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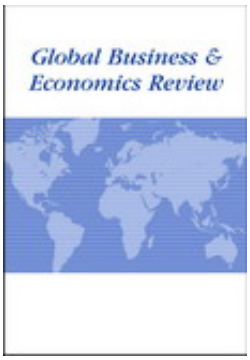

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Earnings management and bank funding

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Abstract: This paper investigates the impact of earnings management on bank funding. Using a sample of Vietnamese commercial banks between 2007 and 2019, we reveal that greater earnings opacity of banks causes a significant drop in total bank funding. When decomposing total funding into its components, we find that wholesale funds are the primary driver of the result, while no significant effect of earnings manipulation on retail deposits is documented. Further analyses on bank heterogeneity indicate that the unfavourable impact of earnings opacity on banks' wholesale funds is less pronounced for banks that are better capitalised, more liquid, larger in size, more profitable, and less risky. Through this consistent pattern, we can conclude that the financial strength of banks may alleviate the adverse effect of earnings opacity on bank funding. Our findings firmly survive after a series of robustness tests.

Keywords: bank funding; discretionary loan loss provisions; earnings opacity; retail deposits; wholesale funds.

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1 Introduction

Bank opacity is an aspect that has been widely discussed in the principles and practices of banking. Since bank managers have enormous informational advantages over investors/creditors, there appears a significant level of information asymmetry between bank managers as insiders and investors/creditors as outsiders. This may lead to bank opacity, which implies a lack of informativeness in bank financial disclosure and makes outsiders fail to judge bank earnings, assets, and values in a clear manner (Flannery et al., 2004). In general, though opacity exists for all industries, banks exhibit a higher degree of opacity than other types of firms (Blau et al., 2017; Flannery et al., 2013).

The majority of former literature focuses on the impact of bank opacity on bank stability, risk-taking, and bank valuation. Some benefits of bank opacity have been revealed in a few studies. Precisely, increasing transparency may lead to more sensitivity of uninsured deposit flows to bank performance and an adverse impact on rollover risk (Moreno and Takalo, 2016). In contrast, most of the existing empirical studies propose the costs of bank opacity. For example, bank opacity is found to decrease bank stability by adversely modifying market disciplines and external monitoring (Acharya and Ryan, 2016; Bushman, 2014). Also, bank opacity may threaten the entire banking sector by raising systemic risk (Flannery et al., 2013; Jones et al., 2013). When looking at risk-taking behaviours of individual banks, prior authors show that bank opacity likely increases the risk levels among banks, and this impact is moderated by both macroeconomic variables (the state of the macro economy and market competition) and bank characteristics (capitalisation, market discipline, and business models) (Fosu et al., 2017). Besides, the higher level of opacity is witnessed to lower bank valuation (Jones et al., 2013) and damage the efficiency of bank stock prices (Blau et al., 2017).

This paper expands the extant literature by examining the effect of bank earnings opacity on bank funding. Theory suggests that opaque banks may face tremendous concerns of fund suppliers and high funding costs, thus leading to changes in banks' funding (Huang and Ratnovski, 2011; Shin, 2009). While we are aware that various aspects of banks' reactions to opacity have received attention from academics, no empirical works thus far have carefully and directly examined how bank opacity drives the core activities of banks in the form of bank funding. In a recent paper, Zheng (2020) documents that bank opacity exerts a negative effect on bank loan growth, and this adverse impact of bank opacity on lending is mitigated for banks that are more reliant on wholesale funds. The prior author has looked into bank funding models to explain the translation from increased bank opacity into decreased bank lending; however, aggregate bank funding and its disaggregate components are not the main focus of their paper.

In this study, we are interested in bank opacity in the form of bank earnings management as captured by the model of loan loss provisions, in line with many previous related papers (Desalegn and Zhu, 2021; Jiang et al., 2016; Tran et al., 2019; Tran and Ashraf, 2018). While operating banks, bank managers widely use loan loss provisions as vital accruals to manipulate earnings and deal with capital requirements. In this regard, discretionary loan loss provisions may satisfactorily exhibit banks' financial disclosure informativeness. For bank funding, we approach total funds and then break them down into different components, given that banks collect funds via various sources. Traditionally, banks have taken retail deposits from depositors, but now they have boosted exposures to wholesale markets to obtain funds from financial institutions and non-financial corporations (Huang and Ratnovski, 2011). Because of the different

characteristics of retail deposits and wholesale funds, we expect that information disclosure may induce heterogeneous impacts on different funding sources. We take our analysis of the nexus between earnings management and bank funding further and investigate whether this nexus is more or less pronounced across different bank characteristics. In this vein, we desire to shed light on how the financial strength of banks alter the impact of earnings management on bank funding, in the context that the financial strength could modify banks' access to funding sources and funders' reactions to bank behaviours (Kashyap and Stein, 2000; Kishan and Opiela, 2006).

We utilise annual bank-level data from Vietnamese commercial banks spanning from 2007 to 2019 to test the linkage between earnings opacity and bank funding. Vietnam possesses many relevant features that motivate our investigation. The financial market and the economy in Vietnam have been heavily reliant on the banking system to function and grow when the capital market (mainly dominated by the stock market) here has been underdeveloped (Dang and Nguyen, 2021b). Still, Vietnamese banks have been immature and weaker compared to those internationally (Huynh and Dang, 2021). Under the banking monitoring and supervision of the State Bank of Vietnam (SBV), Vietnamese commercial banks tend to be stimulated to be listed on the stock exchange to boost transparency and financial disclosures (in the context of many Vietnamese banks still not listed until 2019). However, their transparency degrees, even lower than in other emerging markets, may raise a concern for stakeholders (Batten and Vo, 2019). Being aware of the weaknesses of the banking system, the SBV in recent years has issued massive reforms and required individual banks to standardise risk management according to international rules.

However, despite the efforts, most Vietnamese banks have approached only Basel II standards, leaving great importance on banking transparency and financial disclosure as introduced in Basel III rarely consulted. Regarding the influence of financial reforms, bank characteristics have considerably changed, which could clearly be shown in business models, risk-taking, and balance sheets (Nguyen et al., 2016). These reforms also lead to market deregulation and a highly competitive banking environment in Vietnam (Batten and Vo, 2019), in which the more significant the competition, the more likely it is for banks to engage in data misrepresentation. Vietnamese banks have increased their access to the wholesale funding markets to supplement their traditional retail deposits (Dang and Huynh, 2022). Besides, the Vietnamese banking industry has recently been preparing to apply the International Financial Reporting Standards 9 (IFRS 9) according to a proposed roadmap. In other words, the transparency and financial disclosures of the banking sector in Vietnam have been thus far greatly influenced by the use of domestic accounting standards.[1]

We contribute to the existing literature by exploring the impact of earnings opacity on bank funding. While much empirical research investigates the influences of bank opacity on various economic and financial indicators, the literature has still been very limited in testing the impact of bank opacity on bank funding thus far. In this regard, we offer new empirical evidence regarding how aggregate bank funding and its disaggregate parts are affected by the increased earnings opacity of banks. Our work also extends those of Zheng (2020), who suggests a significant association of bank opacity and bank lending, and notes that opacity negatively drives lending via a wholesale funding channel. Besides, we also deepen our contribution by investigating the conditionality of the link between earnings manipulation and bank funding. We underline the moderating roles of bank characteristics and financial strength on the opacity-funding relationship. This

enriches our understanding of how fund suppliers respond to earnings opacity at distinct banks, and identification of such modifying conditions is helpful for policy implication purposes after financial reform packages in the banking markets.

2 Related literature and hypotheses development

2.1 Bank opacity and bank funding

Traditionally, by disclosing more financial information related to the valuation of assets and risk choices that serve outside monitoring efforts, banks signal to the market that they commit to great market disciplines and low risk-taking behaviours. Consequently, opaque banks failing to disclose information could be seen as of high risk (Berlin and Loeys, 1988), causing them to suffer higher funding costs compared to transparent banks. Moreover, in front of opaque banks, fund suppliers as outsiders may feel uncertain about judging the true financial conditions of these banks. This uncertainty tends to raise significant concerns of fund suppliers, and then they may react by directly withdrawing their funds or reducing the supply of additional ones (Huang and Ratnovski, 2011; Shin, 2009).

Among funding sources, retail deposits are known as a stable source, possibly due to the government deposit insurance that increases the stickiness of depositors to current banks (Gatev and Strahan, 2006). This feature contrasts with wholesale funds that are more sensitive to market liquidity shocks (Dagher and Kazimov, 2015). Transactions of wholesale financiers are not collateralised and covered by any government insurance, so they are more willing to analyse complicated financial reports of banks. If negative signals are diagnosed, they quickly cancel their funding (Huang and Ratnovski, 2011). This mechanism is reinforced by the fact that retail depositors cannot possess sophisticated resources to collect and assess financial information from banks as wholesale funders can (Demirgüç-Kunt and Huizinga, 2004). Given the arguments elaborated above, we posit the hypothesis as follows:

Hypothesis 1 Earnings opacity exerts a negative impact on bank funding, and wholesale funds are the main affected component.

2.2 The moderating role of bank characteristics

Though the literature has not tested the link between earnings opacity and bank funding, it still offers some evidence to encourage us to predict that bank characteristics matter for the link under research. Former research claims that banks use loan loss provisions to smooth their income, especially when pre-managed earnings of banks are low (Kanagaretnam et al., 2004). If this is the case, these low-earning banks are more likely to present a higher opacity level and suffer greater consequences from it. Besides, most relevantly, when opacity leads to concerns of fund suppliers, increasing the financial strength of banks would make these fund suppliers feel more relieved. Thus bank funding would become more stable and less affected. This view is supported by a literature segment revealing that banks' financial strength (traditionally measured by bank size, capital, and liquidity) is associated with greater access to alternative sources of funds which are also cheaper due to lower risk premiums (Kashyap and Stein, 2000; Kishan

and Opiela, 2006). It is also argued that riskier banks may pay higher rates on their funds obtained than safer banks (King, 2008). These arguments imply that the adverse effect of opacity on funding should be amplified if opaque banks face more burden in their financial strength. In sum, the following hypothesis is developed:

Hypothesis 2 The negative impact of earnings opacity on bank funding is mitigated by bank characteristics/financial strength.

3 Methodology and data

3.1 Bank earnings opacity measure

The discretionary component of loan loss provisions is regarded as an earnings management instrument in the sense that a larger magnitude of discretionary loan loss provisions may imply heavier discretion from bank management and suggest increased earnings restatements, which diminishes the ability of stakeholders to evaluate banks accurately (Beatty and Liao, 2014). To empirically figure discretionary loan loss provisions, we set up a model using loan loss provisions as the dependent variable and a wide range of bank-specific and macro determinants as independent variables. Concretely, given that there has been no consensus on the specific composition of the discretionary provisions model, we follow Tran et al. (2019) and Desalegn and Zhu (2021) to conduct regressions based on the equation as follows:

$$\begin{aligned} Llp_{it} = {} & \alpha_0 + \alpha_1 \times \Delta Npl_{i,t+1} + \alpha_2 \times \Delta Npl_{i,t} + \alpha_3 \times \Delta Npl_{i,t-1} + \alpha_4 \times \Delta Siz_{i,t-1} \\ & + \alpha_5 \Delta Loan_{i,t} + \alpha_0 \times \Delta Gdp_t + \alpha_7 \times \Delta Unp_t + \varepsilon_{i,t} \end{aligned} \tag{1}$$

where i and t index banks and years, respectively. The loan loss provisions variable $Llp_{i,t}$ is taken as the share of lagged gross loans. The main determinant of loan loss provisions is the difference in non-performing loans over the year scaled by beginning gross loans. Due to data availability, our model takes into account changes in non-performing loans for three consecutive years (i.e., the previous year $\Delta Npl_{i,t-1}$, the current year $\Delta Npl_{i,t}$, and the next year $\Delta Npl_{i,t+1}$. $Siz_{i,t-1}$ is the natural logarithm of total assets in year t–1. $\Delta Loan_{i,t}$ is the change in total loans scaled by beginning total assets. As macroeconomic factors, ΔGdp_t captures the change in the gross domestic product, and ΔUnp_t reflects the change in unemployment rates. The residuals of the above regression model are treated as discretionary loan loss provisions and we employ their absolute value as our proxy for bank earnings management. The larger the magnitude of discretionary loan loss provisions, the higher the level of bank opacity.

3.2 Methodology

To explore the impact of earnings opacity on bank funding, we specify the following baseline model:

$$Funding_{i,t} = \alpha_0 + \alpha_1 \times Opacity_{i,t-1} + \alpha_2 \times Bank_{i,t-1} + \alpha_3 \times Macro_{t-1} + v_i + \varepsilon_{i,t} \tag{2}$$

The dependent variable $Funding_{i,t}$ is to gauge the total funding of banks, calculated by the ratio of deposits plus wholesale funds to total assets. We then decompose it into two main components, namely deposits and wholesale funds, also defined as the share of total

assets. Our primary independent variable of interest is bank earnings opacity. Following previous papers (Dietrich et al., 2014; Hoque and Pour, 2018), we add into the regression a set of bank-level variables ($Bank_{i,t-1}$ and macroeconomic variables ($Macro_{t-1}$), including bank capital (*Cap*), bank liquidity (*Liq*), bank size (*Siz*), bank returns (*Roa*), bank risk (*Npl*), economic growth (*Gdp*), and monetary policy stance (*Rfr*). v_i controls for bank fixed effects, and $\varepsilon_{i,t}$ is the error term. We use all regressors lagged by one period as we expect earnings management to drive bank funding with a lag. Moreover, the use of lags may be helpful to mitigate reverse causality concerns.

The Hausman test suggests the use of fixed effect regressions, and we attempt to advance our fixed effect regressions using Driscoll-Kraay standard errors that provide us with results robust to cross-sectional and temporal dependence (Hoechle, 2007). However, such regressions are still subject to potential endogeneity problems, e.g., measurement errors or omitted variables. So, to better tackle these bias sources and allow for the dynamic nature of bank funding, we add the lagged dependent variable into the right-hand side of the model as mentioned above and then adopt the two-step system generalised method of moments (GMM) technique to conduct estimations (Blundell and Bond, 1998). In creating instruments, we take two lags to be reasonable, given our data availability (Roodman, 2009).

To further explore the conditionality for the link between earnings opacity and bank funding, we expand our baseline model with the interaction terms. Specifically, we interact earnings opacity with bank-specific characteristics as illustrated in the following equation:

$$\begin{aligned} Funding_{i,t} = {} & \alpha_0 + \alpha_1 \times Opacity_{i,t-1} \\ & + \alpha_2 \times Opacity_{i,t-1} \times Bank_{i,t-1} + \alpha_3 \times Bank_{i,t-1} \\ & + \alpha_4 \times Macro_{t-1} + v_i + \varepsilon_{i,t} \end{aligned} \tag{3}$$

where $Bank_{i,t-1}$ is a vector of all bank-specific characteristics as discussed earlier. Based on the coefficients of the interaction terms, we can be aware of whether the impact of opacity on funding is stronger or weaker in certain groups of banks, thereby offering more insight regarding possible underlying mechanisms behind our main result.

3.3 Data

Bank-level data are collected from banks' annual financial reports, which are available at the website of each bank. We eliminate observations without sufficient data to set up our variables. Due to data accessibility, our final data sample includes 31 Vietnamese commercial banks with a total of 383 bank-year observations spanning from 2007 to 2019. Apart from bank-level data, we also extract data for economic growth and policy rates from the World Development Indicators and the SBV databases.

Table 1 presents the descriptive statistics for all variables under analysis. Looking into bank funding patterns, we document that the average deposit proportion is 62.378%, revealing that the funding of Vietnamese banks mainly stems from deposits rather than wholesale funds. During the sample period, the earnings opacity measure depicts the mean of absolute values of 0.007 and the standard deviation of 0.005. Such a distribution is comparable to previous authors' estimates in other financial markets using the regression model of loan loss provisions (Desalegn and Zhu, 2021; Tran et al., 2019). In

addition to these key variables, the remaining ones display a considerable degree of variability and a high level of heterogeneity across banks in the data sample.

Table 1 Summary descriptive statistics

	Obs	*Mean*	*SD*	*Min*	*Max*	*Descriptions*
Total funds	383	85.234	5.741	69.448	92.706	Deposits and wholesale funds/total assets (%)
Deposits	383	62.378	13.807	28.806	86.496	Deposits/total assets (%)
Wholesale funds	383	22.744	12.027	3.043	48.970	Wholesale funds/total assets (%)
Opa	314	0.007	0.005	0.000	0.019	Absolute value of residuals from the discretionary provisions model
Cap	383	10.019	4.858	4.384	25.267	Book value equity/total assets (%)
Liq	383	17.432	10.013	5.090	45.600	Liquid assets/total assets (%)
Siz	383	32.010	1.264	29.643	34.630	Natural logarithm of total assets
Roa	383	1.574	0.880	0.161	3.929	Net returns/total assets (%)
Npl	383	0.959	0.706	0.015	2.841	Non-performing loans/gross loans (%)
Rfr	383	8.021	2.536	6.000	15.000	Refinancing rates announced by the central bank (%)
Gdp	383	6.245	0.640	5.247	7.130	Gross domestic product growth rate (%)

Notes: The sample period runs from 2007 to 2019. All bank-level variables are winsorised at 2.5% level on the top and bottom of their distributions.

4 Empirical results

4.1 Baseline regression results

In this subsection, we exhibit our empirical results of the baseline model testing the impact of earnings management on bank funding. Results in Table 2 are obtained from fixed effect estimations, while those in Table 3 are based on the dynamic GMM regressions. For each table, we first deal with the function of total funding and then with two components of bank funding, including deposits and wholesale funds; for a robustness purpose, each function excludes and includes macroeconomic factors.

We start our discussion with the model of total funding. Throughout all relevant regressions, the coefficient on bank earnings opacity is negative and statistically significant at least at the 5% level, implying that greater earnings opacity decreases bank funding and thus supporting Hypothesis 1. This result firmly holds no matter how we perform regressions with static/dynamic panel models through different sets of controls.

Table 2 Baseline estimates with fixed effect regressions

	Total funds function		*Deposits function*		*Wholesale funds function*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Opa	–271.379**	–263.152**	–600.154	–509.643*	–276.605***	–261.504***
	(102.373)	(114.405)	(420.112)	(278.730)	(60.142)	(63.899)
Cap	–0.344***	–0.353***	–0.303*	–0.306*	–0.107	–0.180
	(0.108)	(0.100)	(0.139)	(0.146)	(0.123)	(0.153)
Liq	–0.106***	–0.088**	–0.463***	–0.462***	0.276***	0.293***
	(0.022)	(0.029)	(0.049)	(0.041)	(0.071)	(0.070)
Siz	1.626**	2.124	3.873**	4.832*	–0.764	–0.480
	(0.695)	(1.181)	(1.481)	(2.663)	(1.158)	(1.075)
Roa	–1.867***	–1.645***	–5.382***	–5.397***	4.461***	4.796***
	(0.224)	(0.384)	(0.473)	(0.642)	(0.698)	(0.711)
Npl	–1.844**	–1.850**	5.896*	5.344**	–1.721	–1.811
	(0.687)	(0.796)	(2.767)	(1.828)	(1.207)	(1.244)
Rfr		–0.127		0.059		–0.052
		(0.101)		(0.277)		(0.299)
Gdp		–1.036		–1.374		–1.987
		(0.806)		(1.752)		(1.467)
Observations	314	314	314	314	314	314
Banks	31	31	31	31	31	31
R-squared	0.405	0.420	0.515	0.518	0.271	0.284

Notes: This table displays the fixed effect regression estimates of the baseline model, where the dependent variables are exhibited at the top of columns. The main independent variable is Opa. Driscoll-Kraay standard errors are given in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3 Baseline estimates with GMM regressions

	Total funds function		*Deposits function*		*Wholesale funds function*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Lagged dependent variable	0.540***	0.645***	0.542***	0.731***	0.481***	0.581***
	(0.058)	(0.066)	(0.036)	(0.047)	(0.032)	(0.028)
Opa	–737.670***	–701.511***	146.562	104.911	–188.261**	–180.369**
	(83.211)	(173.889)	(89.378)	(82.359)	(77.846)	(75.136)
Cap	0.121	0.224**	0.125	0.190**	0.114	0.068
	(0.095)	(0.103)	(0.094)	(0.082)	(0.078)	(0.071)
Liq	–0.127***	–0.113***	–0.086**	–0.111**	0.086***	0.097***
	(0.019)	(0.021)	(0.034)	(0.043)	(0.023)	(0.028)
Siz	0.784***	1.071***	2.065***	1.782***	–1.403***	–1.322***
	(0.284)	(0.348)	(0.282)	(0.222)	(0.361)	(0.333)
Roa	–0.292	–0.427	–3.285***	–3.573***	2.160***	2.533***
	(0.350)	(0.405)	(0.287)	(0.376)	(0.498)	(0.401)
Npl	3.669***	3.664***	2.456***	2.187***	–1.837***	–1.661***
	(0.626)	(0.917)	(0.428)	(0.280)	(0.480)	(0.364)
Rfr		0.024		0.728***		–0.492***
		(0.103)		(0.114)		(0.063)
Gdp		0.183		1.973***		–1.801***
		(0.233)		(0.247)		(0.319)
Observations	314	314	314	314	314	314
Banks	31	31	31	31	31	31
Instruments	27	29	27	29	27	29
AR(1) test	0.001	0.000	0.003	0.001	0.003	0.002
AR(2) test	0.438	0.528	0.232	0.590	0.330	0.945
Hansen test	0.400	0.441	0.207	0.142	0.168	0.166

Notes: This table displays the system GMM regression estimates of the baseline model, where the dependent variables are exhibited at the top of columns. The main independent variable is Opa. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. *** and ** indicate significance at the 1% and 5% levels, respectively.

One crucial concern is that banks are financed by wholesale funds and deposits, which have different natures, thus the negative effect of opacity on funding may not necessarily imply a decline in wholesale funds and/or deposits. Moreover, a change in deposits can be offset by wholesale funds. We test this possibility by breaking total funding into wholesale funds and deposits and repeat regressions using these two component variables. For the results of deposit regressions, as displayed in columns 3–4 in Tables 2–3, the coefficient of the opacity variable is mixed and insignificant, suggesting that we find no significant impact of earnings management on bank deposits. Different from these results, across all specifications of wholesale funds in columns 5–6 of Tables 2–3, the coefficient of bank opacity is negative and statistically significant at least at the 5% level, revealing the adverse effect of bank opacity on wholesale funds. Employing different econometric techniques and adding more control variables in the regressions do not alter our findings for the relationship between bank opacity and different funding components. Therefore, while average banks tend to significantly reduce their wholesale funds in response to earnings opacity, their deposits are not unaffected by financial information disclosure. These results lend further support to Hypothesis 1.

Taken together, our finding indicates that banks reducing the disclosure of information tend to suffer a decrease in bank funding, and this decrease is totally driven by wholesale funds but not retail deposits. We suggest potential explanations for our finding as follows. Given that earnings management may mitigate market disciplines and weaken outside monitoring, fund suppliers may fail to judge the actual conditions of banks (Huang and Ratnovski, 2011; Shin, 2009). This situation leads to great concerns for fund suppliers, causing them to withdraw supplied funds or raise funding costs, thereby decreasing bank funding. Traditionally, retail depositors are less incentivised to monitor bank operations when compared with wholesale funders (Calomiris and Kahn, 1991), mainly due to the government deposit insurance that wholesale funders typically cannot reach. Moreover, retail depositors cannot have sophisticated resources to collect and assess financial information from banks as wholesale funders can (Demirgüç-Kunt and Huizinga, 2004). These arguments support the view that wholesale funders are the ones that strongly react to financial information disclosure of banks rather than retail depositors, making banks' wholesale funds significantly decline. Our pattern is also in line with the notion that retail deposits offer banks a more stable funding source (Gatev and Strahan, 2006). Our finding draws a particularly important implication in the era that wholesale funds have increasingly replaced retail deposits (Huang and Ratnovski, 2011).

4.2 Augmented regression results

In this part we test if the opacity-funding relationship is affected by bank-specific characteristics, captured by bank capital, liquidity, bank size, risk, and return. We also perform alternative regressions using Driscoll-Kraay fixed effects Table 4 and GMM estimators Table 5, where we control different sets of regressors. We only analyse the function of wholesale funds, given that they are the sole funding component significantly responding to bank earnings management. In most columns, a significantly negative sign for the standalone opacity measure shows that earnings management is still negatively associated with wholesale funds. This result is consistent with our finding gained previously, supporting our conclusion on the detrimental influence of opacity on bank funding.

Table 4 Augmented estimates with fixed effect regressions

	Wholesale funds function									
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Opa	–430.196**	–463.790**	–774.347***	–777.731***	–873.550*	–725.360**	–875.767*	–731.470**	–741.140**	–845.315**
	(159.175)	(164.260)	(108.079)	(101.371)	(411.035)	(312.258)	(413.508)	(317.983)	(242.990)	(311.330)
*Opa*Cap*	67.911***	69.573***								
	(13.605)	(13.100)								
*Opa*Liq*			39.284***	40.895***						
			(5.713)	(5.697)						
*Opa*Siz*					8.419***	8.908**				
					(2.129)	(2.856)				
*Opa*Roa*							69.662**	75.274*		
							(24.334)	(35.501)		
*Opa*Npl*									–184.919**	–233.018*
									(81.337)	(117.205)
Cap	0.084	0.010	–0.118	–0.200	–0.014	–0.012	–0.026	–0.024	–0.105	–0.185
	(0.151)	(0.170)	(0.123)	(0.143)	(0.155)	(0.154)	(0.154)	(0.152)	(0.119)	(0.149)
Liq	0.268***	0.274***	0.204***	0.213***	0.327***	0.348***	0.338***	0.359***	0.272***	0.290***
	(0.074)	(0.074)	(0.056)	(0.052)	(0.070)	(0.064)	(0.072)	(0.065)	(0.065)	(0.062)
Siz	–0.964	–0.683	0.071	0.413	–1.728*	–2.296	–1.763*	–2.320	–0.865	–0.577
	(1.242)	(1.229)	(1.107)	(1.009)	(0.831)	(1.457)	(0.855)	(1.505)	(1.290)	(1.202)
Roa	4.772***	5.031***	4.601***	4.916***	3.917***	4.298***	4.205***	4.602***	4.393***	4.749***
	(0.781)	(0.717)	(0.626)	(0.599)	(0.404)	(0.448)	(0.380)	(0.525)	(0.710)	(0.738)
Npl	–1.837	–1.928	–1.090	–1.161	–7.484**	–6.680**	–7.728**	–6.953***	–1.833	–1.962
	(1.099)	(1.135)	(1.192)	(1.254)	(2.895)	(2.183)	(2.865)	(2.143)	(1.178)	(1.212)
Rfr		0.059		0.013		–0.246		–0.240		–0.063
		(0.281)		(0.250)		(0.227)		(0.237)		(0.316)
Gdp		–1.883		–2.078		0.726		0.722		–2.204
		(1.383)		(1.372)		(1.552)		(1.623)		(1.657)
Observations	314	314	314	314	314	314	314	314	314	314
Banks	31	31	31	31	31	31	31	31	31	31
R-squared	0.291	0.305	0.300	0.315	0.384	0.388	0.380	0.384	0.275	0.291

Notes: This table displays the fixed effect regression estimates of the augmented model, where the dependent variable is wholesale funds. The main independent variable is Opa and its interactions. Driscoll-Kraay standard errors are given in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5 Augmented estimates with GMM regressions

	Wholesale funds function									
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Lagged dependent variable	0.541***	0.640***	0.536***	0.637***	0.552***	0.646***	0.546***	0.653***	0.604***	0.696***
	(0.032)	(0.023)	(0.036)	(0.035)	(0.032)	(0.025)	(0.031)	(0.016)	(0.028)	(0.020)
Opa	–957.488***	–815.943***	–974.118***	–847.436***	–1,002.132***	–870.907***	–1,013.218***	–888.087***	–2,471.751***	–1,772.727***
	(195.194)	(154.188)	(189.073)	(144.206)	(192.393)	(150.724)	(202.594)	(155.415)	(222.429)	(204.970)
Opa*Cap	27.425***	30.117***								
	(7.048)	(8.020)								
Opa*Liq			18.083**	16.557**						
			(7.460)	(7.688)						
Opa*Siz					7.538***	8.292***				
					(2.701)	(2.915)				
Opa*Roa							177.465***	167.986***		
							(49.532)	(45.298)		
Opa*Npl									–190.646**	–110.584
									(79.625)	(68.495)
Cap	0.291***	0.365***	0.112	0.164*	0.143**	0.197**	0.127**	0.197**	0.130**	0.192***
	(0.060)	(0.065)	(0.081)	(0.086)	(0.071)	(0.081)	(0.064)	(0.080)	(0.065)	(0.072)
Liq	0.055**	–0.042	0.057	0.060	0.044*	–0.029	0.055**	–0.043	–0.032	–0.024
	(0.025)	(0.026)	(0.048)	(0.050)	(0.026)	(0.027)	(0.026)	(0.028)	(0.031)	(0.030)

Notes: This table displays the system GMM regression estimates of the augmented model, where the dependent variable is wholesale funds. The main independent variable is Opa and its interactions. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5 Augmented estimates with GMM regressions (continued)

	Wholesale funds function									
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Siz	–1.760***	–1.722***	–1.680***	–1.639***	–1.510***	–1.461***	–1.525***	–1.551***	–2.072***	–1.875***
	(0.307)	(0.334)	(0.308)	(0.327)	(0.319)	(0.330)	(0.319)	(0.333)	(0.396)	(0.350)
Roa	1.705***	2.725***	1.593***	2.413***	1.509***	2.453***	2.794***	3.716***	0.134	1.208*
	(0.420)	(0.653)	(0.400)	(0.657)	(0.412)	(0.671)	(0.595)	(0.819)	(0.301)	(0.636)
Npl	–7.266***	–6.736***	–7.435***	–7.025***	–7.439***	–6.961***	–7.403***	–6.962***	–13.217***	–10.559***
	(0.785)	(0.752)	(0.774)	(0.728)	(0.770)	(0.739)	(0.784)	(0.742)	(1.055)	(0.986)
Rfr		–0.684***		–0.633***		–0.672***		–0.656***		–0.508***
		(0.134)		(0.138)		(0.139)		(0.138)		(0.141)
Gdp		–0.281		–0.346		–0.414*		–0.392*		–0.737**
		(0.227)		(0.231)		(0.211)		(0.209)		(0.294)
Observations	314	314	314	314	314	314	314	314	314	314
Banks	31	31	31	31	31	31	31	31	31	31
Instruments	28	30	28	30	28	30	28	30	28	30
AR(1) test	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
AR(2) test	0.258	0.252	0.274	0.267	0.282	0.271	0.309	0.301	0.916	0.870
Hansen test	0.122	0.180	0.123	0.200	0.121	0.198	0.139	0.215	0.331	0.345

Notes: This table displays the system GMM regression estimates of the augmented model, where the dependent variable is wholesale funds. The main independent variable is Opa and its interactions. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Of main interest is the coefficient on the interaction terms. Looking into the estimates of the association between bank opacity and capitalisation, we find a significantly positive coefficient on the interaction term Opa*Cap in all columns. This result suggests that the effect of opacity on funding depends on bank capital, and more precisely, the adverse effect of bank opacity on wholesale funds is dampened by an increase in banks' capital buffers. Similarly, having interacted earnings opacity with bank liquidity, bank size, and bank return, we find significantly positive coefficients on the interaction terms Opa*Liq, Opa*Siz, and Opa*Roa. These findings firmly hold in all regressions, thus confirming that a rise in bank liquidity/bank size/bank return indeed mitigates the adverse impact of earnings opacity on bank funding. Turning to our last regressions for the conditioning role of bank risk, the coefficients on the interaction term Opa*Npl are significantly negative across most columns reported. This result suggests a more considerable drop in bank funding of opaque banks that are exposed to greater credit risk.

Overall, we confirm that banks' financial strength is an important channel through which bank earnings opacity influences wholesale funders. Combining all results gathered above, we could have a common and consistent mark that financially stronger banks are less affected by earnings opacity than weaker banks when referring to their funding, totally confirming our Hypothesis 2. Increased financial strength could provide banks with buffers against unfavourable concerns that emerge for fund suppliers when banks hide financial information. Further, our finding is supported by well-established evidence that banks having weak balance sheets may face difficulties in receiving uninsured funds (Kashyap and Stein, 2000; Kishan and Opiela, 2006). So, bank funding of financially stronger banks is less damaged by the detrimental impact of earnings opacity compared to weaker banks.

4.3 Robustness checks

Though exhibiting some forms of robustness tests in the earlier subsections, we still aim to conduct additional tests to further validate the robustness of our findings. First, to create an alternative bank opacity measure, we alter our loan loss provision model by adding loan loss allowances and net charge offs, as shares of lagged total loans (Beatty and Liao, 2014). We employ the natural logarithm of the absolute value of the residuals in the model, consistent with former authors, to overcome the influences of extreme outliers (Tran et al., 2019). We re-estimate our baseline and extended models using this alternative measure. As presented in Tables 6 and 7, regardless of the calculation of bank earnings management, we still document unaltered findings.

Second, we are interested in checking the sensitivity of our estimates to the alternative foundation of the funding variables. In the primary regression presented earlier, we use bank funding and its components divided by total assets as the dependent variables in our model specifications. It is argued that this approach cannot wholly reflect the funding expansion in banks' balance sheets (Dang and Dang, 2021a). So, we replace these variables with alternative ones calculated by the growth rate of bank funding, including total funding and component parts via deposits and wholesale funds. Interestingly, despite some fluctuated significance levels, our estimates in Tables 8 and 9 remain similar in signs with acceptable levels of significance. Thus, we have proof to reinforce our findings once again.

Third, when we employ a small sample, one could claim that our estimates may fail to deliver reliable results, though we already tried to overcome this limitation by using

small-sample correction procedures (Windmeijer, 2005). Bearing this fact in mind, we adopt an alternative estimator that works well for unbalanced panels with a limited number of cross-section units: the least squares dummy variable corrected (LSDVC) approach (Bruno, 2005). To save space, we only report the estimated LSDVC results of Arellano and Bond using bootstrapped standard errors with 50 iterations; alternative measures of bank funding and earnings opacity are reported at this stage. As displayed in Table 10, the new sets of results lend support to our main findings of the adverse impact of bank opacity on bank funding and the weakening role of financial strength variables.

Table 6 Robustness checks for the baseline model by the logarithm of bank opacity

	Fixed effect regressions			*GMM regressions*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	Total funds	*Deposits*	*Wholesale funds*	*Total funds*	*Deposits*	*Wholesale funds*
Lagged dependent variable				0.592***	0.762***	0.632***
				(0.066)	(0.048)	(0.093)
Ln(Opa)	–0.386	–2.278	–1.255**	–3.882***	–0.209	–3.274*
	(0.588)	(1.800)	(0.437)	(0.626)	(0.398)	(1.933)
Cap	–0.382***	–0.334**	–0.193	0.179	0.207***	0.080
	(0.097)	(0.131)	(0.144)	(0.120)	(0.080)	(0.129)
Liq	–0.086***	–0.465***	0.297***	–0.128***	0.112***	0.004
	(0.024)	(0.042)	(0.072)	(0.015)	(0.042)	(0.035)
Siz	1.982	4.865*	–0.526	0.799***	1.803***	–1.303**
	(1.139)	(2.519)	(1.194)	(0.286)	(0.196)	(0.551)
Roa	–1.253**	–5.452***	4.698***	–0.361	–3.426***	4.049***
	(0.417)	(0.555)	(0.721)	(0.349)	(0.334)	(0.735)
Npl	–0.144	4.531**	–1.894	2.940***	2.343***	–1.277***
	(0.569)	(1.968)	(1.287)	(0.554)	(0.283)	(0.459)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	314	314	314	314	314	314
Banks	31	31	31	31	31	31
R-squared	0.414	0.521	0.283			
Instruments				29	29	29
AR(1) test				0.001	0.000	0.001
AR(2) test				0.660	0.574	0.147
Hansen test				0.273	0.156	0.131

Notes: This table displays the fixed effect regressions and the system GMM regression of the baseline model, where the dependent variables are exhibited at the top of columns. The main independent variable is *Ln(Opa)*. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Robustness checks for the augmented model by the logarithm of bank opacity

	Wholesale funds function									
	Fixed effect regressions					*GMM regressions*				
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Lagged dependent variable						0.627***	0.631***	0.641***	0.617***	0.452***
						(0.030)	(0.036)	(0.028)	(0.025)	(0.056)
Ln(Opa)	–3.223***	–1.669**	–58.599***	–1.435**	–1.950***	–2.566***	–2.638***	–2.708***	–2.359***	–1.859**
	(0.421)	(0.598)	(11.310)	(0.479)	(0.476)	(0.725)	(0.722)	(0.729)	(0.702)	(0.863)
*Ln(Opa)*Cap*	0.142***					0.119**				
	(0.040)					(0.050)				
*Ln(Opa)*Liq*		0.121***					0.052			
		(0.008)					(0.035)			
*Ln(Opa)*Siz*			1.908***					0.025*		
			(0.349)					(0.015)		
*Ln(Opa)*Roa*				0.372**					0.952***	
				(0.156)					(0.318)	
*Ln(Opa)*Npl*					–1.825**					–0.334***
					(0.637)					(0.050)
Cap	0.192	0.240*	–0.128	–0.219	–0.078	–0.514	0.121	0.140	0.149*	0.064
	(0.248)	(0.123)	(0.152)	(0.149)	(0.141)	(0.329)	(0.098)	(0.094)	(0.089)	(0.108)
Liq	0.280***	0.024	0.277***	0.274***	0.349***	–0.022	–0.294	–0.015	–0.028	1.777***
	(0.078)	(0.058)	(0.084)	(0.076)	(0.056)	(0.027)	(0.193)	(0.029)	(0.029)	(0.286)

Notes: This table displays the fixed effect regressions and the system GMM regression of the augmented model, where the dependent variable is wholesale funds. The main independent variables are Ln(Opa) and its interactions. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Robustness checks for the augmented model by the logarithm of bank opacity (continued)

	Wholesale funds function									
	Fixed effect regressions					*GMM regressions*				
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Siz	−1.375	1.503	−9.343***	−0.394	−2.726	−1.661***	−1.589***	−1.627***	−1.422***	−1.505***
	(1.636)	(0.877)	(2.525)	(1.090)	(1.555)	(0.365)	(0.363)	(0.375)	(0.359)	(0.491)
Roa	5.179***	3.333***	4.516***	3.971***	4.654***	2.767***	2.486***	2.496***	−2.264	3.351***
	(0.478)	(0.719)	(0.399)	(0.792)	(0.479)	(0.686)	(0.700)	(0.736)	(1.645)	(0.453)
Npl	−1.573	−0.579	−1.461	−1.743	4.713*	−4.670***	−4.786***	−4.772***	−4.439***	−4.297***
	(0.915)	(1.244)	(1.006)	(1.390)	(2.364)	(0.616)	(0.590)	(0.615)	(0.606)	(0.835)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	314	314	314	314	314	314	314	314	314	314
Banks	31	31	31	31	31	31	31	31	31	31
R-squared	0.329	0.452	0.345	0.293	0.384					
Instruments						30	30	30	30	30
AR(1) test						0.000	0.000	0.000	0.000	0.000
AR(2) test						0.137	0.156	0.163	0.116	0.107
Hansen test						0.188	0.197	0.200	0.210	0.122

Notes: This table displays the fixed effect regressions and the system GMM regression of the augmented model, where the dependent variable is wholesale funds. The main independent variables are Ln(Opa) and its interactions. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8 Robustness checks for the baseline model by the growth rate of bank funding

	Fixed effect regressions			*GMM regressions*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	Total funds growth	*Deposits growth*	*Wholesale funds growth*	*Total funds growth*	*Deposits growth*	*Wholesale funds growth*
Lagged dependent variable				0.169***	0.152***	0.049***
				(0.017)	(0.032)	(0.015)
Opa	–31.993	922.379	–3,377.912***	–1,118.382***	135.686	–2,239.709***
	(217.278)	(680.952)	(964.152)	(175.684)	(275.712)	(499.653)
Cap	–1.076	1.373	–2.201	1.258***	1.335***	3.779***
	(1.012)	(0.978)	(1.505)	(0.485)	(0.258)	(0.801)
Liq	1.072***	0.591	3.071***	–0.234***	0.037	1.455***
	(0.238)	(0.372)	(0.723)	(0.086)	(0.083)	(0.283)
Siz	–13.673**	–12.444**	–44.988**	–1.220	–2.608	–6.803**
	(4.886)	(4.650)	(14.620)	(1.110)	(1.616)	(3.276)
Roa	4.881**	–0.470	4.336	6.895***	2.316	23.798***
	(1.925)	(2.784)	(6.298)	(1.270)	(2.425)	(2.768)
Npl	–6.297***	–0.541	–21.168***	–0.456	–2.943*	–8.042
	(1.515)	(1.587)	(4.925)	(1.408)	(1.619)	(5.178)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	283	283	283	283	283	283
Banks	31	31	31	31	31	31
R-squared	0.271	0.287	0.200			
Instruments				29	29	29
AR(1) test				0.001	0.001	0.008
AR(2) test				0.446	0.517	0.706
Hansen test				0.105	0.407	0.189

Notes: This table displays the fixed effect regressions and the system GMM regression of the baseline model, where the dependent variables are exhibited at the top of columns. The main independent variable is Opa. Standard errors are given in parentheses. Diagnostic tests are reported with p-values. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5 Conclusions

This study explores the impact of earnings opacity on bank funding using a sample of Vietnamese commercial banks between 2007 and 2019. For deeper insights, we decompose bank funding into wholesale funds and deposits. To the best of our knowledge, this study is the first to analyse how earnings opacity affects bank funding, with a specific focus on wholesale funds and deposits. Our estimation results indicate that greater earnings opacity tends to decrease bank funding, and wholesale funds are the primary driver of the result. In other words, earnings management leads to a drop in wholesale funds but not in bank deposits. Furthermore, we examine how bank characteristics influence the impact of earnings opacity on bank funding. We find that the unfavourable impact of earnings opacity on banks' wholesale funds is less pronounced for banks that are better-capitalised, more liquid, larger in size, more profitable, and less risky. As a consistent pattern, we can conclude that the financial strength of banks could alleviate the adverse effect of earnings opacity on bank funding. Our findings are strongly valid based on a series of robustness tests, including the usage of alternative funding/opacity calculations and different econometric techniques.

Given that our work points to a decrease in wholesale funding associated with bank earnings opacity, we offer timely evidence to indicate how financial information disclosure in the banking system leads to a shift in banks' funding model, in the period that banks have increasingly relied on the wholesale market to substitute traditional retail deposits. Our findings improve the understanding of the behaviours of different fund suppliers in response to financial information disclosure. Our findings imply that regulators and bank managers should pay further attention to earnings opacity consequences with specific regard to bank funding. Along this line, more informed decisions could be reinforced if they clearly understand the moderating role of bank characteristics. Accordingly, an improvement in the financial strength across banks should be encouraged since in case bank opacity prevails, increased financial strength may provide banks with valuable assistance to cushion the adverse impacts of opacity.

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Note

1 For an ideal overview of the economy, the stock market, and the operation of the central bank in Vietnam, please refer to the papers of Nguyen et al. (2016), Nguyen (2022), and Le and Do (2021).