Bank Transparency and Deposit Flows*

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Abstract: How much information bank depositors should have on the assets of banks is a hotly debated issue. On the one hand, information allows depositors to monitor banks' actions, but on the other hand, it might interfere with banks' liquidity-transformation role. We provide, for the first time, empirical evidence that links transparency to deposit flows, deposit rates, banks' investments and profitability. We demonstrate that uninsured deposits respond more strongly to performance when banks are more transparent, and provide other evidence consistent with the idea that transparency adversely affects banks' unique role in creating safe assets for depositors.

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1. Introduction

This paper provides an empirical investigation of the relation between bank transparency and depositor behavior and the resulting consequences for banking operations. The issue of transparency is at the center of debates on bank fragility and regulation, as described, for example, in the survey by Goldstein and Sapra (2014). Yet, there is little empirical evidence to inform the debate.

On the theory side, whether transparency is desirable or not depends on the perspective taken for the role of banks. On the one hand, proponents of transparency usually rely on theories focusing on the asset side of the banking business (e.g., Diamond, 1984; Calomiris and Kahn, 1991; Diamond and Rajan, 2001) to highlight that transparency facilitates monitoring and disciplining of banks' lending activities by external financiers.[1] On the other hand, theories emphasizing the liability side of the banking business suggest that greater transparency may hurt the very source of value creation in the banking industry. Under this view, banks' role is to produce money-like safe, liquid securities (such as demand deposits) whose value does not fluctuate with the asset side of banks' balance sheets. Such securities help investors share liquidity risks and create medium of exchange without fear of adverse selection (e.g., Diamond and Dybvig, 1983; Gorton and Pennacchi, 1990; Hanson, Shleifer, Stein, and Vishny, 2015; Dang, Gorton, Holmström, and Ordoñez, 2017). Greater transparency then hurts banks' ability to perform this role by making the depositor base sensitive to fluctuations in value of banks' assets.[2]

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[1] Indeed, motivated by a history of crises that are often blamed on opacity, regulators tend to demand more transparency in banks. A key component of the international regulatory framework (Basel III) adopted in response to the 2008 crisis is to strengthen bank transparency. One development of financial regulation following the crisis, banks' stress tests, imposes substantial new disclosure requirements on certain financial institutions.

[2] Gorton et al. (2012) find that 35% of the economy wide financial assets take the form of safe debt and that a non-trivial component of this demand is met by the banking sector in the form of demand deposits. Similarly, evidence from Berger and Bouwman (2009) and Egan, Lewellen, and Sunderam (2017) indicates that banks with higher maturity transformation ability and deposit productivity create more value. Gorton (2014) analyzes the history of the U.S. banking and argues that opacity has been important for the U.S. banks to retain their ability to create money.

Assessing the relevance of these issues empirically requires to first obtain evidence on whether bank depositors, who provide 70% of the bank funding (Hanson et al, 2015) and are central to how transparency affects banks in both of the above views, behave in a way that is related to the quality of information available to them. This is what we do in this paper. We then link the evidence to the two lines of theories to examine the overall implications of transparency.

As a first step, we need a measure of transparency. For this purpose, we use the quality of financial information available from a bank's Call reports about its underlying asset values. We focus on Call reports since they are the main source of information about banks' financial positions. They also allow us to include both public and private banks. We construct a measure of transparency based on the ability of key financial metrics disclosed by banks to predict changes in the credit quality of banks' assets. We relegate a detailed description of the construction of this measure to Section 2. For a large sample of U.S. commercial banks in the years 1994-2013, we show that banks vary substantially in their level of transparency. We show that these differences in transparency cannot be explained, by and large, by observable differences in bank characteristics such as size or asset composition.

Our key finding is that uninsured deposits exhibit significantly greater flow-performance sensitivity in more transparent banks. This finding suggests that uninsured depositors are alert to the information about bank performance and respond to it when this information becomes more precise. The results are obtained in specifications that control for bank- and time-fixed effects, as well as time-varying differences in bank characteristics. The economic magnitude is significant: An interquartile change in transparency is associated with nearly 22% increase in the flow-performance sensitivity. For deposit instability, this implies that an interquartile increase in transparency would magnify the effect of performance volatility on uninsured deposit flow volatility by about 49%. In further tests, we show that transparent banks suffer greater overall volatility of uninsured deposit flows (i.e., without conditioning on performance).

Importantly, we do not find the same effect for the insured deposits. This is expected given that insured depositors should care much less about the quality of bank information, as they know they are guaranteed by the FDIC. This gives us an opportunity to sharpen the analysis further by analyzing how the difference between uninsured and insured deposit flows responds to performance for banks with different levels of transparency. This analysis is akin to a within bank fixed effect estimation (Egan et al. 2017) and mitigates the concern that our results on uninsured deposits are driven by omitted bank features that also affect flow-performance sensitivity (such as the quality of banks' non-deposit related service). Indeed, one would expect that both uninsured and insured depositors will be similarly affected by such features. We find that the results on uninsured-insured deposit flow differences are qualitatively similar to those obtained for uninsured deposit flows. Moreover, we find that the results are stronger for banks experiencing poor performance, consistent with the idea that uninsured depositors are concerned about the downside risk and react more to negative news.

Another important part of the picture is the behavior of the deposit rates offered by banks. As expected, banks tend to increase deposit rates following poor performance in an attempt to keep depositors in. More interesting to our study, we find that deposit rates are more sensitive to bank performance in transparent banks. Hence, transparent banks act to substitute the outflow of uninsured deposits in times of poor performance, mostly by attracting insured deposits with higher rates. The substitution appears to be effective, as the sensitivity of total deposits to bank performance does not vary by transparency. However, the substitution comes at a cost because of the higher deposit rates and insurance premium. In other words, transparent banks cannot rely on the stability of uninsured deposits for their operations.

The above results confirm that the basic force underlying both the liability-centric and asset-centric views of transparency is strongly present in the data. On the one hand, stronger deposit-flow sensitivity at transparent banks implies that these banks are at a comparative disadvantage in creating money-like stable deposits. On the other hand, higher deposit-flow sensitivity also means transparent banks are subject to stronger discipline by depositors. We then conduct additional tests, described below, suggesting that the costs of transparency (in the liability-centric view) are more prevalent than the benefits (in the asset-centric view).

First, we examine the differences in how banks fund growth in illiquid assets. Under the liability-centric view, transparent banks would be averse to funding illiquid assets using deposit financing because of increased costs and difficulty in raising stable deposits (Dang et al., 2017). This suggests that transparent banks' ability to fund illiquid growth opportunities would depend on availability of sufficient internal funds. The asset-centric view implies that transparency can help discipline bank lending. To the extent that this effect increases external investors' (equity holder as well as depositors) willingness to provide capital at reasonable price, it suggests that transparent banks would be less dependent on availability of internal equity to fund illiquid growth opportunities, as they can meet internal funding shortfalls by raising cheap external funding. We find empirically that the growth in illiquid assets in transparent banks is more closely tied to the availability of internal equity financing than that in opaque banks. In contrast, and as expected, transparency has no such effect for growth in liquid assets. These findings suggest that the adverse effect of transparency on banks' ability to produce safe assets dominates the positive monitoring effect.

Second, we examine the relation between transparency and bank profitability. The disciplining explanation suggests a positive relation between transparency and profitability if transparency reduces agency problems and disciplines banks' lending decisions. On the other hand, if transparency reduces banks' comparative advantage in raising cheap, stable deposits to fund higher yield illiquid loans, we would expect transparent banks to earn lower spreads and exhibit lower profitability. We find that transparent banks exhibit lower profitability. This effect is robust after controlling for bank fixed-effects, bank asset composition, and various proxies for bank risk. Consistent with the dominance of the liability-centric view over the asset-centric view, we also find that transparency is correlated with lower uninsured-deposit inflows (unconditional on performance), suggesting that depositors exhibit greater demand for opaque banks.

Our paper demonstrates the equilibrium correlation between bank transparency and the sensitivity of uninsured deposit flows to performance. The direction of causality matters less in our view: whether banks' transparency affects the alertness of depositors to performance or depositors' alertness affects banks transparency, the implication that transparency is associated with less stable deposits remains unchanged. Another concern is of an omitted variable: that banks' transparency and depositors' flows are affected by some other bank characteristics. However, as discussed above, our specification that looks at the difference between uninsured and insured deposit flows addresses this concern to a large extent and makes it difficult to come up with an explanation based on omitted variables. It should also be noted that observable bank features such as size or different variables of asset composition explain a small portion of the variation in bank transparency. So it does seem that our transparency measure captures the information environment of the bank. Finally, we do not take a stand on whether transparency is a strategic choice made by the bank to release its private information or a reflection of how inherently difficult it is to predict losses on its loan portfolio (i.e., the inherent opacity of assets). In the spirit of the theories mentioned above, we are interested in how much information is available to depositors, regardless of whether it becomes available due to banks' strategic disclosures or the inherent transparency of banks' assets. We provide more discussion about the nature of our transparency variable in the next section.

Our paper relates to several studies in the banking literature that examine the extent of depositor discipline and stability. Several studies find evidence of greater deposit withdrawals in banks with poorer performance (Gorton, 1988; Goldberg and Hudgins, 1996; Saunders and Wilson, 1996; Calomiris and Mason, 1997; Martinez Peria and Schmukler, 2001) and evidence of significant fragility (Egan et al., 2017).[3] At the same time, Martin, Puri, and Ufier (2018) find that banks are largely able to offset the loss of uninsured deposits through gains in insured deposits as they approach failure. Relatedly, Drechsler, Savov, and Schnabl (2017, 2018) propose that banks benefit from depositor stability. They find that banks have considerable market power over their depositors, allowing them to increase deposit spreads in response to fed fund rate increases. Unlike these papers, we focus on the role of transparency for depositor flows. We show that the stability of deposits is, to a large extent, a function of how much information the bank provides about upcoming losses.

Our study is also related to several accounting papers that examine the monitoring benefits of transparency (Beatty and Liao, 2011; Bushman and Williams, 2012, 2015). These papers focus on the specific aspects of transparency that can be affected by bank managers' financial reporting choices, and measure transparency by whether bank managers incorporate their private

[3] Some other papers examine depositor responses and the role of deposit insurance in specific bank runs: Iyer and Puri (2012); Iyer, Puri, and Ryan (2016); Iyer, Jensen, Johannesen, and Sheridan (2019); Brown, Guin, and Morkoetter (2017).

information into financial reporting in a timely manner. Beatty and Liao (2011) find that banks with more timely disclosure raise equity financing more during non-crisis periods, and reduce lending less during crisis. Bushman and Williams (2012, 2015) document negative associations between reporting timeliness and measures of equity risks for publicly traded banks.[4] Our notion of transparency is broader, and is not restricted to the part affected by managers' reporting choices. More importantly, our focus is on deposit flows, which are central in the theory of banking but absent from these other papers. Our findings call attention to the fact that transparency can hurt banks' liquidity transformation role.

Finally, our paper relates to the broader empirical work on economic consequences of disclosure by non-financial firms in general. Prior works show that greater disclosure benefits firms by reducing information asymmetries and constraining managerial misbehavior (e.g., Leuz and Verrecchia 2000; Greenstone, Oyer, and Vissing-Jorgensen, 2006). Recent works also highlight the costs of greater disclosure in the form of distorted long-term decision making (Kraft et al., 2018; Agarwal et al., 2018), revelation of information to competitors (e.g., Bernard, 2016; Li, Lin, and Zhang, 2018), and crowding out of production of decision relevant information in stock prices (Jayaraman and Wu, 2018). As we highlight above, there are different costs for banks, given their liquidity transformation role.

2. Transparency Measure and Empirical Specification

In this section, we describe our measure for bank transparency (Section 2.1) and main empirical specifications (Section 2.2).

[4] For evidence outside of the U.S. on how transparency affects banks' lending decisions, see Ertan, Loumioti, and Wittenberg-Moerman (2017) and Balakrishnan and Ertan (2017).

2.1. Transparency measure

Our transparency measure is motivated by the theoretical framework in Dang et al. (2017) who model it as the ease (or cost) with which depositors can acquire information about the future performance of bank assets. We operationalize this notion of transparency by measuring the informativeness of financial disclosures in Call reports about banks' underlying asset quality. Depositors' information acquisition costs are expected to be lower when disclosures are more informative and minimize the need for any additional costly investigations.[5] Our measure, which we label as asset transparency, considers a bank as more transparent when its financial disclosures can resolve more uncertainty about its underlying asset values. We focus on the information about the expected losses in banks' underlying asset values. This is because depositors are creditors who are primarily concerned about whether they can withdraw their deposits at par (plus any promised interests).

Our measure for asset transparency captures how much uncertainty about future credit losses can be resolved based on financial information available to depositors from the Call reports. We measure it as the adjusted R-squared from a bank-specific regression of asset losses on information available to depositors. To illustrate the idea, let Ω_d be the set of information available to depositors at the end of period t and let ΔV be the economic credit losses on the bank's loan portfolio incurred over the next period (i.e., t+1). Conceptually, the R-squared from a regression of ΔV on Ω_d corresponds to the proportional uncertainty reduction about ΔV based on Ω_d, i.e., [6]

[5] Information acquisition costs should also be lower when depositors are more sophisticated and have greater ability to process information. We also explore this notion of transparency in additional analyses reported later and find similar inferences.

[6] In information theory, how informative a random variable Y is about X is quantified by the amount of mutual information between Y and X, i.e., I(X,Y)=H(X) – H(X|Y) where H(X) is the marginal entropy for X and H(X|Y) is the conditional entropy (Cover and Thomas, 2012). Regression R-squared corresponds to a scaled version of mutual information (Veldkamp, 2011) and has been used in prior research (e.g., Roll, 1988; Chen et al, 2007; Bai et al, 2016).

$$R_{v,d}^2 = \frac{Var(\Delta V) - Var(\Delta V|\Omega_d)}{Var(\Delta V)} \quad (1)$$

As we can see in Expression (1), conditional on banks' assets, depositors of banks with lower R-squared are able to resolve a lower fraction of the uncertainty about future performance. In other words, banks with lower R-squared are more opaque to depositors.

Two issues regarding this measure deserve clarification. First, a bank can have low R-squared either because the bank itself has relatively less private information about the assets (perhaps because the assets are inherently opaque, making information acquisition prohibitively costly) or because the bank strategically chooses not to fully reveal its private information in the Call reports. We view this to be an appealing feature of the measure because from the perspective of depositors' decision-making, it does not matter whether depositors' lack of information results from inherently opaque assets or imprecise bank disclosures.[7] Thus, the R-squared is a summary measure of how much depositors are in the dark about the quality of banks' assets as in Dang et al. (2017). In additional analyses discussed later, we also explore measures from the accounting literature (Beatty and Liao, 2011; Bushman and Williams, 2012, 2015) that are designed to capture the extent to which banks reveal their private information about asset quality in a timely manner.

Second, a low R-squared doesn't necessarily imply that banks are riskier (i.e., higher $Var(\Delta V)$). This is because the R-squared measures the proportion of fundamental uncertainty that depositors can resolve about banks' future loan portfolio performance (i.e., $\frac{Var(\Delta V)-Var(\Delta V|\Omega_d)}{Var(\Delta V)}$), not the unconditional uncertainty ($Var(\Delta V)$) itself. Indeed, we find that R-squared and earnings

[7] The distinction becomes relevant if one wants to evaluate the effect of specific accounting and disclosure standards designed to alter the revelation of bank managers' private information. The purpose of this study, however, is to study depositor behaviors (and their resulting consequences) when they can obtain more information, regardless of its source.

volatility (our measure of unconditional fundamental uncertainty) exhibit a relatively modest correlation of 0.05 (Table 1, Panel B). In sensitivity analysis (reported in Table 7), we find that controlling for fundamental uncertainty results in virtually no change in our inferences.

The key challenge in empirically measuring Expression (1) is that the depositors' information set (Ω_d) is unobservable to econometricians. In theory, the depositors' information set, Ω_d, includes all available disclosures that can be used to predict future credit losses. Therefore we proxy for Ω_d with key variables in the Call reports that are predictive of future credit losses to estimate the R-squared.

We first consider two variables that directly pertain to information about future credit losses on a bank's loan portfolio: loan loss provisions (*LLP*s) and changes in non-performing loans (ΔNPL). *LLP*s for period *t* are banks' best estimates for the increases in the level of credit losses for the banks' entire portfolios over period *t*. The estimates are recorded as an expense in banks' income statements for the period and directly affect reported profitability (return on equity). Accounting rules do not restrict *LLPs* to include only losses from certain defaults but also provide managers the discretion to incorporate their information about uncertain future defaults.[8] *NPL*s are typically defined to be loans that are 90-days past due.[9] An increase in *NPL* therefore indicates the presence of problematic loans and increased probability of default. A large accounting literature has shown that both *LLP* and *NPL* are important performance indicators for banks and there is considerable cross-bank variation in how effectively they capture current and future loan portfolio deteriorations (e.g., Wahlen, 1994).

[8] Banks are required to follow the incurred loss model specified under US generally accepted accounting principles (GAAP) for estimating *LLPs*. See Ryan (2012) for a detailed discussion of the incurred loss model and its application.
[9] *NPL* is a concept defined by banking regulators and is not an accounting concept defined in the U.S. GAAP. A common definition considers a loan to be non-performing when the payment is 90-days past due, although it differs across jurisdictions.

We include two lags of $LLPs$ and ΔNPL (both scaled by lagged total loans) to capture information about future credit losses in these variables. We also include two additional variables from the Call reports: (i) earnings before loan loss provisions scaled by lagged total loans ($EBLLP$) and (ii) book value of equity scaled by assets (*Capital*). *EBLLP* allows us to capture any relevant information in a bank's profits that is incremental to loan loss provisions. For example, an aggressive growth in revenues may indicate lowering of lending standards and, consequently, more future defaults. We include capital ratio based on prior finding suggesting that it is an important predictor for future loan portfolio performance (Wahlen, 1994).

We measure future credit losses (ΔV) using gross loan write-offs (or charge-offs), which represent the dollar amount of gross loans that are deemed to be uncollectible by banks in a period. Intuitively, write-offs can be thought of as future realization of the estimated loan-losses recorded in previous periods in the form of LLPs.[10]

To summarize, our measure of asset transparency is the adjusted R-squared ($R2$) from Eqn. (2) below, estimated for each bank-quarter using observations over the previous 12 quarters:

$$WriteOff_t = \alpha_0 + \beta_1 LLP_{t-1} + \beta_2 LLP_{t-2} + \gamma_1 \Delta NPL_{t-1} + \gamma_2 \Delta NPL_{t-2} + \delta EBLLP_{t-1} + \rho Capital_{t-1} + \varepsilon_t \quad (2)$$

In estimating equation (2), it is important to consider the timing of the measurement of write-offs because it is not clear when past signals of loan quality deterioration (e.g., *LLPs* or *NPLs*) would manifest in the form of write-offs. To allow for the possibility that write-offs may not manifest immediately in the next future quarter, we use the cumulative write-offs over the two

[10] LLP_t reduces the reported income for period t, whereas NPL_t and write-offs do not. Among the three, LLP_t is affected the most by accounting rules and bank managers' reporting discretion, whereas NPL_t and write-offs are relatively free from accounting choices.

quarters (*t and t+1)* following the end of quarter *t-1*.[11] In sensitivity tests reported later, we obtain similar inferences when we measure write-offs over the next 4 quarters.

One potential concern with our approach is that some banks may have few loans in their asset base and *R2* may not capture the transparency of their overall asset base and may mistakenly classify such banks as transparent even if their other assets (which may constitute bulk of the balance sheet) are opaque. We note that this measurement error would likely bias us against finding our results. Nevertheless, in untabulated analyses we examine the robustness of our results to controlling for total loans scaled by assets to ensure we are comparing banks with similar reliance on loans. We find that our inferences are robust.

2.2 Empirical specification

Our primary analyses focus on whether bank transparency affects the sensitivity of deposit flows to bank performance. This is motivated by extant banking theories, which highlight the effect on depositor behavior as the main channel through which transparency affects banks' operations. As discussed earlier, under the asset-centric set of theories, banks create value primarily by funding loans; the economic role of depositors under these theories is to discipline banks' lending activities by voting with their feet when banks' performance deteriorates. Greater transparency under this view is desirable as it facilitates depositor monitoring. The liability-centric theories emphasize the role of banks in creating stable, money-like claims (demand deposits) whose value does not fluctuate with the asset side of banks' balance sheet. Greater transparency in this view is not necessarily desirable because it hurts banks' ability to create money-like stable deposits by making

[11] This approach is also consistent with the regulatory guidance for consumer loans. Specifically, the guidance specifies that consumer loans must be written-off no later than the specified number of days past due: 120 days past due for closed-end consumer loans and 180 days past due for open-end consumer loans and residential mortgages (see Federal Financial Institutions Examination Council's policy dated June 12, 2000).

deposit flows sensitive to fluctuations in the value of banks' assets. Regardless of which view one holds, the central question we explore is whether transparency has a material effect on the sensitivity of deposit flows to bank performance.

We examine this issue by estimating various versions of the following specification:

$$\Delta Dep_{i,t} = \alpha_i + \delta_t + \beta_0 Perf_{i,t-1} + \beta_1 R2_{i,t-1} * Perf_{i,t-1} + \beta_2 R2_{i,t-1} + \Gamma \mathrm{X} + \varepsilon_{i,t}, \quad (3)$$

where $\Delta Dep_{i,t}$ is the deposit flows measured as the changes in bank i's deposit balances over period *t* scaled by the beginning of period assets; $Perf_{i,t-1}$ is a measure of bank performance that depositors observe at the end of quarter *t-1*; $R2_{i,t-1}$ is the asset transparency measure discussed earlier and measured at the end of quarter *t-1*. The key coefficient of interest in the above specification is β_1, which measures how the sensitivity of deposit flows to bank performance varies by bank transparency. Everything else equal, we expect the flow-performance sensitivity to be higher in banks that are more transparent.[12]

An important consideration in this analysis is the timing of the measurement for the dependent variables based on data from the Call reports. Most banks typically file call reports with a delay of 30 days after the calendar quarter ending (Badertscher et al., 2018). Furthermore, the literature on post earnings announcement drift suggests that investors react to quarterly accounting reports with a delay of up to a quarter following the announcement (e.g., Foster et al., 1984; Bernard and Thomas, 1989). Thus, using the deposit flows only for the 3 months subsequent to end of calendar quarter *t-1* may miss a significant portion of the flows that are a response to the

[12] This prediction is a direct implication of the rule of Bayesian updating. Chen, Goldstein, and Jiang (2007) use a similar specification to document that firms' investment sensitivity to stock prices increases in the informativeness of stock prices, consistent with the idea that managers learn from stock prices. Similarly, Chen, Francis, and Jiang (2005) show that stock prices react more to the forecast revisions made by more accurate analysts.

bank performance for quarter *t-1*. To address this issue, we measure deposit flows over the two quarters following the end of quarter *t-1* for which bank performance is measured. Specifically, we measure deposit flows as the change in deposits over the subsequent two quarters scaled by the beginning of period assets. We cluster standard errors at bank level, which adjusts for arbitrary forms of correlations between observations for the same bank that might result from overlapping windows for flow measurement.

We use return on equity (*ROE)* as the primary measure of bank performance. We prefer *ROE* over the change in equity capital as a performance measure because the latter is affected by banks' endogenously chosen dividend policies and external capital raising activity. We also prefer *ROE* over either *LLP* or changes in *NPL* as measures of bank performance as the latter measures provide an incomplete evaluation of banks' lending decisions. A depositor would not necessarily be concerned by high levels of *LLPs* or *NPLs* if they are accompanied by sufficiently high interest revenues. Nevertheless, in tests reported later we find our inferences to be robust to these alternative performance measures.[13]

In all estimations, we include bank and quarter fixed effects (α_i and δ_t) to control for time-invariant differences in business models across banks and any secular trends in deposit flows and rates. We also include time varying controls (*X*) for bank characteristics that are shown to affect

[13] We also prefer *ROE* over return on assets (*ROA)* because *ROE* takes into account the effect of equity cushion available to absorb losses. To see this, note that *ROE* can be expressed as the product of return on assets and bank leverage (measured as the ratio of bank assets to equity). For two banks with equally poor return on assets, depositors have a higher probability of suffering losses in the more levered bank. Similarly, holding leverage constant, depositors' risks are higher in the bank with lower return on assets. In sensitivity tests reported later, we find our results are robust to using *ROA*. We also prefer *ROE* over an estimated probability of default. Two approaches have been used for such estimation. One is to use Merton (1974) option-based model which would restrict our sample to publicly traded banks only. The other approach is to estimate a prediction model based on observed defaults. This approach is problematic in our setting because the observed defaults can be endogenously affected by depositors' behaviors, which in turn depend on bank transparency (e.g., Diamond and Dybvig, 1983; Goldstein and Pauzner, 2005; Parlatore, 2015; Egan et al. 2017). To the extent that transparency exacerbates depositors' responses to bad performance which can increase the chances of default, this approach can bias towards finding our results.

deposit flows in prior works (e.g., Acharya and Mora, 2015). These control variables include (i) capital ratio defined as book value of capital scaled by total assets (*Capital Ratio*), (ii) wholesale funding scaled by total assets (*Wholesale Funding*), (iii) the ratio of total unused commitments divided by the sum of total loans and unused commitments (*Unused_Commitments*), (iv) real estate loan share calculated as the amount of loans secured by real estate divided by total loans (*RealEstate_Loans)*, and (v) the logarithm of asset size (*Ln(Assets)*). Finally, we control for lagged deposit rate which would also be expected to affect the deposit flows (*Deposit Rate*). Ideally, we would like to control for rates offered on uninsured and insured deposits when modelling these two categories of deposit flows. However, Call reports do not separately report the interest expenses on insured and uninsured deposits. We use the core deposit rate to proxy the rates offered on insured deposits and the rate on large time deposit to proxy the rates on uninsured deposits. We believe this is a reasonable approximation because core (large time) deposits are most likely to be insured (uninsured).[14] We measure these rates as the quarterly interest expense on the deposits divided by the average quarterly deposits over the same period.

We conduct our main tests of the effect of transparency using uninsured deposit flows (ΔDep_{it}^{U}), which allow us to directly assess banks' ability to create money-like securities without the support of government backed deposit insurance.[15] A potential concern with this analysis is that the effect of transparency on deposit flows to performance sensitivity could be driven by some bank characteristics that are correlated with transparency but not explicitly controlled for. For

[14] Until March 31, 2011, core deposits were defined in the Uniform Bank Performance Report (UBPR) User Guide as the sum of demand deposits, all NOW and automatic transfer service (ATS) accounts, money market deposit accounts (MMDAs), other savings deposits, and time deposits under $100,000. As of March 31, 2011, the definition was revised to reflect the permanent increase to FDIC deposit insurance coverage from $100,000 to $250,000 and to exclude insured brokered deposits from core deposits.

[15] Wolff (2014) shows that about two-third of all deposits in the US are held by the richest 10% individuals. Anecdotal evidence and our conversations with bank officers also suggest that a large portion of uninsured deposits are held by businesses. An open question for future research is why depositors hold uninsured deposits when insured deposits are available.

example, it could be that less transparent banks provide better non-deposit services, which makes their deposits sticky. Another possibility is that less transparent banks operate in regions with greater market power where depositors have fewer alternatives and therefore exhibit stickier flows.

We mitigate this concern by examining the behavior of insured depositors. Like uninsured deposits, flows for insured deposits are likely affected by the quality of a bank's branch network, non-deposit services, and the availability of services from competing banks. Unlike uninsured deposits, however, insured deposits should be less sensitive to bank performance (because they are insured).[16] In other words, if our transparency measures capture the effects of any correlated omitted variable, it should affect the flow-performance sensitivity similarly for insured and uninsured deposits. Therefore, evidence on the effect of transparency on the flow-performance sensitivity of insured deposits can help us gauge the extent to which our inferences are confounded by other omitted correlated factors.

In addition to separately modelling uninsured and insured deposit flows, we also estimate Eqn. (3) using the difference in deposit flows between uninsured and insured as the dependent variable. This is similar to a regression with bank-time interactive fixed effects, where the coefficient estimate would derive from within-bank differences in the flow-performance sensitivity of uninsured and insured depositors. To illustrate the idea, suppose consumers make their deposit decision based on bank performance (as proxied by ROE_{it-1}), deposit rate ($Rate_{it-1}$), and bank services such as customer service quality (Q_{it-1}). The flow responses are given by

[16] As noted in Benston and Kaufman (1997), before the enactment of FDIC improvement act (FDICIA) in 1991, "the FDIC almost always financed the purchase and assumption of all liabilities of resolved insolvent institutions by other banks, particularly larger banks, thereby fully protecting depositors with uninsured funds at these institutions." Benston and Kaufamn (1997) further note that a benefit of FDICA was ending of FDIC policy of protecting uninsured depositors and report evidence of increased incidence of FDIC leaving uninsured depositors unprotected in bank failures after 1991. Furthermore, even if a failed bank has enough assets to pay both insured and uninsured depositors, uninsured depositors likely have to wait longer to recover money (https://www.fdic.gov/consumers/banking/facts/payment.html) and therefore experience greater loss of liquidity. It is therefore reasonable to expect uninsured depositors to be more concerned about bank performance.

$$\Delta Dep_{it}^{J} = \alpha_i + \delta_t + \beta_0^J ROE_{it-1} + \beta_1^J R2_{it-1} * ROE_{it-1} + \beta_2 Rate_{it-1}^J + \beta_3 Q_{it-1} + \varepsilon_{it}, \quad (4)$$

where $J \in \{I, U\}$, with I standing for insured and U for uninsured. If $R2_{it-1}$ and Q_{it-1} are correlated, then we may mistakenly attribute flow-performance sensitivity to transparency if Q_{it-1} is not accounted for in the regression. However, under the assumption that both insured and uninsured deposits respond similarly to unobserved bank services (i.e., $\beta_3^I = \beta_3^U = \beta_3$) and deposit rates (i.e., $\beta_2^I = \beta_2^U = \beta_2$), we can address this concern by using the difference between uninsured and insured flows as the dependent variable in Eqn. (2), as follows:

$$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I} = \alpha_i + \delta_t + (\beta_0^U - \beta_0^I) ROE_{it-1} + (\beta_1^U - \beta_1^I) R2_{it-1} * ROE_{it-1}$$

$$+\beta_2 \left(Rate_{it-1}^U - Rate_{it-1}^I\right) + \varepsilon_{it}. \quad (5)$$

Because of deposit insurance we would expect the flow performance sensitivity for insured depositors to be lower than that for uninsured depositors and less affected by transparency, i.e., $\beta_1^U > \beta_1^I$. Thus, a significantly positive coefficient estimate for the interaction term of $R2_{it-1} * ROE_{it-1}$ would be consistent with our inference.

3. Data, sample construction, and summary statistics

We obtain most of our bank-level variables from the U.S. Call Reports as disseminated by the Wharton Research Data Services (WRDS). Call reports contain quarterly data on all commercial banks' income statements and balance sheets. Our sample period is from January 1994 to December 2013. Our bank-quarter observation is at commercial bank level.[17] To avoid the

[17] A priori, it is not clear whether depositors make withdrawal decisions based on the health of the top bank holding company or of the subsidiary commercial bank alone. We estimate our main specifications at commercial bank level because the insured deposits data are not available from Y9-C reports filed by bank holding companies. In sensitivity analyses (results not tabulated), we aggregate banks belonging to a common holding company to their top

impact of mergers and acquisitions, we exclude bank-quarter observations with quarterly asset growth greater than 10%. We also exclude bank quarters with total assets smaller than 100 million and winsorize all continuous variables at 1% and 99%. These sample-selection and cleaning procedures are commonly used in prior work (e.g., Gatev and Strahan, 2006; Acharya and Mora, 2015).

Table 1, Panel A presents the summary statistics. Our asset transparency measure has substantial variation across banks: $R2$ has a mean of 0.23 and a standard deviation of 0.45. Bank's performance, measured as the annualized $ROE_{i,t-1}$, has a mean of 10.26 and standard deviation of 11.36 (in %). Table 1, Panel B presents the pairwise correlation for main variables. It shows that the correlation between uninsured deposit flows and lagged ROE is much higher (at 0.17) than the correlation between insured deposit flows and ROE (at 0.03), suggesting that uninsured deposit flows are more sensitive to bank performance.

Table 1, Panel C explores the association between $R2$ and banks' asset side characteristics. We regress $R2$ on a vector of variables that capture the bank's asset size and composition: (i) the percentage of liquid assets in total assets ($Liquid\ assets$), (ii) the percentage of real estate loans in total assets, (iii) the percentage of commercial and industrial loans in total assets, ($Commercial\ Loan$), and (iv) the log of total assets, $Ln(Assets)$. We include both bank and quarter fixed effects in Column 1, only bank fixed effects in Column 2, only quarter fixed effects in Column 3, and no fixed effects in Column 4. In the full model (Column (1)), it can be seen that $R2$ is positively associated with $Ln(Assets)$, $Liquid\ assets$, and $Real\ EstateLoan$, but exhibits no significant relation with $Commercial\ Loan$. Furthermore, the adjusted $R2$ is 0.168 when both

holder level and treat them as a single entity (following Kashyap, Rajan, and Stein 2002; Archarya and Mora, 2015), and find qualitatively similar results.

bank and quarter fixed effects are included, 0.153 with only bank fixed effects, 0.03 with only quarter fixed effects and 0.013 with no fixed effects.

These results imply that while time-invariant bank-specific factors explain the largest proportion of variation (about 14%) in *R2*, there is significant heterogeneity in bank transparency that cannot be captured by observable bank characteristics such as size and asset composition. This suggests that banks that appear similar based on aggregate asset composition can still differ significantly in the inherent opacity of their loan portfolio (possibly due to differences in borrower characteristics or geographic presence) and/or in their incentives to release private information. This further highlights the advantage of our *R2* measure which allows us to sort banks into different levels of transparency using a parsimonious model without access to detailed data on bank characteristics.

Figure 1 plots the summary statistics for *R2* across all banks in our sample for each quarter from 1994Q1 to 2013Q4. While the level of *R2* changes over time, the interquartile differences in *R2* across banks do not exhibit similar changes. Since our analyses are based on cross-sectional differences in bank transparency, this suggests that our results are not driven by any specific time-period. That said, it is interesting to observe that the average *R2* has been declining during years 1994 to 2005 from 0.25 to 0.17. It started increasing since 2005, sharply so before and during the Financial Crisis of 2007-2008 and reached a peak of 0.39 in 2009Q3. *R2* subsequently dropped after the crisis. Similar patterns are observed across all quintiles of *R2*. Since *R2* is estimated with data from the preceding 12 quarters, the peak in *R2* around 2010 suggests that information presented in banks' Call reports (the right hand side variables in Equation (2)) are highly predictive of banks' future loan write-offs during the financial crisis period (2007-2009). To the extent that more information became available about the deteriorating bank asset quality during the financial crisis period, it is comforting to observe that our transparency measure reflects this fact. Figure 2 plots the same time-series trend of average *R2* for three subsamples of banks: small (with assets<500 million), medium (500 million<assets<3 billion), and large (assets>3 billion).[18] We find similar pattern of *R2* over time for the three subgroups.

4. Main results

4.1. Transparency and deposit flows

Table 2, Panel A presents the results for our analysis of the relation between transparency and deposit flows by presenting estimates of various versions of Equation (3). We first present evidence on the unconditional relation between transparency and deposit flows by estimating Equation (3) without including bank performance and its interaction term with *R2*. Column (1) presents the results for uninsured deposit flows. It shows that the coefficient on *R2* is negative and significant (Coef = -0.172; t-stat = 3.752), implying that more transparent banks have a harder time attracting uninsured deposits. The coefficient estimate implies that an increase in *R2* from the 25th to the 75th percentile is associated with a 0.12% decrease in deposit growth rate, which represents about 6% of the average uninsured deposit growth. Column (2) shows that unlike uninsured deposits, there is no significant relation between *R2* and insured deposit flows. Finally, in Column (3) we model the difference between uninsured and insured deposit flows and find that *R2* has a negative and significant coefficient (Coef=-0.120; t-stat=-1.740.). These results provide preliminary evidence consistent with the liability centric theories which suggest that greater transparency can make it difficult for banks to create stable deposits.

[18] The assets cutoffs are in real 2000 dollars. Following Beatty and Liao (2011), we use $500 million as the cutoff for small banks as this was the cutoff FDICIA uses for independent audit requirement. We further classify banks with assets above 3 billion as large banks (Berger and Bouwman (2009)).

We next examine the relation between transparency and deposit flow-performance sensitivity by estimating the full model in Equation (3). Column (4) examines uninsured deposit flows. The coefficient estimate on *ROE* is positive and significant at 1% level (Coef = 0.064; t-stat = 20.745), suggesting that banks with poorer performance experience fewer uninsured deposit inflows. Our main interest is in the coefficient for the interaction term between *ROE* and *R2*, which is positive and significant at the 1% level (Coef= 0.020; t-stat = 4.441), consistent with the hypothesis that the sensitivity of uninsured deposits to bank performance is higher in banks with more asset transparency. This result implies more transparent banks would experience stronger outflows of uninsured deposits in times of poor performance.

The economic magnitude of the effect of transparency is reasonably large: the estimates suggest that an interquartile movement in transparency is associated with nearly 22% increase in the flow-performance sensitivity.[19] In terms of deposit stability (volatility), the estimates imply that an interquartile increase in *R2* would magnify the effect of ROE volatility on deposit flow volatility by about 49% (=1.22*1.22-1). In other words, for the same changes in the fundamental ROE volatility, a relatively transparent bank would experience 49% more volatility in its uninsured deposit flows than a more opaque bank.

Column (5) of Panel A examines insured deposit flows. We do this analysis to mitigate concerns about omitted correlated variables and to assess the effect of transparency on banks' total deposit funding. Estimates in this column show that while insured deposits are sensitive to bank performance,[20] unlike for uninsured deposits, the sensitivity does not increase with transparency.

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[19] This is estimated as (sensitivity at 75th percentile – sensitivity at 25th percentile) / (sensitivity at 25th percentile) = (0.064+0.02*.59 – (0.064+0.02*-0.09))/ (0.064+0.02*-0.09) = 22%.

[20] That insured depositors also exhibit some sensitivity to bank performance is commonly found in prior work. He and Manela (2016) find that around one-third of insured depositors ran on Washington Mutual Bank in 2008. Davenport and McDill (2006) examine the behavior of depositors around the failure of Hamilton Bank and find evidence of running by insured depositors although at a smaller rate than by uninsured depositors. See also Martinez Peria and Schumkler (2001) for evidence in Argentina, Chile, and Mexico and Berger and Turk-Ariss (2015) for

In fact, the coefficient on the interaction term between *Transparency* and *ROE* is negative. As we discuss later in our interest rate analysis, the negative effect of *R2* on the flow-performance sensitivity of insured depositors suggests that transparent banks try to attract insured depositors to offset the loss of uninsured depositors by offering higher rates. This finding is consistent with Martin, Puri, and Ufier (2018) who find that banks approaching failure attempt to offset the loss of uninsured depositors with insured depositors.

In Column (6), we model the difference between uninsured and insured deposit flows. As discussed in Section 2.2, the effect of transparency in these specifications is identified by the within-bank difference in the flow-performance sensitivity of uninsured and insured depositors. We find that the coefficient estimate for *R2*ROE* is significantly positive, suggesting that our results on the effect of transparency on the flow-performance sensitivity of uninsured depositors are unlikely to be driven by unobserved bank characteristics that affect deposit flows.

We next examine whether the effect of transparency differs depending on bank size. We split the sample into three subsamples based on asset size: big banks with more than 3 billion assets, small banks with less than 500 million, and medium banks with assets between 500 million and 3 billion, all measured in real 2000 dollars. Panel B of Table 2 presents the results. Column (1) shows that the coefficient on the interaction term *R2*ROE* is significantly positive for the subsample of small banks and implies an 18% increase in flow-performance sensitivity for an interquartile increase in *R2*. Column (4) and (7) document similar economic magnitudes for medium and large banks. The coefficient estimates indicate an amplification in the flow-performance sensitivity of 16% and 13% for medium and large banks for an interquartile

evidence in EU countries. Possible explanations for this behavior include concerns about timing of the payment by FDIC and less than perfect trust in the credibility of the insurance system. For example, Reuters (2007) notes the following responses from customers running on Countrywide Bank: *"I don't trust the FDIC insurance"* and "*Dealing with the insurance afterward and possibly losing my money didn't appeal to me*."

movement in *R2*. The statistical significance for the coefficients for medium and large banks are weaker, as the sample sizes are significantly smaller for medium and large banks (about 80% and 95% smaller than that for small banks). However, Column (3), (6) and (9) find that the coefficient estimates *R2*ROE* are all highly statistically significant across all bank sizes when we explore the within-bank variations by examining the difference between uninsured and insured deposits. Overall, these results indicate that the effect of transparency on deposit flow-performance sensitivity is present in all bank sizes.

Lastly, we examine whether the effect of transparency on deposit flow-performance sensitivity is asymmetric with respect to bank performance. Since uninsured depositors are mainly concerned about the downside risk of bank health, one would expect the effect of transparency to be stronger when banks experience poor performance. To examine this conjecture, we estimate Eqn. (3) on the subsamples partitioned by whether ROE_{it-1} is above or below the sample median. Panel C of Table 2 presents the results. Columns (1) show that the effect of transparency is indeed concentrated in banks with poor performance. The coefficient estimates for ROE_{it-1} and $R2_{it-1} * ROE_{it-1}$ are significantly positive in the subsample of banks with below median ROE at 0.050 (t-stat = 11.765) and 0.022 (t-stat = 3.550), respectively. In contrast, in the subsample of banks with above median *ROE* (shown in Column (2)), these coefficients are much smaller in magnitudes, and the coefficient on $R2_{it-1} * ROE_{it-1}$ is not significantly different from zero at conventional levels. These inferences continue to hold when we model the difference between uninsured and insured deposit flows in Columns (5) and (6). Estimates in Columns (3) and (4) show that the negative relation between asset transparency and the flow-performance sensitivity of insured deposits (documented earlier) is also concentrated in the subsample with below median *ROE*.

4.2. Transparency and deposit rates

Since deposits account for more than 70% of banks' total funding with 40% of them uninsured, one would expect that banks would take actions to mitigate fluctuations in their deposit funding in response to performance, for example, by offering higher rates. We model both core deposit rates and large time deposit rates measured as the interest expense on the respective deposits over the two quarters divided by average quarterly deposits over the same period. Using two quarter data to measure deposit rates is analogous to the approach we use to measure deposit flows.

Table 3 presents the estimates for Equation (3) with deposit rates as the dependent variable. Because we are modelling banks' response in the form of deposit rates, we do not control for lagged deposit rates in these regressions. Column (1) shows that the sensitivity of rate for uninsured deposit (as proxied by rate on large time deposits) to bank performance is stronger in more transparent banks: the coefficient estimate on *R2*ROE* is -0.001, significantly negative at less than the 1% level. This suggests that banks with more transparent assets offer higher deposit rates in times of poor performance. The estimates imply that compared to a bank at the 25th percentile of *R2*, a bank at the 75th percentile offers an additional 0.8 basis points on its rate for large time deposit for every standard deviation decline in *ROE ((0.59-(-0.09)) *11.36*0.1 basis=0.8 basis)*.

Column (2) presents result for core deposit rate, which is our proxy for rate on insured deposit. It shows that core deposit rate is negatively related to bank performance, suggesting that banks raise rates in times of poor performance to attract insured deposits. Furthermore, the sensitivity of core deposit rate to bank performance is higher in banks with more asset transparency (Column (1)). The coefficient for *R2* ROE* is negative and significant at 1% level (Coef = - 0.001; t-stat = -2.013).

Findings in Tables 2 and 3 reveal interesting facts about banks with more asset transparency. Specifically, Table 3 shows these banks attempt to retain and attract deposits by offering higher rates for both insured and uninsured deposits in times of poor performance. This strategy appears to be effective in retaining insured deposits, as the sensitivity of insured deposit flows to performance is indeed lower for banks with more asset transparency (as shown in the negative coefficient for *R2*ROE* in Column (5) in Panel A of Table 2). Higher rates, however, are less effective in retaining uninsured deposits, as the sensitivity of uninsured deposit flows to performance continues to be higher for these banks. In untabulated results, we find that the flow-performance sensitivity of total deposits (insured flows plus uninsured flows) does not vary significantly across banks with different asset transparency, suggesting that in times of poor performance, banks with higher asset transparency are able to offset the greater outflow of their uninsured depositors by attracting more insured depositors through higher rates. Of course, while the substitution mitigates the fluctuations in their total deposit funding, it comes at the cost of higher interest costs and higher insurance premium.

4.3. Transparency and reliance on internal equity funding

We next examine differences in banks' reliance on internal equity to finance illiquid loan commitments. Under the liability-centric view, transparency constrains banks' ability to fund illiquid assets using deposit financing because of increased costs and difficulty in raising stable deposits. Therefore all else equal, transparent banks' ability to fund illiquid growth opportunities would depend on availability of sufficient internal funds (Dang et al., 2017). Conversely, opaque banks' decision should be less dependent on availability of internal equity financing because of the relative ease with which they can meet internal funding shortfalls by raising stable external deposit financing.

The asset-centric view suggests that transparency facilitates bank monitoring and therefore increases external capital providers' (including equity holders and depositors) willingness to provide capital at reasonable price. This should make transparent banks less dependent on availability of internal equity to fund illiquid growth opportunities, as they can meet funding shortfalls by raising cheap deposits or external equity. Prior findings indicate that it is easier for transparent banks to obtain external financing as potential investors are better able to monitor them (Beatty and Liao, 2011; Bushman and Williams, 2012, 2015). This suggests that transparent banks' investment decisions should not depend as much on changes in their internal equity.

We use the following regression specification to examine the effects of transparency on banks' reliance on availability of internal equity to fund asset growth:

$$AssetGrowth_{i,t} = \alpha_i + \delta_t + \beta_0 \Delta Equity_{i,t-1} + \beta_1 R2_{i,t-1} * \Delta Equity_{i,t-1} + \beta_2 R2_{i,t-1} + \Gamma X + \varepsilon_{i,t}, \quad (6)$$

where $AssetGrowth_{i,t}$ represents the annualized growth rate in one of banks' asset classes scaled by beginning of quarter total assets, and $\Delta Equity_{i,t-1}$ is the change in internal equity, measured as change in equity balances excluding stock issuance and adding back dividends and repurchases, scaled by total assets at the beginning of quarter.[21] Similar to our analysis of deposit flows, we measure asset growth over two quarters subsequent to quarter *t-1*. The key coefficient of interest in Eqn. (6) is β_1, which measures how transparency affects the relation between availability of internal equity and asset investment decisions.

[21] This definition of internal equity implicitly assumes that dividends are paid out from residual funds left after funding investment opportunities. In sensitivity analyses (results not reported), we find qualitatively similar results when we measure changes in equity after paying dividends.

Table 4 presents the estimates of Eqn. (6) for growth in different asset classes. Column (1) models the effect on total loans. The coefficient on the interaction between $R2$ and $\Delta Equity_{i,t-1}$ is positive and significant at 1% level (Coef = 0.244; t-stat = 7.701). This suggests that banks with higher asset transparency are more reluctant to fund loans without the availability of internal equity. The effect is economically large: a bank at the 75th percentile of $R2$ is nearly 37% (=0.244*(0.59-(-0.09))/(0.474+0.244*(-0.09)) more sensitive to availability of internal equity for funding loans compared to a bank at the 25th percentile. In untabulated analyses, we separately model growth in real estate loans and commercial loans and obtain inferences that are very similar to that for total loans.

Column (2) examines changes in the outstanding loan commitments to see if transparency also affects banks' willingness to provide liquidity in the form of credit lines. We again find that the interaction term of $R2_{it-1} * \Delta Equity_{i,t-1}$ is positive and significant at 1% level with large economic magnitudes. An interquartile increase in $R2$ amplifies banks' sensitivity of loan commitments to $\Delta Equity_{i,t-1}$ by about 34%. Not surprisingly, similar inferences are obtained when we examine total credit in Column (3), which includes both loan and commitments.

We also model growth in liquid assets in Column (4). We measure liquid assets as the sum of cash, federal funds sold & reverse repos, and securities excluding MBS/ABS securities. Because liquid assets can be readily liquidated to meet any deposit withdrawals, deposit stability should be less of a concern while funding liquid assets. Therefore, we do not expect transparency to negatively affect the sensitivity of changes in liquid assets to internal equity. In fact, it is possible that compared to opaque banks, liquid investments in transparent banks exhibit lower sensitivity to the availability of internal equity. This could occur if opaque banks exploit their comparative advantage in raising stable deposits to earn higher spreads by actively targeting illiquid investment opportunities. They may invest in low-spread short-term liquid investment when they have excess internal equity available after exhausting their opportunities to fund illiquid loans. This would manifest in opaque banks exhibiting higher sensitivity to the availability of internal equity for liquid investments relative to transparent banks. Indeed, consistent with this possibility, we find a negative coefficient on the interaction term between $R2$ and $\Delta Equity_{i,t-1}$ for liquid investments (Coef = –0.071; t-stat = –2.208).

Overall, consistent with liability-centric theories, these results suggest that transparency makes it difficult for banks to fund illiquid loans by hurting their ability to raise stable deposits.

4.4. Transparency and bank profitability

In this section, we examine the association between bank transparency and profitability. The disciplining explanation suggests a positive relation between transparency and profitability if transparency reduces agency problems and disciplines banks' lending decisions. On the other hand, if, as suggested by our previous findings, transparency reduces banks' comparative advantage in raising cheap, stable deposits to fund higher yield illiquid loans, we would expect transparent banks to earn lower spreads and exhibit lower profitability. Table 5 presents the results of this analysis in which we regress *ROE* and *ROA* on the *R2* measure and other bank characteristics. Columns (1) and (4) present the results for *ROE* and *ROA* without including bank fixed effects. We find that *R2* exhibits a significant negative association with both *ROE* and *ROA*. In terms of economic magnitude, an interquartile increase in *R2* is associated with nearly 1.0% (0.08%) decrease in *ROE* (*ROA*). Columns (2) and (5) estimate the models after including bank fixed effects and focus on only within bank time-series variation in *R2*. The coefficient on *R2* continues to be negative and significant (at 1% level).

One may be concerned that these differences in profitability may reflect differences in risk: i.e., if transparent banks make less risky loans, they would also be expected to be less profitable. We note that our results obtain after controlling for differences in banks' asset composition and fixed effects, which should control for differences in risk. To further mitigate this concern, in Columns (3) and (6), we estimate our regressions after controlling for standard deviation of *ROE* and *ROA* (measured over the last 12 quarters) as time varying measures of risk. It can be seen that our inferences continue to hold.[22] Overall, consistent with liability centric theories, these results suggest that transparency reduces banks' comparative advantage in raising cheap, stable deposits to fund higher yield illiquid loans, which manifests in lower profitability.

5. Additional analyses and robustness checks

5.1. Can information sources other than call reports affect our inferences?

A potential concern with our analysis is that we rely on information contained in Call reports to assess depositors' sensitivity to bank performance, but depositors are likely to have access to other information sources as well. It is possible that depositors of banks whose Call reports are not informative (i.e., exhibit low *R2*) rely more on other information sources (e.g., analyst reports, information aggregated in stock prices or perhaps the soft information revealed by bank managers in conference calls) for decision-making. To the extent that these alternative information sources sufficiently make up for the lower informativeness of Call reports in low *R2* banks, it is possible that depositors of low *R2* banks have similar total information as depositors in

[22] In untabulated analyses, we also entertain the possibility that this result could reflect banks increasing transparency following periods of poor performance. If this is the case, we would expect past performance to be negatively correlated with banks' future transparency. To test this possibility, we regress banks' one-year ahead transparency ($R2_{it+4}$) on their past performance (ROE_{it}) and do not find any evidence of a significant negative correlation.

high *R2* banks. Consequently, it is possible that while depositors of low *R2* banks are less sensitive to information released in call reports, they exhibit overall stability levels that are similar to depositors of higher *R2* banks.

We first note that if deposits at low and high *R2* banks exhibit similar stability, then we should not observe our previous findings on banks' deposit rate response, reliance on internal equity to fund loans, and profitability. All of these results rest on deposits being more sensitive at high *R2* banks.

Nevertheless, we perform two additional analyses to address this concern. First, we directly test whether uninsured deposits are unconditionally more volatile at high *R2* banks and present the results in Table 6, Panel A. The dependent variable is the logarithm of the standard deviation of uninsured deposit flows calculated over the same periods as those used to estimate *R2* from Equation (2). Column (1) does not include bank fixed effects and shows that asset transparency is significantly positively related to deposit flow volatility. Similar positive relation is observed with bank fixed effects (Column (2)). Hence, transparency is clearly associated with fragility.

Second, we examine whether our main results hold for the subset of private banks. To the extent that depositors at private banks do not have access to other information sources and have to rely primarily on call reports to assess performance, evidence of a positive relation between transparency and flow-performance sensitivity for private banks would further address this concern. Table 6 Panel B shows the results from estimating Equation (3) separately for the subsamples of public and private banks. We find that our main results hold equally well in both subsamples. Specifically, Columns (1) – (2) show that greater asset transparency is associated with higher uninsured deposit flow-performance sensitivity for both public and private banks.

Furthermore, Columns (3) – (6) show that we also obtain similar results for private and public banks when we model insured and the difference between uninsured and insured deposit flows.

5.2. Do our results reflect differences in risk between transparent and opaque banks?

As we discuss in Section 2.1, our transparency measure is designed to estimate the proportion of fundamental uncertainty that depositors can resolve about banks' future loan portfolio performance (i.e., $\frac{Var(\Delta V)-Var(\Delta V|\Omega_d)}{Var(\Delta V)}$), not the unconditional uncertainty ($Var(\Delta V)$) itself. Nevertheless, to mitigate any concerns that our results simply reflect differences in risk, we augment our regression specifications with the standard deviation of *ROE* (*Std_ROE*) and its interaction term with *ROE*.[23] We compute *Std_ROE* using data for the most recent 12 quarters on a rolling basis. The results from this augmented specification, presented in Columns (1) to (3) of Table 7, show that banks with higher *R2* continue to exhibit greater flow-performance sensitivity for uninsured depositors. Columns (4) to (6) repeat the analyses by replacing *Std_ROE* with the standard deviation of write-offs in the most recent 12 quarters and its interaction term with *ROE* and find similar results.

5.3. Alternative transparency measures

In Table 8, Panel A, we explore robustness to alternative ways of measuring transparency. We first explore the robustness of our results to measuring *R2* after extending the window for measurement of write-offs in equation (2) to 4 quarters instead of 2 quarters. This is because some

[23] In untabulated sensitivity analyses, we also include interactions between control variables and ROE in the regression specifications to allow the flow-performance sensitivity to vary with other bank characteristics. Our results are robust to this alternative specification.

loans may take longer than 2 quarters to be written off after becoming non-performing or part of loan loss provision. For example, regulatory guidance differs for different types of loans in the number of days past due before it must be written-off (Bhat, Lee and Ryan, 2019). Results in Columns (1) to (3) of Panel A show that our results are robust.

We also explore transparency measures from the accounting literature examining the ability of banks' loan loss provisions (*LLP*) in reflecting future credit losses in a timely manner (Beatty and Liao, 2011; Bushman and Williams, 2012, 2015). In this literature, a bank's *LLP* is considered to be more timely if it incorporates more information about future loan performance. This literature views bank managers' incentives to reveal private information as the main determinant for the timeliness of *LLP*s. Some researchers also refer to banks with more timely *LLP*s as more transparent (Bushman and Williams, 2012, 2015). To the extent that more timely *LLPs* indicate greater availability of information to depositors about banks' future prospects, we would expect greater deposit flow-performance sensitivity for banks with more timely *LLPs*.

We note that our notion of transparency is broader than the timeliness of *LLP*, which is constructed to capture variation in the extent to which banks reveal their private information. As we discuss in Section 2.1, from the perspective of depositors' decision-making, it does not matter whether a bank is opaque because the bank itself has less private information about the assets (perhaps because the assets are inherently opaque) or because the bank chooses to not fully reveal its private information (Huizinga and Laeven, 2012). Our main measure of asset transparency accommodates both sources of variations in the availability of information. Nonetheless, to see whether our main finding is unique to our transparency measure, we also construct the timeliness measure following Beatty and Liao (2011), as described in detail in the Appendix. Table 1, Panel B shows that the correlation coefficient between the timeliness measure and *R2* is 0.05. Results in

Columns (4) to (6) of Table 8, Panel A, show that our inferences are robust and the *Timeliness* of *LLP* has a significantly positive effect on uninsured deposit flow-performance sensitivities.

Lastly, we examine the robustness of our results to an alternative notion of transparency, which refers to a bank as transparent when its depositors are more sophisticated and have lower costs in processing financial information. All else equal, more sophisticated depositors would be expected to extract greater information about banks' future prospects. While depositor sophistication is not directly related to policy proposals to increase transparency, it is a useful variable to capture how depositors' behaviors are affected by the information they can process. We measure depositor sophistication as the average percentage of residents with college education in the counties where a bank operates, weighted by the amount of deposits the bank draws from the counties in a given year. We retrieve the information on the percentage of adult residents with college education from the 2000 Census data, and the information on the county-level data (bank branches and dollar deposits) from the FDIC's Summary of Deposits disclosures. Results using *Sophistication* as the transparency measure are presented in Columns (7) – (9) of Panel A. They show that *Sophistication* has a significantly positive effect on uninsured deposits' flow-performance sensitivity.

5.4.Alternative performance measures

In our final set of robustness tests presented in Panel B of Table 8, we explore the sensitivity of our results to four alternative performance measures: (i) return on assets (ROA), (ii) change in equity capital ($\Delta EquityCapital$), (iii) the level of loan loss provisions (LLP), and (iv) non-performing loans (NPL). It can be seen that the results using these measures are qualitatively similar to those using ROE. Specifically, Columns (1) and (4) show that the sensitivity of uninsured deposits to *ROA* and to change in equity capital is increasing in *R2*. Columns (7) and (10) show a negative sensitivity of uninsured deposit flows to banks' non-performing loans and to loan loss provisions and more so for more transparent banks as measured by *R2*. The sensitivity of the difference between uninsured and insured flows to these performance measures varies with *R2* in a similar way to Table 2.

6. Conclusion

Increasing bank transparency is commonly offered as the centerpiece of banking regulation. In this study, we provide evidence on the effect of transparency on deposit flows and the resulting consequences for bank operations. Our analysis is motivated by extant banking theories, which suggest that transparency affects banks' operations primarily through its effect on depositor behavior. Furthermore, deposits consistently represent the largest source of funding for banks.

Using a large sample of US banks from 1994-2013 we find that uninsured depositors of more transparent banks are significantly more sensitive to their banks' performance. We also find that transparent banks offer greater deposit rate increases following bad performance, rely more strongly on internal equity to finance illiquid assets, and exhibit lower profitability. Overall, our results suggest that while transparency helps discipline bank management by making deposit funding more sensitive to performance, it also interferes with the role of banks in liquidity creation.

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Appendix: Variable definitions

	Definitions
R2 $_{it-1}$	Adjusted R^2 for each bank-quarter from the regression $WriteOff_{[t,t+1]} = \alpha_0 + \sum_{j=1}^{2} \beta_j \Delta NPL_{t-j} + \sum_{j=1}^{2} \gamma_j LLP_{t-j} + \delta Capital_{t-1} + \rho EBLLP_{t-1} + \varepsilon_t$, estimated using the bank's observations from Quarter $t-12$ to Quarter $t-1$. $WriteOff_{t,t+1}$ is the sum of write-off (RIAD4635) in Quarter t and $t+1$. LLP_{t-j} is loan loss provision (RIAD4230, adjust year-to-date reporting to within-quarter) in Quarter $t-j$ from the previous quarter; ΔNPL_{t-j} is change in non-performing loan (RCFD1403+RCFD1407) in Quarter $t-j$ from the previous quarter, capital ratio is capital divided by total assets (RCFD3210/RCDF2170), EBLLP is earnings before loan loss provision (RIAD4301+RIAD4230, reported as year-to-date, converted to within-quarter). All variables other than capital ratio are scaled by total loan (RCFD1400).
Liquid Assets $_{i,t-1}$	Liquid assets are the sum of cash (RCFD0010), federal funds sold & reverse repos [RCFD1350 (before 2002Q1) and RCONB987 + RCFDB989 (from 2002Q1)], and securities excluding MBS/ABS securities [before 2009Q2: RCFD1754+RCFD1773 - (RCFD8500+RCFD8504+RCFDC026+RCFD8503+RCFD8507+RCFDC027). And from 2009Q2: RCFD1754 + RCFD1773 - (RCFDG300 + RCFDG304 + RCFDG308 + RCFDG312 + RCFDG316 + RCFDG320 + RCFDG324 + RCFDG328 + RCFDC026 + RCFDG336 +RCFDG340 + RCFDG344 + RCFDG303 + RCFDG307 + RCFDG311 + RCFDG315 + RCFDG319 + RCFDG323 + RCFDG327 + RCFDG331 + RCFDC027 + RCFDG339 + RCFDG343 + RCFDG347)].
Commercial Loan $_{i,t-1}$	Commercial and industrial loan (RCFD1766), scaled accordingly.
RealEstate_Loans $_{i,t-1}$	Loans secured by real estate (RCFD1410), scaled accordingly.
ROE $_{I,t-1}$	Annualized ROE (in %) in quarter t-1, calculated as net income (RIAD4300, adjust year-to-date reporting to within quarter) divided by beginning equity (RCFD3210).
StDev_ROE $_{i,t-1}$	Standard deviation of ROE measured over 12 rolling quarters (from Quarter $t-12$ to $t-1$).
Capital_Ratio $_{i,t-1}$	Total equity (RCFD3210) divided by total assets (RCFD2170).
Wholesale_Funding $_{i,t-1}$	Wholesale funds are the sum of following: large-time deposits (RCON2604), deposits booked in foreign offices (RCFN2200), subordinated debt and debentures (RCFD3200), gross federal funds purchased and repos [RCFD2800, or (RCONB993+RCFDB995 from 2002q1)], other borrowed money (RCFD3190). Scaled by total assets.
Ln(Assets) $_{i,t-1}$	Log of total assets (RCFD2170).
Unused_Commitments$_{it-1}$	Unused commitments (RCFD3814 + RCFD3816 + RCFD3817 + RCFD3818 + RCFD6550 + RCFD3411) divided by the sum of loans (RCFD1400) and unused commitments.
$\Delta Equity_{i,t-1}$	Annualized growth rate in bank equity (RCFD3210) as a percentage of lagged assets. Dividends are added back (RIAD4460+RIAD4470), stock issuances/repurchases and treasury stock transactions are excluded (RIADB509+RIADB510, or RIAD4346 before 2001Q1), both adjusted from year-to-date to quarterly.
ΔDep_{it}^{I}	Annualized growth rate in insured deposits as a percentage of lagged assets in quarter t and $t+1$ (in %): $(Insured\ Deposits_{i,t+1} - Insured\ Deposits_{i,t-1})/Asset_{i,t-1} *$ 200%. Insured deposits are accounts of \$100,000 or less. After 2006Q2, it includes retirement accounts of \$250,000 or less. From 2009Q3, reporting thresholds on non-retirement deposits increased from \$100,000 to \$250,000. Insured deposits: RCON2702 (before 2006Q2); RCONF049 + RCONF045 (from 2006Q2).

ΔDep_{it}^{U}	Annualized growth rate in uninsured deposits as a percentage of lagged assets (in %) in quarter t and $t+1$. Uninsured deposit is calculated as deposits (RCFD2200) – insured deposits.
ΔLoans$_{it}$	Annualized growth rate in total loans (RCFD1400) as a percentage of lagged assets in quarter t and $t+1$ (in %): $(Loan_{i,t+1} - Loan_{i,t-1})/Asset_{i,t-1} * 200\%$.
ΔCommitments$_{it}$	Annualized growth rate in commitments in quarter t and $t+1$ as a percentage of lagged assets: $(Commitments_{i,t+1} - Commitments_{i,t-1})/Asset_{i,t-1} * 200\%$. Commitments = (RCFD3814 + RCFD3816 + RCFD3817 + RCFD3818 + RCFD6550 + RCFD3411)
$\Delta Credit_{it}$	Sum of *ΔLoans$_{it}$ and ΔCommitments$_{it}$.*
$\Delta Liquid\ Assets_{it}$	Annualized growth in liquid assets as a percentage of lagged assets in quarter t and $t+1$ (in %): $(Liquid\ assets_{i,t+1} - Liquid\ Assets_{i,t-1})/\text{Asset}_{i,t-1} * 200\%$.
Large Time Deposit Rate$_{i,t}$	Annualized average interest rate (in %) over the two quarters $t, t+1$ on large time deposits. Calculated as quarterly interest expense (RIADA517 (RIAD4174 before 1997Q1), adjusted year-to-date reporting to within quarter) divided by average balance of large time deposits (RCONA514 (RCON3345 before 1997Q1)): $(large\ time\ deposit\ interest\ expense\ in\ Qtr\ t\ and\ t+1)/$ $(Avg.large\ time\ deposit\ balance\ in\ Qtr\ t\ and\ t+1)\ ) * 400\%)$.
Core Deposit Rate$_{i,t}$	Annualized average interest rate (in %) over the two quarters $t, t+1$ on core deposits. Core deposits are the sum of transaction deposits, saving deposits, and small time deposits. The average balance items: transaction deposits: RCON3485; savings deposits: RCONB563 + (RCON3486 + RCON3487 before 2001Q1); small time deposits: RCONA529 (RCON3469 before 1997Q1). The interest expense items: transaction deposits: RIAD4508; saving deposits: RIAD0093 (RIAD4509 + RIAD4511 before 2001Q1); small time deposits: RIADA518 (RIAD4512 before 1997Q1), adjusted year-to-date reporting to within quarter.
Public $_{i,t-1}$	Indicator variable equal to 1 if in Quarter $t-1$ the commercial bank is a public company or a subsidiary of a public company. That is, if a bank's Fed ID (RSSD9001), or its bank holding company (RSSD9348) can be linked to a PERMCO. The PERMCO-RSSD link table is from the website of Federal Reserve Bank of New York.
Sophistication $_{i,t-1}$	The average percentage of college education for adults in counties where a bank operates, weighted by the amount of deposits the bank draws from the counties in a given year. The percentage of adults with some college education or above is obtained from U.S. 2000 Census 2000 data. The information on the county-level data (bank branches and dollar deposits) is from the FDIC's Summary of Deposits disclosures.
TimelinessLLP $_{i,t-1}$	The timeliness of LLP (LLP Timeliness) is an indicator variable that equals 1 (0) if the difference in the adjusted R-squared from the following two equations is above (below) sample median: both equations are estimated for each bank-quarter using the bank's observations from the previous 12 quarters: $LLP_t = \beta_0 + \sum_{j=-2}^{-1} \beta_j \Delta NPL_{t+j} + \gamma_1 Capital_{t-1} + \gamma_2 EBLLP_t + \varepsilon_t\ (a)$ and $LLP_t = \beta_0 + \sum_{j=-2}^{1} \beta_j \Delta NPL_{t+j} + \gamma_1 Capital_{t-1} + \gamma_2 EBLLP_t + \varepsilon_t\ \ (b)$.
StDev_Writeoff $_{i,t-1}$	Standard deviation of write-off as a percentage of total loans measured over 12 rolling quarters (from Quarter $t-12$ to $t-1$).
StDev_ROE $_{i,t-1}$	Standard deviation of ROE measured over 12 rolling quarters (from Quarter $t-12$ to $t-1$).
NPL $_{i,t-1}$	The percentage of non-performing loan (RCFD1403+RCFD1407) in total loan.
ROA $_{i,t-1}$	Annualized ROA (in %) in quarter t-1, calculated as net income (RIAD4300, adjust year-to-date reporting to within quarter) divided by beginning assets.

Figure 1: Average *R2* Over Time

This graph plots the average *R2* across banks in the sample over time. *R2* is the adjusted *R2* from estimating Equation (2) for each bank-quarter using 12 quarters rolling window.

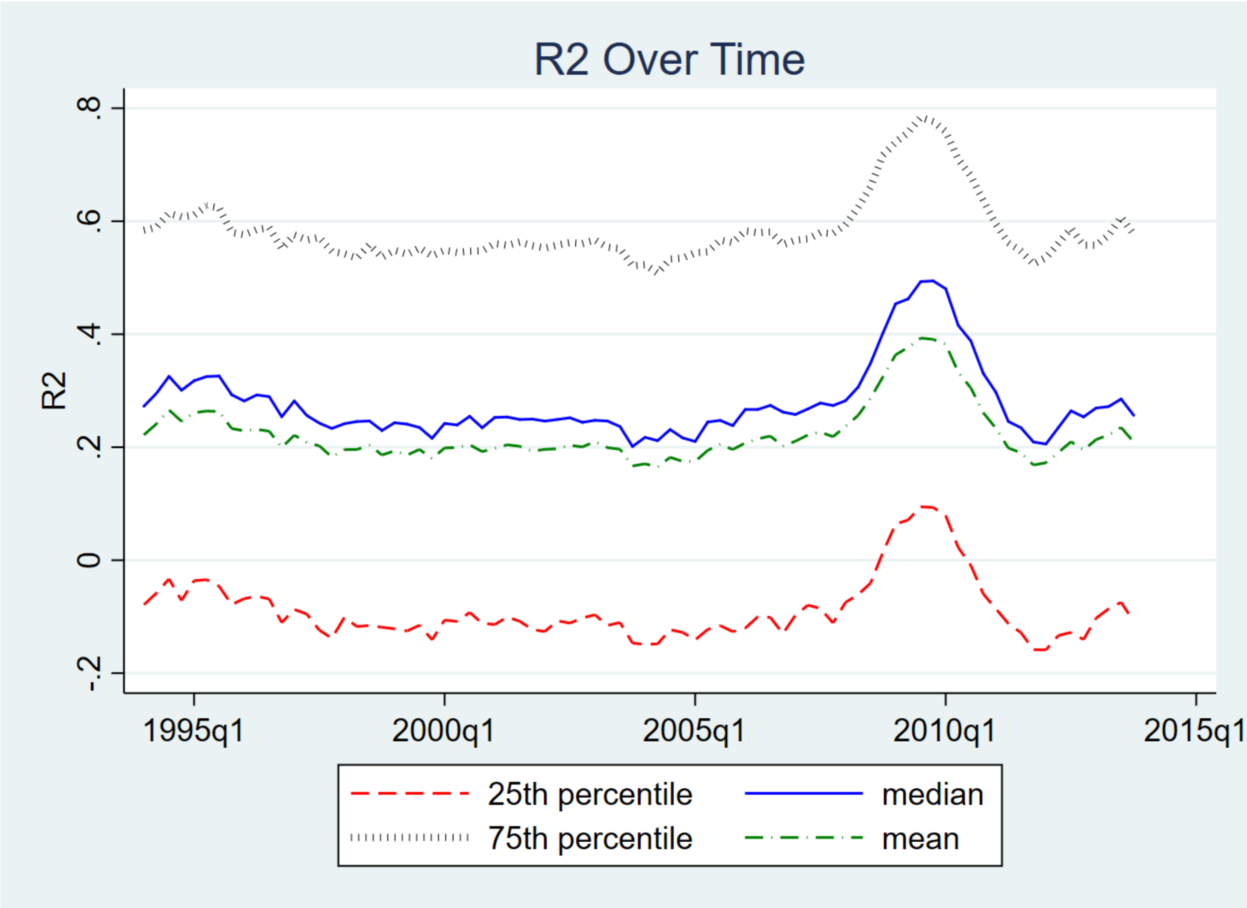

Figure 2: Average *R2* Over Time by Bank Size

This graph plots the average *R2* for three groups of banks over time. *R2* is the adjusted *R2* from estimating Equation (2) for each bank-quarter using 12 quarters rolling window. Small banks have assets below 500 million, large banks have assets above 3 billion, medium banks have assets between 500 million and 3 billion (measured in 2000 real dollars).

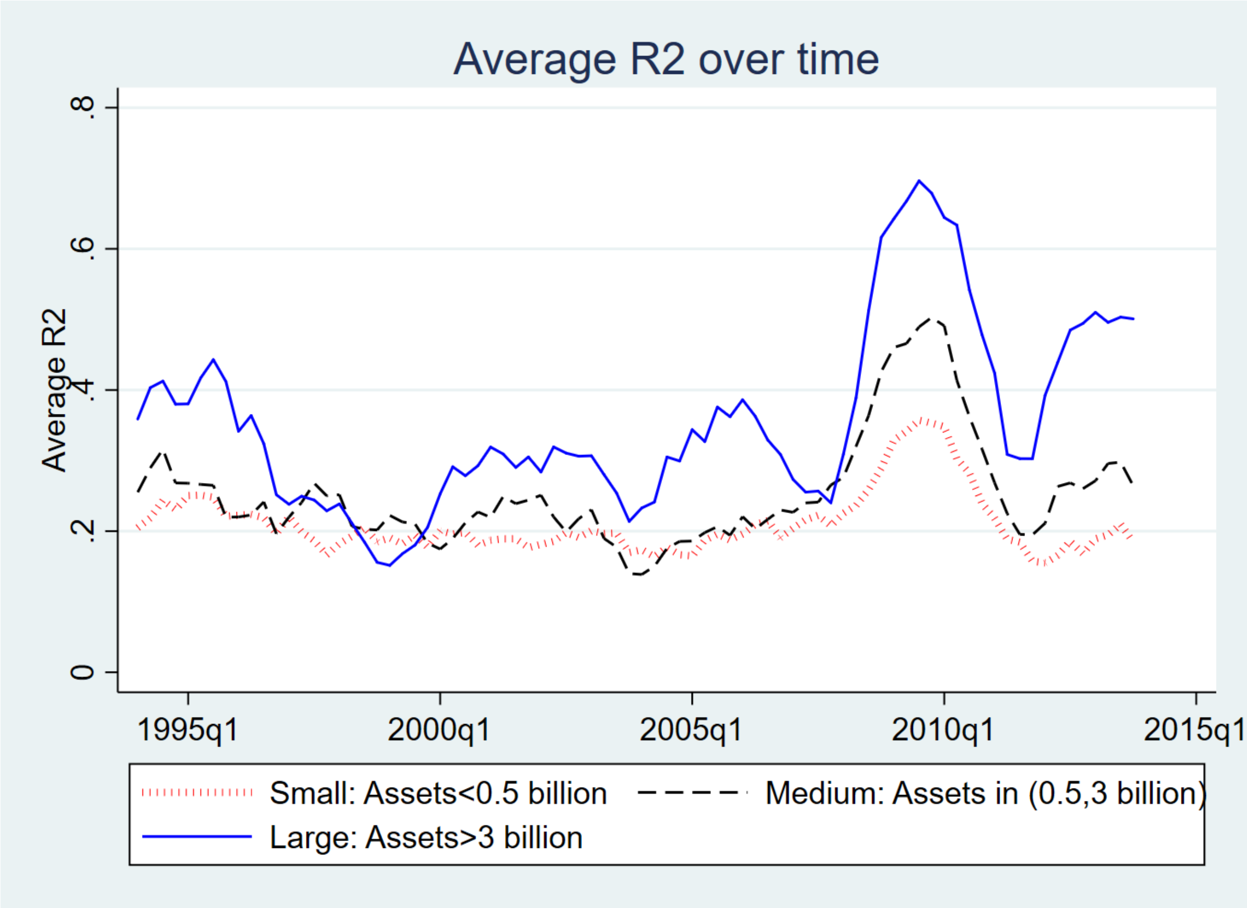

Table 1. Descriptive analyses

Panel A: Summary statistics

This panel presents summary statistics for the main regression variables. These statistics are calculated over the regression sample. To avoid the impact of mergers and acquisitions, we exclude bank-quarter observations with quarterly asset growth greater than 10%. We also exclude bank quarters with total assets smaller than 100 million. See the Appendix for variable definitions.

	N	Mean	Std. Dev.	p10	p25	Median	p75	p90
$R2_{it-1}$	272,840	0.23	0.45	-0.42	-0.09	0.28	0.59	0.79
$Sophistication_{it-1}$	272,840	0.49	0.11	0.34	0.41	0.49	0.56	0.63
$Timeliness_{it-1}$	272,840	0.50	0.50	0.00	0.00	0.50	1.00	1.00
ROE_{it-1}	272,840	10.26	11.36	2.15	6.84	11.22	15.65	20.43
$Capital\_Ratio_{it-1}$	272,840	0.10	0.03	0.07	0.08	0.09	0.11	0.13
$Wholesale\_Funding_{it-1}$	272,840	0.20	0.11	0.08	0.12	0.19	0.26	0.34
$RealEstate\_Loans_{it-1}$	272,840	0.70	0.18	0.46	0.59	0.72	0.83	0.91
$Ln(Assets)_{it-1}$	272,840	12.66	1.10	11.67	11.90	12.36	13.04	13.96
$Unused\_Commitments_{it-1}$	272,840	0.14	0.07	0.05	0.08	0.13	0.18	0.23
ΔDep_{it}^{U}	266,284	1.85	9.98	-7.33	-1.93	2.00	6.51	12.11
ΔDep_{it}^{I}	266,284	2.95	9.45	-4.97	-1.57	1.43	5.23	11.47
$\Delta Loans_{it}$	266,286	4.10	9.18	-5.96	-1.10	3.50	8.72	14.78
$\Delta Commitments_{it}$	266,286	0.96	4.93	-4.09	-1.45	0.53	3.05	6.54
$\Delta Liquid\ Assets_{it}$	182,379	1.09	8.81	-9.03	-3.88	0.62	5.75	11.87
$Large\ Time\ Deposit\ Rate_{it}$	254,394	3.58	1.67	1.27	2.16	3.58	5.02	5.74
$Core\ Deposit\ Rate_{it}$	254,455	2.47	1.39	0.64	1.27	2.37	3.67	4.36
$StDev\_ROE_{it-1}$	264,223	5.72	11.43	1.18	1.78	2.94	5.50	11.53
ROA_{it-1}	272,840	0.98	0.96	0.21	0.69	1.08	1.44	1.85
NPL_{it-1}	272,840	1.57	2.44	0.11	0.34	0.83	1.80	3.63
$\Delta Equity_{i,t-1}$	272,840	1.08	1.61	-0.24	0.52	1.09	1.67	2.39

Panel B: Pairwise correlation for main variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	*R2* $_{it-1}$	1.00																
2	*ROE* $_{it-1}$	-0.11	1.00															
3	*StDev_ROE* $_{it-1}$	0.05	-0.29	1.00														
4	*Capital_Ratio* $_{it-1}$	-0.01	0.00	-0.13	1.00													
5	*Wholesale_Funding* $_{it-1}$	0.05	-0.11	0.09	-0.16	1.00												
6	*RealEstate_Loans* $_{it-1}$	0.02	-0.16	0.06	-0.06	-0.01	1.00											
7	*Ln(Assets)* $_{it-1}$	0.10	0.00	0.03	-0.02	0.20	-0.06	1.00										
8	*Unused_Commitments*$_{it-1}$	0.02	0.15	-0.10	-0.09	-0.02	-0.17	0.39	1.00									
9	ΔDep_{it}^{U}:*Uninsured Deposit Flows*$_{it}$	-0.06	0.17	-0.08	0.02	-0.04	-0.05	0.01	0.10	1.00								
10	ΔDep_{it}^{I}: *Insured Deposit Flows*$_{it}$	0.04	0.03	-0.08	-0.01	0.06	0.00	-0.01	0.03	-0.50	1.00							
11	$\Delta Loans_{it}$	-0.06	0.31	-0.21	-0.02	-0.01	-0.05	0.01	0.23	0.24	0.22	1.00						
12	Δ*Commitments*$_{it}$	-0.04	0.14	-0.06	0.00	-0.04	-0.06	0.02	-0.02	0.14	0.03	0.21	1.00					
13	$\Delta Liquid\ Assets_{it}$	0.01	0.02	-0.02	0.03	0.00	-0.02	-0.01	-0.03	0.31	0.22	-0.21	0.04	1.00				
14	*Large Time Deposit Rate*$_{it}$	0.00	0.14	-0.16	-0.11	0.09	-0.03	-0.04	0.06	0.02	0.07	0.17	0.00	-0.04	1.00			
15	*Core Deposit Rate*$_{it}$	0.00	0.09	-0.13	-0.11	0.16	-0.04	-0.11	-0.03	0.01	0.09	0.16	-0.02	-0.03	0.85	1.00		
16	$\Delta Equity_{i,t-1}$	-0.06	0.60	-0.14	0.15	-0.05	-0.13	0.02	0.08	0.11	0.04	0.18	0.09	0.02	0.12	0.09	1.00	
17	$Timeliness_{i,t-1}$	0.05	-0.04	0.03	0.00	0.01	0.00	0.04	0.01	-0.02	0.01	-0.03	-0.02	0.01	-0.02	-0.02	-0.02	1.00
18	*Sophistication* $_{it-1}$	0.06	-0.07	0.10	-0.08	0.04	0.10	0.24	0.32	0.03	0.00	0.04	0.03	-0.01	-0.03	-0.05	-0.03	0.02

Panel C: R2 and Banks' Asset Side Characteristics

This panel presents the association between *R2* and banks' asset side characteristics. The dependent variable is the adjusted R2 from estimating Equation (2) for each bank-quarter using a 12-quarter rolling window. *Real Estate Loan* $_{it}$ is the ratio of real estate loans (RCFD1410) to total assets. *Commercial Loan* $_{it}$ is the ratio of commercial and industrial loans (RCFD1766) to total assets. *Liquid Assets* $_{it}$ is the ratio of liquid assets to total assets. *Ln(Assets)* $_{it}$ is the log of total assets. The first column includes both bank and quarter fixed effects, the second includes bank fixed effects, and the third includes quarter fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	$R2_{it}$	$R2_{it}$	$R2_{it}$	$R2_{it}$
Liquid Assets $_{it}$	0.100**	-0.028	-0.060**	-0.107***
	(2.085)	(-0.592)	(-2.226)	(-3.987)
RealEstateLoan $_{it}$	0.141***	0.280***	0.080***	0.103***
	(2.750)	(5.651)	(3.892)	(4.998)
Commercial Loan $_{it}$	-0.016	0.035	0.035	0.026
	(-0.205)	(0.441)	(0.932)	(0.685)
Ln(Assets) $_{it}$	0.039***	0.080***	0.040***	0.040***
	(3.155)	(8.706)	(17.669)	(17.840)
Bank FE	Yes	Yes	No	No
Quarter FE	Yes	No	Yes	No
Observations	177,579	177,579	177,579	177,579
Adjusted R-squared	0.168	0.153	0.030	0.013

Table 2. Transparency and Sensitivity of Deposit Flows to Bank Performance

Panel A: Transparency and flow-performance sensitivity

This panel presents ordinary least-squares estimates of Equation (3). The dependent variable in Column (1) is the change in the uninsured deposits scaled by the beginning value of total assets. The dependent variable in Column (2) is the change in insured deposits, and in Column (3) is the difference in changes in uninsured and insured deposits, all scaled by beginning value of total assets. The Appendix contains detailed descriptions for the independent variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔDep_{it}^{U}	ΔDep_{it}^{I}	$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$	ΔDep_{it}^{U}	ΔDep_{it}^{I}	$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$
ROE_{it-1}				0.064***	0.076***	-0.012**
				(20.745)	(23.488)	(-2.456)
$R2_{it-1} \times ROE_{it-1}$				0.020***	-0.020***	0.040***
				(4.441)	(-4.239)	(5.538)
$R2_{it-1}$	-0.172***	-0.058	-0.120*	-0.307***	0.212***	-0.526***
	(-3.752)	(-1.269)	(-1.740)	(-4.647)	(3.050)	(-4.975)
Large Time Deposit Rate$_{it-1}$	-0.024			-0.014		
	(-0.798)			(-0.492)		
Core Deposit Rate$_{it-1}$		0.508***			0.547***	
		(6.962)			(7.43)	
Large Time – Core rate$_{it-1}$			0.034			0.034
			(0.821)			(0.823)
Capital_Ratio$_{it-1}$	36.017***	30.078***	7.416***	33.923***	28.481***	6.984***
	(18.020)	(14.108)	(3.081)	(17.847)	(14.080)	(2.911)
Wholesale_Funding$_{it-1}$	6.470***	10.033***	-3.536***	6.185***	9.805***	-3.564***
	(10.734)	(15.340)	(-4.159)	(10.490)	(15.422)	(-4.189)
RealEstate_Loans$_{it-1}$	-1.290***	-1.589***	0.368	-1.233***	-1.521***	0.364
	(-3.143)	(-3.768)	(0.737)	(-3.112)	(-3.708)	(0.730)
Ln(Assets)$_{it-1}$	-3.134***	-2.926***	-0.339**	-3.067***	-2.897***	-0.306**
	(-22.670)	(-20.234)	(-2.215)	(-22.602)	(-20.305)	(-1.994)
Unused_Commitments$_{it-1}$	12.123***	13.195***	-0.970	9.621***	10.825***	-1.098
	(15.164)	(17.189)	(-0.995)	(12.531)	(14.813)	(-1.128)
Bank and Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	257,161	257,240	256,712	257,161	257,240	256,712
Adj. R-squared	0.313	0.337	0.389	0.317	0.341	0.389

Table 2 (Cont'd): *Panel* B*: Main results in subsamples of small, medium, and large banks*

This panel presents the results in Panel A separately for small, medium, and large banks.

	Assets ∈ (100, 500 million)			Assets ∈ (500 million, 3 billion)			Assets > 3 billion		
Dependent variable	ΔDep_{it}^{U}	ΔDep_{it}^{I}	$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$	ΔDep_{it}^{U}	ΔDep_{it}^{I}	$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$	ΔDep_{it}^{U}	ΔDep_{it}^{I}	$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ROE_{it-1}	0.059***	0.078***	-0.018***	0.080***	0.074***	0.007	0.092***	0.024	0.065**
	(17.558)	(21.846)	(-3.362)	(10.028)	(8.629)	(0.513)	(5.432)	(1.460)	(2.541)
R2 it-1 × ROE it-1	0.016***	-0.015***	0.031***	0.019	-0.032***	0.050***	0.017	-0.051**	0.073**
	(3.234)	(-2.796)	(3.826)	(1.617)	(-2.762)	(2.679)	(0.873)	(-2.494)	(2.463)
R2 it-1	-0.272***	0.132*	-0.408***	-0.356*	0.470***	-0.829***	-0.088	0.749**	-0.931*
	(-3.787)	(1.707)	(-3.487)	(-1.929)	(2.582)	(-2.855)	(-0.263)	(2.133)	(-1.941)
Large Time Deposit Rate it-1	0.054*			-0.087			-0.183		
	(1.656)			(-1.063)			(-1.537)		
Core Deposit Rate it-1		0.542***			0.602***			0.234	
		(6.479)			(3.486)			(0.935)	
Large Time – Core rate it-1			0.027			0.052			0.011
			(0.583)			(0.445)			(0.068)
Capital_Ratio it-1	38.778***	32.525***	7.077**	28.446***	28.873***	3.443	17.516**	2.784	15.591*
	(17.394)	(13.685)	(2.487)	(6.017)	(5.589)	(0.499)	(2.514)	(0.378)	(1.709)
Wholesale_Funding it-1	8.032***	12.681***	-4.545***	10.717***	12.526***	-1.597	1.989	9.639***	-7.483***
	(11.035)	(17.088)	(-4.102)	(7.025)	(8.376)	(-0.708)	(0.994)	(4.426)	(-2.591)
RealEstate_Loans it-1	-0.656	-1.149**	0.607	-2.105*	-1.966	-0.208	-2.588	0.240	-2.430
	(-1.457)	(-2.494)	(1.054)	(-1.831)	(-1.616)	(-0.137)	(-1.416)	(0.160)	(-1.140)
Ln(Assets) it-1	-5.498***	-4.546***	-1.090***	-5.155***	-4.461***	-1.045*	-2.102***	-2.323***	0.107
	(-29.920)	(-24.479)	(-4.306)	(-14.051)	(-11.226)	(-1.937)	(-4.815)	(-4.763)	(0.184)
Unused_Commitments it-1	11.678***	12.893***	-1.134	8.823***	9.431***	-0.884	0.266	5.434*	-4.710
	(13.767)	(15.492)	(-0.984)	(4.762)	(5.220)	(-0.389)	(0.073)	(1.836)	(-1.003)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	204,765	204,856	204,594	41,515	41,459	41,363	10,881	10,925	10,755
Adj. R-squared	0.329	0.367	0.404	0.345	0.321	0.386	0.200	0.190	0.231

Panel C: Asymmetric effects of transparency on flow-performance sensitivity

This panel explores whether the effect of transparency on flow-performance sensitivity differs by bank performance. Odd (Even) numbered columns present the results for deposit flow-performance sensitivity using ordinary least-squares estimates of Equation (2) for the subsample of bank-quarters with below (above) median ROEs. The Appendix contains detailed descriptions for all variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent variable	ΔDep_{it}^{U}		ΔDep_{it}^{I}		$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low ROE	*High ROE*	*Low ROE*	*High ROE*	*Low ROE*	*High ROE*
ROE_{it-1}	0.050***	0.037***	0.076***	0.015*	-0.028***	0.023*
	(11.765)	(4.251)	(16.865)	(1.836)	(-3.968)	(1.856)
$R2_{it-1} \times ROE_{it-1}$	0.022***	-0.001	-0.030***	-0.008	0.053***	0.007
	(3.550)	(-0.105)	(-4.379)	(-0.672)	(5.052)	(0.328)
$R2_{it-1}$	-0.241***	0.013	0.201***	0.109	-0.448***	-0.090
	(-3.304)	(0.057)	(2.691)	(0.505)	(-3.835)	(-0.258)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	130,173	126,539	130,173	126,539	130,173	126,539
Adj. R-squared	0.392	0.218	0.432	0.238	0.478	0.257

Table 3. Transparency and Sensitivity of Deposit Rates to Performance

This table presents ordinary least-squares estimates of Equation (3) with deposit rates as the dependent variable. Column (1) models rates on large time deposits and Column (2) models rates on core deposits. The Appendix contains detailed descriptions for the independent variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent variable	*Large time deposit rate*$_{it}$	*Core deposit rate*$_{it}$
	(1)	(2)
ROE_{it-1}	-0.000	-0.001***
	(-1.246)	(-3.035)
$R2_{it-1} \times ROE_{i,t-1}$	-0.001***	-0.001**
	(-2.751)	(-2.013)
$R2_{it-1}$	0.002	0.009**
	(0.360)	(2.016)
$Capital\_Ratio_{it-1}$	-0.824***	-1.587***
	(-3.970)	(-8.723)
$Wholesale\_Funding_{it-1}$	0.313***	-0.047
	(5.333)	(-0.860)
$RealEstate\_Loans_{it-1}$	0.027	-0.096**
	(0.551)	(-2.342)
$Ln(Assets)_{it-1}$	0.052***	0.132***
	(3.740)	(9.461)
$Unused\_Commitments_{it-1}$	0.136*	-0.315***
	(1.896)	(-4.545)
Bank fixed effects	Yes	Yes
Quarter fixed effects	Yes	Yes
Observations	253,965	253,965
Adj. R-squared	0.900	0.938

Table 4. Transparency and Reliance on Internal Equity to Fund Assets

This table presents ordinary least-squares estimates of Equation (6). The dependent variable is changes in the balance of total loans in Columns (1), the changes in the balance of total commitments in Columns (2), the changes in the sum of loans and commitment in Column (3), and changes in the balances of liquid assets in Columns (4). All dependent variables are scaled by lagged total assets. The Appendix contains detailed descriptions for the independent variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent Variable	$\Delta Loans_{it}$	$\Delta Commitments_{it}$	$\Delta Credit_{it}$	$\Delta Liquid\ Assets_{it}$
	(1)	(2)	(3)	(4)
$\Delta Equity_{i,t-1}$	0.474***	0.182***	0.660***	0.039*
	(22.964)	(17.489)	(24.888)	(1.890)
$R2_{it-1}$ X $\Delta Equity_{i,t-1}$	0.244***	0.086***	0.330***	-0.071**
	(7.701)	(5.573)	(8.098)	(-2.208)
$R2_{it-1}$	-0.717***	-0.260***	-0.968***	0.126*
	(-10.783)	(-7.905)	(-11.541)	(1.851)
$Capital\_Ratio_{it-1}$	12.443***	-0.350	12.096***	45.515***
	(4.216)	(-0.246)	(3.356)	(17.967)
$Wholesale\_Funding_{it-1}$	-2.115***	-0.313	-2.506**	6.475***
	(-2.712)	(-0.759)	(-2.537)	(10.162)
$RealEstate\_Loans_{it-1}$	-0.683	-4.088***	-4.863***	-1.400**
	(-1.002)	(-12.208)	(-6.091)	(-2.440)
$Ln(Assets)_{it-1}$	-3.800***	-1.636***	-5.425***	-3.802***
	(-18.841)	(-14.798)	(-22.030)	(-21.682)
$Unused\_Commitments_{it-1}$	54.618***	-35.437***	16.147***	-16.490***
	(40.604)	(-42.153)	(10.978)	(-16.399)
Bank fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Observations	246,713	246,713	246,713	181,586
Adj. R-squared	0.303	0.143	0.260	0.069

Table 5. Transparency and Bank Performance

This table explores the association between transparency and bank performance. The dependent variable is return on equity (*ROE*) for columns (1) – (3), and ROA for Columns (4) – (6). The Appendix contains detailed descriptions for the independent variables. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent variable	ROE_{it}			ROA_{it}		
	(1)	(2)	(3)	(4)	(5)	(6)
$R2_{it}$	-1.405***	-0.945***	-0.685***	-0.121***	-0.083***	-0.061***
	(-17.341)	(-14.979)	(-12.246)	(-17.596)	(-16.018)	(-13.192)
$Capital\_Ratio_{it}$	-12.783***	27.814***	-10.215***	6.123***	7.875***	6.355***
	(-4.761)	(6.351)	(-3.081)	(24.388)	(22.471)	(22.755)
$Wholesale\_Funding_{it}$	-7.527***	3.184***	-1.151	-0.661***	0.159**	-0.194***
	(-10.055)	(3.272)	(-1.386)	(-10.189)	(2.013)	(-2.865)
$RealEstate\_Loans_{it}$	-7.024***	-1.046	0.339	-0.657***	-0.044	0.070
	(-16.377)	(-1.457)	(0.559)	(-17.000)	(-0.720)	(1.359)
$In(Assets)_{it}$	0.111	-0.655***	-1.086***	0.003	-0.023	-0.055***
	(1.638)	(-2.974)	(-5.774)	(0.551)	(-1.282)	(-3.665)
$Unused\_Commitments_{it}$	10.333***	34.857***	19.002***	0.630***	2.777***	1.505***
	(9.701)	(24.041)	(16.805)	(6.836)	(24.341)	(16.699)
$StDev\_ROE_{it}$			-0.900***			
			(-50.348)			
$StDev\_ROA_{it}$						-0.889***
						(-57.312)
Bank fixed effects	No	Yes	Yes	No	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	272,840	272,840	264,137	272,840	272,840	264,137
Adj. R-squared	0.168	0.432	0.519	0.189	0.457	0.538

Table 6: Are the inferences confounded by information sources other than call reports?

Panel A: Unconditional variation in uninsured deposit flows

This panel examines how does the unconditional volatility of uninsured deposit flows varies with the level of bank transparency. The dependent variable is the logarithm of the standard deviation of uninsured deposit flows during the 12-quarter periods over which the *R2* is estimated. The Appendix contains detailed descriptions for the independent variables. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent variable	$Log(\sigma(\Delta Dep^U))$	
	(1)	(2)
$R2_{it}$	0.020***	0.016***
	(3.646)	(3.567)
$Capital\_Ratio_{it}$	-1.691***	-1.195***
	(-8.266)	(-4.686)
$Wholesale\_Funding_{it}$	0.772***	0.361***
	(13.726)	(4.918)
$RealEstate\_Loans_{it}$	-0.459***	-0.322***
	(-13.038)	(-5.637)
$In(Assets)_{it}$	-0.113***	-0.047**
	(-20.641)	(-2.472)
$Unused\_Commitments_{it}$	1.357***	0.592***
	(17.869)	(6.866)
Bank fixed effects	No	Yes
Quarter fixed effects	Yes	Yes
Observations	161,189	161,189
Adj. R-squared	0.429	0.708

Panel B: Exploring variations in transparency within public and private banks

This panel explores the effect of transparency as measured by *R2* within the subset of public and private banks separately. A commercial bank is classified as public if its Fed ID (RSSD9001), or its bank holding company (RSSD9348) can be linked to a PERMCO using the PERMCO-RSSD link table from the website of Federal Reserve Bank of New York. The Appendix contains detailed descriptions for all variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent variable	ΔDep_{it}^{U}		ΔDep_{it}^{I}		$\Delta Dep_{it}^{U} - \Delta Dep_{it}^{I}$	
Subsample	Public	Private	Public	Private	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)
ROE_{it-1}	0.066***	0.061***	0.063***	0.076***	0.002	-0.014***
	(8.687)	(17.852)	(7.959)	(21.688)	(0.192)	(-2.697)
$R2_{it-1} \times ROE_{it-1}$	0.029***	0.019***	-0.034***	-0.015***	0.062***	0.033***
	(2.645)	(3.810)	(-2.971)	(-2.833)	(3.587)	(4.219)
$R2_{it-1}$	-0.399**	-0.313***	0.400**	0.152**	-0.790***	-0.473***
	(-2.225)	(-4.412)	(2.109)	(2.012)	(-2.777)	(-4.129)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	49,356	207,805	49,365	207,875	49,165	207,547
Adj. R-squared	0.281	0.360	0.272	0.397	0.303	0.439

Table 7: Do the results reflect differences in fundamental volatility?

This table explores the robustness of our main results in Table 2 to inclusion of controls for volatility of fundamentals. Columns (1) – (3) present the results with standard deviation of *ROE* and Columns (4) – (6) with standard deviation of *Writeoffs* as the proxy for fundamental volatility. The Appendix contains detailed descriptions for all variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Dependent variable	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$
	(1)	(2)	(3)	(4)	(5)	(6)
ROE_{it-1}	0.036	0.167***	-0.129***	0.023	0.160***	-0.137***
	(1.102)	(5.065)	(-2.645)	(0.716)	(5.049)	(-2.842)
$R2_{it-1} \times ROE_{it-1}$	0.017***	-0.015***	0.033***	0.015***	-0.022***	0.038***
	(3.817)	(-3.302)	(4.474)	(3.429)	(-4.718)	(5.235)
$R2_{it-1}$	-0.264***	0.156**	-0.427***	-0.250***	0.246***	-0.507***
	(-3.997)	(2.251)	(-4.018)	(-3.773)	(3.504)	(-4.750)
$StDev\_ROE_{it-1} \times ROE_{it-1}$	-0.000*	0.001	-0.001***			
	(-1.783)	(1.506)	(-3.480)			
$StDev\_ROE_{it-1}$	-0.019***	-0.059***	0.041***			
	(-3.727)	(-5.454)	(4.803)			
$StDev\_Writeoff_{it-1} \times ROE_{it-1}$				0.031***	0.080***	-0.036***
				(2.653)	(6.952)	(-2.577)
$StDev\_Writeoff_{it-1}$				-1.097***	-2.751***	1.895***
				(-4.119)	(-6.873)	(4.145)
Large Time Deposit Rate$_{it-1}$	-0.029			-0.016		
	(-0.984)			(-0.553)		
Core Deposit Rate$_{it-1}$		0.474***			0.500***	
		(6.617)			(7.072)	
Large Time – Core rate$_{it-1}$			-0.004			0.024
			(-0.094)			(0.566)
$Capital\_ratio_{it-1}$	32.847***	23.785***	10.218***	33.045***	28.014***	5.911**
	(15.753)	(10.226)	(3.686)	(16.491)	(13.261)	(2.259)
$Wholesale\_funding_{it-1}$	4.812***	10.462***	-5.562***	4.947***	10.717***	-5.665***
	(7.315)	(14.963)	(-5.619)	(7.711)	(15.517)	(-5.817)
$RealEstate\_loans_{it-1}$	-1.578***	-0.818*	-0.684	-1.658***	-1.461***	-0.143
	(-3.469)	(-1.731)	(-1.178)	(-3.741)	(-3.118)	(-0.247)
$In(Assets)_{it-1}$	-3.050***	-2.911***	-0.261*	-3.054***	-2.926***	-0.246
	(-21.780)	(-19.807)	(-1.664)	(-22.439)	(-20.446)	(-1.601)
$Unused\_Commitment_{it-1}$	7.664***	11.864***	-3.941***	8.271***	13.073***	-4.646***
	(8.345)	(12.912)	(-3.116)	(9.106)	(14.567)	(-3.737)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	249,102	249,183	248,675	257,161	257,240	256,712
Adj. R-squared	0.320	0.348	0.395	0.317	0.343	0.390

Table 8: Other robustness checks

Panel A: Alternative transparency measures

This panel explores the robustness of our main results to alternative transparency measures. *R2writeoff4* is the adjusted R2 from estimating Equation (2) using write-off in the leading 4 quarters as the dependent variable. *Timeliness of LLP* is an indicator variable that equals 1(0) if the incremental adj. R-squared from estimating equations (a) and (b), as outlined in the Appendix, is above (below) the sample median. The Appendix contains detailed descriptions for all variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Transparency measure	*R2(4 quarters of write-off)*			*Timeliness of LLP*			*Depositor Sophistication*		
Dependent variable	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ROE $_{it-1}$	0.066***	0.077***	-0.010**	0.067***	0.072***	-0.004	0.045***	0.061***	-0.016
	(20.567)	(21.841)	(-2.003)	(20.222)	(20.311)	(-0.761)	(3.584)	(4.699)	(-0.767)
Transparency $_{it-1}$ × *ROE* $_{it-1}$	0.012**	-0.019***	0.031***	0.007*	-0.006	0.013*	0.051**	0.016	0.036
	(2.521)	(-3.757)	(3.994)	(1.785)	(-1.388)	(1.940)	(2.025)	(0.619)	(0.893)
Transparency $_{it-1}$	-0.298***	0.250***	-0.554***	-0.111*	0.041	-0.151	9.563***	8.333***	1.330
	(-4.312)	(3.397)	(-4.979)	(-1.957)	(0.672)	(-1.591)	(4.040)	(2.910)	(0.410)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	257,053	257,135	256,611	257,161	257,240	256,712	257,161	257,240	256,712
Adj. R-squared	0.317	0.342	0.389	0.316	0.341	0.389	0.317	0.341	0.389

Panel B: Alternative performance measures

This table explores the robustness of our main results to use of four alternative bank performance measures– (i) return on assets, (ii) change in equity capital, (iii) loan loss provisions, and (iv) non-performing loans. The Appendix contains detailed descriptions for all variables. All regressions include bank- and quarter-fixed effects. T-statistics, reported in parentheses, are based on standard error estimates clustered at the bank level. Statistical significance (two-sided) at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Performance measure	*ROA*			*Change in Equity*		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$
$Perf_{it-1}$	0.711***	0.828***	-0.101*	0.184***	0.168***	0.016
	(19.077)	(21.807)	(-1.778)	(12.935)	(12.251)	(0.749)
$R2_{it-1} \times Perf_{it-1}$	0.276***	-0.199***	0.473***	0.092***	-0.035	0.125***
	(5.272)	(-3.615)	(5.641)	(3.792)	(-1.464)	(3.256)
$R2_{it-1}$	-0.376***	0.201***	-0.578***	-0.209***	-0.027	-0.187***
	(-5.274)	(2.680)	(-5.088)	(-4.410)	(-0.562)	(-2.587)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	257,161	257,240	256,712	257,161	257,240	256,712
Adj. R-squared	0.339	0.362	0.409	0.337	0.360	0.409

Performance measure	*Loan Loss Provision*			*Non-performing Loan*		
	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$	ΔDep^U	ΔDep^I	$\Delta Dep^U - \Delta Dep^I$
$Perf_{it-1}$	-1.709***	-1.541***	-0.135	-0.326***	-0.475***	0.158***
	(-12.613)	(-10.955)	(-0.616)	(-17.693)	(-20.087)	(6.010)
$R2_{it-1} \times Perf_{it-1}$	-0.742***	0.342	-1.173***	-0.114***	0.067**	-0.187***
	(-3.484)	(1.517)	(-3.329)	(-4.919)	(2.409)	(-5.114)
$R2_{it-1}$	-0.017	-0.059	0.047	0.052	-0.102*	0.156*
	(-0.341)	(-1.199)	(0.619)	(0.931)	(-1.757)	(1.836)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	257,161	257,240	256,712	257,161	257,240	256,712
Adj. R-squared	0.337	0.360	0.409	0.339	0.365	0.409