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Loan growth, capitalization, and credit risk in Islamic banking

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ABSTRACT

We assess the effect of loan growth and capitalization on credit risk in Islamic banking. Using a sample of Islamic banks from 29 countries, our empirical results reveal that higher loan growth exacerbates credit risk one year ahead, particularly for Islamic banks with higher capitalization. However, a deeper investigation highlights that such evidence is more pronounced after the 2008 global financial crisis (GFC). Hence, strengthening prudential tools and supervision for Islamic banks with higher capitalization is necessary to mitiate moral hazard and ensure prudent lending behavior in the aftermath of the GFC. Likewise, strengthening capital requirements is not enough to ensure prudent lending behavior in Islamic banking.

1. Introduction

Islamic banking has developed rapidly after the 2008 global financial crisis. In 2010, the total assets of Islamic banks only reached USD 939 billion (Cevik and Charap, 2011). Until 2013, Islamic banks' total assets already reached USD 1.2 trillion, which is projected to grow from 10% to 15% annually (Ernst and Young, 2015). Such development might be associated with higher loan growth related to non-profit and loss sharing (PLS) contracts. This is because the majority of Islamic banks' mode of financing around the world is generally dominated by non-PLS contracts (Abedifar et al., 2013). For many countries, Kahn (2010) points out that *Murabaha* (trade-related markup financing) as a non-PLS contract can constitute more than 80% of Islamic banks' total assets.

This in turn renders Islamic banks somewhat comparable to conventional banks, because conventional bank loans are not based on a PLS contract. Accordingly, research on the comparison of financial performance between conventional banks and Islamic banks have emerged (e.g. Alqahtani and Mayes, 2018; Alqahtani et al., 2017; Doumpos et al., 2017; Abedifar et al., 2015; Belanès et al., 2015; Abedifar et al., 2013; Bourkhis and Nabi, 2013). However, the implication of loan growth on risk in Islamic banking remains unexplored, and this paper contributes in three ways.

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First, to our knowledge, this paper is the first to assess the link between loan growth and credit risk in Islamic banks. Hence, we enrich prior literature on the impact of loan growth on risk that only focuses on conventional banks (e.g. Festić et al., 2011; Foos et al., 2010; Soedarmono et al., 2017b). For instance, Festić et al. (2011) document from a sample of Central and Eastern European conventional banks, that a decline in bank peformance and an increase in credit risk can be affected by loan growth in banking. Empirical evidence from a sample of conventional banks in OECD countries also shows that higher abnormal loan growth exacerbates credit risk during three years, while it also deterioriates interest income, risk-adjusted interest income, and capitalization (Foos et al., 2010). From a sample of Asian conventional banks that are listed on stock exchanges, Soedarmono et al. (2017b) document that higher abnormal loan growth precipitates systemic risk one year ahead, although this relationship is conditional on the quality of credit reporting system.

Second, we examine the joint impact of bank loan growth and capitalization on credit risk in Islamic banks to assess whether the effect of loan growth on credit risk is conditional on bank capitalization. Soedarmono et al. (2017a) highlight that strengthening capitalization is necessary for Islamic banks to promote the countercyclicality of loan loss provisoning, which enables Islamic banks to increase loan loss provisions during economic booms, and to reduce loan loss provisions during economic downturns. Pramono et al. (2018) further highlight that higher non-discretionary loan loss provisions deteriorate loan growth, but higher capitalization mitigates the negative effect of non-discretionary loan loss provisions on loan growth in Islamic banks. Consequently, economic recessions that potentially increase Islamic banks' non-performing loans and non-discretionary loan loss provisions will be prolonged by lower loan growth in Islamic banking, unless Islamic banks' capitalization increases. However, these studies do not investigate whether loan growth and capitalization in Islamic banking might interact, which in turn affect credit risk in Islamic banking.

By assessing the joint impact of bank loan growth and capitalization on credit risk in Islamic banking, this present paper therefore establishes an empirical link between the bank loan growth-stability literature and the bank capitalization-stability literature, particularly to study Islamic banking. Although strengthening capitalization is essential to render loan loss provisions in Islamic banks countercyclical as in Soedarmono et al. (2017a) and Pramono et al. (2018), a large stand of literature on bank capitalization highlights that the role of capitalization in mitigating bank riskiness remains ambiguous. On the one hand, bank capital is considered as a financial buffer to mitigate bank insolvency when no risk-taking incentives from bank shareholders and managers are taken into consideration (e.g. Koehn and Santomero, 1980; Kim and Santomero, 1988; Berger et al., 2009; DeYoung et al., 2018; Anginer et al., 2018). On the other hand, higher bank capitalization also indicates that self-interested bank managers may reshuffle bank portfolios by pursuing higher risk taking in a way that can increase profitability to cover higher cost of capital. Hence, higher capitalization may exacerbate bank risk taking and deteriorate financial stability (e.g. Bitar et al., 2018; Iannotta et al., 2007; Jeitschko and Jeung, 2005).

Third, we analyze whether the 2008 global financial crisis (GFC) affects the interplay of loan growth, capitalization, and credit risk in Islamic banking. Recent studies in Islamic banking also advocate the importance of analyzing the GFC in influencing Islamic bank performance. Alqahtani et al. (2017) report that Islamic banks, especially large Islamic banks, suffer more than conventional banks in terms of financial instability in the aftermath of the GFC. Alqahtani et al. (2017) also document that during the period subsequent to the GFC, Islamic banks exhibit lower profit and cost efficiency than conventional banks. In turn, investigating the interplay of loan growth, capitalization, and credit risk before and after the GFC is relevant, particularly to examine whether financial crisis aggravates Islamic banks' moral hazard. Such moral hazard problems can be due to bank risk taking or a lack of monitoring effort to the borrowers that become common issues in Islamic banks as stated in Abedifar et al. (2013).

Our empirical results show that higher loan growth is linked to higher credit risk in Islamic banks one year ahead. A deeper analysis documents that this finding only occurs for Islamic banks with higher capitalization. In addition, we find that the adverse implication of higher capitalization in precipitating moral hazard and credit risk in Islamic banking due to higher loan growth is more pronounced in the aftermath of the GFC. This paper therefore advocates the importance of strengthening prudential tools and supervision in addition to capital regulation in order to ensure prudent lending behavior in Islamic banking after the GFC.

The rest of this paper is structured as follows. Section 2 describes our data, variables and methodology. Section 3 presents our empirical results with a batteries of robustness checks, while Section 4 concludes.

2. Data, variables, and method

In this paper, we use a similar dataset retrieved by Soedarmono et al. (2017a) and Pramono et al. (2018) that covers balance-sheet and income statement indicators from a sample of Islamic banks operating in 29 countries during the 1997–2012 period.[2] All bank-level indicators come from Bankscope (or BankFocus). Macroeconomic data related to real GDP (gross domestic product) is also obtained from the World Development Indicators database. Using a dataset of Soedarmono et al. (2017a) and Pramono et al. (2018) enables us to provide evidence whether capitalization in Islamic banks might also have drawbacks for financial stability using the similar setting, when their findings strongly emphasize on the importance of boosting capitalization to promote financial intermediation in times of crises.

With regards to our dependent variables reflecting credit risk, we use three measurements. These include the ratio of loan loss provisions to total assets (*LLP*), the ratio of loan loss reserves to total assets (*LLR*) and the ratio of non-performing loans to total loans

[2] Our sample comprises 147 banks from the following countries, in which numbers in the bracket represent the number of banks in each country: United Arab Emirates (10), Bangladesh (2), Bahrain (19), Brunei Darussalam (1), Egypt (2), UK (5),Gambia (1), Indonesia (3), Iraq (6), Iran (16), Jordan (3), Kuwait (9), Cayman Islands (1), Lebanon (3), Mauritania (2), Maldives(1), Malaysia (17), Philippines (1), Pakistan (9), Palestinian Territory (2), Qatar (4), Russia (1), Saudi Arabia (4), Sudan (12),Singapore (1), Syiria (2), Tunisia (1), Turkey (4), and Yemen (4). Numbers in the brackets represent the number of banks in each country.

(*NPL*). The use of *LLP*, *LLR* and *NPL* has been widely recognized in the literature on bank credit risk (e.g. Soedarmono et al., 2017a; Natsir et al., 2019). Higher *LLP*, *LLR* and *NPL* are associated with higher credit risk. Both *LLP* and *LLR* can be affected by forward-looking components, while *NPL* is a backward-looking measure of credit risk when loan losses materialize. The forward-looking component of credit risk is dependent on bank managerial discretion in building up provisions to deal with expected credit risk due to changes in bank-specific and country-specific factors.

In order to assess loan growth as our explanatory varaibles of interest, we use similar indicators used by Pramono et al. (2018). Loan growth is measured using *DLOAN* or *LOANG*. For each bank *i* at year *t*, *DLOAN* and *LOANG* are defined as follows in which *L* and *TA* represent total loans and total assets, respectively.

$$DLOAN_{i,t} = (L_{i,t} - L_{i,t-1}) / [0.5(TA_{i,t} + TA_{i,t-1})]$$

$$LOANG_{i,t} = (L_{i,t} - L_{i,t-1}) / L_{i,t-1}$$

Control variables are also incorporated. We incorporate the ratio of total equity to total assets (*EQTA*) as a measure of bank capitalization, the size of banks measured by the logarithm of bank total assets (*SIZE*) and real GDP growth (*GROWTH*).

With regards to our research methodology, we proceed this study in three stages. For bank *i* in country *j* at year *t*, we initially estimate as the first stage, the impact of loan growth on credit risk in Islamic banks one year ahead as in Eq. (1). In this regard, we incorporate the lagged value of dependent variable (*Risk*) as an independent variable following prior literature on the nexus between loan growth and riskiness in banking, because credit risk might be affected by its past values (e.g. Foos et al., 2010; Soedarmono et al., 2017b).

$$Risk_{ijt} = \alpha + \beta_0 Risk_{ijt-1} + \beta_1 LG_{ijt-1} + \sum_{i=2}^{4} \beta_{ijt} X_{ijt} + error \quad (1)$$

Risk represents the measure of bank credit risk (*LLP*, *LLR* or *NPL*), while *LG* represents the measure of bank loan growth (*DLOAN* or *LOANG*). Meanwhile, *X* is the vector of independent variables comprising *EQTA*, *SIZE* and *GROWTH*. In Eq. (1), we follow Foos et al. (2010) by considering the lagged values of loan growth indicators, because credit risk takes time to materialize after loans are granted.

Unlike Foos et al. (2010) who investigate abnormal loan growth (i.e. the extent to which bank-level loan growth exceeds the banking system's loan growth) with a time lag of one to four years, we only consider loan growth with a time lag of 1 year as an explanatory variable of interest.[3] This is because the share of Islamic banks' total assets in the banking system is still limited in countries with a dual banking system. Hence, considering abnormal loan growth in Islamic banks might undermine bank-level moral hazard that could arise, even though bank-level loan growth does not exceed the loan growth of the banking system, particularly when Islamic banks are susceptible to operational risk and information asymmetry due to a lack of monitoring as a common issue in Islamic banking (Abedifar et al., 2013).

In the second stage, we estimate the impact on bank credit risk of the interaction term between loan growth and capitalization as in Eq. (2). This is to investigate whether bank capitalization matters in affecting the link between loan growth and credit risk in Islamic banks one year ahead. For this purpose, we consider the one-year lagged value of bank capitalization (*EQTA*) instead of contemporaenous value of *EQTA*. Hence, the interaction term of the loan growth and capitalization variables (*LG*EQTA*) is also based on its one-year lagged value instead of contemporanous value.

$$Risk_{ijt} = \delta + \gamma_0 Risk_{ijt-1} + \gamma_1 LG_{ijt-1} + \gamma_2 LG{*}EQTA_{ijt-1} + \gamma_3 EQTA_{ijt-1} + \gamma_4 SIZE_{ijt} + \gamma_5 GROWTH_{jt} + error \quad (2)$$

In the third stage, we run regressions as in Eq. (2) for two distinct periods before and after the 2008 global financial crisis (GFC), in order to assess whether the interplay of loan growth, capitalization, and credit risk in Islamic banks is altered due to the GFC. For this purpose, we analyze the 1997–2006 period and the 2007–2012 period separately to be consistent with Alqahtani and Mayes (2018) who consider 2007 as the beginning of the global financial crisis.

To estimate Eq. (1) and Eq. (2), we follow Soedarmono et al. (2017b) using a dynamic panel data methodology. All independent variables other than the one-year lagged value of dependent variable are treated as exogenous variables. Specifically, we use a two-step system GMM (generalized methods of moments) estimation following Arellano and Bover, 1995 and Blundell and Bond (1998) to avoid potential reverse causality issues that may occur between loan growth and credit risk. Orthogonal deviation transformations of instruments and bank-specific characteristics are also taken into account, while we also follow Windmeijer (2005) to take finite sample correction into consideration. In addition, we also implement Roodman (2009)'s correction by collapsing instruments to limit instrument proliferation, so as to ensure that our models do not suffer from problems related to too many instruments. Overall, the validity of the system GMM is not violated when the AR(2) test and the Hansen-J test are not statistically significant.

[3] We also run regressions in which explanatory variables of interest consist of loan growth with a time lag of one to several years (e.g. two years, three years, or four years), but only coefficients of loan growth with a time lag of one year are statistically significant. These empirical results are not presented here, but are available on request.

3. Empirical results

Our descriptive statistics of all dependent and independent variables are shown in Table 1, while Table 2 shows the correlation matrix of all variables and indicates no multicollinearity issues due to the fact that independent variables are not strongly correlated. In Table 1, all variables are already economically plausible and hence, we do not conduct winsorization of variables. However, we eliminate zero values for all variables, because zero values can distort the distribution of variables and empirical estimates, especially when missing values are considered as zero.

Table 3 reports the baseline regressions in which we investigate the link between loan growth measured by *DLOAN* or *LOANG*, and credit risk measured by *LLP*, *LLR* or *NPL*. It is shown that higher loan growth exacerbates credit risk one year ahead regardless of the measure of loan growth and credit risk. This finding is in line with previous studies on conventional banks in which higher credit growth in Islamic banks is detrimental for financial stability (e.g. Foos et al., 2010; Festić et al., 2011). The validity conditions of regression coefficients are also fulfilled, because the AR(2) test and the Hansen-J test are not rejected at the 1% level.

However, a deeper investigation documents that the negative association between loan growth and credit risk is reversed when bank capitalization increases. Table 4 documents that the coefficients of the interaction terms between loan growth and capitalization (*DLOAN*EQTA* or *LOANG*EQTA*) have a positive sign and statistically significant, particularly when *LLP* or *LLTA* is used as an explanatory variable of interest. Moreover, the positive coefficients of *DLOAN*EQTA* or *LOANG*EQTA* also exhibit higher magnitude than the negative coefficients of loan growth. This suggests that the adverse impact of loan growth on financial stability due to higher credit risk is more pronounced for banks with higher capitalization.

From Table 4, we also document that the turning points of capitalization vary depending on the measurement of credit risk or loan growth. For instance, the turning point of capitalization reaches 15.2% (calculated from 0.01158 / 0.07632) when *LLP* and *DLOAN* are used as a proxy for credit risk and loan growth, respectively. This indicates that the link between *DLOAN* and *LLP* is positive and significant, particularly when *EQTA* exceeds 15.2%.

In this context, higher capitalization exacerbates moral hazard due to loan growth in Islamic banks. This result is also consistent with the notion that higher bank capital ratios might be a source of greater risk taking to offset the cost of capital (Bitar et al., 2018; Iannotta et al., 2007; Jeitschko and Jeung, 2005). Our findings are also in line with Basher et al. (2017). They highlight that higher capitalization is indeed detrimental for Islamic bank stability, although they only investigate using a relatively small sample covering 22 Islamic banks. Several reasons may arise from this finding.

First, although Islamic bank capitalization increases, it is rather difficult to mitigate Islamic banks' credit risk due to the fact that Islamic banks do not use collaterals to cover loan losses (Errico and Farahbaksh. 1998). This may indicate that Islamic banks do not have flexibility in adjusting borrowers' risk profiles, causing loans mispricing and adverse selection problems. Islamic banks also do not have sufficient control to deal with information asymmetry when managing projects under *Mudarabah* contracts (Abedifar et al., 2013).

Second, because Islamic banking needs to comply with *Sharia* principles, risks associated with Islamic banking are also complex, in addition to the fact that Islamic banks' profit and losses may also be subject to witdrawal risk coming from their investment account holders (Kahn and Ahmed, 2001). Consequently, the depositor withdrawal risk of Islamic banks may drive Islamic banks to offer higher deposit rates compared to market rates that are not in line with *Sharia* principles (Obaidullah, 2005). In turn, Islamic banks may pursue higher risk taking in the credit markets to offset higher cost of deposits, in addition to offseting higher cost of capital when capitalization increases.

In the next turn, we assess whether the interplay of loan growth, capitalization, and credit risk in Islamic banks is different before and after the 2008 global financial crisis. This analysis is motivated by the fact that Islamic banks might exhibit lower efficiency and stability than conventional banks during the period subsequent to the GFC (e.g. Alqahtani and Mayes, 2018; Alqahtani et al., 2017). A lack of monitoring by Islamic banks, a lack of flexibility in restructuring loan losses using collaterals, and the withdrawal risk of investment debt holders as emphasized by Abedifar et al. (2013) can explain as to why Islamic banks exhibit higher riskiness and inefficiency. Such riskiness may further be exacerbated when Islamic banks' capitalization worsens agency conflicts between shareholders and managers, especially when managers undertake excessive risk taking to offset an increase in the cost of capital as in Basher et al. (2017).

Moreover, taking into account different periods before and after the 2008 global financial crisis, Tables 5 and 6 present our empirical results when *DLOAN* and *LOANG* are used as a dependent variable reflecting bank loan growth, respectively. For the 2007–2012 period, we find that higher loan growth is indeed detrimental for Islamic banks with higher capitalization, because their credit risk increases. The turning points of capitalization in affecting the link between loan growth and credit risk after the 2008 global financial crisis also vary depending on how loan growth and credit risk are measured. The system GMM estimation in Tables 5 and 6 is also valid, given that the AR(2) test and the Hansen-J test are not rejected.

Overall, these findings highlight that the role of higher capitalization in exacerbating credit risk due to higher loan growth only occurs after the GFC, particularly when capital regulation tends to be stricter across countries in facing financial instability. This may indicate that in order to maintain the stability of Islamic banks after financial crises, strengthening capital regulation may not be sufficient. To ensure our findings are robust, we also conduct some robustness checks.[4]

First, we run regressions before and after the GFC by incorporating *EBTP* and *SIGN* to account for earning managements and signaling effects, respectively. This is because we also use the ratio of loan loss provisions or loan loss reserves a proxy of credit risk that might be affected by Islamic banks' managerial discretion related to income smoothing and signaling as in Soedarmono et al. (2017a). *EBTP* is the ratio of income before tax and provisions divided by total assets following Soedarmono et al., 2017a, while *SIGN* is

[4] The results of these robustness checks are not shown in the paper, but are available upon request.

calculated as follows in which *INC* represents total income before tax and loan loss provisions.

$$SIGN_{i,t} = \frac{INC_{i,t+1} - INC_{i,t}}{0.5(TA_{i,t+1} + TA_{i,t})}$$

Second, we run regressions incorporating *EBTP* and *SIGN*, but we use a two-way panel fixed effect as econometric procedure, taking into account bank-specific and time-specific characteristics. On the whole, our findings remain consistent in which higher loan growth exacerbates credit risk for Islamic banks with higher capitalization, particularly after the GFC. Third, we repeat estimation to produce Tables 5 and 6, but we incorporate an independent variable representing three interaction between loan growth, capitalization, and a dummy variable of periods before and after the GFC in which 2007 is considered as the beginning of the GFC. Overall, our findings presented earlier are not altered in general.

4. Concluding remarks

This paper documents that higher loan growth increases credit risk in Islamic banks one year ahead. However, this finding is conditional on Islamic bank capitalization and financial crisis. Specifically, we find that prudent lending behavior is more pronounced for Islamic banks with lower capitalization. For Islamic banks with higher capitalization, higher loan growth exacerbates credit risk one year ahead, suggesting that higher capitalization aggravates moral hazard in Islamic banks to undertake higher risk taking. Our results regarding the interplay of loan growth, capitalization, and credit risk in Islamic banks are also different before and after the 2008 global financial crisis (GFC) period. We document that the adverse impact of higher capitalization on Islamic bank stability due to higher loan growth only occurs in the aftermath of the GFC.

In terms of policy implications, these findings advocate the importance of strengthening credit risk management in Islamic banks during economic booms when loan growth tends to increase. Meanwhile, because higher capitalization is not enough to offset higher credit risk due to higher loan growth in Islamic banks, we also emphasize that mitigating moral hazard in Islamic banks should be prioritized following the GFC. Instead of relying on capital regulations, a greater emphasis is needed for Islamic banking to mitigate operational risk and information asymmetry that may be a source of moral hazard as in Errico and Farahbaksh (1998). Eventually, this paper also calls for the refinement of guidelines for capital requirements to accurately reflect specific risks associated with Islamic bank lending behavior.

Appendix

Table 1
Descriptive statistics

Variables	Definition	Observation	Mean	Std. Dev.	Min	Max
LLP	Ratio of loan loss provisions to total assets	694	0.0075819	0.0151546	−0.126497	0.1412412
LLR	Ratio of loan loss reserves to total assets	702	0.0264963	0.0379222	0.0001125	0.4414414
NPL	Ratio of non-performing loans to total loans	417	0.0870674	0.1334875	0.0000941	0.831972
DLOAN	Adjusted loan growth	835	0.0882095	0.1723897	−0.852459	1.000445
LOANG	Loan growth	808	0.2649212	0.5924157	−1	4.100164
EQTA	Ratio of total equity to total assets	1050	0.2621883	0.2636642	−0.5892856	1
SIZE	Logarithm of total assets	1052	13.76343	1.978237	6.272575	18.08244
GROWTH	Real GDP growth	1684	0.0469603	0.0542033	−0.413	0.465

Source: Authors' calculation.

Table 2
Correlation matrix

Variables	*LLP*	*LLR*	*NPL*	*DLOAN*	*LOANG*	*EQTA*	*SIZE*	*GROWTH*
LLP	1							
LLR	0.4228	1						
NPL	0.4143	0.689	1					
DLOAN	−0.2205	−0.2897	−0.4388	1				
LOANG	−0.181	−0.2451	−0.3982	0.8715	1			
EQTA	−0.2546	0.0416	0.1102	−0.1073	−0.0611	1		
SIZE	−0.1344	−0.3075	−0.3441	0.0848	−0.0517	−0.2373	1	
GROWTH	−0.0451	0.0223	−0.0155	0.116	0.0675	0.0155	0.0789	1

Source: Authors' calculation.

Table 3
Baseline regressions

Expl. Variables	Dependent variables					
	LLP	*LLR*	*NPL*	*LLP*	*LLR*	*NPL*
Dep.var(-1)						

(*continued on next page*)

Table 3 (*continued*)

Expl. Variables	Dependent variables					
	LLP	*LLR*	*NPL*	*LLP*	*LLR*	*NPL*
	0.33959***	0.87207***	0.97709***	0.37882	0.88578***	1.00090***
	(0.049)	(0.096)	(0.004)	(0.230)	(0.014)	(0.003)
DLOAN(-1)	0.00371*	−0.00534	0.03058***			
	(0.002)	(0.004)	(0.003)			
LOANG(-1)				0.00248*	0.00226**	0.00839***
				(0.001)	(0.001)	(0.001)
EQTA	−0.02313***	−0.00171	0.00602	−0.02116*	0.00173	0.00821
	(0.003)	(0.010)	(0.009)	(0.011)	(0.006)	(0.009)
SIZE	−0.00091***	−0.00004	−0.00366**	0.00058***	0.00039***	0.00023*
	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)
GROWTH	−0.02164***	−0.04864***	−0.05744***	−0.01730*	−0.05164***	−0.04494***
	(0.006)	(0.016)	(0.018)	(0.009)	(0.010)	(0.015)
Observations	405	433	261	394	422	256
Number of banks	95	97	69	93	96	67
AR(2) test: p-value	0.755	0.354	0.272	0.960	0.355	0.271
Hansen-J test: p-value	0.616	0.385	0.550	0.562	0.303	0.541

Source and notes: Authors' calculation. The definition of variables follows Table 1. Regressions are carried out using the two-step system GMM estimation, taking into account orthogonal transformations of instruments, Windmeijer (2005) finite sample correction and Roodman (2009)'s correction to avoid problems related to too many instruments. Standard errors are shown in parentheses. Constants are included, but not reported. *** indicates statistical significance at the 1% level, while ** and * indicate statistical significance at the 5% and 10% levels, respectively.

Table 4
Loan growth, capitalization, and credit risk in Islamic banks

Expl. Variables	Dependent variables					
	LLP	*LLR*	*NPL*	*LLP*	*LLR*	*NPL*
Dep.var(-1)	0.41519*	0.88088***	0.99538***	0.36279	0.88406***	0.97647***
	(0.241)	(0.078)	(0.112)	(0.236)	(0.016)	(0.153)
DLOAN(-1)	−0.01158*	−0.01021**	0.05017			
	(0.006)	(0.005)	(0.037)			
DLOAN(-1) x *EQTA(-1)*	0.07632*	0.03063*	−0.07236			
	(0.039)	(0.018)	(0.171)			
LOANG(-1)				−0.00568***	−0.00306**	0.01423
				(0.002)	(0.001)	(0.014)
LOANG(-1) x *EQTA(-1)*				0.03043***	0.01730***	−0.03856
				(0.010)	(0.004)	(0.096)
EQTA(-1)	−0.01383	0.00163	0.02219	−0.01838	0.00008	0.02358
	(0.009)	(0.004)	(0.036)	(0.011)	(0.003)	(0.030)
SIZE	−0.00057	−0.00034	−0.00342	−0.00062	−0.00025	−0.00249
	(0.001)	(0.000)	(0.004)	(0.001)	(0.000)	(0.004)
GROWTH	−0.02546***	−0.05665***	−0.05758	−0.02209**	−0.05231***	−0.04480
	(0.009)	(0.012)	(0.093)	(0.009)	(0.008)	(0.107)
Observations	405	432	261	394	421	256
Number of banks	95	97	69	93	96	67
AR(2) test: p-value	0.935	0.361	0.273	0.565	0.354	0.277
Hansen-J test: p-value	0.746	0.604	0.499	0.603	0.354	0.475
Turning point of *EQTA*	0.15	0.33	–	0.19	0.18	–

Source and notes: Authors' calculation. The definition of variables follows Table 1. Regressions are carried out using the two-step system GMM estimation, taking into account orthogonal transformations of instruments, Windmeijer (2005) finite sample correction and Roodman (2009)'s correction to avoid problems related to too many instruments. Standard errors are shown in parentheses. Constants are included, but not reported. *** indicates statistical significance at the 1% level, while ** and * indicate statistical significance at the 5% and 10% levels, respectively.

Table 5
Loan growth, capitalization, and credit risk in Islamic banks before and after the 2008 global financial crisis

Expl. Variables	Dependent variables					
	LLPTA	*LLPTA*	*LLRTA*	*LLRTA*	*NPL*	*NPL*
	1997–2006	2007–2012	1997–2006	2007–2012	1997–2006	2007–2012
Dep.var(-1)	0.24734*	0.39028	0.80211***	0.73495***	0.79524***	0.70633***
	(0.132)	(0.276)	(0.214)	(0.058)	(0.108)	(0.138)
DLOAN(-1)	0.00219	−0.01297*	−0.03129	−0.01239	−0.02500	−0.03765
	(0.004)	(0.007)	(0.025)	(0.008)	(0.029)	(0.037)
DLOAN(-1) x EQTA(-1)	0.00844	0.07878*	0.05962	0.01983	0.00841	0.08600
	(0.027)	(0.041)	(0.082)	(0.021)	(0.063)	(0.212)

(*continued on next page*)

Table 5 (*continued*)

Expl. Variables	Dependent variables					
	LLPTA	*LLPTA*	*LLRTA*	*LLRTA*	*NPL*	*NPL*
	1997–2006	2007–2012	1997–2006	2007–2012	1997–2006	2007–2012
EQTA(-1)	−0.01640*	−0.01572	−0.01028	−0.00055	−0.04153	0.00801
	(0.010)	(0.012)	(0.012)	(0.013)	(0.037)	(0.039)
SIZE	−0.00022	−0.00082	−0.00023	−0.00060	−0.00610	−0.00854**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.005)	(0.004)
GROWTH	−0.03522***	−0.02234	−0.04102	−0.03951**	−0.01500	−0.01245
	(0.009)	(0.014)	(0.049)	(0.016)	(0.042)	(0.094)
Observations	106	299	114	318	44	217
Number of banks	32	91	31	97	15	69
AR(2) test: p-val	0.199	0.909	0.359	0.346	0.310	0.304
Hansen-J test: p-val	0.180	0.772	0.060	0.251	0.201	0.243
Turning point of *EQTA*	–	0.16	–	–	–	–

Source and notes: Authors' calculation. The definition of variables follows Table 1. Regressions are carried out using the two-step system GMM estimation, taking into account orthogonal transformations of instruments, Windmeijer (2005) finite sample correction and Roodman (2009)'s correction to avoid problems related to too many instruments. Standard errors are shown in parentheses. Constants are included, but not reported. *** indicates statistical significance at the 1% level, while ** and * indicate statistical significance at the 5% and 10% levels, respectively.

Table 6
Loan growth, capitalization, and credit risk in Islamic banks before and after the 2008 global financial crisis

Expl. Var	Dependent variables					
	LLPTA	*LLPTA*	*LLRTA*	*LLRTA*	*NPL*	*NPL*
	1997–2006	2007–2012	1997–2006	2007–2012	1997–2006	2007–2012
Dep.var(-1)	0.27224*	0.34418	0.82725***	0.71649***	0.79400***	0.70119***
	(0.145)	(0.267)	(0.214)	(0.059)	(0.091)	(0.165)
LOANG(-1)	0.00082	−0.00717***	−0.00016	−0.00475*	−0.00685	−0.00290
	(0.002)	(0.003)	(0.004)	(0.002)	(0.015)	(0.011)
LOANG(-1) x EQTA(-1)	−0.00251	0.03851***	−0.00612	0.01930***	−0.02153	−0.04756
	(0.008)	(0.013)	(0.011)	(0.007)	(0.053)	(0.109)
EQTA(-1)	−0.01115	−0.01818	−0.00060	−0.00325	−0.04524	0.01144
	(0.010)	(0.015)	(0.011)	(0.019)	(0.034)	(0.042)
SIZE	−0.00011	−0.00080	−0.00044	−0.00082	−0.00649	−0.00847
	(0.000)	(0.001)	(0.001)	(0.001)	(0.004)	(0.006)
GROWTH	−0.03268***	−0.01711	−0.06322	−0.03459**	−0.00125	−0.01540
	(0.007)	(0.012)	(0.068)	(0.016)	(0.049)	(0.090)
Observations	105	289	114	307	43	213
Number of banks	32	89	31	96	15	67
AR(2) test: p-value	0.207	0.445	0.355	0.342	0.308	0.291
Hansen-J test: p-value	0.280	0.537	0.114	0.222	0.245	0.261
Turning point of *EQTA*	–	0.19	–	0.25		

Source and notes: Authors' calculation. The definition of variables follows Table 1. Regressions are carried out using the two-step system GMM estimation, taking into account orthogonal transformations of instruments, Windmeijer (2005) finite sample correction and Roodman (2009)'s correction to avoid problems related to too many instruments. Standard errors are shown in parentheses. Constants are included, but not reported. *** indicates statistical significance at the 1% level, while ** and * indicate statistical significance at the 5% and 10% levels, respectively.

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