Bank Transparency and Deposit Flows*

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Abstract: Based on a large sample of U.S. banks from 1994-2013, we find a significantly positive relation between bank transparency and the sensitivity of uninsured deposit flows to bank performance. In addition, more transparent banks rely much more strongly on their equity to finance illiquid assets. These findings demonstrate both the costs and benefits of bank transparency. It makes deposits, which are banks' main funding sources, more sensitive to bank performance and therefore can act as a discipline on banks' risk taking behavior, but it also reduces banks' unique role in liquidity transformation and the creation of safe money-like claims.

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1. Introduction

Transparency in banking is a hotly debated issue. On the one hand, regulators tend to demand more transparency in banks motivated by a history of crises that are often blamed on opacity. Indeed, a key component of the international regulatory framework (Basel III) adopted in response to the 2008 crisis is to strengthen bank transparency. One of the key developments of financial regulation following the crisis, banks' stress tests, involves an unprecedented amount of disclosure on financial institutions. On the other hand, it is often argued that transparency has significant disadvantages in banking given banks' role in liquidity provision and risk sharing and the fact that they are prone to runs. The overall tradeoff is still being evaluated (Goldstein and Sapra (2014)).

While the theory on bank transparency and its role in banks' ability to perform their different functions developed quickly in recent years, there is not much empirical work on the topic. The empirical facts, however, are critical for the debate. Does increased transparency allow stakeholders to discipline and monitor banks more strongly? Does it interfere in the role of banks as liquidity providers? These are the key arguments that are often made on the two sides of the policy debate, and are strongly motivated by the different theories, but the literature has not established how prevalent they are in the data.

In this paper, we aim to make progress in this direction by studying empirically the effect of bank transparency on deposit flows and the resulting consequences for bank operations. Our study is based on a large sample of U.S. banks in the years 1994-2013. We focus on deposits because of their prominent role in the funding structure of U.S. commercial banks. According to Hanson et al. (2015), deposits consistently represent over three-quarters of the funding for the U.S. commercial banks and, in the largest commercial banks, approximately half of deposits are uninsured. Moreover, deposits have a key role in the different theories of banking mentioned above, either those emphasizing liquidity creation or those emphasizing monitoring. Yet, we know very little about the way bank depositors are affected by bank transparency.

A key challenge in the empirical analysis is to properly measure the degree of bank transparency. Ideally, a measure of transparency has to capture the amount of information depositors (or other bank stakeholders) have when they make decisions, but clearly this can only be measured with noise. As econometricians, we do not observe the information available to depositors. Hence, in this empirical study, we rely on three different measures that highlight different notions of transparency.

The first and main notion of transparency, *asset transparency*, captures the quality of financial information available from a bank about its underlying asset values. We measure this using the information disclosed in banks' Call reports. Specifically, we construct a measure of asset transparency based on the ability of key financial metrics disclosed by the 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.

The second notion of transparency, *market transparency*, captures proliferation of sources of information available about the bank. A natural way to capture this for U.S. banks is to say that banks with publicly traded equities have more market transparency. This is because on top of the disclosure requirements for the private banks, public banks have to release additional information to meet the requirements by the SEC and the stock exchanges. Moreover, the secondary trading markets for public banks also produce a large amount of information about their performance, including, for example, information reflected in banks' share prices and information produced by analysts and other intermediaries.

The third notion of transparency refers to a bank as transparent when its depositors are more sophisticated and have lower costs in processing financial information. We thus refer to this notion as *depositor sophistication*. This notion of transparency is explicitly considered in Dang et al. (2017), where more sophisticated depositors incur lower costs to acquire bank-specific information, and so banks with more sophisticated depositors are less able to create stable deposits. We construct this measure based on population characteristics in the bank's areas of operation. 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 begin our empirical investigation by examining how the sensitivity of uninsured deposit flows to bank performance varies with the level of bank transparency. We focus on uninsured deposits as they allow us to assess the effect of transparency on banks' ability to create stable, money-like deposits without the support of government backed deposit insurance. Our specification controls for bank- and time-fixed effects, as well as time-varying differences in bank characteristics, such as size, capital ratios, and asset compositions. We find that uninsured deposits indeed exhibit significantly greater flow-performance sensitivity in more transparent banks, across the three measures of transparency. Hence, it appears that uninsured depositors are alert to the information on the bank and respond to it in their behavior when this information becomes more precise.

Importantly, the same effect is not observed for the insured deposits. While insured deposits are sensitive to bank performance, as has been documented in previous literature, the sensitivity does not increase with transparency. Specifically, it does not differ between public and private banks, or among banks with different depositor sophistication. It is actually significantly lower for banks with more asset transparency.[1] Overall, the within-bank sensitivity of the difference between uninsured and insured deposit flows to bank performance is significantly higher in more transparent banks across the three measures of transparency. This last analysis helps alleviate the concern that transparency is correlated with unobservable bank characteristics (such as the quality of banks' non-deposit related service) and that this is driving the response of depositors' behavior to performance. Such unobservable bank characteristics would not lead to the results on the difference in sensitivity between different types of deposits.

We also explore the interaction between performance, transparency, and the deposit rates offered by banks. Specifically, we examine whether deposit rates in transparent banks respond to their performance differently from opaque banks. We find some evidence that the rates offered to uninsured deposits are more sensitive to bank performance in transparent banks. We find even stronger evidence that the sensitivity of rates on core deposits (most of them are insured) to bank performance is higher in more transparent banks. These findings suggest that transparent banks act to substitute uninsured deposits with insured deposits in times of poor performance. They do this by increasing the rates offered to insured deposits. The substitution appears to be effective as the sensitivity of total deposits to bank performance does not vary by transparency. Of course, the substitution comes at a cost because of the higher deposit rates and insurance premium.

Another important dimension is the effect of transparency on banks' activities in liquidity transformation. Banks are known to hold illiquid assets against liquid liabilities, but this might be harmed by greater transparency. Dang et al. (2017) show that opaque banks can better fund illiquid assets because they can provide better risk-sharing arrangements to depositors and therefore are better able to attract deposits. Parlatore (2015) shows that more transparent banks are less willing to fund illiquid loans through deposit financing, because they are more subject to

[1] This is probably due to the response of deposit rates explored below.

depositor withdrawal and therefore are more concerned about having to prematurely dispose illiquid loan investments at a loss to meet deposit withdrawals. This implies that a transparent bank's decision to fund an illiquid loan will be more dependent on the availability of internal equity. Indeed, we find that loan growth for more transparent banks is significantly more sensitive to changes in their internal equity capital. In contrast to illiquid loans, we do not find a similar amplification of sensitivity for growth in liquid assets.

Overall, our results empirically demonstrate the tradeoff associated with bank transparency. On the one hand, uninsured deposits indeed exert discipline on the bank by responding to performance when it is more informative. This is consistent with theories such as Calomiris and Kahn (1991) and Diamond and Rajan (2001) who argue for the disciplinary role of bank deposits when banks are funding illiquid assets. The view coming out of prior empirical literature on this point has been mixed. While some studies found that deposit flows (both insured and uninsured) are positively related to bank performance (e.g., Goldberg and Hudgins (1996) Peria and Schmukler (2001)), deposits are overall considered to be a stable source of funding (e.g., Ivashina and Scharfstein (2010)). As far as we know, we are the first ones to empirically link the monitoring role of deposits to the transparency of the bank.

On the other hand, transparency, according to our results, does seem to interfere with the role of banks in liquidity creation. Many theories emphasize this important role of banks. In Diamond and Dybvig (1983), banks finance illiquid long-term assets with liquid short-term deposits, allowing depositors with potential early liquidity needs to benefit from the fruits of the long-term assets. In Gorton and Pennacchi (1990), deposit contracts, whose values do not fluctuate with the asset side of banks' balance sheet, attract depositors who value this safe money-like claim. According to Hanson et al. (2015), the stability of deposits allows banks to fund illiquid assets (such as loans and long-term securities) without having to worry about liquidating them prematurely at a discount. In Dang et al. (2017), banks are unique (relative to stock markets) precisely because they are opaque. In support of this view, 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.

Our results suggest that more transparent banks are subject to greater volatility of uninsured deposits. This may imply that well-informed depositors can curb banks' excess risk taking incentives, but it also suggests that transparency harms banks' liquidity transformation. It is difficult to know which effect dominates for overall efficiency purposes, but to shed some light on this issue, we conduct several additional analyses. First, we find that the effects of transparency are not very different between well-capitalized banks and under-capitalized banks. Given that the incentive to engage in excess risk-shifting is higher in under-capitalized banks than in well-capitalized banks, this result suggests that the main effect of transparency is not disciplinary in nature. Second, and consistent with this conclusion, we find that transparent banks are less profitable on average. Hence, it seems that the main effect of transparency is to reduce banks' comparative advantage in extending illiquid, but presumably higher-return loans.

For robustness and sensitivity tests, we show that our main results remain qualitatively the same after controlling for the volatility of bank ROE. This finding mitigates the concern that our transparency measures capture the effect of bank risks. More generally, our results remain robust to alternative measures of transparency, and after controlling for the effects of bank characteristics such as bank size, capital ratio, and asset composition on the deposit flow-performance sensitivities. Lastly, we find the positive effect of transparency on flow-performance sensitivity is more salient for banks experiencing poor performance, consistent with the idea that depositors are concerned about the downside risk, and react more to negative news.

Aside from the vast banking literature, a very small portion of which is reviewed above,[2] our study is also related to several recent accounting papers on transparency (Beatty and Liao (2011); Bushman and Williams (2012, 2015)). These papers focus on the aspects of transparency that can be affected by bank managers' financial reporting choices, and measure transparency by whether bank managers incorporate their private information into financial reporting in a timely manner. Beatty and Liao (2011) find that banks with more timely disclosure are better able to raise equity financing during financial crisis. Bushman and Williams (2012, 2015) document negative associations between reporting timeliness and measures of equity risks for publicly traded banks. While the authors interpret their evidence as consistent with the monitoring role of transparency, they do not provide direct evidence of monitoring (or are silent about who carries out the monitoring). Our notion of transparency is broader, and is not restricted to the part affected by managers' reporting choices. Our findings of transparency's effect on deposit flows supports the monitoring view of transparency, albeit at the cost of reducing banks' liquidity provision role in the economy.

2. Transparency Measures and Empirical Specification

In this section, we describe our measures for bank transparency (Section 2.1) as well as our main empirical specifications (Section 2.2).

[2] On the empirical side, Gorton (1988), Saunders and Wilson (1996), Calomiris and Mason (1997), and Egan, Hortascu, and Matvos (2017) document evidence of significant deposit withdrawal in banks with poor fundamentals. Iyer and Puri (2012), Iyer, Puri and Ryan (2016), Iyer et al. (2016), Brown, Guin and Morkoetter (2014), and Martin, Puri and Ufier (2018) examine depositor behaviors in bank runs and the role of deposit insurance. We contribute to this literature by examining the effect of transparency on deposit flow-performance sensitivity.

2.1. Transparency measures

In theory, transparency refers to the quality of the information available to depositors. Transparency can be improved either by providing depositors with additional signals, or by improving the precision of their existing signals. However, there is no commonly accepted empirical measure to quantify the amount of information observed and used by depositors. The approach we take in this paper is to measure transparency by three notions commonly discussed in policy debates and the academic literature.

The first and main notion of transparency we rely on focuses on how informative banks' financial disclosures in the Call reports are about banks' underlying asset quality. This notion of transparency considers a bank to be more transparent when its financial disclosures can resolve more uncertainty about its underlying asset values. We refer to this aspect of transparency as asset transparency as it is specific to the information that can help depositors quantify the credit quality of bank assets. 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). Banks expecting significant losses in asset values will have difficulty attracting future depositors and therefore less able to meet their obligations to depositors.

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., [3]

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

Banks with lower R-squared are more opaque to depositors. As we can see in Expression (1), conditional on the assets they hold, banks with lower R-squared provide information Ω_d that reduces a lower fraction of the uncertainty for their depositors. Note that low R-squared does not mean banks know less about their own asset quality, nor does it imply that the underlying assets are riskier (i.e., higher $Var(\Delta V)$).[4] It simply means that banks are better secret keepers in that their actions keep depositors at dark, as in Dang et al. (2017).

The key challenge in estimating equation (1) is that both the true value of credit losses (ΔV) and the depositors' information set (Ω_d) are unobservable. We use noisy proxies for these constructs to estimate R-squared. In theory, the depositors' information set, Ω_d, includes all past disclosures that can be used to predict future credit losses. We first consider two variables available in call reports that directly pertain to information about future credit losses on a bank's loan portfolio: loan loss provisions (LLPs) and changes in non-performing loans (ΔNPL).

LLPs 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 accrued expenses in banks' income statements for the period and directly affect banks' reported profitability (return

[3] 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, 2001). 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)).

[4] Indeed, the correlations between R-squared and bank characteristics (such as asset composition, capital ratio, earnings volatility) are low and mostly in the single digit. The highest correlation is with bank size, at 0.1 (Table 1, Panel B.)

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.[5] A large accounting literature has shown that LLP is an important performance indicator for banks and there is considerable cross-bank variation in how effectively $LLPs$ capture current and future loan portfolio deteriorations.[6]

NPLs are typically defined to be loans that are 90-days past due.[7] An increase in *NPL* therefore indicates the presence of problematic loans and increased probability of default. Unlike LLPs, which convey information about the dollar value of credit losses by taking into account both probability of default and loss given default, *NPLs* do not incorporate information about loss given default. Furthermore, unlike $LLPs$, *NPLs* (because of the mechanical definition) do not incorporate information about future credit losses that bank managers may be aware of for loans not 90-days past due yet. An advantage of *NPLs*, however, is that they are less vulnerable to managerial manipulation.

We include two lags of $LLPs$ and ΔNPL (both scaled by lagged total loans) in Ω_d 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*). Including *EBLLP* allows us to capture any relevant information in a bank's profits that is incremental to loan loss

[5] 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.
[6] See, for example, Beatty and Liao (2011) and Bushman and Williams (2012, 2015).
[7] *NPL* is a concept defined by banking regulators. A common definition considers a loan to be *NPL* when the payment is 90-days past due, although it differs across jurisdiction. *NPL* is not an accounting concept, and therefore not defined in the U.S. GAAP.

provisions.[8] We include capital ratio based on prior research that suggests that it is an important predictor for future loan portfolio performance (Wahlen, 1994).

We proxy for future credit losses (i.e., 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.[9]

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

$$WriteOff_{t+1} = \alpha_0 + \beta_t LLP_t + \beta_{t-1} LLP_{t-1} + \gamma_t NPL_t + \gamma_{t-1} NPL_{t-1} + \delta EBLLP_t + \rho Capital_t + \varepsilon_{t+1} \quad (2)$$

An important consideration in estimating equation (2) is the timing of the measurement of write-offs. It is not clear when past signals of loan quality deterioration (i.e., *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 quarters (*t+1* and *t+2)* following the end of quarter *t*.[10] In robustness tests presented later, we obtain similar inferences using different horizons for measuring write-offs including the next quarter and next 4 quarters.

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[8] For example, an aggressive growth in revenues may indicate lowering of lending standards and, consequently, more future defaults.

[9] An intuitive way to explain the relation among LLP, NPL and write-offs is the following: LLP_t is the estimate for future write-off, based on all information available at time t, including information contained in NPL_t. LLP_t reduces the reported income for period t, whereas NPL_t and write-offs do not.

[10] Our use of two-quarters for measuring write-offs is also consistent with regulatory guidance for consumer loans which 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 closed end consumer loans and residential mortgages (see Federal Financial Institutions Examination Council's policy dated June 12, 2000).

We caveat that the $R2$ from Eqn. (2) is a noisy measure for R^2_{vd} from Expression (1) because of our inability to observe true ΔV and the depositors' information set Ω_d. The noise introduces a measurement error problem, which would bias against us finding any significant results on the effect of transparency. In untabulated analyses, we experiment with several alternative approaches to measure $R2$ and find that our inferences remain unchanged.

The second notion of transparency considers a bank to be more transparent when it is required to disclose more information, or when there are more sources producing information about its performance. We refer to this notion of transparency as market transparency, as it largely depends on the market and regulatory environment the bank operates in. This notion corresponds to the policy proposal for increasing transparency by requiring more disclosures about banks. Since we focus on the U.S. banks, we consider banks with publicly traded equities to have more market transparency. This is because in addition to the disclosure required of both private and public banks by banking regulators, public banks also have to release additional information to meet the requirements by the securities regulators such as the SEC and the stock exchanges. Moreover, the secondary trading markets for public banks' securities also produce a large amount of information about their performance, including for example information reflected in banks' share prices and information produced by analysts and other intermediaries.

The third notion of transparency is the ability of the banks' depositors to process financial information. This notion considers a bank to be operating in a more transparent environment when its depositors are more sophisticated. This aspect of transparency is studied in Dang et al. (2017). In their model, banks hold identical assets but their depositors may have different costs in acquiring information about bank assets: more sophisticated depositors incur lower costs to acquire bank-specific information. As a result, cross-sectional differences in bank transparency, and therefore in banks' ability to create money-like deposits, are also affected by depositor sophistication.

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 residents with college education from the Census data, and the information on the county-level data (bank branches and dollar deposits) from the FDIC's Summary of Deposits disclosures. We note that depositor sophistication is largely exogenous to banks' choice, but nonetheless affects depositors' behavior, therefore it is a useful instrument to provide empirical evidence on how depositors' behaviors are affected by the information they can process. This is because holding constant the amount of information available to depositors, more sophisticated depositors would be able to extract more information from them.

2.2.Empirical specification

Our primary analyses focus on whether bank transparency affects the sensitivity of deposit flows to bank performance. Our focus on the flow-performance sensitivity of depositors 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 one 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 second set of theories emphasize the role of banks in creating stable, money-like claims (demand deposits) whose values do not fluctuate with the asset side of banks. Greater bank transparency in this view is not necessarily desirable because it hurts banks' ability to create money-like stable deposits by making deposit flows sensitive to fluctuations in 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:

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

where $Y_{i,t}$ measures the deposit flow ($Flow_{i,t}$); $Perf_{i,t-1}$ is a measure of bank performance that depositors observe at the end of quarter *t-1*; $Transp_{i,t-1}$ is one of the three aforementioned proxies for bank transparency 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 sensitivity of deposit flows to bank performances to be higher in more transparent banks.[11]

An important consideration in this analysis is the timing of the measurement of 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 (Baderscher et al., 2017). 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 lead us to miss a significant portion of the flows that might result from reaction to bank performance for quarter *t-1*. To address this issue, we measure the deposit flows over the two quarters following the end of quarter *t-1* for which bank

[11] This prediction is a direct implication of the rule of Bayesian updating. Chen, Goldstein and Jiang (2007) use 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.

performance is measured.[12] 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.

Our primary measure of bank performance is return on equity (*ROE)*. In all estimations, we include bank and time 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 known to affect deposit flows based on prior work (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) an indicator variable that equals one for the 25 largest commercial banks by asset size (*LargeBank*). 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. Call reports, however, do not separately report the interest expenses on insured and uninsured deposits. We use the core deposit rate as a proxy for deposit rates offered to insured depositors, and the rate on large time deposit as a proxy for the rates for uninsured depositors. We believe this is a reasonable approximation because core (large time) deposits are most likely to be

[12] In untabulated tests, we explore the sensitivity of our findings to measurement of the dependent variables over the next quarter and find our inferences to be robust.

insured (uninsured).[13] 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, which allow us to directly assess banks' inherent ability to create money like securities without the support of government backed deposit insurance. 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 example, it could be that less transparent banks provide better non-deposit services, which make 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). In other words, a priori, the flow-performance sensitivity for insured deposits is not expected to vary with bank transparency. 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.

[13] 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.

In addition to separately modelling uninsured and insured deposit flows, we also estimate Eqn. (2) using the difference in deposit flows between insured and uninsured 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)*, and bank services such as customer service quality (Q_{it-1}). The flow responses are given by

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

where $J \in \{I, U\}$ with I stands for insured and U for uninsured. If $Transp_{it-1}$ 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 insured and uninsured flows as the dependent variable in Eqn. (2), as follows:

$$Dep_{it}^{U} - Dep_{it}^{I} = \alpha_i + \delta_t + (\beta_0^U - \beta_0^I) ROE_{it-1} + (\beta_1^U - \beta_1^I) Transp_{it-1} * ROE_{it-1} + \beta_2 \left(Rate_{it-1}^U - Rate_{it-1}^I \right) + \varepsilon_{i,t}, \quad (5)$$

Because of deposit insurance we would expect the flow performance sensitivity for insured depositors to be lower than that for uninsured depositors; i.e., $\beta_1^U > \beta_1^I = 0$. Thus, a significantly positive coefficient estimate for the interaction term of $Transp_{it-1} * ROE_{it-1}$ would be consistent with our inference.

3. Data, sample construction, and summary statistics

We obtain most of our bank-level variables from 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. To calculate our measure of depositor sophistication (the average percentage of depositors with college degree), we obtain census data from the 2000 U.S. Census, and the branch-level deposit data from the Summary of Deposit Survey by the Federal Deposit Insurance Corporation (FDIC). To determine whether a bank's equity is publicly traded, we use the link table from the Federal Reserve Bank of New York that links a banks' regulatory identifier number (RSSD9001) to the permanent company number (PERMCO) used in the Center for Research in Security Prices (CRSP) database. We classify a bank as a public bank if we are able to link its identifier RSSD9001 to a PERMCO or it is a subsidiary of a public company (PERMCO matched to RSSD9348).

Our sample period is from January 1994 to December 2013. Our bank-quarter observation is at commercial bank level. 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. All variables are winsorized 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 three measures of transparency have substantial variation across firms: the mean and standard deviation for $R2$ is 0.23 and 0.45 and for depositor sophistication is 0.17 and 0.03. 20% of our observations are from public banks. Bank's performance, measured as $ROE_{i,t-1}$, has a mean of 10.26 and standard deviation of 11.36. Table 1, Panel B presents the pairwise correlation for all variables. The correlation coefficient is 0.04 between $R2$ and $Public$, 0.03 between *R2* and depositor sophistication, and -0.01 between depositor sophistication and $Public$. The overall low pairwise correlations suggest that the three measures, as intended, capture largely different dimensions of transparency.

4. Main results

4.1. Deposit flows to performance sensitivity

Table 2, Panel A presents the results for the flow performance sensitivity of uninsured depositors. As discussed earlier, examining uninsured deposit flows allows us to assess banks' ability to create money-like demand deposits without the help of government provided deposit insurance. Coefficient estimates represent ordinary least squares (OLS) estimates of Eqn. (3) and standard errors are clustered at the bank level. Column (1) presents the estimates when we use *R2* as our measure of transparency. The coefficient estimate on *ROE* is positive and significant at 1% level (Coef = 0.063; t-stat = 20.616), suggesting that banks with poorer performance experience fewer uninsured deposit flows. Our main interest is in the coefficient on the interaction term between *ROE* and *R2*, which estimates how transparency affects the relation between bank performance and deposit flows. The coefficient estimate for the interaction term is positive and significant at the 1% level (Coef= 0.025; t-stat = 5.668), consistent with the hypothesis that the sensitivity of uninsured deposits to bank performance is higher in banks with more asset transparency. This result also 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 28% increase in the flow-performance sensitivity.[14]

Column (2) shows similar results when we use *Public* as the transparency measure. Whereas the average flow-sensitivity is 0.070 (t-stat = 23.232) for uninsured deposits at private banks, the sensitivity is 20% higher (at 0.084=0.070 + 0.014) at public banks, with the difference significant at less than the 5% level. Estimates in Column (3) show that we obtain similar inferences when we use depositor sophistication as the transparency measure. The coefficient on the interaction term of *ROE* and *Sophistication* is positive and significant (Coef= 0.272; t-stat = 2.967), implying that banks that draw more deposits from areas with higher education levels experience greater outflows in uninsured deposits in times of poor performance. Economic magnitude of the effect continues to be significant: an interquartile increase in depositor sophistication is associated with an increase in flow-performance sensitivity of about 12%.

Column (4) combines all three measures of transparency and shows that the effects of *R2*, *Public*, and *Sophistication* remain nearly unchanged when their interactions terms with *ROE* are included in the same regression specification. This result is perhaps not surprising given the low univariate correlations among the three measures (see Table 1, Panel B for the correlation table), suggesting that, as intended, they capture largely independent dimensions of variations in depositors' ability to extract information about their banks' health.

Table 2, Panel B 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. Columns (1) to (4) of Panel B present the results for insured deposit flows.

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[14] This is estimated as (sensitivity at 75th percentile – sensitivity at 25th percentile) / (sensitivity at 25th percentile) = (0.063+0.025*.59 – (0.063+0.025*-0.09))/ (0.063+0.025*-0.09) = 28%.

Estimates in these columns show that unlike uninsured deposits, the flow-performance sensitivity of insured deposits does not increase in bank transparency. In fact, the coefficient on the interaction term between *Transparency* and *ROE* is either negative when transparency is measured with *R2*, or insignificant when transparency is measured with *Public* and *Sophistication*.

In Columns (5) to (8), we model the difference between uninsured and insured deposit flows. The effect of transparency in these specifications is identified by the within-bank difference in the flow-performance sensitivity of uninsured and insured depositors. As discussed in Section 2.2, this approach can mitigate the concern that our transparency measures (especially *Public* and *R2*) are likely correlated with unobservable differences in bank characteristics that may also affect deposit flows. We find that the coefficient estimates for *Transparency*ROE* are all significantly positive in Columns (5) to (8), regardless of how transparency is measured. These findings suggest that our results on the effect of transparency on the flow-performance sensitivity of uninsured depositors are unlikely due to unobserved bank characteristics that affect deposit flows.

4.2.Deposit rates to performance sensitivity

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 rate on uninsured deposits (at least in the short run). We study banks' response in the form of deposit rates on uninsured and insured deposits by modelling rates on large time deposits and core deposits, respectively. Similar to deposit flows, we measure these rates as the interest expense on the deposits over the two quarters divided by average quarterly deposits over the same period.

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. Columns (1) to (4) present results for core deposit rate, which is our proxy for rate on insured deposit. They show that core deposit rates are 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 public banks (Column 2) and in banks with more asset transparency (Column (1)). The coefficients for *R2* ROE* and *Public*ROE* are both negative and significant at 1% level (Coef = - 0.001; t-stat = -2.717 for *R2* ROE*, and coefficient = -0.003 and t-stat = -5.757 for *Public* ROE*). The coefficient estimate for *Sophistication*ROE*, however, is not significant at conventional levels.

Column (5) shows that the sensitivity of rate for uninsured deposit (as proxied by rate on large time deposit) to bank performance is stronger in banks with more asset transparency: the coefficient estimate on *R2*ROE* is significantly negative at less than 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 25^{th} percentile of *R2*, a bank at the 75^{th} percentile offers an additional 0.8 basis points on its rate for large time deposit for every standard deviation decline in *ROE*. The sensitivity is also negative at public banks, although not significant at conventional levels. There is no evidence that the sensitivity varies by the level of depositor sophistication.

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 (1) in Panel B 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. This suggests that transparent banks are largely able to offset the greater outflow of their uninsured depositors in times of poor performance 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 liquidity provision to the real sector

Having provided evidence consistent with the idea that transparency makes it harder for banks to create stable deposits, we now explore the consequences of this effect of transparency on banks' ability to perform their liquidity provision role on the asset side. Since it is costlier for transparent banks to mitigate fluctuations in their deposits, they would be more concerned about having to prematurely dispose their illiquid loan investments at a discount to meet deposit withdrawals. This implies that transparent banks are less willing to engage in maturity/liquidity transformation by funding illiquid loans through deposit financing (Dang et al., 2017; Palartore, 2015).

We test this idea by examining how transparency affects the sensitivity of banks' willingness to fund illiquid loan commitments to the availability of their internal equity. Ex ante, the effect is unclear. 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. On the other hand, since deposits account for the majority of banks' financing, our findings that transparency amplifies the sensitivity of deposit flows to bank performance suggest that more transparent banks lack comparative advantage in raising stable external deposit, and therefore their willingness to fund illiquid lending opportunities is likely more dependent on the availability of their internal equity. Conversely, opaque banks' decision should be less dependent on availability of internal financing because of the relative ease with which they can fund internal funding shortfalls by raising stable external deposit financing.

We use the following regression specification to examine the effects of transparency on banks' asset decisions:

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

where $AssetGrowth_{i,t}$ represents the change in one of banks' asset classes scaled by beginning of quarter total assets, and $ROE_{i,t-1}$ is the net income for quarter *t-1* scaled by equity at the beginning of quarter *t-1*. To measure the changes in internal equity that come from firms' past performance (as opposed to banks' dividend and share repurchases/issuance decisions), we use ROE to capture changes to availability of internally generated equity capital to fund assets. 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 this specification is the one on the interaction term $Transp_{i,t-1} * ROE_{i,t-1}$, which measures how transparency affects the relation between availability of equity capital and asset investment decisions.

Table 4 presents the estimates of Eqn. (6) for growth in different asset classes. Columns (1)-(3) in Panel A model the effect on total loans. The coefficient on the interaction between *R2* and *ROE* is positive and significant at 1% level (Coef = 0.048; t-stat = 9.578). This suggests that banks with higher asset transparency are more reluctant to fund loans without availability of internally generated equity capital. The effect is economically large: a bank at the 75th percentile of *R2* is nearly 28% more sensitive to availability of internal equity for funding loans. We obtain similarly strong results for public banks and for banks with higher depositor sophistication. Specifically, the sensitivity of loans to internal equity is close to 29% higher at public banks than at private banks; and the estimates in Column (3) suggest that a bank at the 75th percentile of depositor sophistication is 13% more sensitive 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.

Columns (4) and (6) examine 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 terms of *ROE* with all transparency measures are positive and significant at 1% level with large economic magnitudes. An interquartile increase in *R2* (*Sophistication*) amplifies banks' sensitivity of loan commitments to *ROE* by about 29% (19%). The effect of being public is even stronger, at about 68% higher (coefficient for *Public*ROE* is 0.032 where that for *ROE* is 0.047). Unsurprisingly, similar inferences are obtained when we examine total credit in Panel B (Columns (1) and (3)), which includes both loan and commitments.

Importantly, and consistent with our hypotheses, we do not find the same results for liquid assets. The results are presented in Columns (4) to (6) of Panel B. We measure liquid assets as the sum of cash, federal funds sold & reverse repos, and securities excluding MBS/ABS securities. Unlike illiquid loans, 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 availability of internal equity for liquid investments relative to transparent banks. Indeed, consistent with this possibility, we find (in Column (4) of Panel B) a negative coefficient on the interaction term between *R2* and *ROE* for liquid investments (Coef = –0.019; t-stat = –3.677). Estimates in Columns (5) and (6), however, show that public banks or banks with more sophisticated depositors do not exhibit different sensitivity of liquid investments to *ROE*.

5. Additional analyses and robustness checks

5.1. Additional analyses

One interpretation for the above findings is that they imply an undesirable effect of transparency in that it increases the instability of deposit flows and therefore reduces banks' ability to fund illiquid loans. Alternatively, they can also be viewed as the resulting from the disciplines imposed by well-informed depositors to counter banks' excessive risk taking incentives. To empirically assess the relative importance of these interpretations requires researchers to quantify the optimal risk taking for banks, which is beyond the scope of this paper. Nonetheless, to shed light on this issue, we conduct two sets of analyses. First, we repeat the analysis in Table 4 separately for well-capitalized banks (i.e., banks with above-median capital ratio) and for under-capitalized banks. Given that the incentive to engage in excess risk-shifting is higher in under-capitalized banks than in well-capitalized banks, transparency should be less important in well-capitalized banks if its main effect is disciplinary in nature. Table 5 presents the results of this analysis. It shows that across all specifications, the coefficients on interaction terms between *ROE* and the transparency measures are significant both for banks with high and low capital ratio. If anything, the coefficients for high capital ratio banks tend to be larger than those for low capital ratio banks. This suggests that the disciplinary effect is not the dominant effect of transparency.

Second, we examine the association between bank transparency and profitability. If the findings in Table 4 reflect transparent banks' comparative disadvantage in extending illiquid, but presumably higher-return loans, we would expect transparent banks to be less profitable compared to opaque banks. The disciplining explanation on the other hand suggests a positive relation between transparency and profitability if transparency reduces agency problems and disciplines banks' lending decisions. Table 6 presents the results of this analysis in which we regress *ROE* on transparency and other bank characteristics. Columns (1)-(3) present the results for the three transparency measures without including bank fixed effects. We find that the coefficient on *Public* is not statistically significant, but both *R2* and *Sophistication* exhibit a significant negative association with *ROE*. In terms of economic magnitude, an interquartile increase in *R2* (*Sophistication*) is associated with nearly 1% (0.2%) decrease in *ROE*. In column (4), we include all transparency measures in the same regression and introduce bank fixed effects. Unsurprisingly, in the presence of bank fixed effects, the coefficient on *Sophistication* turns insignificant because it exhibits little time-series variation as it is calculated based on 2000 census data. More importantly, the coefficient on *R2* continues to be negative and significant (at 1% level) and even the coefficient on *Public* turns negative and significant (at 1% level) in the presence of bank fixed effects. In the presence of bank fixed effects, the coefficient on *Pubic* is identified by banks that switch from being private to public or vice-versa. The coefficient estimate on *Public* in this specification therefore suggests that as a private bank becomes public, it experiences about 1.3% decline in *ROE*.

Viewed collectively, the above results are consistent with the view that transparency restricts banks' ability to perform liquidity and maturity transformation by cost-effectively raising stable deposits and investing them in illiquid, higher yield loans. This comparative disadvantage of transparent banks manifests in lower profitability. This effect is stronger than the potential disciplinary benefits that come with transparency.

5.2. Robustness checks

We perform several robustness checks for our results. We first examine whether the effect of transparency on deposit flow-performance sensitivity is asymmetric with respect to bank performance and present the results in Table 7. To the extent that 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. (2) on the subsamples partitioned by whether ROE_{it-1} is above or below the sample median. Results presented in Column (1) and (2) of Table 7 show that the effect of transparency is indeed concentrated in banks with poor performance. The coefficient estimates for $R2_{it-1} * ROE_{it-1}$ and $Sophistication_{it-1} * ROE_{it-1}$ are significantly positive in the subsample of banks with below-median ROE at 0.028 (t-stat = 4.491) and 0.206 (t-stat = 1.766), respectively. In contrast, in the subsample of banks with above median *ROE*, these coefficients are much smaller in magnitudes and are not significantly different from zero at conventional levels.[15] Similar patterns are not observed in Columns (3) and (4) for insured deposits. In sensitivity tests (untabulated), we find that the effect of transparency is further concentrated in banks with the lowest quartile of *ROE*.

In Table 8, we exploit variation in transparency within the set of public and private banks. Specifically, we examine the effect of *R2* and *Sophistication* separately for public and private banks. Columns (1) – (2) present results for deposit flow-performance sensitivity. They show that greater asset transparency and depositor sophistication is associated with higher uninsured deposit flow-performance sensitivity for both public and private banks. In Columns (3) – (4), we present the results for the effect of transparency on liquidity provision on the asset side. Similar to our main results, we continue to find that increased transparency (i.e., higher *R2* and *Sophistication*) is associated with lower willingness to fund illiquid loans and credit lines using external deposit financing for both public and private banks.

We next examine the robustness of our results to use of alternative windows for measuring write-offs in Eqn. (2). Table 9, Panel A presents the results using *R2* from Eqn. (2) when write-offs are measured over the next quarter or over the next 4 quarters instead of the 2-quarter window used in our main analyses. It can be seen that our results are robust to use of these alternative measures of *R2*.

We also control for the fundamental volatility in banks' operations to illustrate that our results do not simply reflect differences in risk between opaque and transparent banks. As we

[15] The coefficient estimates for $Public_{it-1} * ROE_{it-1}$ are statistically insignificant in either subsample. However, when we estimate Eqn. (2) separately for public and private banks (without the interaction between transparency and ROE), we find that the coefficient for ROE is much higher in public banks than for private banks, only in the below-median ROE subsample and not in the above-median subsample.

discuss in section 2.1, our transparency measures are 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, we augment our regression specifications with the standard deviation of *ROE* (*Std*_ROE) and its interaction term with *ROE*. We compute *Std_ROE* using data for the most recent 12 quarters on a rolling basis. Result in Table 9, Panel B show that including these controls for fundamental volatility result in virtually no change either in the statistical significance or economic magnitudes of the effects of transparency.

Finally, in Table 9, Panel C, we explore the robustness of our results to the inclusion of interactions between control variables and *ROE* in the regression specifications. This specification allows the flow-performance sensitivity to vary with other bank characteristics. The results show that our main findings are quite robust. Banks with higher *R2* and *Sophistication* continue to exhibit greater flow-performance sensitivity for uninsured depositors and greater reliance on internal equity to fund illiquid loans with similar economic magnitudes as before. The coefficient on *Public* × *ROE* becomes insignificant in the uninsured deposit flow analysis, but continues to be significant in the analysis of loans and commitments with little change in economic magnitudes.

6. Conclusions

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 respond to this instability in their deposit funding by relying more on internal equity to fund illiquid loans. These findings highlight the trade-offs of increased transparency. On the one hand, transparency allows depositors to discipline bank management by making deposit funding more sensitive to bank performance. On the other hand, our results also suggest that transparency 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 $WriteOff_{t,t+1} = \beta_0 + \sum_{j=1}^{2} \beta_j \Delta NPL_{t-j} + \sum_{j=1}^{2} \beta_j \Delta LLP_{t-j} + \gamma_1 Capital_{t-1} + \gamma_2 EBLLP_{t-1} + \varepsilon_t$, estimated using the bank's observations from Quarter $t-12$ to Quarter $t-1$. LLP is loan loss provision (RIAD4230); NPL is non-performing loan (RCFD1403+RCFD1407), 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).
Public $_{it-1}$	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 $_{it-1}$	The average percentage of college education for residents 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 residents with college education from the U.S. 2000 Census data, and the information on the county-level data (bank branches and dollar deposits) is from the FDIC's Summary of Deposits disclosures.
ROE $_{it-1}$	Annualized ROE (in %) in quarter t-1, calculated as net income (RIAD4300, adjust year-to-date reporting to within quarter) divided by $equity_{i,t-1}$ (RCFD3210).
StDev_ROE $_{it-1}$	Standard deviation of ROE measured over 12 rolling quarters.
Capital_Ratio $_{it-1}$	Total equity (RCFD3200) divided by total assets (RFD2170).
Wholesale_Funding $_{it-1}$	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).
RealEstate_Loans $_{it-1}$	Loans secured by real estate (RCFD1410) divided by total loans.
LargeBank $_{it-1}$	Indicator equal to 1 for the largest 25 commercial banks in each quarter by asset size (time varying).
Unused_Commitments $_{it-1}$	Unused commitments (RCFD3814 + RCFD3816 + RCFD3817 + RCFD3818 + RCFD6550 + RCFD3411) divided by the sum of loans (RCFD1400) and unused commitments.
Dependent Variables	
Insured Deposit Flows $_{it}$	Annualized growth rate in insured deposits as a percentage of lagged assets (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).
Uninsured Deposit Flows $_{it}$	Annualized growth rate in uninsured deposits as a percentage of lagged assets (in %). 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 %): $\left(Loan_{i,t+1} - Loan_{i,t-1}\right)/Asset_{i,t-1} * 200\%$.
ΔCommitments $_{it}$	Annualized growth rate in commitments 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)
ΔLiquid Assets $_{it}$	Annualized growth in liquid assets (RCFD1400), divided by lagged assets:

	$(Liquid\_assets_{i,t+1} - Liquid_{assets_{i,t-1}})/\mathrm{Asset}_{i,t-1} * 200\%$. 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)]
Large Time Deposit Rate$_{it}$	Annualized interest rate (in %) over the two quarters $t, t+1$ on large time deposits. Large time deposits are timed deposits greater than $250,000. 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). $(larget\ time\ interest\ \mathrm{exp}_{i,t} +\ exp_{i,t+1})/\left(avg.large\ time\ balance_{i,t}\ balance_{i,t+1}\right) * 400\%$.
Core Deposit Rate$_{it}$	Annualized interest rate (in %) over the two quarters $t, t+1$ on core deposits: $(Core\ interest\ exp_{i,t} +\ exp_{i,t+1})/\left(avg.core\ balance_{i,t} + avg.core\ balance_{i,t+1}\right) * 400\%$. Core deposits are the sum of checking deposits, saving deposits, and small time deposits (smaller than $250,000): RCON3485 + RCONB563 + (RCON3486 + RCON3487 before 2001Q1) + RCONA529 (RCON3469 before 1997Q1).

Table 1. Summary Statistics

This table presents summary statistics for the main regression variables. These statistics are calculated over the regression sample (and thus exclude mergers, non-U.S.-domiciled banking organizations, and those below $100 million in total assets). See the Appendix for variable definitions.

Panel A: Summary Statistics

	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
$Public_{it-1}$	272,840	0.20	0.40	0.00	0.00	0.00	0.00	1.00
$Sophistication_{it-1}$	272,840	0.17	0.03	0.13	0.16	0.17	0.19	0.21
ROE_{it-1}	272,840	10.26	11.36	2.15	6.84	11.22	15.65	20.43
$StDev\_ROE_{it-1}$	264,223	5.72	11.43	1.18	1.78	2.94	5.50	11.53
$Capital\_Ratio_{it-1}$	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
$LargeBank_{it-1}$	272,840	0.00	0.07	0.00	0.00	0.00	0.00	0.00
$Unused\_Commitments_{it-1}$	272,840	0.14	0.07	0.05	0.08	0.13	0.18	0.23
$Uninsured\ Deposit\ Flows_{it}$	266,284	1.85	9.98	-7.33	-1.93	2.00	6.51	12.11
$Insured\ Deposit\ Flows_{it}$	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

Panel B: Pair-wise Correlation Table for Main Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	$R2_{it-1}$	1.00															
2	$Public_{it-1}$	0.04	1.00														
3	$Sophistication_{it-1}$	0.03	-0.01	1.00													
4	ROE_{it-1}	-0.11	0.02	-0.01	1.00												
5	$StDev\_ROE_{it-1}$	0.05	0.00	0.06	-0.29	1.00											
6	$Capital\_Ratio_{it-1}$	-0.01	-0.03	-0.03	0.00	-0.13	1.00										
7	$Wholesale\_Funding_{it-1}$	0.05	0.13	-0.09	-0.11	0.09	-0.16	1.00									
8	$RealEstate\_Loans_{it-1}$	0.02	-0.01	-0.05	-0.16	0.06	-0.06	-0.01	1.00								
9	$LargeBank_{it-1}$	0.03	0.13	-0.01	0.01	0.00	0.01	0.08	-0.12	1.00							
10	$Unused\_Commitments_{it-1}$	0.02	0.27	0.19	0.15	-0.10	-0.09	-0.02	-0.17	0.18	1.00						
11	$Uninsured\ Deposit\ Flows_{it}$	-0.06	0.03	0.01	0.17	-0.08	0.02	-0.04	-0.05	0.01	0.10	1.00					
12	$Insured\ Deposit\ Flows_{it}$	0.04	0.00	0.01	0.03	-0.08	-0.01	0.06	0.00	-0.01	0.03	-0.50	1.00				
13	$\Delta Loans_{it}$	-0.06	0.04	0.00	0.31	-0.21	-0.02	-0.01	-0.05	-0.01	0.23	0.24	0.22	1.00			
14	$\Delta Commitments_{it}$	-0.04	0.03	0.01	0.14	-0.06	0.00	-0.04	-0.06	0.01	-0.02	0.14	0.03	0.21	1.00		
15	$\Delta Liquid\ Assets_{it}$	0.01	-0.01	0.01	0.02	-0.02	0.03	0.00	-0.02	0.00	-0.03	0.31	0.22	-0.21	0.04	1.00	
16	$Large\ Time\ Deposit\ Rate_{it}$	0.00	0.05	-0.02	0.14	-0.16	-0.11	0.09	-0.03	-0.01	0.06	0.02	0.07	0.17	0.00	-0.04	1.00
17	$Core\ Deposit\ Rate_{it}$	0.00	0.00	-0.04	0.09	-0.13	-0.11	0.16	-0.04	-0.04	-0.03	0.01	0.09	0.16	-0.02	-0.03	0.85

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

This table presents ordinary least-squares estimates of Equation (3). In Panel A, the dependent variable is the changes in the uninsured deposits scaled by the beginning value of total loan. In Panel B, the dependent variable is the changes in insured deposits (for Columns (1) to (4)) and the differences in changes in uninsured and insured deposits (for Columns (5) to (8)), both scaled by beginning value of total loan. 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.

Panel A: Uninsured deposit flows

	Uninsured Deposit Flows$_{it}$			
	(1)	(2)	(3)	(4)
ROE$_{it-1}$	0.063***	0.070***	0.024	0.018
	(20.616)	(23.232)	(1.490)	(1.084)
R2 $_{it-1}$ × ROE $_{it-1}$	0.025***			0.023***
	(5.668)			(5.337)
R2 $_{it-1}$	-0.398***			-0.377***
	(-5.979)			(-5.704)
Public $_{it-1}$ × ROE $_{it-1}$		0.014**		0.012*
		(2.009)		(1.791)
Public $_{it-1}$		-1.063***		-1.035***
		(-6.089)		(-5.957)
Sophistication $_{it-1}$ × ROE $_{it-1}$			0.272***	0.243***
			(2.967)	(2.683)
Sophistication $_{it-1}$			8.327	9.158
			(0.899)	(0.991)
Large Time Deposit Rate$_{it-1}$	-0.048*	-0.050*	-0.050*	-0.050*
	(-1.650)	(-1.694)	(-1.712)	(-1.697)
Capital_Ratio $_{it-1}$	32.454***	33.538***	32.636***	33.265***
	(17.302)	(18.007)	(17.411)	(17.896)
Wholesale_Funding $_{it-1}$	4.423***	4.525***	4.448***	4.531***
	(7.611)	(7.767)	(7.657)	(7.777)
RealEstate_Loans $_{it-1}$	-1.638***	-1.656***	-1.667***	-1.681***
	(-4.307)	(-4.360)	(-4.376)	(-4.421)
LargeBank $_{it-1}$	-1.478***	-1.483***	-1.501***	-1.484***
	(-2.765)	(-2.848)	(-2.757)	(-2.861)
Unused_Commitments $_{it-1}$	10.037***	10.120***	10.041***	10.026***
	(13.293)	(13.432)	(13.356)	(13.378)
Bank fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Observations	257,161	257,161	257,161	257,161
R-squared	0.334	0.334	0.334	0.334

Table 2 (Cont'd):

Panel B: Insured Deposit Flows and The Differences Between Uninsured and Insured Flows

	Insured Deposit Flows$_{it}$				*Uninsured - Insured Deposit Flows$_{it}$*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE$_{it-1}$	0.076***	0.072***	0.072***	0.077***	-0.012**	-0.001	-0.047*	-0.057**
	(23.364)	(23.026)	(4.473)	(4.742)	(-2.466)	(-0.259)	(-1.842)	(-2.270)
R2 $_{it-1}$ × ROE $_{it-1}$	-0.015***			-0.015***	0.040***			0.038***
	(-3.174)			(-3.121)	(5.611)			(5.376)
R2 $_{it-1}$	0.129*			0.128*	-0.535***			-0.512***
	(1.859)			(1.824)	(-5.055)			(-4.855)
Public $_{it-1}$ × ROE $_{it-1}$		-0.007		-0.006		0.020**		0.018*
		(-1.131)		(-0.950)		(1.994)		(1.729)
Public $_{it-1}$		-0.448**		-0.464**		-0.630**		-0.585**
		(-2.352)		(-2.441)		(-2.498)		(-2.333)
Sophistication $_{it-1}$ × ROE $_{it-1}$			-0.012	0.000			0.278*	0.236*
			(-0.133)	(0.003)			(1.947)	(1.669)
Sophistication $_{it-1}$			6.374	6.012			3.485	4.652
			(0.635)	(0.600)			(0.293)	(0.391)
Core Deposit Rate$_{it-1}$	0.330***	0.331***	0.332***	0.328***				
	(4.897)	(4.906)	(4.928)	(4.878)				
Large Time – Core rate$_{it-1}$					0.037	0.036	0.037	0.036
					(0.887)	(0.871)	(0.894)	(0.859)
Capital_Ratio $_{it-1}$	26.600***	26.746***	26.509***	26.907***	6.814***	7.765***	7.112***	7.336***
	(14.009)	(14.104)	(13.981)	(14.189)	(2.841)	(3.251)	(2.966)	(3.068)
Wholesale_Funding $_{it-1}$	8.161***	8.252***	8.167***	8.250***	-3.762***	-3.746***	-3.742***	-3.739***
	(14.391)	(14.494)	(14.397)	(14.489)	(-4.483)	(-4.445)	(-4.459)	(-4.436)
RealEstate_Loans $_{it-1}$	-1.832***	-1.832***	-1.840***	-1.841***	0.323	0.304	0.301	0.286
	(-4.525)	(-4.525)	(-4.545)	(-4.553)	(0.650)	(0.611)	(0.606)	(0.576)
LargeBank $_{it-1}$	-0.338	-0.367	-0.324	-0.376	-1.092	-1.073	-1.128	-1.066
	(-0.443)	(-0.482)	(-0.425)	(-0.493)	(-1.059)	(-1.048)	(-1.089)	(-1.042)
Unused_Commitments $_{it-1}$	11.070***	11.070***	11.064***	11.085***	-1.065	-0.984	-1.052	-1.091
	(15.366)	(15.365)	(15.344)	(15.382)	(-1.094)	(-1.010)	(-1.084)	(-1.124)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	257,240	257,240	257,240	257,240	256,712	256,712	256,712	256,712
R-squared	0.358	0.358	0.358	0.358	0.409	0.409	0.409	0.409

Table 3. Transparency and Sensitivity of Deposit Rates to Performance

This table presents ordinary least-squares estimates of Equation (3). The dependent variable is the ratio of interest expense to average balance of core deposits in Columns (1) to (4) and the ratio of interest expense on large time deposits to the average balance of large time 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.

	Core Deposit Rate$_{it}$				*Large Time Deposit Rate$_{it}$*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE_{it-1}	-0.001***	-0.000	-0.002**	-0.002	-0.000	-0.000*	-0.002	-0.002
	(-2.913)	(-1.620)	(-2.051)	(-1.341)	(-1.050)	(-1.900)	(-1.582)	(-1.313)
$R2_{it-1} \times ROE_{it-1}$	-0.001***			-0.001**	-0.001***			-0.001***
	(-2.717)			(-2.331)	(-3.073)			(-3.021)
$R2_{it-1}$	0.012***			0.010**	0.004			0.003
	(2.733)			(2.413)	(0.631)			(0.602)
$Public_{it-1} \times ROE_{it-1}$		-0.003***		-0.003***		-0.001		-0.001
		(-5.757)		(-5.602)		(-1.562)		(-1.380)
$Public_{it-1}$		0.040**		0.039**		0.029		0.027
		(2.162)		(2.120)		(1.306)		(1.252)
$Sophistication_{it-1} \times ROE_{it-1}$			0.008	0.008			0.008	0.009
			(1.248)	(1.270)			(1.116)	(1.251)
$Sophistication_{it-1}$			-0.066	-0.105			1.535	1.498
			(-0.067)	(-0.109)			(1.574)	(1.534)
$Capital\_Ratio_{it-1}$	-1.530***	-1.587***	-1.539***	-1.582***	-0.818***	-0.853***	-0.823***	-0.840***
	(-8.296)	(-8.665)	(-8.348)	(-8.627)	(-3.921)	(-4.087)	(-3.960)	(-4.036)
$Wholesale\_Funding_{it-1}$	0.014	0.020	0.014	0.020	0.349***	0.349***	0.351***	0.349***
	(0.268)	(0.366)	(0.266)	(0.372)	(6.026)	(6.020)	(6.059)	(6.030)
$RealEstate\_Loans_{it-1}$	-0.078*	-0.076*	-0.078*	-0.076*	0.033	0.034	0.031	0.032
	(-1.886)	(-1.840)	(-1.896)	(-1.850)	(0.681)	(0.695)	(0.625)	(0.642)
$LargeBank_{it-1}$	-0.093	-0.102	-0.093	-0.102	-0.013	-0.014	-0.012	-0.015
	(-0.737)	(-0.802)	(-0.738)	(-0.806)	(-0.091)	(-0.097)	(-0.084)	(-0.105)
$Unused\_Commitments_{it-1}$	-0.313***	-0.315***	-0.316***	-0.315***	0.126*	0.126*	0.126*	0.124*
	(-4.364)	(-4.402)	(-4.407)	(-4.404)	(1.748)	(1.743)	(1.739)	(1.723)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254,455	254,455	254,455	254,455	254,394	254,394	254,394	254,394
R-squared	0.939	0.939	0.939	0.939	0.903	0.903	0.903	0.903

Table 4. Transparency and Liquidity/Maturity Transformation

This table presents ordinary least-squares estimates of Equation (6). In Panel A, the dependent variable is changes in the balance of total loans in Columns (1) to (3), and the changes in the balance of total commitments in Columns (4) to (6). In Panel B, the dependent variable is changes in the sum of loans and commitment in Columns (1) to (3), and changes in the balances of liquid assets in Columns (4) to (6). 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.

Panel A: Loans and Commitments

		$\Delta Loans_{it}$			$\Delta Commitments_{it}$	
Transparency measure	*R2*	*Public*	*Sophistication*	*R2*	*Public*	*Sophistication*
	(1)	(2)	(3)	(4)	(5)	(6)
ROE_{it-1}	0.123***	0.134***	0.038*	0.047***	0.047***	-0.000
	(32.282)	(36.044)	(1.840)	(25.887)	(27.247)	(-0.016)
$Transparency_{it-1}$ X ROE_{it-1}	0.048***	0.039***	0.583***	0.019***	0.032***	0.304***
	(9.578)	(4.569)	(5.149)	(7.795)	(7.525)	(5.593)
$Transparency_{it-1}$	-0.890***	-1.161***	2.203	-0.333***	-0.477***	1.039
	(-11.514)	(-4.488)	(0.148)	(-8.795)	(-3.374)	(0.136)
$Capital\_Ratio_{it-1}$	13.708***	15.256***	14.010***	-0.440	0.306	-0.341
	(5.217)	(5.837)	(5.342)	(-0.335)	(0.232)	(-0.260)
$Wholesale\_Funding_{it-1}$	-4.449***	-4.408***	-4.402***	-1.148***	-1.193***	-1.128***
	(-6.195)	(-6.108)	(-6.134)	(-3.009)	(-3.112)	(-2.949)
$RealEstate\_Loans_{it-1}$	-0.596	-0.631	-0.637	-4.183***	-4.207***	-4.204***
	(-0.905)	(-0.957)	(-0.968)	(-12.861)	(-12.979)	(-12.896)
$LargeBank_{it-1}$	-2.049***	-1.982**	-2.101***	-0.862	-0.778	-0.886
	(-2.631)	(-2.510)	(-2.677)	(-0.590)	(-0.539)	(-0.607)
$Unused\_Commitments_{it-1}$	50.071***	50.225***	50.083***	-35.435***	-35.379***	-35.446***
	(36.424)	(36.521)	(36.505)	(-41.046)	(-40.988)	(-40.971)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	266,286	266,286	266,286	266,286	266,286	266,286
R-squared	0.321	0.320	0.320	0.168	0.168	0.168

Panel B: Total Loans and Commitments and Liquid Assets

	Δ*Loans + Commitments*$_{it}$			Δ*Liquid Assets*$_{it}$		
Transparency measure	*R2*	*Public*	*Sophistication*	*R2*	*Public*	*Sophistication*
	(1)	(2)	(3)	(4)	(5)	(6)
ROE $_{it-1}$	0.171***	0.182***	0.042*	0.038***	0.031***	0.051***
	(37.103)	(41.046)	(1.715)	(10.447)	(9.528)	(2.965)
Transparency $_{it-1}$ X *ROE* $_{it-1}$	0.065***	0.068***	0.862***	-0.019***	-0.004	-0.114
	(10.345)	(6.410)	(6.228)	(-3.677)	(-0.573)	(-1.209)
Transparency $_{it-1}$	-1.201***	-1.641***	3.952	0.239***	-0.486*	-0.686
	(-12.424)	(-5.227)	(0.244)	(3.018)	(-1.741)	(-0.055)
Capital_Ratio $_{it-1}$	13.234***	15.498***	13.631***	43.025***	43.296***	42.922***
	(4.287)	(5.052)	(4.426)	(17.353)	(17.302)	(17.283)
Wholesale_Funding $_{it-1}$	-5.679***	-5.672***	-5.612***	4.449***	4.478***	4.443***
	(-6.522)	(-6.484)	(-6.442)	(7.407)	(7.452)	(7.402)
RealEstate_Loans $_{it-1}$	-4.842***	-4.899***	-4.904***	-2.009***	-2.019***	-2.006***
	(-6.520)	(-6.598)	(-6.609)	(-3.350)	(-3.360)	(-3.341)
LargeBank $_{it-1}$	-2.802*	-2.660*	-2.876*	-2.380***	-2.431***	-2.358***
	(-1.824)	(-1.768)	(-1.876)	(-2.700)	(-2.775)	(-2.707)
Unused_Commitments $_{it-1}$	11.858***	12.066***	11.861***	-17.577***	-17.586***	-17.572***
	(8.694)	(8.824)	(8.698)	(-17.263)	(-17.280)	(-17.294)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	266,286	266,286	266,286	182,379	182,379	182,379
R-squared	0.281	0.281	0.281	0.098	0.098	0.098

Table 5. Do the Results Reflect Disciplining of Risk-shifting Behavior?

This table presents ordinary least-squares estimates of Equation (6) separately in two subsamples partitioned by the bank's capital ratio. High or Low capital ratio is measured by whether the bank's capital ratio is above or below the sample median. The dependent variables are changes in the balance of total loans, in total commitment, in the sum of loan and commitment, and in liquid assets, all scaled by lagged total assets. All regressions include bank- and quarter-fixed effects. 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.

Panel A: Results for R2

	$\Delta Total\ Loans_{it}$		$\Delta Commitments_{it}$		$\Delta Commitments\ and\ Loans_{it}$		$\Delta Liquid\ assets_{it}$	
Capital Ratio	High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE_{it-1}	0.088***	0.107***	0.048***	0.040***	0.138***	0.148***	0.046***	0.013***
	(12.991)	(23.458)	(14.289)	(17.909)	(16.630)	(26.536)	(6.794)	(2.839)
$R2_{it-1} \times ROE_{it-1}$	0.058***	0.045***	0.017***	0.020***	0.073***	0.064***	-0.033***	-0.012*
	(6.306)	(7.771)	(3.618)	(7.283)	(6.202)	(8.938)	(-3.457)	(-1.887)
$R2_{it-1}$	-0.884***	-0.912***	-0.298***	-0.351***	-1.147***	-1.250***	0.288**	0.198*
	(-7.725)	(-8.705)	(-5.033)	(-6.775)	(-7.853)	(-9.579)	(2.377)	(1.739)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	132,735	133,551	132,735	133,551	132,735	133,551	98,853	83,526
R-squared	0.320	0.386	0.193	0.212	0.277	0.349	0.141	0.122

Panel B: Results for Public dummy

	ΔTotal Loans		ΔCommitments		ΔCommitments and Loans		ΔLiquid assets	
Capital Ratio	High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE $_{it-1}$	0.100***	0.117***	0.045***	0.042***	0.146***	0.161***	0.035***	0.009**
	(14.975)	(27.071)	(14.603)	(19.970)	(18.322)	(30.505)	(5.579)	(2.067)
Public $_{it-1}$ × *ROE* $_{it-1}$	0.051***	0.035***	0.044***	0.026***	0.093***	0.057***	-0.009	-0.003
	(3.202)	(3.424)	(5.457)	(5.014)	(4.879)	(4.442)	(-0.730)	(-0.336)
Public $_{it-1}$	-1.483***	-0.446	-0.656**	-0.357**	-2.198***	-0.768*	-0.747	0.073
	(-3.559)	(-1.267)	(-2.420)	(-1.993)	(-4.273)	(-1.773)	(-1.444)	(0.176)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	132,735	133,551	132,735	133,551	132,735	133,551	98,853	83,526
R-squared	0.320	0.385	0.194	0.212	0.277	0.348	0.141	0.122

Panel C: Results for Depositor Sophistication

	ΔTotal Loans		ΔCommitments		ΔCommitments and Loans		ΔLiquid assets	
Capital Ratio	High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE $_{it-1}$	0.010	0.036	0.013	-0.005	0.032	0.032	0.098***	0.024
	(0.282)	(1.518)	(0.748)	(-0.437)	(0.764)	(1.092)	(2.982)	(1.059)
Sophistication $_{it-1}$ × *ROE* $_{it-1}$	0.563***	0.492***	0.233**	0.296***	0.748***	0.789***	-0.358**	-0.088
	(2.851)	(3.687)	(2.484)	(4.497)	(3.106)	(4.862)	(-1.967)	(-0.709)
Sophistication $_{it-1}$	-31.372	7.434	5.738	9.392	-23.125	16.672	13.041	2.259
	(-1.437)	(0.366)	(0.534)	(0.941)	(-0.931)	(0.715)	(0.655)	(0.094)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	132,735	133,551	132,735	133,551	132,735	133,551	98,853	83,526
R-squared	0.320	0.385	0.193	0.212	0.277	0.348	0.141	0.122

Table 6. Transparency and Bank Performance

This table explores the association between transparency and bank performance. The dependent variable is return on equity (*ROE*). 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.

	ROE_{it}			
	(1)	(2)	(3)	(4)
$R2_{it}$	-1.382***			-0.952***
	(-16.919)			(-15.040)
$Public_{it}$		0.230		-1.305***
		(1.402)		(-3.955)
$Sophistication_{it}$			-5.768**	19.006
			(-2.451)	(1.062)
$Capital\_Ratio_{it}$	-12.552***	-12.469***	-12.714***	28.611***
	(-4.666)	(-4.629)	(-4.716)	(6.521)
$Wholesale\_Funding_{it}$	-7.129***	-7.373***	-7.448***	2.945***
	(-9.611)	(-9.966)	(-10.002)	(3.027)
$RealEstate\_Loans_{it}$	-7.076***	-7.117***	-7.148***	-1.136
	(-16.365)	(-16.465)	(-16.434)	(-1.581)
$LargeBank_{it}$	-1.547**	-1.809***	-1.844***	-2.344*
	(-2.530)	(-3.039)	(-3.026)	(-1.909)
$Unused\_Commitments_{it}$	11.258***	10.816***	11.539***	34.941***
	(11.678)	(10.716)	(11.529)	(24.106)
Bank fixed effects	No	No	No	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Observations	272,840	272,840	272,840	272,840
R-squared	0.168	0.165	0.166	0.450

Table 7: Asymmetric Effects of Transparency on Flow-Performance Sensitivity

This table 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-years 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	*Uninsured deposit flows*		*Insured deposit flows*	
	(1)	(2)	(3)	(4)
	Low ROE	*High ROE*	*Low ROE*	*High ROE*
ROE_{it-1}	0.009	0.029	0.064***	0.023
	(0.411)	(0.559)	(2.948)	(0.471)
$R2_{it-1} \times ROE_{it-1}$	0.028***	-0.001	-0.024***	-0.006
	(4.491)	(-0.066)	(-3.582)	(-0.514)
$R2_{it-1}$	-0.309***	0.006	0.148**	0.062
	(-4.185)	(0.028)	(1.962)	(0.287)
$Public_{it-1} \times ROE_{it-1}$	-0.002	0.004	0.004	0.031*
	(-0.204)	(0.229)	(0.403)	(1.730)
$Public_{it-1}$	-1.301***	-0.257	-0.708**	-0.923**
	(-5.007)	(-0.688)	(-2.263)	(-2.360)
$Sophistication_{it-1} \times ROE_{it-1}$	0.206*	0.077	0.048	-0.048
	(1.766)	(0.264)	(0.397)	(-0.180)
$Sophistication_{it-1}$	16.085	9.253	4.854	8.633
	(0.942)	(0.764)	(0.301)	(0.562)
Controls	Yes	Yes		
Observations	129,598	127,563	129,700	127,540
R-squared	0.421	0.258	0.461	0.274

Table 8: Exploring Variations in Transparency within Public and Private Banks

This table explores the effect of transparency as measured by *R2* and *Sophistication* within the subset of public and private banks separately. Columns (1) – (2) present the results for deposit flow-performance sensitivity using ordinary least-squares estimates of Equation (2). Columns (3) – (4) present the results for liquidity/maturity transformation using ordinary least-squares estimates of Equation (4). 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.

	Uninsured deposit flows		*ΔCommitments and Loans*	
	Public	Private	Public	Private
	(1)	(2)	(3)	(4)
ROE_{it-1}	-0.010	0.023	-0.024	0.041
	(-0.230)	(1.274)	(-0.379)	(1.592)
$R2_{it-1} \times ROE_{it-1}$	0.028**	0.024***	0.067***	0.058***
	(2.566)	(4.879)	(4.178)	(8.744)
$R2_{it-1}$	-0.383**	-0.395***	-1.371***	-1.065***
	(-2.132)	(-5.562)	(-5.065)	(-10.588)
$Sophistication_{it-1} \times ROE_{it-1}$	0.465*	0.194**	1.165***	0.668***
	(1.907)	(1.975)	(3.197)	(4.702)
$Sophistication_{it-1}$	6.661	5.811	9.298	-10.503
	(0.376)	(0.491)	(0.296)	(-0.539)
Controls	Yes	Yes	Yes	Yes
Observations	49,356	207,805	51,952	214,334
R-squared	0.276	0.355	0.292	0.292

Table 9: Robustness tests

Panel A: Alternative R2 measures

This table explores the robustness of our main results to use of two alternative measurement windows – next quarter and next 4 quarters – for measuring write-offs while estimating *R2* using equation (2). 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.

	Uninsured deposit flows		*ΔCommitments and Loans*	
Estimation window	1 Qtr	4 Qtrs	1 Qtr	4 Qtrs
	(1)	(2)	(3)	(4)
ROE_{it-1}	0.066***	0.066***	0.178***	0.172***
	(22.827)	(20.450)	(40.257)	(34.873)
$R2_{it-1} \times ROE_{it-1}$	0.024***	0.016***	0.061***	0.054***
	(5.620)	(3.485)	(10.194)	(8.365)
$R2_{it-1}$	-0.373***	-0.379***	-1.142***	-1.076***
	(-5.730)	(-5.468)	(-12.351)	(-10.507)
Controls	Yes	Yes	Yes	Yes
Observations	256,961	257,053	266,080	266,171
R-squared	0.334	0.334	0.281	0.281

Panel B: Controlling for fundamental volatility

This table explores the robustness of our main results to inclusion of controls for standard deviation of *ROE* (measured over a 12 quarter rolling window) and its interaction with *ROE*. 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.

	Uninsured deposit flows	*ΔCommitments and Loans*
	(1)	(2)
ROE_{it-1}	0.026	0.033
	(1.543)	(1.361)
$R2_{it-1} \times ROE_{it-1}$	0.023***	0.060***
	(5.255)	(9.798)
$R2_{it-1}$	-0.361***	-1.126***
	(-5.463)	(-11.790)
$Public_{it-1} \times ROE_{it-1}$	0.012*	0.064***
	(1.728)	(6.252)
$Public_{it-1}$	-0.973***	-1.565***
	(-5.595)	(-4.926)
$Sophistication_{it-1} \times ROE_{it-1}$	0.215**	0.632***
	(2.331)	(4.684)
$Sophistication_{it-1}$	8.801	7.210
	(0.930)	(0.442)
$StDev\_ROE_{it-1} \times ROE_{it-1}$	-0.000*	0.000
	(-1.844)	(0.183)
$StDev\_ROE_{it-1}$	-0.015***	-0.086***
	(-3.135)	(-5.157)
Controls	Yes	Yes
Observations	249,102	257,768
R-squared	0.338	0.287

Panel C: Controlling for interactions of controls with ROE

This table explores the robustness of our main results to inclusion of interactions of control variables with *ROE* in the regression specifications. 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.

	Uninsured deposit flows	Δ*Commitments and Loans*
	(1)	(3)
ROE_{it-1}	-0.030	0.045
	(-1.297)	(1.254)
$R2_{it-1} \times ROE_{it-1}$	0.021***	0.056***
	(4.703)	(9.194)
$R2_{it-1}$	-0.344***	-1.097***
	(-5.220)	(-11.594)
$Public_{it-1} \times ROE_{it-1}$	0.009	0.062***
	(1.193)	(5.845)
$Public_{it-1}$	-1.024***	-1.612***
	(-5.865)	(-5.140)
$Sophistication_{it-1} \times ROE_{it-1}$	0.267***	0.802***
	(2.926)	(5.878)
$Sophistication_{it-1}$	8.954	6.307
	(0.976)	(0.398)
Controls and their interactions with *ROE*	Yes	Yes
Observations	257,161	266,286
R-squared	0.334	0.283