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Financing contracts and procyclicality in Islamic banks: Evidence from Indonesia

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This paper investigates whether Islamic banks are procyclical and whether different types of financing contracts behave differently in response to economic growth. Using a sample of Islamic banks in Indonesia, our empirical results document that higher economic growth is associated with higher financing growth one quarter ahead, but lower financing growth after two quarters. In general, this suggests that financing growth in Islamic banks is procyclical after one quarter, but it exhibits a countercyclical effect after two quarters. However, this finding is more pronounced for small banks in general. With regards to the role of financing types, a closer investigation highlights that countercyclicality in financing occurs after two quarters for Mudharabah contracts regardless of bank size. Yet, Musharakah and Qardh are also countercyclical after two quarters, particularly in small banks. Finally, Murabahah, Istisna and Ijarah do not exhibit a countercyclical behavior and hence, these financing products are not a hedge for economic downturns. Our findings therefore provide some policy implications to enhance the role of Islamic banks in economic development.

Keywords: Financing products, Islamic banks, Indonesia, procyclicality

JEL Classifications: G21, G28

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1. Introduction

In this paper, we revisit and extend previous literature in order to assess whether Islamic bank financing behavior is procyclical. Unlike previous studies that use a cross-country analysis in investigating procyclicality in Islamic bank lending (Soedarmono et al., 2017; Pramono et al., 2019), our paper focuses on the Indonesian context that enables us to distinguish the behavior of different types of financing contracts made by Islamic banks following business cycles fluctuations. Hence, we may highlight types of financing contracts that are procyclical or countercyclical following changes in business cycles.

Indeed, the issues of procyclicality in bank lending has been extensively studied. In general, procyclicality is referred to as bank behavior that tends to boost lending activities following economic booms, while banks are more risk averse by reducing lending activities during economic downturns. On the one hand, such bank behavior can render economic recessions more prevalent. On the other hand, such procycality can also spur excessive risk taking in banking during economic booms. Accordingly, mitigating bank procyclical behavior is of particular interest for policy makers at the global level, particularly in the aftermath of the 2008 global financial crisis (Elnahass et al., 2016; Bushman and Willams, 2012; and Wezel, 2010). Yet, the new Basel III accord has emphasized the needs for forward-looking risk management practices to deal with procyclicality and systemic risk due to business cycle volatilities (Arnold et al., 2013). However, no consensus has been reached on how to overcome such procyclical behavior in bank lending due to differences in bank-level characteristics and country-level environments. Meanwhile, previous studies highlight that there are at least two sources of procyclicality in bank lending. These include bank capital buffer and loan loss provisioning system.

With regards to bank capital buffer behavior, Jokipii and Milne (2008) find that capital buffer is procyclical in European banks. In other words, bank capital buffer declines following an increase in economic growth. Such behavior will prolong economic downturns in times of crises, because higher bank capital buffer may impair bank lending. Andersen (2011) also highlights that potentical procyclicality in bank capital requirements, which can be mitigated through the improvement of risk weighting calculations based on long observations that cover economic downturns. Liu and Seeiso (2012) documents Basel II procyclicality through bank capital regulation and the liquidity premium effect contributes to exacerbate the procyclicality of bank capital regulation. Using a sample of banks in nine European countries, Ly and Shimizu (2021) find that risk-based capital requirements using the IRB (internal rating-based) approach exhibit a procyclical impact through business cycle, supporting the implementation of countercyclical capital buffer.

Another strand of literature assesses the procyclicality of bank lending through loan loss provisions. Bouvatier and Lepetit (2008) find that loan loss provisioning in a sample of European banks is also procyclical. Specifically, non-discretionary provisions are negatively linked to bank loan growth. In this regards, banks tend to build up provisions in times of economic downturns with high non-performing loans and hence, loan growth declines. Bouvatier and Lepetit (2012) further emphasize that non-discretionary provisions using a backward-looking provisioning approach are procyclical through business cycle in which such finding is more pronounced for emerging markets. Meanwhile, it is also admitted that discretionary provisions as a forward-looking provisioning approach are not procyclical. This is because a forward-looking provisioning approach enables banks to hold higher provisions during economic booms, which can be used to boost lending in times of economic recessions. However, a forward-looking provisioning approach

might drive bank opportunistic behavior in capital management, earning management or signaling (Anandarajan et al., 2007; Lobo and Yang, 2001; Bouvatier and Lepetit, 2008 & 2012).

Previous studies also investigate whether Islamic banks are also procyclical using various approaches. With regards to the issues of loan loss provisioning, Soedarmono et al. (2017) and Pramono et al. (2019) investigate the procyclicality of bank lending due to loan loss provisions using a global sample of Islamic banks. Soedarmono et al. (2017) find that loan loss provisioning in Islamic banks is also procyclical following previous studies in conventional banks, although such procyclicality can be mitigated through strengthening bank capitalization. Meanwhile, Pramono et al. (2019) also find that non-discretionary provisions are also negatively linked to financing growth of Islamic banks, suggesting the presence of procyclicality as in Bouvatier and Lepetit (2008; 2012). Concerning the issues of capitalization, Maatoug et al. (2019) highlight that both conventional and Islamic banks' capital buffer is procyclical, although the speeds of adjustment costs are lower for Islamic banks. On the contrary, Bitar et al. (2018) document that Islamic banks' capital decision tends to be countercyclical, because higher economic growth is associated with higher capitalization. Consequently, Islamic banks can reduce capital buffer to expand lending activities in times of economic recessions. Moreover, using a single-country study, Aysan and Ozturk (2018) do not find that Islamic banking in Turkey can be a natural hedge for business cycles, because both Islamic and conventional banking remain procyclical.

In this paper, we specifically contribute to enrich previous literature on the procyclicality of Islamic bank behavior in three directions. First, unlike previous studies that assess procyclicality using loan loss provisions or capital in banking as described earlier, our present paper investigates directly whether economic growth affects financing growth in Islamic banking. Second, we augment our analysis by investigating whether various types of financing in Islamic banks react

differently to economic growth. To the best of our knowledge, no prior studies have been devoted to assess the impact of economic growth on different types of financing in Islamic banks. Hence, our present paper may identify financing products of Islamic banks that can be countercyclical and thus, a natural hedge for economic recessions. Third, we further explore whether the impact of economic growth on Islamic bank financing differs between large and small Islamic banks. To tackle these objectives, we focus on the Indonesian context, which enables us to differentiate types of financing products in Islamic banking.

For Indonesia, the history of the development of Islamic banking officially began with the issuance of Banking Law No. 7 of 1992 which accommodates banking activities with the principles of profit sharing. However, during the 1992-1998 period, Yusuf and Aziz (2009) document that there was only one sharia (Islamic law) commercial banks and several sharia rural banks as players in the sharia banking industry in Indonesia. This is because during the six years of operations, there were no other regulators that support the operational system of Islamic banking. Therefore, the government of Indonesia took a strategic step in developing sharia banking, namely giving permission to conventional commercial banks to open branches of Sharia Business Units (UUS) and providing supports to the conversion of conventional banks to Islamic banks (Antonio, 2001).

This strategy is also a response to the amendment to the banking law No.10/1998 as the successor to Law No.7/1992, which explicitly places the Islamic Banking System as part of the national banking system. In 2008, the government issued Sharia Banking Law No. 21/2008, which is expected to provide a stronger legal basis and greater opportunities in the development of Islamic banking in Indonesia, so that it is on a par with conventional banks. The impact of the sharia banking law is positive. Until the end of 2009, there are 6 sharia commercial banks, 25 UUS

conventional banks with sharia window and 139 sharia rural banks. Compared to 2005, BUS grew 100%, UUS grew 86%, and BPRS grew 51% (Agustianto, 2010).

Moreover, the development of Indonesian Islamic banking has also been supported by the Indonesian Financial Services Authority (or OJK/*Otoritas Jasa Keuangan*). The initial roadmap for Islamic banking development was established by OJK for the 2015-2019 period, while continuing efforts to boost Islamic banking development have also been documented in "Indonesia Islamic Banking Development Roadmap 2020-2025". This development roadmap comprises three pillars. Pillar 1 focuses on strengthening Islamic banking by adopting proper sharia values, developing unique sharia-based financial products, and enhancing efficiency and capitalization through digitalization processes. Pillar 2 encourages Islamic banks to develop synergy within Islamic Economic Ecosystem involving four major sectors, such as the halal industry, Islamic financial services, Islamic social finance, and the religious sector. Pillar 3 facilitates the improvement of licensing, regulation, and supervision processes for Islamic banking. In this regard, this roadmap is expected to establish an essential foundation to render Islamic banking in Indonesia more resilient and competitive with tangible impacts for socio-economic development.

In the meantime, the development of sharia banking in Indonesia tends to be moderate during the last decade. In 2020, there are 14 sharia commercial banks, 20 conventional banks with sharia window, and 162 sharia rural banks. In terms of market share, Islamic banking in Indonesia remains relatively small compared to conventional banking. In September 2020, the share of total assets in Islamic banking only constitutes to 6.24%, while conventional banks dominate more than 90% of the Indonesian financial system's total assets (Otoritas Jasa Keuangan, 2021). However, recent trends in Islamic banking in Indonesia exhibit some major development, particularly in times of the COVID-19 (Coronavirus disease) pandemic that started to manifest in Indonesia since

March 2020. As of September 2020, the total assets of Islamic banking in Indonesia grew 14.32%, while financing and deposit growth reached around 9.5% and 15% annually in the end of 2020, respectively. In the meantime, the aggregate credit growth of commercial banks in Indonesia only reached 2,41% annually in 2020, while aggregate deposit growth reached around 12 %. In general, this may indicate that the role of Islamic banks tends to outweigh the Indonesian banking industry in performing financial intermediation during the COVID-19 pandemic. Hence, whether or not Islamic banking can be a hedge for business cycle fluctuations is a contextually relevant empirical question, at least in the Indonesian context.

Our present paper is built on the work of Bilgin et al. (2021) who assess different reactions between conventional and Islamic banks to business cycle fluctuations. From a sample of 58 Islamic and 358 conventional banks in 12 countries during the 2009-2018 period, it is shown that higher economic uncertainty index is associated with a decline in bank lending. This finding is indeed more pronounced for conventional banks and hence, Islamic banks tend to be more immune to economic uncertainty. Our present paper is also in line with previous studies on the behavior of Islamic banks in times of crises. Hasan and Dridi (2011) show that Islamic banks exhibit higher lending activities than conventional banks, particularly during the 2007-2009 crisis. Beck et al. (2013) also find that Islamic banks have higher loan-to-deposit ratio than conventional banks during economic recessionary periods. In a similar vein, using a sample of Malaysian banks, Ibrahim (2016) document that Islamic banks tend to be countercyclical, while conventional banks remain procyclical. However, Ibrahim (2016) also does not differentiate Islamic bank financing growth based on types of contracts.

Finally, the rest of this paper is structured as follows. Section 2 presents our data, variables and method. Section 3 provides empirical results, while Section 4 concludes the paper.

2. Data, variables and method

In order to assess the impact of economic growth on financing in Islamic banks, we retrieve balance-sheet and income statement quarterly data from 36 Islamic banks operating in Indonesia from 2014 to the first quarter of 2021. Our bank-level dataset comes from the Indonesia Financial Services Authority (Otoritas Jasa Keuangan). Meanwhile, macroeconomic data related to economic growth is obtained from the Indonesia Central Bureau of Statistics (Badan Pusat Statistik).

As dependent variables, we use two measures of growth in Islamic bank lending following Sobarsyah et al. (2020) and Bouvatier and Lepetit (2008). Growth in Islamic bank financing is measured from quarter to quarter. Specifically, we calculate FING and DFIN as follows in order to reflect financing growth in which TF is total financing and TA represents total assets, while *t* is time index.

$$FING = \frac{TF_t - TF_{t-1}}{TF_{t-1}} \text{ or } DFIN = \frac{TF_t - TF_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (1)$$

Moreover, in order to take into account the impact of different types of financing contracts in Islamic banks, we also use the identical measures of financing growth as dependent variables, which depend on types of financing contracts. Specifically, MUDG (or DMUD) represents Mudharabah growth. MUSG (or DMUS) reflects Musharakah growth. MURAG (or DMURA) denotes Murabahah growth. Istisna growth is represented by ISTG (or DIST). IJAG (or DIJA) reflects Ijarah growth, while QARG (or DQAR) represents Qardh growth. These variables are defined as follows.

$$MUDG = \frac{MUD_t - MUD_{t-1}}{MUD_{t-1}} \text{ or } DMUD = \frac{MUD_t - MUD_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (2)$$

$$MUSG = \frac{MUS_t - MUS_{t-1}}{MUS_{t-1}} \text{ or } DMUS = \frac{MUS_t - MUS_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (3)$$

$$MURG = \frac{MUR_t - MUR_{t-1}}{MUR_{t-1}} \text{ or } DMUR = \frac{MUR_t - MUR_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (4)$$

$$ISTG = \frac{IST_t - IST_{t-1}}{IST_{t-1}} \text{ or } DIST = \frac{IST_t - IST_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (5)$$

$$IJAG = \frac{IJA_t - IJA_{t-1}}{IJA_{t-1}} \text{ or } DIJA = \frac{IJA_t - IJA_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (6)$$

$$QARG = \frac{QAR_t - QAR_{t-1}}{QAR_{t-1}} \text{ or } DQARD = \frac{QAR_t - QAR_{t-1}}{0.5*(TA_t + TA_{t-1})} \quad (7)$$

MUD, MUS, MUR, IST, IJA and QAR represent total financing based on Mudharabah, Musharakah, Istisna, Ijarah, and Qardh contracts, respectively[2].

As an explanatory variable of interest, we use GDPG defined as the quarterly growth rate of real gross domestic product. If Islamic banks can be a hedge for business cycle fluctuations as in Ibrahim (2016), we expect a negative sign between GDPG and one of Islamic bank financing indicators from Eq. (1) to Eq. (6), depicting countercyclical behavior of Islamic banks. This means that Islamic banks will increase lending activities, although economic growth declines. Consequently, economic recessions can be mitigated. If the coefficient of GDPG is positive, Islamic banks tend to be procyclical following business cycle fluctuations, which may in turn precipitate economic downturns.

[2] Mudharabah is close to venture capital mechanism with a profit-loss sharing (PLS) mechanism, in which banks provide capital and borrowers provide expertise to run business. Musharakah is a PLS contract in which both banks and borrowers manage joint-venture businesses. Murabahah is a contract that facitates borrowers to buy goods and banks provide financing. Istisna is a contract made by banks to acquire specific goods in which the payment of contract can be conducted at the beginning of contract or gradually based on the agreement made by banks and borrowers. Ijarah is an Islamic leasing contract in which banks provide goods to be used by borrowers until specific period of time with specific price. Qardh is a contract made by Islamic banks and borrowers only pay the principal amount of loans received without additional margin.

Several control variables that affect Islamic bank lending activities are also incorporated. First, we include the ratio of non-performing financing to total financing (NPF), because higher credit risk tends to limit bank lending expansion through an increase in loan loss provisions following prior literature (Bouvatier and Lepetit, 2008; Soedarmono et al., 2017; Pramono et al., 2019). Second, funding liquidity is also considered as a control variable. Higher funding liquidity is expected to boost Islamic bank lending activities. Funding liquidity is measured by the ratio of third party funds to total assets, while third party funds consist of savings, demand deposits and time deposits (DTA). Aside from bank liquidity, we consider the ratio of total equity to total assets (EQTA) as a control variable reflecting the role of bank capitalization. Higher capitalization may render Islamic banks countercyclical through business cycle as in Soedarmono et al. (2017), but higher capitalization may also be detrimental for liquidity creation (Evans and Haq, 2021). Finally, we also incorporate bank profitability measured by the ratio of net income to total assets (ROA) and bank size (SIZE) measured by the logarithm of bank total assets as control variables.

Moreover, to investigate the impact of economic growth on Islamic bank financing, we proceed in three stages. In the first stage, we run regressions of Islamic bank financing growth (FING or DFIN) on GDPG and a set of control variables as in Eq. (7). In the second stage, we differentiate our bank sample into a sub-sample of large and small banks. A bank is included in our large bank sample, if the mean value of total assets of such bank during our observation periods exceeds the median of the average total assets of all banks during the 2014-2021 period. In the third stage, we repeat the first and second stages for different proxies of financing growth based on contract types formulated from Eq. (2) to Eq. (7).

In terms of econometric methodology, we use a dynamic panel data analysis using a two-step system GMM (generalized methods of moments) estimator as in previous studies in Islamic

banking (Soedarmono et al., 2017; Sobarsyah et al., 2020). Using a two-step system GMM estimation developed by Blundell and Bond (1998) may avoid potential endogeneity in independent variables. Meanwhile, in order to avoid overidentification of instrumental variables, we perform a instruments collapsing process as in Roodman (2009). We also take into account orthogonal transformation of instruments to control for possible fixed effects in our regressions. Finally, we conduct Windmeijer's (2005) finite sample corrections, because our sample size and observations are relatively small.

3. Empirical results

Table 1 presents our descriptive statistics of all variables used in this study. All zero variables are already excluded. Meanwhile, our independent variables are also not highly correlated. This suggests that potential multicollinearity issues can be avoided.

[Insert Table 1 and Table 2 here]

In Table 3, we present baseline regressions to highlight whether Islamic bank financing behavior is procyclical through business cycles. We find that higher economic growth is associated with an increase in total financing growth by Islamic banks one quarter ahead. This suggests that Islamic bank financing is procyclical after one quarter following economic growth. If economic growth declines, Islamic bank financing also tends to decline after one quarter, which may precipitate economic downturns. However, we also find a negative association between economic growth and growth in Islamic bank financing after two quarters. This means that Islamic bank financing behavior can be countercyclical two quarters ahead. In this context, Islamic banks need

adjustment time to become a hedge for economic downturns. Specifically, when economic growth declines, Islamic bank financing growth will increase after two quarters. This finding follows previous studies highlighting the importance of Islamic bank lending to mitigate economic downturns (Ibrahim, 2016; Bilgin et al., 2021). Moreover, we also find that the countercyclical behavior of Islamic bank financing tends to occur for small Islamic banks. All models in Table 3 are also valid, because the AR(2) test and the Hansen-J test are not rejected at least at the 5% level.

[Insert Table 3 here]

Table 4 presents our findings when we examine the impact of economic growth on growth in Mudharabah financing. It is shown that Mudharabah financing exhibit a procyclical behavior after one quarter shown by a positive associated between GDPG and Mudharabah financing growth (MUDG or DMUD). It indicates that after one quarter, Mudharabah financing will increase following economic booms and decline in times of economic downturns. This may in turn precipitate economic recessions. However, Mudharabah financing growth is also countercyclical after two quarters shown by a negative coefficient of GDPG with two time lags. This finding is consistent between large and small banks. In this regard, Mudharabah financing can potentially be a hedge for economic downturns. The AR(2) test and the Hansen-J test for Table 4 are also not statistically significant, suggesting that all models in Table 4 are valid.

[Insert Table 4 here]

Regarding Musharakah financing, Table 5 show that Musharakah can also be countercyclical after two quarters, although it remains procyclical one quarter ahead. Moreover, the countercyclicality of Musharakah financing as shown by negative association between GDPG(-2) and growth in Musharakah financing is indeed more pronounced for small banks, while large banks tend to remain procyclical after one quarter to a lesser extent. Econometric models in Table 5 are also valid in which the AR(2) test and the Hansen-J test are still not significant.

[Insert Table 5 here]

In Table 6 and Table 7, we document the behavior of Murabahah and Istisna financing products, respectively. We do not find significant relationship between economic growth (measured by GDPG(-1) or GDPG(-2)) and Murabahah (or Istisna) financing growth, although all models are statistically valid from the AR(2) and the Hansen-J tests. Some control variables are also omitted in Table 7 due to our limited number of observations. Meanwhile, Table 8 documents our findings for Ijarah financing behavior. It is shown that Ijarah financing remains procyclical regardless of the number of time lags considered in economic growth variable. This also remains unaltered when we observe large or small banks. Models in Table 8 are also valid, because the AR(2) and the Hansen-J tests are not significant.

[Insert Table 6, Table 7 and Table 8 here]

Eventually, Table 9 find that Qardh financing can be countercyclical after two quarters, although it remains procyclical one quarter ahead as Mudharabah or Musharakah financing. Higher

economic growth will reduce Qardh financing after two quarters, which means that lower economic growth will also boost Qardh financing two quarters ahead. However, the countercyclicality of Qardh financing after two quarters is more pronounced for small banks.

[Insert Table 9 here]

Some robustness checks are also conducted to ensure that the relationships between economic growth and financing products of Islamic banks in all our models from Table 3 to Table 9 are stable. These robustness checks are not presented in this paper, but are available upon request. First, we run regressions using first difference transformation of instruments instead of orthogonal deviations. Second, we exclude all control variables in which we only have GDPG(-1) and GDPG(-2) as explanatory variables of interests. In general, our previous findings from Table 3 to Table 9 are not altered.

4. Conclusion

In this paper, we investigate whether Islamic banks' financing behavior can be countercyclical. In other words, we test whether or not Islamic banks can be a hedge for economic downturns. Using quarterly data from a sample of 36 Islamic banks in Indonesia from 2017 to the first quarter of 2021, our empirical findings show that the impact of economic growth on financing behavior of Islamic banks is affected by time lags, bank size, and types of financing products. Specifically, we find that financing growth of Islamic banks is procyclical one quarter ahead, but countercyclical two quarters ahead. This means that Islamic banks can be a hedge for economic downturns after two quarters.

A closer investigation however highlights that the countercyclicality of Islamic bank lending behavior is also affected by size of total assets and financing types. In general, small banks tend to exhibit a countercyclical behavior following changes in economic growth. With regards to types of financing products, we find that Mudharabah growth is countercyclical after two quarters due to business cycles movement regardless of whether we observe large or small banks. Musharakah and Qardh financing growth also tend to follow a countercyclical pattern following economic growth, although such countercyclicality is more pronounced for small banks. Conversely, Murabahah, Istisna and Ijarah do exhibit countercyclical behavior through business cycles for large or small banks.

Overall, this paper offers some policy implications. In order to enhance financial intermediation, especially during economic downturns, promoting the development of Mudharabah, Musharakah and Qardh financing products is essential, particularly for small banks to contribute to economic development. Moreover, strengthening forward-looking credit risk management for large Islamic banks might also be worth considering to spur countercyclical behavior in times of economic downturns.

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Table 1. Descriptive statistics

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
LOANG	Financing growth (%)	937	2.6941	9.2887	-97.4675	33.5443
DLOAN	Total assets-adjusted financing growth (%)	947	1.2453	4.5689	-54.3039	65.2263
DMUD	Total assets-adjusted Mudharabah growth (%)	654	-0.0677	3.2225	-35.1986	39.2147
MUDG	Mudharabah growth (%)	671	-0.3015	26.9364	-91.1817	231.4220
MUSG	Musyarakah growth (%)	868	11.6357	39.8611	-96.8817	485.2499
DMUS	Total assets-adjusted Musyarakah growth (%)	947	0.6375	2.0399	-7.7687	27.7638
MURG	Murabahah growth (%)	930	0.4650	13.5823	-97.4675	101.9687
DMUR	Total assets-adjusted Murabahah growth (%)	947	0.5457	3.1140	-21.0479	41.7440
ISTG	Istishna growth (%)	283	0.9424	51.4051	-76.3368	602.0422
DIST	Total assets-adjusted Istishna growth (%)	947	0.0043	0.1078	-2.6914	0.8236
IJAG	Ijarah growth (%)	514	2.9467	37.2533	-99.9904	195.4381
DIJA	Total assets-adjusted Ijarah growth (%)	947	0.0012	1.0710	-15.2413	11.6075
QARG	Qardh growth (%)	742	2.8472	53.6308	-99.9245	716.1332
DQAR	Total assets-adjusted Qardh growth (%)	947	-0.0033	0.2693	-4.0597	4.5009
GDPG	Real GDP growth (%)	979	0.9880	2.6698	-4.1926	5.0452
NPF	Ratio of non-performing loans/financing to total loans (%)	957	3.8974	4.4781	0.0012	46.5535
EQTA	Ratio of total equity to total assets (%)	982	3.2399	7.6597	-0.1804	62.3415
DTA	Ratio of total deposits to total assets (%)	977	34.1826	8.2244	1.0584	50.0905
ROA	Ratio of net income to total assets (%)	982	2.1533	2.8435	-19.4000	16.7090
SIZE	Logarithm of total assets (%)	982	9.1020	1.3812	5.7621	13.0551

Source: Authors' calculation.

Table 2. Correlation matrix

Variables	FING	DFIN	DMUD	MUDG	MUSG	DMUS	MURG	DMUR	ISTG	DIST	IJAG	DIJA
FING	1											
DFIN	0.9844	1										
DMUD	0.0025	-0.0006	1									
MUDG	0.1936	0.1973	-0.0892	1								
MUSG	0.5032	0.4464	-0.1153	0.0945	1							
DMUS	0.6101	0.5699	-0.0536	0.0684	0.858	1						
MURG	0.5773	0.6133	0.0213	0.042	0.0725	0.1319	1					
DMUR	0.5564	0.6008	0.0371	0.0285	0.0645	0.12	0.9839	1				
ISTG	-0.0239	-0.019	-0.2061	0.1072	-0.0152	-0.0505	0.0068	-0.0088	1			
DIST	0.1146	0.1125	-0.0703	0.1893	0.185	0.0884	-0.0003	0.0016	0.267	1		
IJAG	-0.0266	-0.0651	0.0824	0.0146	0.0689	0.0305	-0.2618	-0.2646	-0.1686	0.0402	1	
DIJA	-0.0415	-0.0441	0.0063	0.0185	-0.0114	-0.0427	-0.0924	-0.0888	-0.0443	0.05	0.7456	1
QARG	0.0787	0.0717	-0.0998	-0.0348	0.0597	0.0283	-0.0467	-0.0619	0.0625	-0.0419	0.2606	0.3222
DQAR	0.0492	0.0427	-0.04	-0.0572	-0.0071	0.0045	-0.0147	-0.0213	0.072	-0.0148	0.0963	0.2128
GDPG	0.1096	0.1201	-0.0581	0.0921	0.1405	0.0773	0.0396	0.0381	-0.0524	0.0386	-0.0009	0.052
NPF	-0.0786	-0.0673	-0.0007	0.0252	-0.0248	-0.0932	-0.0209	-0.0218	0.155	0.2585	-0.0729	-0.0118
EQTA	-0.0982	-0.0798	0.1069	-0.0212	-0.0804	-0.0062	-0.0481	-0.0309	-0.1007	-0.2092	-0.1284	-0.0613
DTA	-0.0597	-0.0289	0.1487	-0.0245	-0.1578	-0.0155	-0.0442	-0.0405	-0.1515	-0.316	0.0579	0.0301
ROA	0.1297	0.0985	-0.1375	0.0006	0.195	0.181	0.0752	0.0345	0.0606	0.0926	0.0136	-0.0106
SIZE	-0.0846	-0.0701	0.1806	-0.0939	-0.1233	-0.0634	-0.1339	-0.1179	-0.1406	-0.3133	0.1311	0.0391

Variables	QARG	DQAR	GDPG	NPF	EQTA	DTA	ROA	SIZE
QARG	1							
DQAR	0.5857	1						
GDPG	0.0222	-0.018	1					
NPF	-0.077	-0.1038	0.0545	1				
EQTA	-0.0432	0.0383	-0.0345	0.211	1			
DTA	0.1262	0.0234	0.0216	-0.2247	0.1475	1		
ROA	-0.0031	0.0442	0.0495	-0.3364	-0.5053	-0.3368	1	
SIZE	0.1268	0.0707	0.0095	-0.3237	0.0732	0.8028	-0.3354	1

Source: Authors' calculation.

Table 3. Economic growth and growth in total financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	LOANG	DLOAN	LOANG	DLOAN	LOANG	DLOAN
Dep.var(-1)	0.05241	-0.20753*	-0.00479	-0.22620*	0.21084	0.19315
	(0.052)	(0.115)	(0.124)	(0.109)	(0.126)	(0.129)
GDPG(-1)	0.32124***	0.12199**	0.27652*	0.16581**	0.10688	0.03488
	(0.073)	(0.045)	(0.135)	(0.074)	(0.189)	(0.053)
GDPG(-2)	-0.14230**	-0.00879	-0.05766	0.05747	-0.56241**	-0.18978**
	(0.059)	(0.034)	(0.115)	(0.058)	(0.216)	(0.068)
NPF	-0.26035**	-0.13681***	-0.33240	-0.32152	-0.12581	-0.06427
	(0.111)	(0.029)	(0.219)	(0.280)	(0.106)	(0.057)
DTA	-0.01734	-0.00805	-0.25316	-0.07180	-0.04786	0.00170
	(0.078)	(0.036)	(0.283)	(0.086)	(0.067)	(0.036)
EQTA	-0.11019	-0.03328	-0.13246	-0.03902	-0.16430	-0.02620
	(0.080)	(0.038)	(0.156)	(0.100)	(0.138)	(0.044)
ROA	0.00312	-0.00955	-0.09295	-0.14977	-0.06848	-0.00596
	(0.167)	(0.059)	(0.351)	(0.177)	(0.242)	(0.095)
SIZE	-0.28886	0.14779	-0.73947	0.06736	-0.54411	-0.17800
	(0.689)	(0.144)	(1.620)	(0.630)	(1.476)	(0.680)
Observations	843	858	468	479	375	379
Number of banks	34	34	23	23	22	22
AR(2) test: *p*-value	0.0694	0.246	0.203	0.228	0.238	0.256
Hansen-J test: *p*-value	0.542	0.527	0.920	0.974	0.986	0.995

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.

Table 4. Economic growth and growth in Mudharabah financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	MUDG	DMUD	MUDG	DMUD	MUDG	DMUD
Dep.var(-1)	0.07384*	-0.33916***	0.00111	-0.49135***	0.17327**	-0.26141*
	(0.036)	(0.108)	(0.017)	(0.013)	(0.060)	(0.133)
GDPG(-1)	-0.14989	-0.02119	-0.76489	0.03051	-0.18357	-0.06891
	(0.381)	(0.040)	(0.598)	(0.036)	(0.380)	(0.084)
GDPG(-2)	-0.95120***	-0.02158**	-2.50029**	-0.00620	-1.28281**	-0.01948
	(0.408)	(0.021)	(1.447)	(0.012)	(0.822)	(0.049)
NPF	-0.08636	-0.00434	7.63304*	0.01921	0.42598	-0.01966
	(0.453)	(0.018)	(4.369)	(0.024)	(2.467)	(0.039)
DTA	0.07554	0.00095	-2.69849	-0.00225	0.32514	0.01270
	(0.315)	(0.011)	(1.933)	(0.005)	(0.771)	(0.018)
EQTA	0.12102	-0.00936	-3.59457	0.00115	-0.09120	-0.03467
	(0.340)	(0.011)	(8.597)	(0.007)	(1.056)	(0.042)
ROA	0.30813	-0.00651	2.41431	0.04187	-2.11916	-0.03650
	(1.448)	(0.051)	(4.442)	(0.038)	(2.611)	(0.087)
SIZE	2.09045	0.00162	30.14816	0.05272	-25.08640	0.22159
	(2.186)	(0.058)	(19.317)	(0.044)	(18.766)	(0.230)
Observations	616	625	359	362	257	263
Number of banks	27	27	17	17	16	16
AR(2) test: *p*-value	0.653	0.318	0.150	0.306	0.942	0.646
Hansen-J test: *p*-value	0.890	0.483	1.000	0.974	1.000	0.999

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.

Table 5. Economic growth and growth in Musharakah financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	MUSG	DMUS	MUSG	DMUS	MUSG	DMUS
Dep.var(-1)	0.10712*	0.07835	0.05049	0.01260	0.20335**	0.12835
	(0.058)	(0.109)	(0.077)	(0.114)	(0.073)	(0.103)
GDPG(-1)	0.62584*	0.07882***	0.29675	0.04963**	-0.05004	0.07448*
	(0.312)	(0.021)	(0.744)	(0.019)	(0.850)	(0.039)
GDPG(-2)	-1.22228**	-0.01894	0.20719	0.00212	-2.61453**	-0.09195***
	(0.620)	(0.022)	(0.358)	(0.023)	(1.019)	(0.032)
NPF	-0.38947	-0.04252	-0.35636	-0.07482	-0.69751	-0.03544*
	(0.318)	(0.027)	(0.462)	(0.054)	(0.519)	(0.018)
DTA	0.17393	-0.02121	-0.40690	-0.11852***	-1.57108	0.02034
	(0.321)	(0.022)	(0.566)	(0.038)	(1.934)	(0.015)
EQTA	0.18823	0.02554	-0.55769	-0.02833	-0.61085	0.07164*
	(0.435)	(0.033)	(0.551)	(0.039)	(1.266)	(0.036)
ROA	0.32148	0.00560	0.48574	-0.13414	-2.59014	0.05750
	(0.810)	(0.081)	(1.992)	(0.084)	(3.258)	(0.066)
SIZE	-1.10252	0.13997	-4.20077	-0.25688	5.52729	0.24139
	(2.969)	(0.100)	(3.841)	(0.323)	(7.227)	(0.194)
Observations	792	858	448	479	344	379
Number of banks	34	34	23	23	21	22
AR(2) test: *p*-value	0.304	0.629	0.443	0.879	0.283	0.940
Hansen-J test: *p*-value	0.360	0.436	0.991	0.998	0.999	0.968

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.

Table 6. Economic growth and growth in Murabahah financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	MURG	DMUR	MURG	DMUR	MURG	DMUR
Dep.var(-1)	0.01156	-0.13148	-0.03983	-0.20723	0.07558	0.00517
	(0.097)	(0.119)	(0.128)	(0.156)	(0.162)	(0.213)
GDPG(-1)	0.10550	0.01622	0.17776	0.02130	0.06239	-0.00479
	(0.117)	(0.035)	(0.220)	(0.069)	(0.142)	(0.030)
GDPG(-2)	0.02874	-0.01511	0.10517	-0.01990	-0.00675	0.01774
	(0.154)	(0.031)	(0.267)	(0.031)	(0.194)	(0.029)
NPF	-0.03895	-0.04304	0.02453	-0.03249	-0.11285	-0.02390
	(0.161)	(0.033)	(0.450)	(0.032)	(0.129)	(0.025)
DTA	-0.00541	-0.00037	0.23559	0.01894	-0.06751	-0.00765
	(0.141)	(0.018)	(0.268)	(0.045)	(0.113)	(0.018)
EQTA	-0.21203	-0.05569	0.15426	-0.06371	-0.30126	-0.10848**
	(0.178)	(0.034)	(0.464)	(0.074)	(0.179)	(0.041)
ROA	0.26474	0.00286	1.24336	0.02402	-0.22873	-0.07035
	(0.283)	(0.047)	(0.966)	(0.114)	(0.258)	(0.053)
SIZE	-0.71718	-0.06415	0.99964	-0.26199	-1.86824	-0.43752
	(1.105)	(0.112)	(3.706)	(0.496)	(1.967)	(0.413)
Observations	830	858	454	479	376	379
Number of banks	34	34	23	23	22	22
AR(2) test: *p*-value	0.694	0.527	0.470	0.870	0.766	0.838
Hansen-J test: *p*-value	0.282	0.295	0.870	0.935	0.938	0.951

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.

Table 7. Economic growth and growth in Istisna financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	ISTG	DIST	ISTG	DIST	ISTG	DIST
Dep.var(-1)	0.16241	-0.12650	-0.06810	0.59567***	-0.15043	-0.06721
	(0.163)	(0.220)	(0.036)	(0.008)	(0.654)	(0.297)
GDPG(-1)	-2.32824	0.02010	-31.24025	0.05043	*Omitted*	0.04405
	(3.247)	(0.118)	(32.171)	(0.066)		(0.058)
GDPG(-2)	-6.52926	-0.04626	-100.67371	-0.00433	10.99694	-0.08040
	(9.501)	(0.051)	(106.830)	(0.007)	(15.086)	(0.094)
NPF	-9.17950	-0.60547	-57.23201	-0.01074	10.80520	-0.32086
	(12.903)	(0.891)	(59.677)	(0.034)	(10.708)	(1.194)
DTA	-4.80629	0.02590	-647.14365	0.00855	-2.98250	0.08440
	(5.262)	(0.056)	(664.572)	(0.025)	(3.530)	(0.063)
EQTA	-5.85650	-0.45321**	-24.17494	-0.06383	*Omitted*	-0.74615*
	(7.617)	(0.207)	(31.445)	(0.082)		(0.403)
ROA	-21.86709	-0.33189	813.63377	-0.00179	*Omitted*	-0.16735
	(29.377)	(0.652)	(838.807)	(0.028)		(0.869)
SIZE	-46.17155	-0.00422	2,352.37706	0.02371	*Omitted*	0.05088
	(67.217)	(0.620)	(2,418.905)	(0.208)		(0.787)
Observations	262	858	189	479	73	379
Number of banks	11	34	8	23	4	22
AR(2) test: *p*-value	0.949	0.148	0.723	0.316	0.317	0.230
Hansen-J test: *p*-value	1	0.802	1	0.855	1	1

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.

Table 8. Economic growth and growth in Ijarah financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	IJAG	DIJA	IJAG	DIJA	IJAG	DIJA
Dep.var(-1)	-0.05259	-0.28740***	-0.14722	-0.30887***	0.05794	0.18940***
	(0.069)	(0.051)	(0.102)	(0.048)	(0.072)	(0.041)
GDPG(-1)	2.10418***	0.03627**	2.38978	0.04460*	*-0.92440*	0.01540*
	(0.637)	(0.014)	(1.453)	(0.022)	(1.896)	(0.008)
GDPG(-2)	0.40491	0.02692*	0.56109	0.04195*	1.59931**	-0.00327
	(0.615)	(0.015)	(1.370)	(0.021)	(0.646)	(0.005)
NPF	-0.44738	-0.00052	-1.09484	0.00460	-0.92495	-0.00050
	(0.387)	(0.004)	(2.757)	(0.015)	(4.461)	(0.002)
DTA	-0.39140	-0.00071	-0.85430	-0.00698	-0.87432	0.00240
	(0.373)	(0.006)	(6.072)	(0.015)	(1.121)	(0.002)
EQTA	-0.97084	0.00517	-3.88108	0.01112	*-0.59321*	0.00072
	(0.644)	(0.006)	(5.051)	(0.014)	*(4.223)*	(0.002)
ROA	-1.83357	0.00226	-5.64426	-0.00102	*-6.65626**	0.00140
	(1.405)	(0.010)	(6.729)	(0.021)	*(3.278)*	(0.005)
SIZE	0.92896	-0.01251	-18.62252	-0.01416	*-9.27140*	-0.00941
	(1.614)	(0.020)	(70.936)	(0.058)	*(8.170)*	(0.035)
Observations	445	858	283	479	162	379
Number of banks	27	34	18	23	14	22
AR(2) test: *p*-value	0.139	0.861	0.309	0.918	0.687	0.124
Hansen-J test: *p*-value	0.944	0.158	0.999	0.767	1.000	0.829

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.

Table 9. Economic growth and growth in Qardh financing

	Dependent variables					
	All banks		*Large banks*		*Small banks*	
Expl.variables	QARG	DQAR	QARG	DQAR	QARG	DQAR
Dep.var(-1)	-0.07261**	-0.44960***	-0.16025***	-0.50810***	0.31060**	-0.42118***
	(0.027)	(0.102)	(0.051)	(0.160)	(0.120)	(0.071)
GDPG(-1)	0.46003	0.00053	0.96244	0.00086	*-0.96035*	-0.00040
	(0.741)	(0.001)	(1.003)	(0.003)	(1.455)	(0.001)
GDPG(-2)	0.27410	-0.00178*	1.44550	0.00272	-1.74811*	-0.00810**
	(0.616)	(0.001)	(1.174)	(0.002)	(0.890)	(0.004)
NPF	-1.47348	-0.00139	-0.17328	-0.01004	-7.30065	0.00174
	(1.367)	(0.002)	(1.133)	(0.009)	(7.329)	(0.004)
DTA	0.98578***	-0.00123	0.61392	-0.00141	1.67819	-0.00123
	(0.341)	(0.002)	(0.657)	(0.003)	(2.166)	(0.002)
EQTA	2.26772	0.00074	2.25226*	-0.00083	6.15577	0.00358
	(1.518)	(0.002)	(1.196)	(0.004)	(4.045)	(0.003)
ROA	2.85184*	0.00361	4.77990***	-0.00343	2.43667	0.01073
	(1.407)	(0.003)	(1.610)	(0.006)	(5.577)	(0.006)
SIZE	-0.12524	0.02720**	3.99481	0.01807	-15.36278	0.05575
	(3.567)	(0.013)	(7.867)	(0.014)	(24.745)	(0.034)
Observations	678	858	381	479	297	379
Number of banks	30	34	22	23	17	22
AR(2) test: *p*-value	0.307	0.866	0.284	0.726	0.343	0.718
Hansen-J test: *p*-value	0.547	0.210	0.920	0.834	0.901	0.889

Source: Authors' calculation. Regressions use a two-step system GMM estimation, taking into account orthogonal deviation transformations of instruments, instruments collapsing following Roodman (2009) and finite sample corrections by Windmeijer (2005). Standard errors are in parentheses. *** indicates statistical significance at the 1% level, while ** and * reflects statistical significance at the 5% and 10% levels, respectively. Models are valid when the AR(2) test and the Hansen-J test are not statistically significant.