# Forward Guidance and Corporate Lending

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**Abstract**

We suggest that forward guidance, via publicly committing the central bank to future actions and creating associated expectations, fundamentally affects bank lending decisions independently of other forms of monetary policy. To test this hypothesis, we build a forward guidance measure based on the language used in the Federal Open Market Committee meetings and match this measure with syndicated loans. Our results show that expansionary forward guidance decreases corporate loan spreads and that this effect is stronger for well-capitalized banks lending to riskier firms. Forward guidance also affects nonprice lending terms, such as covenants, performance pricing provisions, and the loan syndicate structure. Additionally, banks tend to initiate new lending relationships with lower spreads after forward guidance issuance.

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## 1. Introduction

How does forward guidance affect corporate lending? The answer has important implications for the role of monetary policy on bank lending and, by extension, for real economic activity. Central banks describe forward guidance as their communication with the public about the state of the economy, the economic outlook, and the likely future course of monetary policy. Thus, forward guidance explicitly affects the future expectations of economic agents, the long-term path of interest rates, and long-term economic and financial expectations (e.g., McKay, Nakamura, and Steinsson, 2016). Officially, the Board of Governors of the Federal Reserve System (Fed) acknowledges that the Federal Open Market Committee (FOMC) began using forward guidance in its post-meeting statements in the early 2000s. In the aftermath of the 2008 global financial crisis, and with consistently low policy rates, forward guidance has become an indispensable tool for central banks to fulfil the dual mandate of maximum sustainable employment and price stability.

The credit-channel literature suggests that expansionary monetary policy, exercised via low interest rates, advances banks' appetite for risk (Jiménez et al., 2014; Delis, Hasan, and Mylonidis, 2017) and generally affects credit supply (Bernanke and Blinder, 1992; Kashyap and Stein, 2000). With the policy rate constrained in its effective lower bound since 2008, little scope has existed to change actual policy in order to affect expectations. Therefore, central banks have relied on quantitative easing and forward guidance to shape expectations. In line with this, recent research places the spotlight on the effects of unconventional monetary policy tools. Most related to our research, Dell'Ariccia, Laeven, and Suarez (2018) suggest that asset purchases increase bank lending and reserves, a result especially pronounced for banks with weaker balance sheets.

The literature remains silent on the role of forward guidance in the credit channel of monetary policy. We hypothesize that by publicly committing the central bank to future actions

and creating associated expectations, forward guidance fundamentally affects contemporary bank-lending decisions *independently* of the related effects of short rates and asset-purchase programs. To test our hypothesis, we build a monthly forward guidance measure based on the language used in the statements produced after the FOMC meetings. We distinguish the language used in these meetings into two categories: language associated with accommodative or contractionary monetary policy, with commitment to a particular course of action ("Odyssean" forward guidance); and language relating to a likely monetary policy action ("Delphic" forward guidance). The distinction is important because Odyssean forward guidance significantly affects economic output, inflation, and the unemployment rate, while Delphic forward guidance has no such effects (Campbell et al., 2017).

We place the cost of loans (loan spreads over the LIBOR plus any fees) at the center of our analysis (see, e.g., Ivashina, 2009; Delis, Hasan, and Mylonidis, 2017; Paligorova and Santos, 2017). All else being equal, the loan spread is an indicator of the loan-specific default probability (*ex ante* risk). We match the dates of forward guidance with 20,615 syndicated loans made to 3,834 US companies by 329 US banks, from May 1999 until June 2017.

Our identification strategy for a causal effect of forward guidance on the cost of loans confronts three problems. First, we disentangle the effect of forward guidance from the effects of the federal funds rate and other unconventional monetary policy innovations. Our first remedy is to control for the shadow rate (Krippner, 2015), which encompasses the full stance of monetary policy (central bank rate, unconventional tools, and forward guidance), leaving the effect of forward guidance to be captured by our measure of explicit forward-looking language. In an important robustness test, we also refine our forward guidance variable to include FOMC meetings that do not include the quantitative easing (QE) periods. Further, we refine the shadow rate to

disentangle its forward guidance component from the rest of monetary policy tools, or build our forward guidance variable using the unexpected changes of federal funds futures and Eurodollar futures within a window around the FOMC announcement (Gürkaynak, Sack, and Swanson, 2005; Altavilla et al., 2019).

The other two identification problems find their solution in the use of loan-level data (Jiménez et al., 2014; Ioannidou, Ongena, and Peydró, 2015; Delis, Hasan, and Mylonidis, 2017). Specifically, identifying the effect of forward guidance implies identifying changes in incentives to take *new* risk, and this new risk must emanate from the supply (bank) side as opposed to the demand (firm) side. In these respects, syndicated loans are ideal because they allow both (i) studying the effect of forward guidance on the credit conditions for borrowers and (ii) distinguishing between loan demand and loan supply using firm × quarter and bank × firm fixed effects and interaction terms between forward guidance and specific bank and/or firm characteristics.

Our benchmark results (without interaction terms but with firm × quarter and bank × firm fixed effects) show that expansionary forward guidance is associated with a decline in the corporate loan spreads, with this effect being highly significant in the post-2008 period over and above the effect of conventional monetary policy tools. According to our baseline specification, forward guidance yields a decline in corporate loan spreads by approximately 24.44 basis points (or 10.4% reduction in the loan spread) for a loan with an average spread originated one month after an Odyssean forward guidance. When we consider loans originated within three months of an Odyssean forward guidance (at which point the lending markets have had time to further absorb the guidance information), the effect is more pronounced, with a decline of 35.02 basis points in

corporate loan spreads (or 14.9% reduction in the loan spread). The reduction of interest expenses for the borrowing firm is equal to USD 8.61 million for a loan of average size and maturity.

Notably, our results support a risk-taking channel working via forward guidance. Specifically, the models that interact forward guidance with bank capital and firm risk measures show that banks with higher capital levels offer lower spreads to riskier firms, *ceteris paribus*. These specifications enable us to isolate the pure supply-driven effects of forward guidance on loan spreads, suggesting that banks, especially those with higher capital ratios, take on more risk after forward guidance, as evidenced by their willingness to offer cheaper loans to riskier firms. Economically, a highly capitalized bank ($75^{th}$ percentile) reduces the loan spread by 17.48% (8.76%) more than a less capitalized bank ($25^{th}$ percentile) one month (two months) after expansionary forward guidance, for a borrowing firm with high leverage ($75^{th}$ percentile in a standard leverage ratio).

These findings are robust (and conservative) to several robustness tests. Indicatively, we use a weekly measure of forward guidance; we run tests for Delphic forward guidance (the results are statistically insignificant); we replace the shadow rate with the federal funds rate; we use different fixed effects and alternative control variables (e.g., credit ratings); we distinguish between term loans and credit lines (because these loan groups have important differences); and we collapse our sample to one observation per loan.

We also consider four important extensions of our analysis. The first is on borrower-lender relationships, which can play a key role in the effect of forward guidance on loan spreads. We show that expansionary forward guidance increases the probability of establishing new borrower-lender relationships and lowers the loan spreads on such loans. Second, we show that forward guidance also affects the non-price terms of lending. Specifically, we document a strong negative

effect of forward guidance on placing high numbers of restrictive covenants and performance pricing provisions. Third, we examine the effect of forward guidance on the structure of loan syndicates (syndicate size and concentration). Consistent with the literature suggesting that lower informational asymmetry between syndicate participants implies less monitoring effort by lead banks and thus less concentrated syndicates (e.g., Sufi, 2007), our findings show that forward guidance innovations increase the number of lenders in the syndicate and lower the share held by lead banks. Fourth, we show that the significant effect of forward guidance on the loan spreads is pronounced for banks (as opposed to institutional investors) and public firms (as opposed to private firms). The results from these analyses further imply that, by alleviating informational asymmetry concerns, forward guidance intensifies banks' willingness both to lend and to lend at lower cost. This finding also suggests a potential shift from the bond to the loan market after forward guidance, rather than issuing loans to credit-constrained firms.

The remainder of this paper proceeds as follows. Section 2 places the paper within the extant literature, discusses the theoretical background of our study, and formulates our testable hypotheses. Section 3 discusses the data and our empirical model, emphasizing the importance of distinguishing between Odyssean and Delphic forward guidance. Section 4 discusses our solutions to the identification problems. Section 5 presents our empirical results and discusses the implications for our hypotheses. Section 6 concludes.

## 2. Theoretical considerations and hypothesis development

### *2.1 The credit channel of monetary policy*

The prevailing mechanism for the transmission of monetary policy is through the interest-rate channel. A monetary tightening, along with the combination of sticky prices and rational

expectations, increases the real long-term interest rate. This, in turn, lowers investment spending and aggregate demand, yielding reduced output. In reexamining the transmission mechanism, both Bernanke and Blinder (1988) and Bernanke and Gertler (1995) suggest that the response to interest rate changes can be considerably larger than that implied by the conventional interest rate channel, and they put forth the role of the credit channel, further separated into the bank-lending channel and the balance sheet channel.

The bank-lending channel suggests that a monetary contraction reduces bank deposits, yielding a reduction in bank lending and the aggregate loan supply.[1] In turn, the balance sheet channel (Bernanke, Gertler, and Gilchrist, 1999) suggests that shifts in monetary policy affect the financial position of both borrowers (e.g., firms, households, and consumers) and private agents. A contractionary monetary policy reduces borrowers' net worth, which triggers an increase in agency costs and motivates banks to reallocate the loan supply from riskier to safer borrowers.

The simultaneous low interest rates and increase of bank risk-taking on the road to the global financial crisis triggered renewed discussion on the credit channel. The key premise is that a prolonged period of low interest rates leads to excessive bank risk-taking for three reasons (Borio and Zhu, 2012; Delis, Hasan, and Mylonidis, 2017). First, low nominal interest rates lower the intermediation margin and induce a search for yield mechanism through the financing of riskier loans. Second, low rates lead to risk downsizing by banks through the higher asset and collateral values, and firms' net worth. Third, the commitment of a central bank to lower future interest rates in the case of a threatening shock reduces the probability of large downside risks, thereby encouraging banks to assume greater risk (the transparency effect). Several studies empirically

[1] There is voluminous empirical literature on the bank-lending channel (e.g., Kashyap and Stein 2000; Kishan and Opiela, 2000, 2012; Jayaratne and Morgan, 2000; Ashcraft, 2006; Jiménez et al., 2014), showing that banks with relatively weak balance sheets reduce loan supply during monetary contractions.

show a potent risk-taking channel of monetary policy (e.g., Ioannidou, Ongena, and Peydró, 2015; Jiménez et al., 2014; Dell'Ariccia, Laeven, and Suarez, 2017; Delis, Hasan, and Mylonidis, 2017).

The third mechanism of the risk-taking channel (working via central bank commitment) is particularly important for our work. This effect, also known as the Greenspan or Bernanke put, operates through expected lower interest rates rather than through the current low rates themselves. Theoretically, anticipated interest rate reductions tend to correspond to a higher-risk position when there is greater room for monetary expansion—that is, when current rates are relatively high (De Nicolò et al., 2010). When current rates are close to the zero lower bound, however, the focus turns to the effects of unconventional policy tools. In the next subsection, we discuss how forward guidance in particular might affect bank lending and loan pricing.

### *2.2 Forward guidance and the cost of corporate loans*

Since the FOMC cut interest rates to the zero lower bound in December 2008, forward guidance and quantitative easing have become the key policy tools for monetary accommodation. The theoretical foundation of the effects of these tools is found in macroeconomic models of forward-looking beliefs and expectations. Krugman (1999) was among the first to note that, at the zero lower bound, central banks can stimulate output by providing guidance that commits to generate inflation. In theory, such commitments affect private expectations *ex ante* (Woodford, 2003; Galí, 2008).

Eggertsson and Woodford (2003) show that commitment to future policy rates affects the entire path of expected future interest rates, and this dynamic in turn influences economic activity. Accordingly, Krishnamurthy and Vissing-Jorgensen (2011) find that FOMC guidance concerning asset purchase programs has significantly increased asset prices. To explain these effects,

Justiniano, Primiceri, and Tambalotti (2011) use a macroeconomic model in which forward guidance influences both private and public expectations about the future path of the economy and alleviates uncertainty. Romer and Romer (2004) and Ellingsen and Söderström (2001) show that the use of explicit forward-guidance language facilitates changes in economic outcomes.

Central bank guidance is not always sufficiently clear and quantifiable, however, and as a result, its effects are questionable. Campbell et al. (2012) study public statement announcements made by the FOMC. They distinguish between "Odyssean" forward guidance, which commits policymakers to specific future actions of monetary policy at a specific date (i.e., state- and time-dependent commitment), and "Delphic" forward guidance, which provides communication about future economic developments and intended monetary policy actions. Working along these lines, Carlstrom, Fuerst, and Paustian (2015) and Campbell et al. (2017) theoretically show that an explicit promise by the central bank to keep interest rates below the natural rate of interest for a time horizon of two years causes a significant increase in output.[2]

The relevant empirical literature is scant, whereas the effect of forward guidance on banks' loan pricing is, to the best of our knowledge, novel research. Our first hypothesis is that apart from (over and above) the direct effect of short-term rates on banks' incentives (i.e., apart from the usual effect of the interest rate channel), the central bank communication policies affect the cost of loans. Transparency, commitment, and guidance about the future monetary policy path, as well as the specific time-dependent binding actions communicated by the FOMC, reduce informational asymmetries between the central bank and lenders. The same effects prevail for the private

[2] Other studies are more sceptical about the potency of these effects. McKay, Nakamura, and Steinsson (2016) question the magnitude of the effects of forward guidance on the real economy in the long term. Hagedorn et al. (2019) focus on the power of forward guidance in a liquidity trap and suggest that its effects are negligible. Angeletos and Lian (2018) provide an explanation on the so-called "forward guidance puzzle" by relaxing the assumption that agents have common understanding on the central bank's policy announcement. Their findings suggest that the effectiveness of forward guidance is time- and agent-dependent.

decision makers' uncertainty about future economic and financial outcomes. This implies that anticipated interest rates induce forward-looking expectations about banks' funding costs, so that future corporate loan spreads are also better anticipated.

In theory, we should then observe that expansionary forward guidance lowers the cost of loans. Two notable issues lie behind this prediction. First, any empirical findings should result first and foremost from Odyssean forward guidance, which provides the most explicit path for future monetary policy. The effect of Delphic forward guidance does not lower the relevant informational asymmetries and should have a much lesser effect (if any) on the cost of bank loans. Second, our prediction suggests a mechanism outside the risk-taking channel, which predicts that in light of low interest rates, banks will charge higher loan spreads on average because they will expand lending to higher-risk borrowers. The effect of forward guidance mitigates informational asymmetries via increased transparency and commitment. Thus, expansionary forward guidance should reduce the cost of loans despite the opposite effect of short-term interest rates.

To this end, we formulate our first hypothesis as follows:

*H1: Expansionary Odyssean forward guidance lowers the cost of loans.*

Very similar to the mechanisms of the bank-lending channel, forward guidance should have heterogeneous effects across banks with different balance sheet characteristics. A key bank characteristic in recent literature in relation to the bank-lending channel is bank capitalization (Jiménez et al., 2014; Delis, Hasan, and Mylonidis, 2017). The theoretical reason behind the role of bank capitalization is that it represents a measure of the bank's ability to expand credit in conjunction with any agency conflict that besets banks' own borrowing from their financiers (Holmstrom and Tirole, 1997; Freixas and Rochet, 2008; Jiménez et al., 2014).

Better-capitalized banks are better able to pass changes in forward-looking expectations along to lending rates. Specifically, in light of expansionary forward guidance and the associated developments highlighted under *H1*, the availability of bank capital implies lower loan spreads to existing borrowers or attractive rates for new borrowers. Moreover, in a period of low interest rates (as is the case when central banks use forward guidance), bank asset valuation increases, thereby increasing the availability of bank capital (Dell'Ariccia, Laeven, and Marquez, 2014). We expect banks with already high levels of capital to benefit the most from such valuation effects, thereby allowing them to offer their borrowers the most attractive loan spreads.

Given the potentially important role of bank capitalization in the relation between forward guidance and loan cost, we formulate our second hypothesis as follows:

*H2: The negative effect of Odyssean forward guidance on the cost of loans will be more potent for loans originated by highly capitalized banks.*

Regardless of its financial condition, every bank aims to lend to borrowers that maximize the bank's returns. Especially in the corporate loan market, the pool generally includes a mix of relatively low-risk borrowers and relatively high-risk borrowers. For a fixed level of bank capital, we expect that expansionary forward guidance will boost the mechanisms underlying the risk-taking channel in the form of lending to riskier borrowers. The two key firm characteristics indicating firms' health are leverage and credit ratings. When expansionary forward guidance occurs, better-capitalized banks will probably be those expanding lending (via the associated mechanisms highlighted in our second hypothesis). If a risk-taking channel is at work, banks (especially the better-capitalized ones) should decrease the cost of loans more for risky and leveraged firms.

To be clear about our premise here, consider an example of the same bank lending to the same firm twice within one year. The first loan originates during the period before expansionary forward guidance, and the second originates after expansionary forward guidance. The better-capitalized banks are more likely than less-capitalized banks to offer loans at lower rates but also to further decrease those rates for relatively risky firms. Thus, the lending-rate reduction would be more potent for risky firms compared with less risky ones (those that already have access to relatively low rates).

Accordingly, we formulate our third testable hypothesis as follows:

*H3: The negative effect of Odyssean forward guidance on the cost of loans will be more potent for loans originated by highly capitalized banks and to relatively riskier borrowers.*

## 3. Data and variables

Table 1 summarizes all the variable definitions and the data sources. Our main variables include measures of forward guidance, the shadow rate, a series of loan characteristics, as well as bank and firm characteristics.

(Please insert Table 1 about here)

### *3.1 Forward guidance*

We measure forward guidance from the forward-looking language used in statements released by the FOMC after every meeting. Our sample begins in May 1999, when the FOMC first began disclosing information about the future stance of monetary policy in its post-meeting statements. Approximately eight regular FOMC meetings take place each year, but several post-meeting

statements do not contain a clear forward-looking guidance message to the public (Rudebusch and Williams, 2008; Campbell et al., 2012; Swanson, 2021).

Since the 2008 global financial crisis, the FOMC began providing explicit forward guidance within its statements in order to improve macroeconomic outcomes by affecting agents' expectations. Although forward guidance might be expected to act in similar ways to other monetary policy tools, its own nature carries a greater risk of misinterpretation. For example, the FOMC sometimes makes strong commitments about the future path of monetary policy (and uses strong and definite language); while in other cases, the statements look hesitant to restrict their ability to react to future economic conditions.[3]

The best method to clean such misinterpretation issues comes from Campbell et al. (2012), who distinguish between two types of forward guidance: Odyssean forward guidance, in which policymakers publicly commit to a particular course of action; and Delphic forward guidance, which broadly discusses macroeconomic conditions and likely monetary policy actions without binding the central bank to future courses of action. The authors find that the use of Odyssean forward guidance effectively stimulates the economy. For this reason, our empirical analysis focuses on Odyssean forward guidance from October 2008 onwards. However, we also undertake tests for Delphic guidance and for the pre-crisis period. The analysis on Delphic guidance in particular serves as an important placebo test. We expect the effects of Delphic guidance to be considerably weaker because of the blurred FOMC statements to be interpreted by banks as a weak monetary policy tool.

[3] Former Kansas City Fed President Thomas Hoenig described the Committee's trade-off: "In general, I think that it is difficult to construct a very specific statement that is credible to markets and does not unduly tie the hands of this Committee".

The policy stance and the communicative language used in the statements can remain unchanged across several meetings if the committee so desires. Therefore, we consider only new guidance issued to the public, wherein the forward-looking language changed significantly from the previous statement. This procedure yields 19 instances of Odyssean forward guidance since the global financial crisis. Appendix Table A1 lists the dates of Odyssean forward guidance and the relevant key forward-looking phrases within the statements.[4] Based on forward guidance dates, we construct forward guidance indicator variables corresponding to the month when the relevant statement is publicly released. In constructing the variables, we also note the direction of forward guidance, because an accommodative monetary policy and a tightening monetary policy are expected to affect bank lending differently. More precisely, for a given loan origination month *t*, we define the following:

$$Forward\ guidance\ (t-n) =$$

$$\begin{cases} 1, & \text{if the most recent expansionary guidance is provided } n \text{ month(s)ago,} \\ -1, & \text{if the most recent contractionary guidance is provided } n \text{ month(s) ago,} \\ 0, & \text{otherwise,} \end{cases} \quad (1)$$

where $n$ = 1, 2, 3. The three forward guidance variables described in Eq. (1) measure whether the FOMC forward guidance was in play one, two, or three months before the loan origination date.

In important robustness tests, we consider several alternative measures/definitions of forward guidance. From these, two are the most important. First, we completely isolate the forward guidance dates from the three QE announcement dates (March 18, 2009, November 03, 2010, and

[4] Our dates include the Federal Reserve's list of forward guidance dates about the Federal Funds Rate, as listed in Board of Governors of the Federal Reserve System (2019). Only three dates from that list do not appear in Table A1 (Oct 29, 2014; Jul 29, 2015; and Oct 28, 2015) because we consider these three dates as Delphic forward guidance (as they do not provide a commitment). Our results are robust to an analysis based on exactly the same dates as in this webpage.

September 13, 2012) and three other statement dates releasing details about QE (September 21, 2011, December 12, 2012 and December 18, 2013). In all our empirical models, we control for changes in other types of monetary policy using the shadow rate, which encompasses movements in the central bank rate, forward guidance, and QE. Removing the QE-related announcement dates serves the purpose of preventing our results capturing multicollinearities between our forward guidance measure and the shadow rate. We also serve the same purpose via regressing the shadow rate on our main forward guidance variables and using the residuals as the shadow rate control. In this case, the shadow rate does not include information on forward guidance.

Second, we measure the monetary policy shock using the unexpected changes of federal funds futures and Eurodollar futures within a window around the FOMC announcement (Gürkaynak, Sack, and Swanson, 2005). We decompose this shock into a target factor corresponding to surprise changes in the current policy rate, and a path factor corresponding to changes in the expected future rates. The path factor measures forward guidance because it contains the monetary policy shock additional to that arising from changes to the current policy rate.

The path factor does not distinguish Odyssean from Delphic guidance. Therefore, we follow Altavilla et al. (2019) to categorize the path factor into Odyssean and Delphic guidance by evaluating its co-movements with future interest rates, stock prices, and inflation-linked swaps. We estimate the path factor using the method of Gürkaynak, Sack, and Swanson (2005) around all the announcement dates.[5] We use seven futures contracts to construct this path factor (current-month and 3-month-ahead federal funds futures contracts, and 2-, 3-, 4-, 5-, and 6-quarter-ahead

[5] Following Campbell et al. (2012), we consider all the FOMC statement dates and the Board of Governors' press release on November 25, 2008.

Eurodollar futures contracts). Subsequently, we rescale the factor such that a unit change corresponds to a 1 basis point change in the 4-quarter-ahead Eurodollar rate. Next, we compare the directional movements of the path factor with changes in S&P 500 and with the 5-year Treasury Inflation-Protected Security on the same announcement dates. Forward guidance dates on which stock prices and inflation together move in the opposite direction to the path factor are Odyssean, while the same directional movements are Delphic (Altavilla et al., 2019). Thus, this forward guidance measure (named *GSS forward guidance*) takes the value of the path factor on Odyssean forward guidance dates and 0 otherwise. We note here that a negative shock to this measure is associated with an expansionary Odyssean forward guidance.

*3.2 Loan-level variables*

We match the FOMC statement dates with syndicated loan data, obtained from Thomson Reuters LPC's DealScan. An important feature of this data is that it records loan originations with their origination date, the spread over LIBOR, loan maturity, status of seniority, and identities of lenders and borrowers. We note that some of the loan observations in DealScan are loans that are renegotiated, instead of new loans. In this regard, our analysis translates to the broader credit conditions for borrowers. We exclude loans obtained by financial companies (SIC codes 6000–6999) and loans without pricing or maturity information. We match borrowers with their financial information using the Chava and Roberts (2008) DealScan–Compustat link table. Next, we manually match the lead arrangers' names and cities with call reports (for standalone commercial banks) or with FR Y-9C reports (for bank holding companies). This matching procedure allows us to obtain the lender's financial statements at the time of loan origination. Our full sample consists

of 20,615 syndicated loans to 3,834 US firms from 329 US banks initiated from May 1999 to June 2017.

Among the loan-level variables, our key outcome variable is the all-in spread drawn (AISD), which reflects the total (including fees and interest) annual spread paid over LIBOR for each dollar drawn down from the loan. The literature uses this variable to identify the risk-taking channel using syndicated loans (Delis, Hasan, and Mylonidis, 2017; Paligorova and Santos, 2017). *Ceteris paribus*, a higher loan spread is an *ex ante* indicator of higher bank risk-taking because it reflects a riskier borrower (demand-side risk) or a riskier stance by bank management (supply-side risk). Since we aim to identify the supply-side effect, we also take into consideration the loan amount. Further, we employ syndicate-level information on the use of covenants, performance pricing provisions and information on the syndication structure (i.e. share held by the lead arranger and HHI) as our dependent variables, since they represent lenders' judgments on the loan risk.

Additional to the above, we consider a large set of loan-level control variables, including loan maturity (in years), type of loan (term loan or credit line), loan purpose (corporate purpose, debt repayment, or working capital), loan category (secured or unsecured), use of dividend restrictions, and the number of lenders in the syndicate. These variables capture a rich set of information on the banks' syndication process and control for loan-level heterogeneity.

### *3.3 Bank and firm characteristics*

Concerning bank-level variables (quarterly data), and following our theoretical considerations, we first use the capital ratio (*Capital*) as our key identifier of banks' willingness to give out new loans following forward guidance innovations. Moreover, we use the log of total assets, a liquidity ratio, the bank's return on assets (ROA), and the bank's quarterly net loan charge-offs to proxy for

additional elements of bank health. At the firm-level, and following our theoretical discussion, our key proxies for firm risk are the book leverage and Moody's credit rating. The firm and bank variables are quarterly and enter our empirical model lagged once before a loan origination.

We aim to identify the effect of forward guidance over and above the general monetary conditions, and thus we control for the quarterly shadow rate (Krippner, 2015). This measure captures the effect of both the federal funds rate and (importantly) the effect of quantitative easing after the financial crisis, when interest rates were constrained at the zero lower bound.[6]

*3.4 Summary statistics*

Table 2 reports summary statistics for the variables used in our analysis, distinguishing between the pre-crisis period (May 1999 to September 2008) and the crisis and post-crisis period (October 2008 to June 2017). Our sample includes 13,122 syndicated loans in the pre-crisis period and 7,493 loans in the crisis and post-crisis period. In Appendix Table A2, we report summary statistics for the full sample period.

The average AISD in the pre-crisis period is 181 basis points, rising to 235 basis points from October 2008 onward. We observe equivalent increases for loan amount and maturity. Notably, the proportion of loans offered for corporate purposes more than doubles (from 32% to 67%) after October 2008, whereas the other loan-purpose groups shrink during the same period. This trend explains the increase in credit lines vis-à-vis term loans. In terms of the syndicate composition, we observe a slight increase in the average number of lenders.

[6] Some studies prefer using the change in the monetary policy variable, as a measure of shocks. Using changes in the shadow rate instead of the level of shadow rate in the regressions does not alter our results. Further, we also use Taylor rule residuals based on the shadow rate (another variable reflecting shocks) with very similar findings (see below).

The relevant figures for bank and firm characteristics follow our theoretical priors and the empirical literature. We observe increases in the average bank capital and liquidity ratios, whereas the ROA drops from 0.7% to 0.4%. In addition, the average quarterly net loan charge-offs increase from 0.1% to 0.2%. The average borrower's debt composition increases; however, the average credit rating also improves further, showing the importance of including a more thorough measure of firm risk.

(Please insert Table 2 about here)

## 4. Identification method

For identification purposes, we conduct our analysis at the lead bank-loan facility level[7] and estimate the following model:

$$logAISD_{l,f,b,t} = a_{f,q} + b_{b,f} + \delta_n Forward\ guidance\ (t-n) + \rho Shadow\ rate_{t-1} + \boldsymbol{\beta}' \boldsymbol{X_{l,t}} + \boldsymbol{\gamma}' \boldsymbol{Y_{b,t-1}} + \varepsilon_{l,f,b,t}\ . \quad (2)$$

The dependent variable, $logAISD_{l,f,b,t}$, is the natural log of the AISD of a syndicated loan $(l)$ to firm $(f)$ from bank $(b)$ at time $(t)$. The $a_{f,q}$ and $b_{b,f}$ are firm × quarter and bank × firm fixed effects respectively. *Forward guidance* is the indicator variable capturing Odyssean forward guidance issued one, two, or three months before the loan origination date, as defined in Eq. (1). In addition, $\boldsymbol{X_l}$, and $\boldsymbol{Y_b}$ are vectors representing the loan and bank control variables, respectively.

[7] This means that we have observations for each lead bank in our sample. Thus, we are able to have repeated observations for the same loan facility if that loan facility originates from more than one lead bank. This practice substantially improves our identification approach resulting from the use of firm × quarter fixed effects, as thoroughly discussed later. Moreover, the unit of our analysis is the loan facility, not the loan package. The loan facility refers to each individual portion of a deal (the package), with one package usually comprising multiple loan facilities. Loan facilities may have different starting dates, spreads, maturity, amount, and loan types. Hence, multiple loan facilities, even when in the same loan deal, are not fully dependent observations—simply adding facilities and ignoring their differences, for example, may introduce a bias in the estimates. The firm may use different loan facilities of the same package within a quarter, which introduces the heterogeneity allowing the use of firm × quarter fixed effects.

Our coefficient of interest is $\delta_n$, which is expected to capture the negative effect of expansionary forward guidance on the loan spread (based on *H1*).

Our identification strategy confronts three interrelated identification problems (Ioannidou, Ongena, and Peydró, 2014; Delis, Hasan, and Mylonidis, 2017). The first is the fact that any monetary policy innovation must affect new risk. Using syndicated loan data and the respective loans originated in the three months after forward guidance innovations provides the key to solving this problem.

Second, we must effectively control for types of monetary policy other than forward guidance. Using the shadow rate symmetrically with *Forward guidance*, as shown in Eq. (2), essentially achieves this goal. In other words, we extract the effect of forward guidance from the total effect of monetary policy as captured by the shadow rate. As suggested in Section 3.1, in robustness tests we also use a forward guidance measure that removes the effects driven by QE announcements.

Third, any model of the risk-taking channel aims to identify shifts in loan supply from shifts in loan demand. To this end, and in line with our testable hypotheses, we use a mix of fixed effects and interaction terms with bank and firm characteristics (Delis, Hasan, and Mylonidis, 2017; Paligorova and Santos, 2017). Thus, we consider a highly saturated model with triple interactions of *Forward guidance* with bank capitalization and firm risk, along with suppressing the effect from demand side using firm × quarter and bank × firm fixed effects.

The firm × quarter fixed effects are very important because they control for time- (quarter-) variant demand (firm) characteristics. Furthermore, including bank × firm fixed effects enables us to identify the effect of lending between the same bank-borrower pair before and after the policy. This would eliminate the concern that changes in spreads are driven by shifts to different lenders

with varying private information about the borrower. Including these fixed effects comes at the expense of limiting our inferences from changes in loan spreads for firms obtaining at least two loans within the same quarter and from the same lead bank. We identify 3,095 cases where the same firm borrows at least twice in a year. The structure of syndicated loans, however—with many lead banks that naturally have different characteristics—eases concerns about limiting our sample. To this end, the triple interaction term with *Capital* serves to improve the information extracted from the model. The reasons are that (i) banks provide many syndicated loans in the same quarter, (ii) *Capital* is observed at a quarterly level, and (iii) *Capital* is different across observations even for the same loan facility if many lead banks provide the loan.

Formally, we estimate the following model:

$$logAISD_{l,f,b,t} = a_{f,q} + b_{b,f} + \delta_n Forward\ guidance\ (t-n) + \lambda_{1n} Forward\ guidance\ (t-n) Capital_{b,t-1} + \lambda_{2n} Forward\ guidance\ (t-n) R_{f,t-1} + \lambda_{3n} Forward\ guidance\ (t-n) Capital_{b,t-1} R_{f,t-1} + \rho Shadow\ rate_{t-1} + \theta_1 Shadow\ rate_{t-1} Capital_{b,t-1} + \theta_2 Shadow\ rate_{t-1} R_{f,t-1} + \theta_3 Shadow\ rate_{t-1} Capital_{b,t-1} R_{f,t-1} + \theta_4 Capital_{b,t-1} R_{f,t-1} + \boldsymbol{\beta}' \boldsymbol{X_{l,t}} + \boldsymbol{\gamma}' \boldsymbol{Y_{b,t-1}} + \varepsilon_{l,f,b,t}, \quad (3)$$

where *Capital* is the capital ratio of bank ($b$) and $R_f$ is the firm risk measure (*Book leverage* or *Credit rating*). The focus of the analysis concerns the interaction terms. In line with *H2*, a negative and statistically significant $\lambda_{1n}$ implies that the negative effect of expansionary forward guidance is more pronounced for highly capitalized banks. In line with *H3*, a positive $\lambda_{3n}$ indicates that the negative effect of expansionary forward guidance will be less pronounced for highly capitalized banks that lend to riskier borrowers. We symmetrically control for the effect of conventional

monetary policy by including the interactions of shadow rate with the bank capital ratio and firm risk measures.

Eq. (3) represents a model that tests our three hypotheses while effectively mitigating the three identification problems. First, it identifies the pricing of loans originated in the three months following forward-guidance innovations. Second, the model disentangles the effect of the general monetary environment from the effect of forward guidance. Third, the model saturates shifts in loan supply from shifts in loan demand via the fielding of firm × quarter and bank × firm fixed effects, and the double and triple interaction terms (directly following the paradigm of, e.g., Kashyap and Stein, 2000; Jiménez et al., 2014; Ioannidou, Ongena, and Peydro, 2015; and subsequently many others).

## 5. Empirical results

### *5.1 Results from the model without interaction terms*

Table 3 reports the results from the estimation of Eq. (2), which serves as a benchmark to show the overall effects of the monetary environment on loan spreads. Columns 1 to 4 report the results for the Odyssean forward guidance. The results show that loan spreads decrease subsequent to expansionary forward guidance of an Odyssean nature. The effect is highest on loans originated two to three months after the forward guidance is issued.[8] This result is expected because the syndication process (book-running stage) usually takes several weeks to complete (46 days or approximately 7 weeks according to Bruche, Malherbe, and Meisenzahl, 2020).

[8] Forward guidance issued more than three months before loan originations is found to be insignificant in the empirical tests. This is possibly because there are fewer loan originations with the most recent forward guidance provided four or more months ago.

We calculate the economic effect of forward guidance on loan spreads using the estimation results in column 4 and report them in the lower part of Table 3. Odyssean forward guidance issued one month ago decreases the spread of a syndicated loan by 24.44 basis points or 10.4% compared with a loan of average spread (equal to 235 basis points). The effect hits the peak after three months, with an equivalent 14.9% reduction in loan spread, corresponding to 35.02 basis points. The corresponding reduction of interest expenses of a loan of average size and maturity issued one month after Odyssean guidance is USD 6.01 million (= USD 615 million × 24.44 basis points × 4 years).

Columns 5 to 8 report the results for Delphic forward guidance. This exercise serves as a placebo test, given that Delphic forward guidance does not reflect explicit commitment. Further, this test substantially reduces the possibility that unobserved factors associated with FOMC meetings affect the syndicated loan market. Further, in columns 9 to 12, we examine the effect of forward guidance before the financial crisis. Because Odyssean guidance emerged after the financial crisis and as the policy rates touched the zero lower bound, we also expect the effect of forward guidance to be negligible prior to the crisis. Indeed, the coefficients on forward guidance are never significant in these falsification tests.

(Please insert Table 3 about here)

Figure 1 provides a graphical representation of how forward guidance affects loan spreads across different sample periods. Similarly to Welch and Goyal (2007), we undertake the following procedure. We estimate three regression models—the benchmark model, the shadow rate model, and the forward guidance model—using a two-year monthly moving estimation window, and record their root-mean-square errors (RMSEs). The benchmark model regresses loan spreads on the loan and bank-level control variables, along with firm × quarter and bank × firm fixed effects.

The shadow rate model includes the shadow rate as an additional independent variable in the benchmark model. The forward guidance model adds both the shadow rate and the forward guidance variables to the benchmark model, as in Eq. (2). Next, the performance of the shadow rate model is calculated as the cumulative RMSE of the benchmark model minus the cumulative RMSE of the shadow rate model. Analogously, we calculate the performance of the forward guidance model over and above the benchmark model. Finally, we plot line graphs of the performance of both the shadow rate model and the forward guidance model over time.

This graph is informative because when the line shows an upward movement, the benchmark model is weaker than the preferred model (i.e., the shadow rate model or the forward guidance model). Similarly, when the line shows a downward movement, the benchmark model performs better than the preferred model. Because the difference in cumulative errors is plotted over time in the line graph, we can gauge the performance of a preferred model for any given sample period. That is, if any two given points on the graph form an upward curve, the preferred model contributes explanatory power to the loan spread during the period between those two points.

In Figure 1, the dashed (dotted) line is the cumulative RMSE of the benchmark model minus the cumulative RMSE of the forward guidance model (shadow rate model). The gap between the two lines represents the extra explanatory power that forward guidance adds to the model over and above the shadow rate. In the beginning of the sample period, the two models both outperform the benchmark model but are quite close to each other. The gap widens around the third quarter of 2008. This widening coincides with the FOMC's statement with forward guidance issued on October 08, 2008, which was the first accommodating Odyssean forward guidance since May 04, 2004, in our sample. Since 2008, the forward guidance model has provided significant explanatory power over and above the shadow rate model.

(Please insert Figure 1 about here)

For a granular assessment, we conduct additional analysis examining the timing of the impact of forward guidance on loan originations by constructing a weekly measure of Odyssean Forward Guidance. Bruche, Malherbe, and Meisenzahl (2020) document that the book-running process, where all the terms of the loans and investors' participation is established, takes on average 46 days (about 7 weeks). We estimate the regression of loans spreads on the weekly measure of forward guidance, along with firm × quarter, bank × firm, and firm × month fixed effects. A noteworthy observation is that weekly originations in the above specification allows us to include firm × month fixed effects. The results of this additional analysis are presented in Appendix Table B1. In line with the average length of time it takes for the book-running process to complete, we find that a strong negative impact of forward guidance on loan spreads emerges from week 4 onwards, with most significance seen consistently between weeks 6 and 8. This indicates that announcement of the forward guidance affects the initial stages of the book-running process, when the lead arranger proposes the terms of the loans based on market conditions. The results establish that monetary policy has significant effects on the syndication process affecting the new risk originations subsequent to the issuance of the forward guidance.

Overall, consistent with *H1*, we find that forward guidance significantly affects corporate loan spreads since the beginning of the 2008 financial crisis.

*5.2 Results from the model with interaction terms*

In Table 4, we report the results from the estimation of Eq. (3), which allows testing *H2* and *H3*. Moreover, as highlighted in Section 4, this model significantly improves the empirical identification of the supply-side effects of forward guidance, by increasing the informational

content of our data using interaction terms in conjunction with the firm × quarter and bank × firm fixed effects. Given the results from Eq. (2), we focus on the crisis and post-crisis period because this is where we identify significant effects of Odyssean forward guidance.

Two important findings emerge from the results in Table 4. First, the negative effect of forward guidance at $t - 1$ and $t - 2$ seems to be more potent for the well-capitalized banks. In Appendix Table B2, we show that this remains the case when we do not include the triple interaction terms within the specification. Based on the estimation in column 4 in Table B2, the additional percentage reduction on loan spreads offered by highly capitalized banks (75th percentile) compared with less capitalized banks (25th percentile) is 14.24%, after expansionary forward guidance was issued two months before. Thus, consistent with *H2*, the results show that the negative effect of forward guidance on loan spread intensifies for loans by highly capitalized banks. Moreover, this finding is consistent with the negative effect of forward guidance being supply-driven.

Second, consistent with *H3*, the negative coefficients on the triple interactions at $t - 1$ and $t - 2$ show that the negative effect of Odyssean forward guidance on the cost of loans is more potent for loans originated by highly capitalized banks and to relatively riskier borrowers. The results are fairly similar irrespective of whether we add the forward guidance terms separately for the three periods $t - 1$ to $t - 3$ (results in columns 1 to 3 of Table 4) or whether we add all the terms in one specification (results in column 4). Further, our results are similar irrespective of the variable used to proxy firm risk. In the first four columns, we use *Book leverage* (higher values reflect higher firm risk, and hence the coefficient on the triple term is negative), and in the final four columns, we use *Credit rating* (higher values reflect lower firm risk, and hence the coefficient

on the triple term is positive). In the specifications with *Credit rating*, the results are in fact stronger, reflecting a significant effect of forward guidance across all three periods $t - 1$ to $t - 3$.

This is the key finding of our paper, suggesting that banks—especially those with higher capital ratios—take on more risk after forward guidance, as evidenced by their willingness to offer cheaper loans to riskier firms. To provide inferences on the economic magnitude of the risk-taking effects for highly capitalized banks, we report in the lower part of Table 4 the marginal effects of the difference-in-differences—the additional percentage reduction on loan spreads offered to riskier firms (25th percentile) compared with safer firms (75th percentile) by highly capitalized banks (75th percentile), over and above the reduction offered by less capitalized banks (25th percentile). Based on model specification (4) with book leverage, a highly capitalized bank reduces the loan spread by 12.48% (8.76%) more than a less capitalized bank one month (two months) after expansionary forward guidance, for a borrowing firm with a weaker capital structure. Similarly, based on model specification (8) with *Credit rating*, the loan spread difference offered by highly versus less capitalized banks for riskier borrowers is 23.01% (22.73%) lower than for safer borrowers, after expansionary forward guidance one month (two months) before.

Note that the shadow rate and its interaction terms are also statistically significant. This result is as expected, because the shadow rate reflects the general monetary policy stance and represents the effects of quantitative easing after the financial crisis. Nonetheless, and quite importantly, the effects of forward guidance prevail over and above the effects from the shadow rates.

(Please insert Table 4 about here)

*5.3 Robustness*

We conduct several robustness tests on our baseline results. An important test is to assess whether the announcement dates of quantitative easing (QE) drive the forward guidance results. We note that the shadow rate control includes the impact of QE on the cost of credit and thus our results so far should not be capturing QE effects. To ensure this is the case and that our results are not driven by multicollinearity,[9] we first remove any announcement/narrative effects of QE by excluding the three QE announcement dates (March 18, 2009, November 03, 2010, and September 13, 2012) and three other statement dates releasing details about QE (September 21, 2011, December 12, 2012, and December 18, 2013) from the Odyssean forward guidance measure. The results reported in the first three columns of Table 5 remain largely unaltered compared to our baseline.

Further, in the last three columns of Table 5, we control for the shadow rate residuals (instead of the shadow rate) obtained from regressing the shadow rate on our forward guidance variables. These residuals do not include information on forward guidance, thus completely disentangling the effects of forward guidance from other types of monetary policy. Again, the results remain largely unaffected.

(Please insert Table 5 about here)

Next, we examine whether our findings hold when using alternative forward guidance measures. In Table 6 we report the results using *GSS forward guidance*. Based on the definition of the measure in section 3.1, a negative surprise in GSS forward guidance represents an expansionary Odyssean guidance, and thus we expect positive signs for GSS forward guidance. In line with our baseline findings, the results show that a negative average GSS forward guidance surprise two months ago, which lowers the one-year ahead interest rate by 6.35 basis points,

[9] Multicollinearity comes from the inclusion of forward guidance information both in our main forward guidance variables and in the shadow rate control.

reduces the loan spread by 6.35% (calculation based on column 1 of Table 6). Irrespective of the definition of forward guidance, the triple interactions in columns 2 and 3 are statistically significant, indicating that riskier firms get more reduction in loan cost subsequent to an expansionary Odyssean guidance. These results are again consistent with our baseline.

(Please insert Table 6 about here)

Third, we examine whether the risk-taking effect of forward guidance can be identified using the weekly forward guidance measure, along with stringent firm × month and bank × month fixed effects. Appendix Table B3 reports the estimation results of this specification with triple interaction terms. This model studies the effect at a granular level, taking weekly loan originations into consideration. However, with eight weekly forward guidance indicators, we have 32 interaction terms. Nevertheless, the results show that banks – especially those with higher capital ratios – take on more risk after forward guidance, as evidenced by their willingness to offer cheaper loans to riskier firms.

Fourth, because we include multiple observations for each loan, our results can be biased towards larger loans. To address this concern, we reestimate our models with two changes. First, we cluster the standard error at the firm-level (columns 1 to 3 in Appendix Table B4). Second, we collapse our sample to one observation for each facility and use the weighted-average capital ratio as the bank characteristic (columns 4 to 6 in Appendix Table B4). In this case, we aggregate the pricing decisions from lead banks for each loan. The specification is informative because loan spreads are jointly set by the participating banks. The results again confirm that forward guidance increases banks' risk-taking incentives.

Fifth, we consider the effective federal funds rate, instead of the shadow rate, in the estimation of Eqs. (2) and (3). The effective federal funds rate is the most straightforward monetary

policy tool used in previous research, but it disregards the novel monetary policy tools implemented in the crisis and post-crisis periods. The results are presented in Appendix Table B5. We note that the estimated effects of forward guidance are consistent with our baseline inferences.

Finally, our results are also robust to the inclusion of different fixed effects. Specifically, in alternative specifications, we include bank and firm fixed effects as well as bank × year fixed effects. These fixed effects further saturate our model from the time-invariant bank and firm characteristics, and time-varying bank characteristics, respectively. The results in Appendix Tables B6 to B8 replicate those of Tables 3 and show that all our main results remain essentially unchanged.

*5.4 Loan amount and other loan characteristics*

Standard economic theory predicts that a rightward shift in loan supply produces an associated increase in equilibrium loan amounts, *ceteris paribus*. We examine this premise in Table 7, using the loan amount as the dependent variable. We find a positive and statistically significant triple interaction term one month after the enactment of Odyssean forward guidance (column 1). As expected, the equivalent effects of Delphic forward guidance and forward guidance before the financial crisis (columns 2 and 3) remain statistically insignificant.

Arguably, the effect of Odyssean forward guidance on the loan amount is less potent than the equivalent effect on the loan spreads. This finding is consistent with the textbook analysis that short-term demand is more inelastic than long-term demand. In the credit market, firms have relatively fixed credit needs and capital structure decisions in the short run. Karlan and Zinman (2019) provide evidence consistent with this intuition for the microcredit market. In turn, banks have no incentive to supply more loans to the same borrowers pre- and post-forward guidance

(considering the use of firm × quarter fixed effects). Therefore, the rightward shift in loan supply produced by expansionary forward guidance should increase spreads more than the associated increase in loan amount.

(Please insert Table 7 about here)

Further, we consider different loan contract terms that determine the risk profiles of loan originations after forward guidance. We begin by examining the potential responses on covenants and performance pricing provisions. First, for covenants, we split the sample into loans with at least four covenants and loans with fewer than four covenants. We expect a negative coefficient (i.e., fewer covenants imposed by banks) if forward guidance enhances banks' risk-taking incentives. As shown in Table 8 column 1, we indeed find that loans originated from well-capitalized banks to riskier firms two months after an expansionary Odyssean forward guidance are less likely to have a high number of covenants.

We next consider interest-increasing provisions, which are commonly used by banks if the credit quality of the borrower is expected to decrease over the life of the loan (Asquith, Beatty, and Weber, 2005). The results in Table 8 column 2 show that well-capitalized banks originate loans without interest-increasing performance pricing provisions for riskier borrowers when forward guidance is in place. These results suggest that forward guidance eases the constraints on loans imposed by banks, supporting the risk-taking effect of forward guidance.

Third, we consider the syndication structure, which reflects the banks' perception of the information asymmetry problem with regard to the borrowers. Sufi (2007) and others thereafter note that considering lower informational asymmetry problems, the lead arrangers keep smaller loan shares and form less concentrated loan syndicates because less monitoring effort is required to provide incentives to participant investors. We measure syndicate structure using the share held

by the leader arrangers and the Herfindahl–Hirschman index (HHI) based on the shares of all lenders. The share held by lead arranger and the HHI reflect the monitoring effort and joint monitoring effort required by participants, respectively. As reported in Table 8 columns 3 and 4, forward guidance reduces the share held by lead arrangers and the syndicate's HHI for riskier firms, suggesting that forward guidance eases the information asymmetry concerns of banks and encourages risk-taking.

Finally, we see that the effects of forward guidance on the various non-pricing terms become mainly significant two months after forward guidance, in contrast to our baseline results for loan spreads, which are seen to react to forward guidance immediately. This is not surprising, as any changes in the non-pricing terms can possibly take longer time than adjustments to loan spreads during the book-running process (Bruche, Malherbe, and Meisenzahl, 2020).

(Please insert Table 8 about here)

*5.5 Expansion of bank credit and private versus public beneficiaries*

Institutional investors can drive credit expansion (Ivashina and Sun, 2011; Shivdasani and Wang, 2011; Fleckenstein et al., 2020) and banks can originate riskier loans to accommodate the demand from institutional investors (Aramonte, Lee, and Stebunovs, 2019). Thus, a further test to establish that forward guidance expands bank credit is to separate loans by banks (credit lines and term A loans) from loans by institutional investors (term B loans) (Ivashina and Sun, 2011). Essentially, this disentangles whether changes in loan supply stem from banks' credit expansion, as opposed to institutional investors' credit expansion, who are not directly affected by forward guidance. The

results in Table 9 show that the identified effect comes from credit lines.[10] In the case of credit lines, for which we have more observations and for which loan spreads change more easily within loan packages, the results are consistent with our baseline results. Additionally, we note that, although statistically insignificant, the economic magnitudes of the results in the term loan A sample are qualitatively similar to those of credit lines, unlike term B loans. The findings provide further evidence for a supply-side forward-guidance-driven risk-taking channel in banks.

(Please insert Table 9 about here)

Next, we consider the effect of forward guidance on private versus public borrowers. Theoretically, there are two opposite forces at work. On the one hand, lending to more opaque firms following an expansionary forward guidance implies lending more to private firms. The reason is that public firms have easier access to alternative sources of finance (e.g., the bond market), especially as investors face higher informational asymmetries with private firms (Hale and Santos, 2009). In a similar vein, Saunders and Steffen (2011) show that the higher cost of information production associated with privately held firms can be an important determinant of the loan cost for these firms. On the other hand, corporate loans and bonds are not perfect substitutes because corporate bonds are harder to renegotiate (e.g., Becker and Josephson, 2016; Crouzet, 2017; Darmouni, Giesecke, and Rodnyansky, 2020) and there is less screening and monitoring (e.g., Holmstrom and Tirole, 1997; Darmouni, Giesecke, and Rodnyansky, 2020). Thus, by committing to monetary easing, forward guidance induces substitution of more rigid corporate bonds to more flexible bank loans. If this is the case, we expect larger effects on public firms.

[10] The coefficients on the triple terms are also positive and statistically significant when using credit ratings to measure firm risk (results available on request).

We find strong support in favor of the latter mechanism. In columns 1 and 2 of Table 10, we examine the relation between forward guidance and loan spreads for private firms and in columns 3 and 4 the equivalent for public firms.[11] We find that the use of forward guidance is associated with a decrease in loan spreads for both private and public borrowers (columns 1 and 3). However, when we use the models with the triple interaction terms (columns 2 and 4), we find significant effects only for public firms and not for private firms. Specifically, the negative effect of Odyssean forward guidance on the cost of loans is more potent for loans originated one to two months after forward guidance by highly capitalized banks and to relatively riskier public borrowers. This suggests a potential shift from the bond to the loan market after forward guidance, rather than credit to borrowers that otherwise do not have access to funds. Combined with the results in Table 11 on new relationship lending after forward guidance, these findings are consistent with firms substituting corporate bonds to corporate loans following expansionary forward guidance.

(Please insert Table 10 about here)

*5.6 New borrower-lender relationships*

An important element in banks' loan pricing decisions is their relationship with the borrowers. Because of the related informational asymmetries, establishing new borrower relationships is riskier than providing loans to borrowers with already well-established credit relationships. The reduction in macroeconomic uncertainty following forward guidance implies that lenders might be willing to take more risk by providing loans to new borrowers. We trace the history of each borrower–lender relationship and define new borrowers as firms that have not borrowed a

[11] Models with quadruple interaction terms instead of the sample split confirm these results.

syndicated loan from a specific lead bank in the recent past. We consider three scenarios in which borrower relationships did not exist in the previous three, five, or eight years.

We first examine the effect of forward guidance on the establishment of a new lending relationship. In line with Gomila (2020), we favor the linear probability model (instead of a probit model) because of the extensive use of fixed effects. We report the results in Panel A of Table 11. The outcome variable takes the value 1 if the loan involves a new borrower (no loans in the previous two or three years), and 0 otherwise. In both specifications, we use bank, firm, and year fixed effects. Using more involved fixed effects (as in the previous tables) is not feasible in this model because we do not have as much heterogeneity in the outcome variable. The results provide evidence that the probability of establishing new lending relationships significantly increases two months after expansionary forward guidance. Specifically, we find that following an expansionary forward guidance, better-capitalized banks are more likely to establish a lending relationship with more leveraged firms. The results are robust to using either a two-year or a three-year period within which banks and firms did not have a lending relationship.[12]

Next, we examine whether banks provide cheaper credit to new borrowers following forward guidance innovations. Panel B of Table 11 analyzes the spreads that banks charge for new term loans and credit lines issued to new borrowers (as compared with the respective effects for existing borrowers). The results show that, although new borrowers receive higher spreads (as expected and reflected on the main term of *New borrower*), the coefficients on the interaction terms are negative, suggesting that new borrowers get more reduction in loan spreads after expansionary forward guidance. Overall, we find evidence of banks engaging in new risks in the

[12] The results are also robust to using a five-year or an eight-year period.

presence of forward guidance, by initiating new borrower-lender relationships and offering lower spreads to new borrowers.

(Please insert Table 11 about here)

## 6. Conclusion

Following the Great Recession and the monetary policy rates hitting the zero lower bound, unconventional tools have taken up a key role for both policymakers and researchers. Forward guidance, in particular, affects the real economy by creating expectations about the future course of monetary policy. In this study, we consider for the first time the effects of forward guidance on bank lending, using data from the syndicated loan market.

Our analysis features several novel findings. First, Odyssean forward guidance decreases the loan spreads on syndicated loans originating in the next three months. The effect is economically significant, peaking after three months with a 14.9% reduction in loan spreads. This effect corresponds to a 35.02 basis points reduction in spreads or a USD 8.61 million reduction in the cost of a loan of mean size and maturity.

Second, the effect of forward guidance on loan spreads is more potent for highly capitalized banks, especially when those highly capitalized banks lend to firms with weaker capital structure or higher default probability. For example, a highly capitalized bank reduces the loan spread by an average 11% more than a less capitalized bank for a borrowing firm with a weak capital structure in the one to two months after expansionary forward guidance. These loans also have fewer covenants and performance pricing provisions. Moreover, the syndication structure is less concentrated, reflecting the lower monitoring effort that banks need to exert.

Third, expansionary forward guidance allows a higher probability of establishing new bank-firm relationships and lowers the spreads of such loans. These effects are consistent with the lower informational asymmetries regarding the stance of monetary policy in particular and the monetary environment in general. Fourth, our findings concern loans by banks and not institutional investors, who are not directly affected by monetary policy. Moreover, our findings primarily concern loans to public firms (as opposed to private ones). This latter finding warrants further investigation with more inclusive data on loans to private firms.

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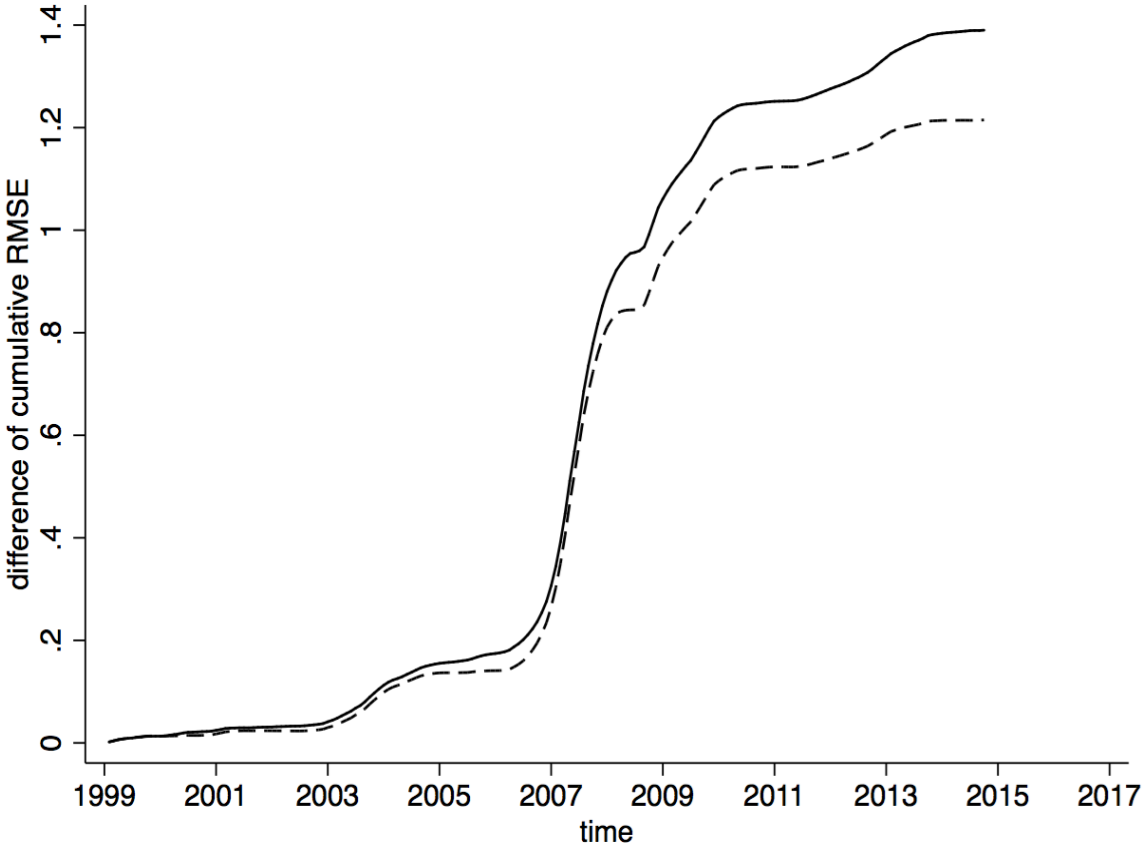
## Figure 1. Explanatory power of forward guidance and shadow rate over time

This figure plots the performance of the shadow rate over time (dotted line), which is calculated as the cumulative RMSE of the benchmark model minus the cumulative RMSE of the shadow rate model. Analogously, the performance of forward guidance over time (dashed line) is calculated as the cumulative RMSE of the benchmark model minus the cumulative RMSE of the forward guidance model. For the construction of the graphs, three regression models are estimated – benchmark model, shadow rate model and forward guidance model – using a 2-year monthly moving estimation window, and their respective RMSEs are recorded. The benchmark model regresses loan spreads on the loan and bank-level control variables, along with firm × quarter and bank × firm fixed effects. The shadow rate model includes the shadow rate as an additional independent variable in the benchmark model, while the forward guidance model adds both the shadow rate and the forward guidance variables to the benchmark model. Definitions for all the variables used in the regressions are provided in Table 1.



## Table 1. Variable definitions and sources

| Variable | Definition | Source |
|---|---|---|
| **Monetary policy variables** | | |
| Forward guidance (t – 1), Forward guidance (t – 2), Forward guidance (t – 3) | Three indicator variables measuring whether forward guidance is in play one month, two months, and three months prior to the loan origination date (see section 3.2 for the variable construction details) | FOMC |
| GSS forward guidance | The variable takes the GSS path factor value on Odyssean forward guidance dates, and 0 otherwise | FOMC, Bloomberg and FRED |
| Shadow rate | Monthly average shadow rate | Leo Krippner's website |
| **Loan-level variables** | | |
| Loan spread | Log of all-in-spread-drawn above LIBOR (in basis points) at origination | DealScan |
| Loan amount | Log of loan amount (in million US dollars) | DealScan |
| Maturity | Maturity of the loan (in years) | DealScan |
| Credit line | Indicator variable equal to 1 if a loan is a credit line, and 0 otherwise | DealScan |
| Term loan | Indicator variable equal to 1 if a loan is a term loan, and 0 otherwise | DealScan |
| Corporate purpose | Indicator variable equal to 1 if a loan is used for a corporate purpose, and 0 otherwise | DealScan |
| Working capital | Indicator variable equal to 1 if the loan is used for working capital, and 0 otherwise | DealScan |
| Debt repayment | Indicator variable equal to 1 if the loan is for repayment of previous debt, and 0 otherwise | DealScan |
| Secured | Indicator variable equal to 2 if the loan is secured, 1 if unsecured, and 0 if the information is missing | DealScan |
| Dividend restriction | Indicator variable equal to 2 if a loan has to meet a dividend restriction, 1 if no such restrictions are present, and 0 if the information is missing | DealScan |
| Lender number | Log of the number of lenders in the syndicate | DealScan |
| Covenant | Indicator variable equal to 1 if the loan has more than 4 covenants, and 0 otherwise | DealScan |
| Performance pricing provisions | The number of interest increasing performance pricing provisions | DealScan |
| Share held by lead arranger | The percent of a facility that is held by the lead arranger | DealScan |
| HHI | Herfindahl–Hirschman Index based on facility shares | DealScan |
| **Firm-level variables** | | |
| Book leverage | The ratio of common equity over total assets, and multiplied by –1 for ease of interpretation (higher values for the ratio indicate higher book leverage) | Compustat |
| Credit rating | Credit rating for the firm coded into numbers ranging from 1 to 22 (higher values indicate higher rating) | Moody's |
| **Bank-level variables** | | |
| Total asset (log) | Bank total assets (RCFD2170 and BHCK2170) | Call reports and Y-9C reports |
| Capital ratio | The ratio of bank equity over total assets (RCFD3210 and BHCK3210) | Call reports and Y-9C reports |
| Liquidity | The ratio of banks' cash and treasuries over total assets (RFCD0010 and RFCD0400, BHCP6775 and BHCK1287) | Call reports and Y-9C reports |
| ROA | The ratio of banks' net income before taxes over total assets (RIAD4340 and BHCK4340) | Call reports and Y-9C reports |
| Charge-off | The ratio of bank quarterly net charge-offs over total assets (RIAD4635 and BHCK2432) | Call reports and Y-9C reports |

## Table 2. Summary statistics

This table reports the summary statistics of all the variables used in the empirical analysis. The pre-financial crisis sample period is from May 1999 to September 2008, and the sample period following the pre-financial crisis is from October 2008 to June 2017. Definitions for all the variables are provided in Table 1.

| | Pre-financial crisis sample period | | | | | Sample period following the pre-financial crisis | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Obs. | Mean | Std. Dev. | Min | Max | Obs. | Mean | Std. Dev. | Min | Max |
| **Loan-level variables** | | | | | | | | | | |
| Loan spread | 13,122 | 4.890 | 0.864 | 0.405 | 7.313 | 7,493 | 5.331 | 0.508 | 2.708 | 7.111 |
| Loan amount | 13,122 | 4.818 | 1.721 | –6.639 | 10.309 | 7,493 | 5.602 | 1.380 | –2.303 | 10.800 |
| Maturity | 13,122 | 3.580 | 1.962 | 0.005 | 20 | 7,493 | 4.482 | 1.459 | 0.083 | 16 |
| Credit line | 13,122 | 0.563 | 0.496 | 0 | 1 | 7,493 | 0.621 | 0.485 | 0 | 1 |
| Term loan | 13,122 | 0.246 | 0.431 | 0 | 1 | 7,493 | 0.330 | 0.470 | 0 | 1 |
| Corporate purpose | 13,122 | 0.320 | 0.467 | 0 | 1 | 7,493 | 0.671 | 0.470 | 0 | 1 |
| Working capital | 13,122 | 0.231 | 0.422 | 0 | 1 | 7,493 | 0.105 | 0.306 | 0 | 1 |
| Debt repayment | 13,122 | 0.115 | 0.319 | 0 | 1 | 7,493 | 0.030 | 0.170 | 0 | 1 |
| Secured | 13,122 | 1.246 | 0.856 | 0 | 2 | 7,493 | 1.249 | 0.859 | 0 | 2 |
| Dividend restrictions | 13,122 | 1.248 | 0.901 | 0 | 2 | 7,493 | 0.891 | 0.884 | 0 | 2 |
| Number of lenders | 13,122 | 1.677 | 1.041 | 0 | 5.088 | 7,493 | 1.888 | 0.827 | 0 | 4.248 |
| Covenant | 13,122 | 0.161 | 0.368 | 0 | 1 | 7,493 | 0.017 | 0.129 | 0 | 1 |
| Performance pricing provisions | 11,091 | 1.471 | 0.903 | 1 | 18 | 6,938 | 1.344 | 0.806 | 1 | 12 |
| Share held by lead arranger | 3,766 | 0.277 | 0.251 | 0.003 | 1 | 1,529 | 0.203 | 0.210 | 0.014 | 1 |
| HHI | 3,283 | 24.822 | 25.965 | 2.099 | 100 | 1,286 | 18.265 | 21.208 | 2.974 | 100 |
| **Firm-level variables** | | | | | | | | | | |
| Book leverage | 13,122 | –0.409 | 0.198 | 0.000 | –1.000 | 7,493 | –0.389 | 0.194 | 0.000 | –0.960 |
| Credit rating | 7,137 | 10.307 | 3.526 | 1 | 22 | 4,731 | 11.318 | 3.097 | 1 | 22 |
| **Bank-level variables** | | | | | | | | | | |
| Total asset | 13,122 | 19.808 | 1.330 | 9.501 | 21.279 | 7,493 | 20.884 | 1.225 | 10.555 | 21.586 |
| Capital ratio | 13,122 | 0.079 | 0.015 | 0.056 | 0.149 | 7,493 | 0.102 | 0.018 | 0.056 | 0.149 |
| ROA | 13,122 | 0.007 | 0.004 | –0.012 | 0.048 | 7,493 | 0.004 | 0.004 | –0.039 | 0.031 |
| Liquidity | 13,122 | 0.047 | 0.026 | 0 | 0.212 | 7,493 | 0.062 | 0.048 | 0 | 0.474 |
| Charge-off | 13,122 | 0.002 | 0.002 | 0 | 0.016 | 7,493 | 0.002 | 0.003 | 0 | 0.028 |
| **Monetary policy variable** | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Shadow rate | 113 | 3.446 | 1.770 | 0.984 | 6.224 | 105 | –1.687 | 1.880 | –5.461 | 1.812 |

## Table 3. Response of loan spreads to forward guidance: Baseline specifications

This table reports the regression results of Eq. (2), where the dependent variable is the log of loan spread. Forward guidance indicator variables capture forward guidance issued one, two, or three months before the loan origination date. Using the sample period following the pre-financial crisis (October 2008 to June 2017), columns (1) – (4) report results for Odyssean forward guidance and columns (5) – (8) report test results for Delphic forward guidance. Columns (9) – (12) report test results for forward guidance issued during the pre-financial crisis sample period (May 1999 to September 2008). Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | Odyssean forward guidance | | | | Delphic forward guidance | | | | Forward guidance before financial crisis | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Forward guidance (t–1) | –0.051** | | | –0.104*** | –0.021 | | | –0.025 | 0.004 | | | 0.007 |
| | (–2.01) | | | (–3.27) | (–1.09) | | | (–1.15) | (0.13) | | | (0.26) |
| Forward guidance (t–2) | | –0.075*** | | –0.128*** | | –0.009 | | –0.016 | | 0.017 | | 0.020 |
| | | (–3.30) | | (–4.33) | | (–0.34) | | (–0.53) | | (0.51) | | (0.61) |
| Forward guidance (t–3) | | | –0.100*** | –0.149*** | | | –0.077 | –0.086 | | | 0.009 | 0.014 |
| | | | (–3.31) | (–4.10) | | | (–1.28) | (–1.41) | | | (0.30) | (0.43) |
| Shadow rate | 0.0005 | –0.0003 | –0.002 | –0.006 | 0.0003 | 0.001 | 0.002 | 0.001 | –0.021** | –0.021** | –0.021** | –0.020** |
| | (0.04) | (–0.02) | (–0.11) | (–0.38) | (0.02) | (0.06) | (0.10) | (0.06) | (–2.46) | (–2.29) | (–2.40) | (–2.26) |
| Loan-level variables | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 7,468 | 7,468 | 7,468 | 7,468 | 7,468 | 7,468 | 13,042 | 13,042 | 13,042 | 13,042 |

*Economic impact of forward guidance on loans with mean spreads (in basis points)*

| | Forward guidance (t–1) | Forwards guidance (t–2) | Forward guidance (t–3) |
|---|---|---|---|
| Odyssean forward guidance (estimated from Model (4)) | 24.44 | 30.08 | 35.02 |

## Table 4. Response of loan spreads to forward guidance: Triple interactions

This table reports the regression results of Eq. (3), with the triple interaction of forward guidance, bank capital ratio and firm risk measures (denoted R). The dependent variable is the log of loan spread. The firm risk measure is book leverage in columns (1) – (4) and credit rating in columns (5) – (8). Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | R = Book leverage | | | | R = Credit rating | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Forward guidance (t–1)*Capital ratio | –7.480* | | | –8.111* | –17.60** | | | –19.75** |
| | (–1.80) | | | (–1.89) | (–2.00) | | | (–2.21) |
| Forward guidance (t–2)*Capital ratio | | –5.667** | | –6.658** | | –16.78 | | –19.84* |
| | | (–2.07) | | (–2.25) | | (–1.60) | | (–1.91) |
| Forward guidance (t–3)*Capital ratio | | | –0.467 | –2.237 | | | –11.07** | –15.67*** |
| | | | (–0.11) | (–0.48) | | | (–2.05) | (–2.69) |
| Forward guidance (t–1)*R*Capital ratio | –16.28* | | | –17.382** | 1.427* | | | 1.587** |
| | (–1.88) | | | (–2.01) | (1.95) | | | (2.19) |
| Forward guidance (t–2)*R*Capital ratio | | –9.777 | | –12.195* | | 1.341* | | 1.566** |
| | | (–1.53) | | (–1.83) | | (1.66) | | (1.99) |
| Forward guidance (t–3)*R*Capital ratio | | | –2.432 | –6.041 | | | 0.838* | 1.194** |
| | | | (–0.30) | (–0.70) | | | (1.82) | (2.45) |
| Shadow rate | –0.443*** | –0.430*** | –0.464*** | –0.420*** | –0.912*** | –0.897*** | –0.954*** | –0.811*** |
| | (–4.53) | (–4.25) | (–4.51) | (–4.20) | (–7.57) | (–7.73) | (–7.94) | (–6.30) |
| Shadow rate*Capital ratio | 4.207*** | 4.077*** | 4.351*** | 3.929*** | 9.478*** | 9.341*** | 9.829*** | 8.498*** |
| | (4.46) | (4.23) | (4.40) | (4.12) | (7.74) | (7.43) | (7.87) | (6.42) |
| Shadow rate*R*Capital ratio | 9.917*** | 9.625*** | 10.15*** | 9.099*** | –0.758*** | –0.747*** | –0.781*** | –0.669*** |
| | (5.21) | (4.87) | (5.05) | (4.69) | (–6.64) | (–6.39) | (–6.78) | (–5.40) |
| Loan-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y | Y | Y | Y | Y |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bank × firm fixed effects | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 7,468 | 7,468 | 4,717 | 4,717 | 4,717 | 4,717 |

*How much additional reduction in spreads do riskier firms (25 percentile) as compared to safer firms (75 percentile) receive from highly capitalized banks (75 percentile), over and above those offered from less capitalized banks? (marginal effects of the difference-in-difference)*

| | Forward guidance (t–1) | Forward guidance (t–2) | Forward guidance (t–3) |
|---|---|---|---|
| Model (4) | 12.48% | 8.76% | Insignificant |
| Model (8) | 23.01% | 22.73% | 17.33% |

## Table 5. Sensitivity test: Exclusion of QE dates and shadow rate residual

This table reports the regression results of Eqs. (2) and (3). The forward guidance variable in columns (1) – (3) excludes the three QE announcement dates and three other statement dates releasing details about QE. Columns (1) – (3) use the original shadow rate control, as defined in Table 1, while columns (4) – (6) use the shadow rate residual (obtained by regressing the shadow rate on the forward guidance variables) as the control variable. The dependent variable is the log of loan spread. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | | R=Book leverage | R=Credit rating | | R=Book leverage | R=Credit rating |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Forward guidance (t–1) | –0.129*** | 1.166** | 1.858** | –0.068 | 2.907*** | 2.973*** |
| | (–4.39) | (2.29) | (2.24) | (–1.21) | (4.74) | (3.89) |
| Forward guidance (t–2) | –0.213*** | 1.292*** | 1.603* | –0.131*** | 0.591 | 1.346 |
| | (–5.79) | (3.15) | (1.74) | (–4.37) | (1.51) | (1.26) |
| Forward guidance (t–3) | –0.222*** | 0.468 | 3.113** | –0.152*** | –0.136 | 0.717 |
| | (–4.90) | (0.63) | (2.32) | (–4.17) | (–0.27) | (1.36) |
| Forward guidance (t–1)*Capital ratio | | –12.32** | –20.35** | | –28.33*** | –31.85*** |
| | | (–2.60) | (–2.51) | | (–5.01) | (–4.35) |
| Forward guidance (t–2)*Capital ratio | | –13.38*** | –19.15** | | –6.005 | –12.85 |
| | | (–3.53) | (–2.29) | | (–1.64) | (–1.28) |
| Forward guidance (t–3)*Capital ratio | | –6.888 | –33.15*** | | 0.101 | –9.625* |
| | | (–1.00) | (–2.63) | | (0.02) | (–1.77) |
| Forward guidance (t–1)*R*Capital ratio | | –25.77** | 1.573** | | –62.95*** | 2.506*** |
| | | (–2.54) | (2.25) | | (–5.13) | (3.93) |
| Forward guidance (t–2)*R*Capital ratio | | –20.04** | 1.087* | | –6.663 | 0.709 |
| | | (–2.54) | (1.70) | | (–0.91) | (0.98) |
| Forward guidance (t–3)*R*Capital ratio | | –6.765 | 2.740*** | | 1.413 | 0.562 |
| | | (–0.55) | (2.69) | | (0.15) | (1.25) |
| Shadow rate | 0.002 | –0.451*** | –0.517*** | –0.011 | –0.581*** | –0.574*** |
| | (0.15) | (–3.77) | (–3.07) | (–0.71) | (–4.89) | (–3.91) |
| Shadow rate*Capital ratio | | 4.492*** | 5.738*** | | 5.662*** | 6.236*** |
| | | (4.04) | (3.51) | | (5.37) | (4.53) |
| Shadow rate*R*Capital ratio | | 11.77*** | –0.504*** | | 13.87*** | –0.551*** |
| | | (5.56) | (–4.02) | | (6.74) | (–5.06) |
| Loan-level variables | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 4,717 | 7,468 | 7,468 | 4,717 |

## Table 6. Sensitivity analysis: Response of loan spreads to forward guidance (using GSS forward guidance)

This table reports the regression results using the GSS forward guidance variable, which takes the value of the GSS path factor on Odyssean forward guidance dates, and 0 otherwise. The dependent variable is the log of loan spread. Forward guidance variables capture shocks to the path factor one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | | R=Book leverage | R=Credit rating |
|---|---|---|---|
| | (1) | (2) | (3) |
| GSS forward guidance (t–1) | 0.005* | –0.150** | –0.294*** |
| | (1.82) | (–2.59) | (–3.32) |
| GSS forward guidance (t–2) | 0.010*** | –0.168*** | –0.147*** |
| | (2.64) | (–3.54) | (–2.63) |
| GSS forward guidance (t–3) | 0.004 | –0.139*** | –0.288*** |
| | (1.49) | (–3.27) | (–2.77) |
| GSS forward guidance (t–1)*Capital ratio | | 1.400** | 2.889*** |
| | | (2.43) | (3.23) |
| GSS forward guidance (t–2)*Capital ratio | | 1.578*** | 1.331** |
| | | (3.43) | (2.34) |
| GSS forward guidance (t–3)*Capital ratio | | 1.227*** | 2.625*** |
| | | (2.89) | (2.65) |
| GSS forward guidance (t–1)*R*Capital ratio | | 2.712** | –0.241*** |
| | | (2.37) | (–3.08) |
| GSS forward guidance (t–2)*R*Capital ratio | | 2.600*** | –0.0847* |
| | | (2.94) | (–1.97) |
| GSS forward guidance (t–3)*R*Capital ratio | | 2.044** | –0.209** |
| | | (2.50) | (–2.61) |
| Shadow rate | 0.001 | –0.508*** | –0.566*** |
| | (0.08) | (–4.53) | (–3.31) |
| Shadow rate*Capital ratio | | 4.884*** | 5.967*** |
| | | (4.59) | (3.50) |
| Shadow rate*R*Capital ratio | | 12.19*** | –0.528*** |
| | | (5.93) | (–3.93) |
| Loan-level variables | Y | Y | Y |
| Bank-level variables | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 4,717 |

## Table 7. Response of loan amounts to forward guidance

This table reports the regression results of Eq. (3), with the triple interaction of forward guidance, bank capital ratio and firm book leverage (denoted R). The dependent variable is the log of loan amount. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017 in columns (1) and (2), and May 1999 to September 2008 in column (3). Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | Odyssean forward guidance | Delphic forward guidance | Forward guidance before financial crisis |
|---|---|---|---|
| | (1) | (2) | (3) |
| Forward guidance (t–1)*Capital ratio | 16.207*** | –7.332* | 4.432 |
| | (2.78) | (–1.95) | (0.95) |
| Forward guidance (t–2)*Capital ratio | –5.156 | 3.140 | –9.923 |
| | (–0.89) | (0.61) | (–1.21) |
| Forward guidance (t–3)*Capital ratio | –2.753 | 28.28 | –4.709 |
| | (–0.51) | (1.43) | (–0.76) |
| Forward guidance (t–1)*R*Capital ratio | 38.406** | –9.391 | 14.16 |
| | (2.24) | (–1.09) | (1.63) |
| Forward guidance (t–2)*R*Capital ratio | –17.46 | 9.463 | –18.46 |
| | (–1.54) | (0.74) | (–1.19) |
| Forward guidance (t–3)*R*Capital ratio | –9.045 | 108.0 | –0.270 |
| | (–0.84) | (1.64) | (–0.02) |
| Shadow rate | –0.229*** | –0.139 | 0.121 |
| | (–2.68) | (–1.37) | (1.49) |
| Shadow rate*Capital ratio | 2.222** | 1.432 | –0.965 |
| | (2.58) | (1.46) | (–0.95) |
| Shadow rate*R*Capital ratio | 4.683** | 3.030 | –1.677 |
| | (2.24) | (1.52) | (–0.84) |
| Loan-level variables | Y | Y | Y |
| Bank-level variables | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 13,042 |

## Table 8. Forward guidance and other loan characteristics

This table reports the regression results of Eq. (3), where the dependent variable is now either covenants, performance pricing provisions, share held by lead arranger, or HHI. The triple interaction of forward guidance, bank capital ratio and firm book leverage (denoted R) is included in the model. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. Covenants takes the value of 1 if a loan has more than 4 covenants, and 0 otherwise. Performance pricing provisions is the number of interest-increasing performance pricing provisions. Share held by lead arranger and HHI are based on lender shares. The sample period is from October 2008 till June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | Covenants | Performance pricing provisions | Share held by lead arranger | HHI |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Forward guidance (t–1) | 0.043 | 0.206 | 0.350** | 10.52 |
| | (0.58) | (0.50) | (2.05) | (0.81) |
| Forward guidance (t–2) | 0.182** | 0.845*** | 0.104 | 13.69 |
| | (2.32) | (3.53) | (0.83) | (1.00) |
| Forward guidance (t–3) | –0.056 | 0.235 | 0.052 | 0.509 |
| | (–0.54) | (0.67) | (0.45) | (0.06) |
| Forward guidance (t–1)*Capital ratio | –0.501 | –1.392 | –3.588** | –112.8 |
| | (–0.75) | (–0.36) | (–2.14) | (–0.91) |
| Forward guidance (t–2)*Capital ratio | –1.845** | –9.053*** | –1.414 | –178.1 |
| | (–2.39) | (–4.09) | (–1.17) | (–1.33) |
| Forward guidance (t–3)*Capital ratio | 0.578 | –2.888 | –0.216 | 16.08 |
| | (0.61) | (–0.83) | (–0.19) | (0.18) |
| Forward guidance (t–1)*R*Capital ratio | –0.908 | –1.286 | –7.714** | –421.2 |
| | (–0.57) | (–0.15) | (–2.02) | (–1.42) |
| Forward guidance (t–2)*R*Capital ratio | –4.789** | –11.840** | –6.649** | –719.0** |
| | (–2.06) | (–2.13) | (–2.14) | (–2.14) |
| Forward guidance (t–3)*R*Capital ratio | 0.820 | –0.506 | 0.541 | 50.20 |
| | (0.30) | (–0.06) | (0.21) | (0.27) |
| Shadow rate | 0.003 | –0.211*** | –0.021 | –2.947 |
| | (0.26) | (–2.89) | (–0.84) | (–1.13) |
| Shadow rate*Capital ratio | –0.024 | 1.612** | 0.109 | 17.76 |
| | (–0.20) | (2.33) | (0.43) | (0.70) |
| Shadow rate*R*Capital ratio | 0.119 | 6.913*** | 0.048 | 20.48 |
| | (0.36) | (4.46) | (0.08) | (0.34) |
| Loan-level variables | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y | Y |
| Number of observations | 7,468 | 6,911 | 1,512 | 1,270 |

## Table 9. Effect of forward guidance on banks vs. institutional investors

This table presents the regression results of Eq. (3), with the triple interaction of forward guidance, bank capital ratio and firm book leverage (denoted R). The dependent variable is the log of loan spread. Term A loans are included in column (1), term B loans in column (2) and credit lines in column (3). Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | Term loan A | Term loan B | Credit line |
|---|---|---|---|
| | (1) | (2) | (3) |
| Forward guidance (t–1) | 0.283 | –0.132 | 0.931* |
| | (0.51) | (–0.43) | (1.79) |
| Forward guidance (t–2) | –0.060 | 0.052 | 0.638 |
| | (–0.11) | (0.15) | (1.52) |
| Forward guidance (t–3) | 0.807 | –0.545 | –0.282 |
| | (0.77) | (–1.29) | (–0.48) |
| Forward guidance (t–1)*Capital ratio | –3.023 | 0.836 | –9.472* |
| | (–0.57) | (0.29) | (–1.93) |
| Forward guidance (t–2)*Capital ratio | –0.168 | –1.725 | –6.781* |
| | (–0.03) | (–0.49) | (–1.72) |
| Forward guidance (t–3)*Capital ratio | –8.354 | 4.311 | 1.164 |
| | (–0.87) | (1.06) | (0.21) |
| Forward guidance (t–1)*R*Capital ratio | –17.22 | –3.107 | –17.97** |
| | (–1.19) | (–0.41) | (–2.08) |
| Forward guidance (t–2)*R*Capital ratio | –14.43 | 0.713 | –13.85* |
| | (–1.21) | (0.06) | (–1.72) |
| Forward guidance (t–3)*R*Capital ratio | –33.58 | 6.432 | –0.065 |
| | (–1.24) | (0.58) | (–0.01) |
| Shadow rate | –0.500*** | –0.570*** | –0.406*** |
| | (–2.98) | (–3.23) | (–3.92) |
| Shadow rate*Capital ratio | 4.176*** | 5.132*** | 3.813*** |
| | (2.77) | (3.03) | (3.91) |
| Shadow rate*R*Capital ratio | 11.70*** | 12.95*** | 8.675*** |
| | (3.61) | (3.09) | (5.15) |
| Loan-level variables | Y | Y | Y |
| Bank-level variables | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y |
| Number of observations | 871 | 825 | 4,991 |

## Table 10. Forward guidance and loan spread for private and public firms

This table presents the regression results of Eqs. (2) and (3), with the triple interaction of forward guidance, bank capital ratio and firm book leverage (denoted R). The dependent variable is the log of loan spread. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. Columns (1) – (2) present results for private firms and columns (3) – (4) for public firms. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | Private | | Public | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Forward guidance (t–1) | –0.078** | 0.572 | –0.113*** | 1.523** |
| | (–2.20) | (1.28) | (–3.15) | (2.58) |
| Forward guidance (t–2) | –0.095*** | 0.487 | –0.157*** | 1.448*** |
| | (–2.96) | (1.08) | (–4.04) | (3.04) |
| Forward guidance (t–3) | –0.173*** | 0.192 | –0.154*** | –0.160 |
| | (–4.28) | (0.37) | (–3.53) | (–0.22) |
| Forward guidance (t–1)*Capital ratio | | –5.644 | | –14.50** |
| | | (–1.33) | | (–2.55) |
| Forward guidance (t–2)*Capital ratio | | –5.170 | | –14.09*** |
| | | (–1.21) | | (–3.17) |
| Forward guidance (t–3)*Capital ratio | | –3.226 | | –0.498 |
| | | (–0.64) | | (–0.07) |
| Forward guidance (t–1)*R*Capital ratio | | –8.206 | | –26.36** |
| | | (–0.92) | | (–2.12) |
| Forward guidance (t–2)*R*Capital ratio | | –5.818 | | –23.58*** |
| | | (–0.55) | | (–2.89) |
| Forward guidance (t–3)*R*Capital ratio | | 2.111 | | –5.392 |
| | | (0.20) | | (–0.39) |
| Shadow rate | –0.013 | –0.329** | –0.004 | –0.450*** |
| | (–0.77) | (–2.20) | (–0.23) | (–2.94) |
| Shadow rate*Capital ratio | | 3.074** | | 4.382*** |
| | | (2.21) | | (3.08) |
| Shadow rate*R*Capital ratio | | 11.28*** | | 11.61*** |
| | | (3.47) | | (5.09) |
| Loan-level variables | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y | Y |
| Number of observations | 2,958 | 2,958 | 4,488 | 4,488 |

## Table 11. New borrower-lender relationships

This table reports in Panel A the regression results of linear probability models, where the dependent variable captures whether the bank enters into a new borrower-lender relationship. The dependent variable takes the value of 1 if the borrowing firm has not borrowed a syndicated loan from the bank in the past 2 years (results in columns 1) or 3 years (results in columns 2). In Panel B, the dependent variable is the log of loan spread. The triple interaction of forward guidance, bank capital ratio and firm book leverage (denoted R) is included in the model. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the firm and bank levels in Panel A, and at the bank-year level in Panel B. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| Panel A | | | Panel B | | |
|---|---|---|---|---|---|
| | 2 years | 3 years | | 2 years | 3 years |
| | (1) | (2) | | (1) | (2) |
| Forward guidance (t–1)*Capital ratio | 0.827 | 4.536 | Forward guidance (t–1) | 0.035 | 0.027 |
| | (0.33) | (1.48) | | (0.93) | (0.65) |
| Forward guidance (t–2)*Capital ratio | 5.645** | 6.576** | Forward guidance (t–2) | 0.021 | 0.023 |
| | (2.30) | (2.38) | | (0.53) | (0.60) |
| Forward guidance (t–3)*Capital ratio | 0.588 | 0.722 | Forward guidance (t–3) | 0.004 | 0.002 |
| | (0.20) | (0.25) | | (0.09) | (0.05) |
| Forward guidance (t–1)*R*Capital ratio | 0.110 | 11.74 | New Borrower | 0.169*** | 0.192*** |
| | (0.02) | (1.38) | | (4.50) | (5.54) |
| Forward guidance (t–2)*R*Capital ratio | 12.06** | 15.22** | Forward guidance (t–1)*New borrower | –0.084** | –0.072 |
| | (2.27) | (2.51) | | (–2.06) | (–1.65) |
| Forward guidance (t–3)*R*Capital ratio | –1.791 | 0.757 | Forward guidance (t–2)*New borrower | –0.087** | –0.092** |
| | (–0.29) | (0.11) | | (–2.37) | (–2.43) |
| Shadow rate | 0.011 | –0.072 | Forward guidance (t–3)*New borrower | –0.099** | –0.104*** |
| | (0.17) | (–0.96) | | (–2.08) | (–2.65) |
| Shadow rate*Capital ratio | –0.0004 | 0.778 | Shadow rate | –0.011 | –0.008 |
| | (–0.00) | (1.08) | | (–0.66) | (–0.45) |
| Shadow rate*R*Capital ratio | 0.573 | 3.087** | Shadow rate*New borrower | 0.043*** | 0.044*** |
| | (0.57) | (2.39) | | (4.51) | (4.95) |
| Loan-level variables | Y | Y | | | |
| Bank-level variables | Y | Y | | | |
| Firm-level variables | Y | Y | Loan-level variables | Y | Y |
| Firm fixed effects | Y | Y | Bank-level variables | Y | Y |
| Bank fixed effects | Y | Y | Firm × quarter fixed effects | Y | Y |
| Year fixed effects | Y | Y | Bank × firm fixed effects | Y | Y |
| Number of observations | 7,468 | 7,468 | Number of observations | 468 | 7,468 |

# Online Appendix for Forward Guidance and Corporate Lending

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This document presents tables of results from additional tests that serve as robustness checks and supplement the main tables in the paper. The following tables are presented:

## A. List of Odyssean forward guidance statements, summary statistics

Table A1 lists the dates of Odyssean guidance statements used in the construction of the forward guidance measures, with relevant key phrases within the statements with the forward-looking (contractionary or expansionary) language.

Table A2 reports the summary statistics of the loan-, firm-, and bank-level control variables for the whole sample period, May 1999 to June 2017.

## B. Additional sensitivity tests

Part B of the Appendix presents additional sensitivity tests that supplement the main tables in the paper and confirm the robustness of the results.

1. Response of loan spreads to forward guidance: results with the weekly forward guidance measure.

   Table B1 reports the results for the baseline specifications (estimation of Eq. (2)) with 8 weekly forward guidance variables. The weekly measure of forward guidance enables us to use firm × month fixed effects, controlling for the short-term demand of borrowers.

2. Response of loan spreads to forward guidance: role of bank capitalization.

   We examine the role of bank capitalization in the relationship between cost of loans and forward guidance. Table B2 estimates regression models with double interaction terms between forward guidance measures and bank capital ratio.

3. Response of loan spreads to forward guidance: results including firm × month and bank × month fixed effects and the weekly forward guidance measure.

Table B3 reports the results from estimating Eq. (3) with 8 weekly forward guidance variables and the corresponding triple interactions, while also controlling for the unobserved heterogeneity at the firm- and bank-level.

4. Response of loan spreads to forward guidance: results with standard errors clustered by firm and using the weighted-average of capital ratio.

   We reestimate the baseline specifications (Eqs. (2) and (3)) with standard errors clustered at the firm-level (results in columns 1 to 3 of Table B4) and use the weighted-average capital ratio as the bank characteristic (results in columns 4 to 6 of Table B4).

5. Response of loan spreads to forward guidance: results with federal funds rate.

   We use federal funds rate as a control for the monetary policy stance, instead of the shadow rate. The results are reported in Table B5.

6. Tests with different fixed effects and sample periods.

   Tables B6, B7, and B8 estimate the regression models in Table 3 in the paper with bank fixed effects, firm fixed effects, and bank × year fixed effects, in order to test for the sensitivity of the findings. In these specifications we also control for firm-level characteristics and economy-level variables including GDP growth rate and VIX. Table B6 presents the baseline regression results using Odyssean forward guidance, Table B7 presents the test results for the effect of Delphic forward guidance on loan spreads, and Table B8 reports the test for the pre-crisis period.

   In all the sensitivity tests considered, we observe that the findings reported in the paper continue to hold.

## Table A1. Forward guidance dates in FOMC statements

This table presents forward guidance dates considered Odyssean and examples of explicit forward-looking phrases (contractionary or expansionary in nature) used within the statements. Key phrases are highlighted in italics.

| Date | Forward-looking language | Type |
|---|---|---|
| October 08, 2008 | "The recent intensification of the financial crisis has augmented the downside risks to growth and thus has diminished further the upside risks to price stability. Some *easing of global monetary conditions is therefore warranted*."[1] | expansionary |
| December 16, 2008 | "The Federal Open Market Committee decided today to establish a target range for the federal funds rate of 0 to 1/4 percent...The Federal Reserve will employ all available tools to promote the resumption of sustainable economic growth and to preserve price stability. In particular, *the Committee anticipates that weak economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time.*"[2] | expansionary |
| March 18, 2009 | "…economic conditions are likely to warrant *exceptionally low levels of the federal funds rate for an extended period*…The Federal Reserve has launched the Term Asset-Backed Securities Loan Facility to facilitate the extension of credit to households and small businesses and anticipates that the range of eligible collateral for this facility is likely to be expanded to include other financial assets." | expansionary |
| August 12, 2009 | "To promote a smooth transition in markets as these purchases of Treasury securities are completed, *the Committee has decided to gradually slow the pace of these transactions and anticipates that the full amount will be purchased by the end of October*." | contractionary |
| December 16, 2009 | "In light of ongoing improvements in the functioning of financial markets, the Committee and the Board of Governors anticipate that most of the Federal Reserve's special liquidity facilities will expire on February 1, 2010, consistent with the Federal Reserve's announcement of June 25, 2009…*The Federal Reserve expects that amounts provided under the Term Auction Facility will continue to be scaled back in early 2010.*" | contractionary |
| November 03, 2010 | "Although the Committee anticipates a gradual return to higher levels of resource utilization in a context of price stability, progress toward its objectives has been disappointingly slow. *To promote a stronger pace of economic recovery and to help ensure that inflation, over time, is at levels consistent with its mandate, the Committee decided today to expand its holdings of securities*. The Committee will maintain its existing policy of reinvesting principal payments from its securities holdings. In addition, the Committee intends to purchase a further $600 billion of longer-term Treasury securities by the end of the second quarter of 2011, a pace of about $75 billion per month. The Committee will regularly review the pace of its securities purchases and the overall size of the asset-purchase program in light of incoming information and will adjust the program as needed to best foster maximum employment and price stability." | expansionary |
| August 09, 2011 | "The Committee currently anticipates that economic conditions—including low rates of resource utilization and a subdued outlook for inflation over the medium run—*are likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013*." | expansionary |
| September 21, 2011 | "To support a stronger economic recovery and to help ensure that inflation, over time, is at levels consistent with the dual mandate, *the Committee decided today to extend the average maturity of its holdings of securities*...To help support conditions in mortgage markets, *the Committee will now reinvest principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities*. In addition, the Committee will maintain its existing policy of rolling over maturing Treasury securities at auction." | expansionary |

[1] This FOMC statement sets the stage for a significant shift in the direction of monetary policy from contractionary to expansionary, for the first time since the collapse of Lehman Brothers.

[2] Interest rates were at the zero lower bound for the first time at that time and the Fed provides guidance on keeping rates low for longer for some time.

| | | |
|---|---|---|
| January 25, 2012 | "...the Committee decided today to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that economic conditions—including low rates of resource utilization and a subdued outlook for inflation over the medium run—are likely to warrant *exceptionally low levels for the federal funds rate at least through late 2014.*" | expansionary |
| September 13, 2012 | "The Committee is concerned that, without further policy accommodation, economic growth might not be strong enough to generate sustained improvement in labor market conditions...the Committee agreed today to increase policy accommodation by purchasing additional agency mortgage-backed securities at a pace of $40 billion per month...If the outlook for the labor market does not improve substantially, the Committee will continue its purchases of agency mortgage-backed securities, undertake additional asset purchases, and employ its other policy tools as appropriate until such improvement is achieved in a context of price stability...In particular, the Committee also decided today to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that exceptionally low levels for the federal funds rate are likely to be warranted *at least through mid-2015.*" | expansionary |
| December 12, 2012 | "…the Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that *this exceptionally low range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent*, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored." | expansionary |
| December 18, 2013 | "The Committee now anticipates, based on its assessment of these factors, that it likely will be appropriate to maintain the current target range for the federal funds rate *well past the time that the unemployment rate declines below 6-1/2 percent*, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal." | expansionary |
| March 19, 2014 | "…the Committee decided to make a further measured reduction in the pace of its asset purchases...The Committee continues to anticipate, based on its assessment of these factors, that it likely will be appropriate to maintain the current target range for the federal funds rate for a considerable time after the asset purchase program ends, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal, and provided that longer-term inflation expectations remain well anchored...When the Committee decides to begin to remove policy accommodation, it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent. *The Committee currently anticipates that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run.* With the unemployment rate nearing 6-1/2 percent, *the Committee has updated its forward guidance*." | expansionary |
| December 17, 2014 | "Based on its current assessment, the Committee judges that it can be *patient in beginning to normalize the stance of monetary policy.*" | expansionary |
| March 18, 2015 | "Consistent with its previous statement, the Committee judges that *an increase in the target range for the federal funds rate remains unlikely at the April FOMC meeting.*" | expansionary |
| December 16, 2015 | "The Committee judges that there has been considerable improvement in labor market conditions this year, and it is reasonably confident that inflation will rise, over the medium term, to its 2 percent objective. Given the economic outlook, and recognizing the time it takes for policy actions to affect future economic outcomes, the Committee decided to raise the target range for the federal funds rate to 1/4 to 1/2 percent. The stance of monetary policy remains accommodative after this increase, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation...The Committee expects that economic conditions will evolve in a manner that *will warrant only gradual increases* in the federal funds rate; *the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run*...The Committee is maintaining its | expansionary |

| | | |
|---|---|---|
| | existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way." | |
| September 21, 2016 | "Against this backdrop, the Committee decided to maintain the target range for the federal funds rate at 1/4 to 1/2 percent. *The Committee judges that the case for an increase in the federal funds rate has strengthened but decided, for the time being, to wait for further evidence of continued progress toward its objectives.* The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation." | expansionary |
| December 14, 2016 | "In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 1/2 to 3/4 percent. *The stance of monetary policy remains accommodative*, thereby *supporting some further strengthening in labor market* conditions and a return to 2 percent inflation." | expansionary |
| March 15, 2017 | "In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 3/4 to 1 percent. *The stance of monetary policy remains accommodative*, thereby supporting some further strengthening in labor market conditions and a *sustained return to 2 percent inflation."* | expansionary |

## Table A2. Summary statistics

This table reports the summary statistics of all variables for the whole sample period, May 1999 to June 2017. Definitions for all the variables are provided in Table 1.

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **Loan-level variables** | | | | | |
| Loan spread | 20,615 | 5.050 | 0.783 | 0.405 | 7.313 |
| Loan amount | 20,615 | 5.103 | 1.649 | –6.639 | 10.800 |
| Maturity | 20,615 | 3.908 | 1.847 | 0.005 | 20 |
| Credit line | 20,615 | 0.584 | 0.493 | 0 | 1 |
| Term loan | 20,615 | 0.276 | 0.447 | 0 | 1 |
| Corporate purpose | 20,615 | 0.448 | 0.497 | 0 | 1 |
| Working capital | 20,615 | 0.185 | 0.389 | 0 | 1 |
| Debt repayment | 20,615 | 0.084 | 0.277 | 0 | 1 |
| Secured | 20,615 | 1.247 | 0.857 | 0 | 2 |
| Dividend restrictions | 20,615 | 1.118 | 0.911 | 0 | 2 |
| Number of lenders | 20,615 | 1.754 | 0.974 | 0 | 5.088 |
| Covenant | 20,615 | 0.109 | 0.311 | 0 | 1 |
| Performance pricing provisions | 18,029 | 1.422 | 0.869 | 1 | 18 |
| Share held by lead arranger | 5,295 | 0.256 | 0.242 | 0.003 | 1 |
| HHI | 4,569 | 22.976 | 24.892 | 2.100 | 100 |
| **Firm-level variables** | | | | | |
| Book leverage | 20,615 | –0.402 | 0.196 | 0.000 | –1.000 |
| Credit rating | 11,868 | 10.710 | 3.397 | 1 | 22 |
| **Bank-level variables** | | | | | |
| Total asset | 20,615 | 20.199 | 1.392 | 9.501 | 21.586 |
| Capital ratio | 20,615 | 0.087 | 0.019 | 0.056 | 0.149 |
| ROA | 20,615 | 0.006 | 0.004 | –0.039 | 0.048 |
| Liquidity | 20,615 | 0.052 | 0.036 | 0 | 0.474 |
| Charge-off | 20,615 | 0.002 | 0.002 | 0 | 0.028 |
| **Monetary policy variable** | | | | | |
| Shadow rate | 218 | 0.974 | 3.150 | –5.461 | 6.224 |

## Table B1. Results using weekly forward guidance

This table reports the regression results using the weekly forward guidance measure. The dependent variable is the log of loan spreads. Forward guidance variables capture Odyssean forward guidance issued one to eight weeks before the loan origination date. The sample period is from October 2008 till June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) |
|---|---|---|
| Weekly forward guidance (t–1) | –0.053 | –0.057 |
| | (–1.47) | (–1.54) |
| Weekly forward guidance (t–2) | –0.062 | –0.066 |
| | (–1.35) | (–1.34) |
| Weekly forward guidance (t–3) | –0.057 | –0.071* |
| | (–1.42) | (–1.72) |
| Weekly forward guidance (t–4) | –0.124*** | –0.135*** |
| | (–3.19) | (–3.37) |
| Weekly forward guidance (t–5) | 0.015 | 0.002 |
| | (0.33) | (0.03) |
| Weekly forward guidance (t–6) | –0.077** | –0.107** |
| | (–2.15) | (–2.55) |
| Weekly forward guidance (t–7) | –0.057* | –0.070* |
| | (–1.72) | (–1.89) |
| Weekly forward guidance (t–8) | –0.116*** | –0.123*** |
| | (–3.19) | (–3.15) |
| Shadow rate | –0.002 | –0.003 |
| | (–0.13) | (–0.17) |
| Loan-level variables | Y | Y |
| Bank-level variables | Y | Y |
| Firm × quarter fixed effects | Y | |
| Bank × firm fixed effects | Y | Y |
| Firm × month fixed effects | | Y |
| Number of observations | 7,468 | 7,468 |

## Table B2. Response of loan spreads to forward guidance: Double interactions

This table reports the regression results with the double interaction of forward guidance and bank capital ratio. The dependent variable is the log of loan spread. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, ** and * indicate statistical significance at the 1, 5 and 10 percent, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Forward guidance (t–1)*Capital ratio | –3.852** | | | –4.754** |
| | (–2.19) | | | (–2.47) |
| Forward guidance (t–2)*Capital ratio | | –4.532*** | | –5.429*** |
| | | (–2.68) | | (–2.95) |
| Forward guidance (t–3)*Capital ratio | | | –0.035 | 0.089 |
| | | | (–0.17) | (0.40) |
| Shadow rate | 0.006 | 0.020 | 0.004 | 0.023 |
| | (0.09) | (0.28) | (0.06) | (0.32) |
| Shadow rate*Capital ratio | 0.142 | 0.016 | 0.143 | –0.029 |
| | (0.21) | (0.02) | (0.21) | (–0.04) |
| Loan-level variables | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 7,468 | 7,468 |

## Table B3. Results using weekly forward guidance: triple interactions

This table reports the results of Eq. (3), with the triple interactions of forward guidance, bank capital, and firm risk measures (denoted R). The dependent variable is the log of loan spread. The firm risk measure is book leverage in column (1) and credit rating in column (2). Forward guidance variables capture Odyssean forward guidance issued one to eight weeks before the loan origination date. The sample period is from October 2008 till June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | R=Book leverage | R=Credit rating |
|---|---|---|
| | (1) | (2) |
| Weekly forward guidance (t–1)*R*Capital ratio | –20.52 | 0.421 |
| | (–1.42) | (0.57) |
| Weekly forward guidance (t–2)*R*Capital ratio | –36.14** | 0.513 |
| | (–2.14) | (0.89) |
| Weekly forward guidance (t–3)*R*Capital ratio | –6.294 | 0.296 |
| | (–0.40) | (0.31) |
| Weekly forward guidance (t–4)*R*Capital ratio | –9.534 | 1.504** |
| | (–0.72) | (2.11) |
| Weekly forward guidance (t–5)*R*Capital ratio | –41.36*** | 1.266 |
| | (–3.13) | (1.62) |
| Weekly forward guidance (t–6)*R*Capital ratio | –18.61 | 0.772 |
| | (–1.47) | (0.67) |
| Weekly forward guidance (t–7)*R*Capital ratio | –9.067* | 1.820** |
| | (–1.82) | (2.50) |
| Weekly forward guidance (t–8)*R*Capital ratio | –5.024 | 1.362** |
| | (–0.48) | (2.12) |
| Other interaction terms | Y | Y |
| Shadow rate and interactions | Y | Y |
| Loan-level variables | Y | Y |
| Bank-level variables | Y | Y |
| Firm × month fixed effects | Y | Y |
| Bank × month fixed effects | Y | Y |
| Number of observations | 7,491 | 4,731 |

## Table B4. Results with standard errors clustered at firm-level and using weighted-average of capital ratio

This table presents the regression results of Eqs. (2) and (3), where the dependent variable is the log of loan spread. In columns (1) – (3) the standard errors are clustered at the firm-level. In columns (4) – (6) we keep one observation for each facility and use the weighted-average capital ratio when there are multiple lead arrangers. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | | R=Book leverage | R=Credit rating | | R=Book leverage | R=Credit rating |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Forward guidance (t–1) | –0.104*** | 1.287*** | 1.544*** | –0.114*** | 1.413*** | 1.892** |
| | (–3.59) | (4.09) | (2.84) | (–3.66) | (2.61) | (2.11) |
| Forward guidance (t–2) | –0.128*** | 0.980*** | 1.907*** | –0.134*** | 0.886** | 1.696* |
| | (–5.21) | (3.64) | (2.74) | (–4.61) | (2.24) | (1.72) |
| Forward guidance (t–3) | –0.149*** | 0.175 | 1.261** | –0.139*** | 0.238 | 1.387** |
| | (–5.21) | (0.44) | (2.39) | (–4.08) | (0.56) | (2.26) |
| Forward guidance (t–1)*Capital ratio | | –12.48*** | –15.73*** | | –14.01*** | –18.54** |
| | | (–3.97) | (–2.79) | | (–2.76) | (–2.18) |
| Forward guidance (t–2)*Capital ratio | | –9.774*** | –18.40*** | | –9.128** | –16.62* |
| | | (–3.77) | (–2.95) | | (–2.45) | (–1.82) |
| Forward guidance (t–3)*Capital ratio | | –2.859 | –14.93*** | | –3.209 | –16.35** |
| | | (–0.76) | (–2.80) | | (–0.78) | (–2.58) |
| Forward guidance (t–1)*R*Capital ratio | | –22.34*** | 1.038** | | –24.61** | 1.218* |
| | | (–3.16) | (2.18) | | (–2.33) | (1.69) |
| Forward guidance (t–2)*R*Capital ratio | | –13.53** | 1.142** | | –12.08* | 1.004 |
| | | (–2.32) | (2.19) | | (–1.71) | (1.50) |
| Forward guidance (t–3)*R*Capital ratio | | –4.131 | 0.992** | | –6.037 | 1.129** |
| | | (–0.52) | (2.14) | | (–0.75) | (2.19) |
| Shadow rate | –0.006 | –0.409*** | –0.400*** | –0.006 | –0.415*** | –0.319 |
| | (–0.94) | (–5.52) | (–2.84) | (–0.38) | (–3.02) | (–1.54) |
| Shadow rate*Capital ratio | | 4.040*** | 4.542*** | | 4.133*** | 3.782* |
| | | (5.74) | (3.55) | | (3.29) | (1.88) |
| Shadow rate*R*Capital ratio | | 11.01*** | –0.418*** | | 11.18*** | –0.362** |
| | | (6.97) | (–3.94) | | (4.98) | (–2.28) |
| Loan-level variables | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 4,717 | 6,724 | 6,724 | 4,171 |

## Table B5. Sensitivity analysis: Response of loan spreads to forward guidance (using federal funds rate)

This table reports the regression results using the federal funds rate instead of shadow rate. The dependent variable is the log of loan spread. Forward guidance variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

| | | R=Book leverage | R=Credit rating |
|---|---|---|---|
| | (1) | (2) | (3) |
| Forward guidance (t–1) | –0.095*** | 1.293*** | 1.395** |
| | (–2.97) | (3.04) | (2.45) |
| Forward guidance (t–2) | –0.119*** | 1.529*** | 2.146** |
| | (–4.08) | (4.43) | (2.20) |
| Forward guidance (t–3) | –0.147*** | 0.791 | 1.808*** |
| | (–4.07) | (1.62) | (2.97) |
| Forward guidance (t–1)*Capital ratio | | –12.47*** | –14.05** |
| | | (–3.08) | (–2.46) |
| Forward guidance (t–2)*Capital ratio | | –14.90*** | –20.69** |
| | | (–4.51) | (–2.31) |
| Forward guidance (t–3)*Capital ratio | | –8.880* | –20.62*** |
| | | (–1.95) | (–3.46) |
| Forward guidance (t–1)*R*Capital ratio | | –22.23*** | 0.962* |
| | | (–2.88) | (1.90) |
| Forward guidance (t–2)*R*Capital ratio | | –27.43*** | 1.427** |
| | | (–4.03) | (2.13) |
| Forward guidance (t–3)*R*Capital ratio | | –19.94** | 1.556*** |
| | | (–2.19) | (3.01) |
| Federal funds rate | 0.140 | 3.012*** | 5.962** |
| | (1.59) | (2.77) | (2.59) |
| Federal funds rate *Capital ratio | | –31.50*** | –66.39*** |
| | | (–2.61) | (–2.68) |
| Federal funds rate *R*Capital ratio | | –51.80** | 5.870*** |
| | | (–2.59) | (2.92) |
| Loan-level variables | Y | Y | Y |
| Bank-level variables | Y | Y | Y |
| Firm × quarter fixed effects | Y | Y | Y |
| Bank × firm fixed effects | Y | Y | Y |
| Number of observations | 7,468 | 7,468 | 4,717 |

## Table B6. Response of loan spreads to Odyssean forward guidance (with different fixed effects)

This table reports the regression results of Eq. (2), where the dependent variable is the log of loan spread. Forward guidance indicator variables capture Odyssean forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Columns (1) – (4) use bank fixed effects and firm fixed effects, columns (5) – (8) use bank × year fixed effects. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, ** and * indicate statistical significance at the 1, 5 and 10 percent, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Forward guidance (t–1) | –0.050** | | | –0.071*** | –0.063** | | | –0.098*** |
| | (–2.12) | | | (–2.89) | (–2.40) | | | (–3.11) |
| Forward guidance (t–2) | | –0.053*** | | –0.076*** | | –0.072*** | | –0.107*** |
| | | (–3.01) | | (–3.90) | | (–2.66) | | (–3.37) |
| Forward guidance (t–3) | | | –0.087*** | –0.103*** | | | –0.103*** | –0.132*** |
| | | | (–4.29) | (–4.98) | | | (–3.02) | (–3.59) |
| Shadow rate | 0.015*** | 0.013*** | 0.013*** | 0.010*** | 0.000 | –0.001 | –0.002 | –0.009 |
| | (3.22) | (2.99) | (2.90) | (2.65) | (0.01) | (–0.05) | (–0.10) | (–0.45) |
| Loan-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Firm-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Economy-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank fixed effects | Y | Y | Y | Y | | | | |
| Firm fixed effects | Y | Y | Y | Y | | | | |
| Bank × year fixed effects | | | | | Y | Y | Y | Y |
| Number of observations | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 |
| | Forward guidance (t–1) | | | Forwards guidance (t–2) | | | Forward guidance (t–3) | |
| Model (4) | 16.69 | | | 17.86 | | | 24.21 | |
| Model (8) | 23.03 | | | 25.15 | | | 31.02 | |

## Table B7. Response of loan spreads to Delphic forward guidance (with different fixed effects)

This table reports the regression results of Eq. (2), where the dependent variable is the log of loan spread. Forward guidance indicator variables capture Delphic forward guidance issued one, two, or three months before the loan origination date. The sample period is from October 2008 to June 2017. Columns (1) – (4) use bank fixed effects and firm fixed effects, columns (5) – (8) use bank × year fixed effects. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, ** and * indicate statistical significance at the 1, 5 and 10 percent, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Forward guidance (t–1) | –0.013 | | | –0.013 | –0.018 | | | –0.019 |
| | (–1.26) | | | (–1.28) | (–0.76) | | | (–0.72) |
| Forward guidance (t–2) | | –0.005 | | –0.005 | | 0.000 | | –0.003 |
| | | (–0.35) | | (–0.39) | | (0.01) | | (–0.10) |
| Forward guidance (t–3) | | | –0.027 | –0.030 | | | –0.010 | –0.015 |
| | | | (–0.52) | (–0.56) | | | (–0.23) | (–0.33) |
| Shadow rate | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.001 | 0.001 | 0.002 | 0.001 |
| | (3.09) | (3.13) | (3.04) | (3.00) | (0.06) | (0.08) | (0.08) | (0.07) |
| Loan-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Firm-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Economy-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank fixed effects | Y | Y | Y | Y | | | | |
| Firm fixed effects | Y | Y | Y | Y | | | | |
| Bank × year fixed effects | | | | | Y | Y | Y | Y |
| Number of observations | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 |

## Table B8. Response of loan spreads to forward guidance during the pre-financial crisis sample period (with different fixed effects)

This table reports the regression results of Eq. (2), where the dependent variable is the log of loan spread. Forward guidance indicator variables capture all forward guidance issued one, two, or three months before the loan origination date. The sample period is from May 1999 to September 2008. Columns (1) – (4) use bank fixed effects, columns (5) – (8) use bank × year fixed. Standard errors are clustered at the bank-year level. Y indicates that the set of control variables or fixed effects is included. The list of control variables and their definitions are provided in Table 1. ***, ** and * indicate statistical significance at the 1, 5 and 10 percent, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Forward guidance (t–1) | 0.025 | | | 0.027 | 0.016 | | | 0.018 |
| | (1.38) | | | (1.44) | (0.49) | | | (0.57) |
| Forward guidance (t–2) | | 0.021 | | 0.024 | | 0.023 | | 0.025 |
| | | (1.00) | | (1.12) | | (0.63) | | (0.67) |
| Forward guidance (t–3) | | | 0.013 | 0.015 | | | 0.000 | 0.004 |
| | | | (0.70) | (0.83) | | | (–0.01) | (0.12) |
| Shadow rate | –0.052*** | –0.052*** | –0.052*** | –0.051*** | –0.001 | –0.001 | –0.001 | –0.001 |
| | (–12.66) | (–11.61) | (–12.71) | (–11.63) | (–0.12) | (–0.07) | (–0.12) | (–0.06) |
| Loan-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Firm-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Economy-level variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Bank fixed effects | Y | Y | Y | Y | | | | |
| Firm fixed effects | Y | Y | Y | Y | | | | |
| Bank × year fixed effects | | | | | Y | Y | Y | Y |
| Number of observations | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 | 7,493 |