLATERAL		-0.1227 (-1.27)			0.0063 (0.36)			-0.0025 (-0.17)	
BANKRUPTCY			0.0193 (0.10)			-0.0096 (-0.25)			-0.1163*** (-4.03)
$SIZE_{t-1}$	0.0098 (0.97)	0.0093 (0.94)	0.0080 (0.79)	0.0007 (0.46)	0.0009 (0.48)	0.0037 (1.22)	-0.0066*** (-3.41)	-0.0064*** (-3.43)	-0.0063*** (-3.38)
$OVERHEAD_{t-1}$	0.0057 (0.18)	0.0094 (0.30)	0.0088 (0.28)	0.0069 (1.37)	0.0038 (0.83)	0.0045 (0.92)	-0.0231*** (-4.25)	-0.0231*** (-4.27)	-0.0234*** (-4.30)
ROA_{t-1}	-7.7082*** (-18.98)	-7.6447*** (-18.79)	-7.6794*** (-19.35)	-0.1812*** (-3.18)	-0.1563*** (-3.27)	-0.1473*** (-3.02)	-0.6259*** (-8.99)	-0.6254*** (-8.83)	-0.6044*** (-8.70)
$LEVERAGE_{t-1}$	-0.9848*** (-12.70)	-0.9661*** (-12.74)	-0.9539*** (-12.78)	-0.0357** (-2.57)	-0.0149 (-1.13)	0.0016 (0.11)	-0.0518*** (-3.60)	-0.0595*** (-4.19)	-0.0523*** (-3.65)
$LERNER_{t-1}$	0.3092*** (6.51)	0.3081*** (6.54)	0.2922*** (6.18)	-0.0175* (-1.96)	-0.0154** (-2.04)	-0.0108 (-1.40)	-0.0059 (-0.83)	-0.0055 (-0.76)	-0.0033 (-0.45)
$FINDEV_{t-1}$	-0.2463*** (-5.82)	-0.2455*** (-5.89)	-0.2268*** (-5.82)	0.0278* (1.84)	0.0193* (1.88)	0.0185* (1.87)	0.0497*** (7.05)	0.0506*** (6.96)	0.0496*** (7.24)
$INFLATION_{t-1}$	-0.0003 (-0.34)	-0.0004 (-0.43)	-0.0008 (-0.94)	-0.0002 (-0.95)	-0.0001 (-1.14)	-0.0003** (-2.20)	-0.0005*** (-3.38)	-0.0005*** (-3.38)	-0.0005*** (-3.41)
ΔGDP_{t-1}	0.0004 (0.28)	0.0012 (0.69)	0.0003 (0.21)	-0.0000 (-0.23)	-0.0001 (-0.40)	-0.0001 (-0.63)	-0.0029*** (-11.34)	-0.0030*** (-11.15)	-0.0029*** (-11.26)
RECESSION	-0.0018 (-0.05)	0.0076 (0.21)	-0.0089 (-0.24)	0.0137 (1.64)	0.0099 (1.43)	0.0111 (1.59)	0.0043 (0.85)	0.0031 (0.61)	0.0059 (1.12)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.2412	0.2502	0.2510	0.3170	0.3569	0.3545	0.1901	0.1898	0.1820
Sargan-Hansen test (p-value)	0.5981	0.4605	0.9132	0.1066	0.3476	0.8674	0.0049	0.0040	0.0189
#Observations	16,953	16,953	16,953	2,947	2,947	2,947	12,937	12,937	12,937
#Banks	2,673	2,673	2,673	740	740	740	2,280	2,280	2,280
#Countries	127	127	127	67	67	67	123	123	123

Table 7: Investor sentiment and bank stability: the effect of a systemic banking crisis

This table presents the results examining the effect of the global financial crisis. SENT_GPCA is the variable that proxies for investor sentiment. The dependent variable in columns (1) and (2) is the natural logarithm of the ratio of gross bank loans over their value in the previous year (ΔLOANS). The dependent variables are the natural logarithm of the Z-score (ZSCORE) in column (3), the ratio of total loss loans to total gross loans (TLLTGL) in column (4) and the ratio of impaired and non-performing loans to gross loans (IMPAIRED) in column (5). ΔCUSTOMDEP defined as the annual growth rate in customer deposits. TGLTA is the ratio of total gross loans to total assets. CRISIS is a dummy variable that takes a value of one in the years of systemic crises according to Laeven and Valencia (2012) and zero otherwise. SIZE is the natural logarithm of total bank assets. OVERHEAD is personnel, administrative and other non-interest expenses over net revenues. ROA is the return on assets ratio. LEVERAGE is the ratio of total liabilities on total assets. LERNER is the Lerner index at sector level. It is defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. FINDEV is the ratio of private credit by deposit-money banks to GDP. INFLATION is measured as annual growth rate in the consumer price index. ΔGDP is the annual growth rate in real GDP. RECESSION is a dummy variable that takes value 1 if, according to the Braun and Larrain (2005) methodology, it is a year classified as a recession year. T-statistics are in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Dependent Variable:	***ΔLOANS***		***ZSCORE***	***TLLTGL***	***IMPAIRED***
	(1)	(2)	(3)	(4)	(5)
SENT_GPCA $_{t-1}$	0.0101***	0.0138***	-0.0097*	-0.0001	-0.0010
	(7.41)	(8.48)	(-1.85)	(-0.19)	(-1.32)
ΔCUSTOMDEP $_{t-1}$	0.0005***	0.0005***			
	(2.80)	(2.82)			
TGLTA$_{t-1}$	-0.1590***	-0.1580***			
	(-19.96)	(-19.80)			
CRISIS	-0.0098***	-0.0148***			
	(-2.78)	(-3.95)			
*SENT_GPCA $_{t-1}$*CRISIS*		-0.0115***			
		(-4.16)			
ΔLOANS			-1.0521***	0.0416**	0.0748**
			(-4.80)	(2.46)	(2.13)
CRISIS			-0.2149***	0.0050**	0.0095***
			(-14.90)	(1.97)	(4.22)
*ΔLOANS*CRISIS*			0.9535***	-0.0449	-0.1056***
			(4.25)	(-1.51)	(-2.96)
SIZE$_{t-1}$	-0.0231***	-0.0229***	-0.0097	0.0002	-0.0045**
	(-8.73)	(-8.67)	(-1.00)	(0.15)	(-2.28)
OVERHEAD$_{t-1}$	0.0245***	0.0244***	0.0035	0.0027	-0.0257***
	(2.88)	(2.87)	(0.12)	(0.65)	(-4.85)
ROA$_{t-1}$	0.5896***	0.5980***	-7.4317***	-0.1372***	-0.6522***
	(5.50)	(5.58)	(-18.54)	(-3.17)	(-9.28)
LEVERAGE$_{t-1}$	0.0488**	0.0487**	-0.8086***	-0.0245**	-0.0669***
	(2.40)	(2.40)	(-11.47)	(-2.11)	(-4.73)
LERNER$_{t-1}$	-0.0940***	-0.0934***	0.1214**	-0.0108	0.0052
	(-7.40)	(-7.36)	(2.46)	(-1.51)	(0.68)
FINDEV$_{t-1}$	-0.0729***	-0.0737***	-0.1487***	0.0127	0.0430***
	(-8.02)	(-8.11)	(-4.09)	(1.47)	(7.09)
INFLATION$_{t-1}$	0.0009***	0.0010***	-0.0007	-0.0002	-0.0004***
	(4.30)	(4.67)	(-0.84)	(-1.31)	(-3.20)
ΔGDP$_{t-1}$	0.0054***	0.0055***	0.0016	-0.0003	-0.0031***
	(12.54)	(12.77)	(0.85)	(-1.42)	(-11.23)
RECESSION	-0.0073	-0.0067	-0.0034	0.0089	0.0031
	(-0.73)	(-0.68)	(-0.10)	(1.39)	(0.62)
Country - Year	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes
R^2	0.1415	0.1410	0.2643	0.4086	0.2064
Sargan-Hansen test (p-value)	-	-	0.8181	0.9510	0.0208
#Observations	16,953	16,953	16,953	2,947	12,937
#Banks	2,673	2,673	2,673	740	2,280
#Countries	127	127	127	66	123

Figure 1: Evolution of investor sentiment proxy (SENT_GPCA)

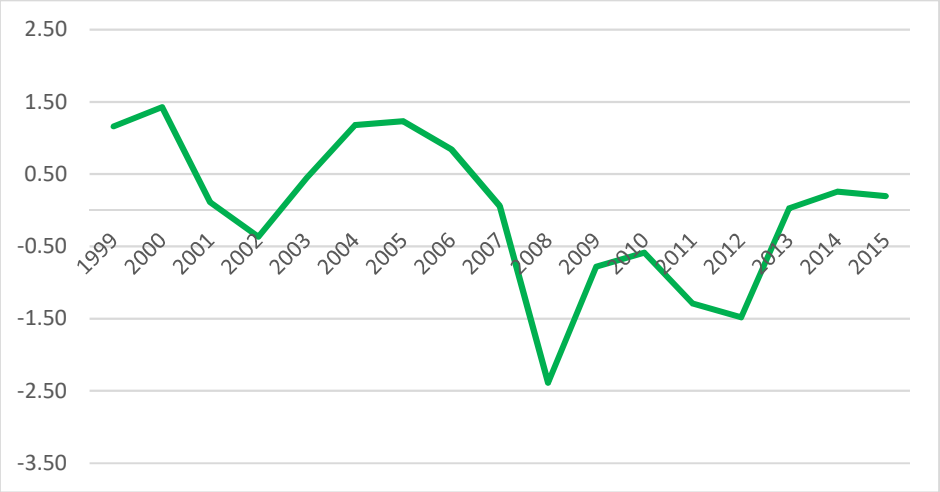

Figure 2: Evolution of the annual variation in bank credit supply (ΔLOANS)

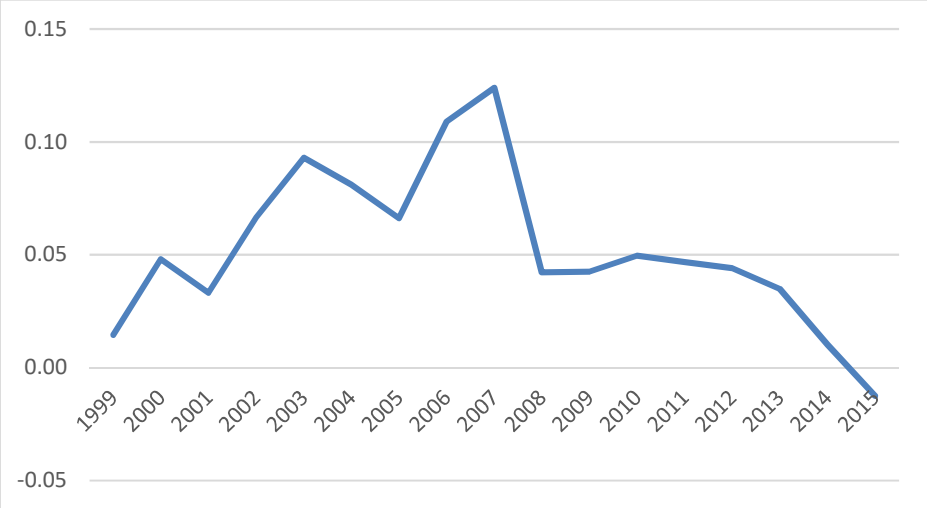

Figure 3: Evolution of bank Z-score (ZSCORE)