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The Bank Lending Channel in Dual Banking Systems: How Market Power Shapes Monetary Policy Effectiveness

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Abstract

This paper investigates the effectiveness of the bank lending channel as a mechanism for monetary policy transmission in dual banking systems. Using generalized method of moments (GMM) estimators, we examine how market power and the presence of Islamic banks influence the bank lending channel. Our empirical results reveal that the effectiveness of this channel is conditional on the degree of market power. Specifically, we find that increases in interest rates are effective in altering bank lending only when the Lerner index, a measure of market power, reaches the threshold of 0.35. This suggests that the bank lending channel is only effective in markets with lower to average levels of competition (i.e. high market power). Additionally, we identify unique characteristics of Islamic banks that warrant further research for a comprehensive understanding of their role in the bank lending channel. Our study has important policy implications, particularly for emerging economies and dual banking systems, where regulatory measures may need to consider the intricate balance between market competition and effective monetary policy.

Keywords: *Monetary Policy, Lending Channel, Dual Banking System, Market Power, Bank Competition*

A. Introduction

The literature on monetary policy transmission mechanisms has highlighted bank lending as a vital channel that plays a pivotal role in transmitting the impacts of policy shifts to the broader economy (Bernanke, 1983; Bernanke and Gertler, 1995; Amidu and Wolfe, 2013). Specifically, changes in monetary policy directly affect banks' balance sheets by

influencing both the demand and supply of loans. Notably, the effectiveness of this lending channel varies depending on bank-specific variables such as size, capitalization, and liquidity (Kashyap and Stein, 2000; Altunbas et al., 2009).

When monetary policy becomes more restrictive, it's likely that some banks will curtail their loan offerings. The degree to which this happens can vary widely among different banks. Particularly vulnerable are those banks that do not have easy access to other sources of capital. These banks are more likely to significantly reduce their lending compared to others. This access to other funding channels is not just a function of a bank's features like its size, capital adequacy, and liquidity; it's also influenced by the broader banking environment and the market power of each bank. In markets with less intense competition (i.e., higher market power), banks typically find it easier to secure alternative funding, such as offering certificates of deposit and interbank lending. There is empirical evidence for the notion that easier access to alternative funding is positively correlated with less competitive banking environments, particularly among banks that are more profitable and have a lower risk of failure (Turk-Ariss, 2010; Fungácová, Solanko and Weill, 2014).

Despite the substantial research on the bank lending channel, fewer studies have explored the influence of market structure on the effectiveness of this channel (Adams and Amel, 2005; Amidu and Wolfe, 2013; Olivero et al., 2011; Fungácová et al., 2014; Leroy, 2014; Yang and Shao, 2014; Khan et al., 2016). The existing evidence on the subject is inconclusive, showing divergent findings about the role that competition plays in shaping the lending channel. For example, Adams and Amel (2005) argue that the lending channel is relatively ineffective in a concentrated market, whereas Amidu and Wolfe (2013) suggest that increased competition weakens the lending channel.

We seek to fill this gap in two ways. First, we focus on a group of Organisation of Islamic Cooperation (OIC) countries. The OIC is a particularly compelling context for several reasons: varying competitive conditions, rapid economic growth fuelled by extensive natural resources, and a heavy reliance on the banking sector in these emerging economies. Second, the presence of Islamic banks in these countries offers a unique opportunity to examine their role in monetary policy transmission. Islamic banks operate differently from their conventional counterparts—engaging in risk-sharing contracts, refraining from investing in toxic assets, and showing less vulnerability to economic downturns (Beck et. al., 2013; Fakhfekh et al., 2016; Hasan and Dridi, 2010; Čihák and Hesse, 2010; Ibrahim, 2017). The presence of Islamic banks and its response to competition makes it worthy investigating the effectiveness of monetary policy through bank lending in a dual banking system. In other words, we expect the presence of Islamic banks, due to structural and operational differences, and its response to the competitiveness in a market, to have a significant effect on the monetary policy transmission.

Our study, therefore, aims to investigate how banking competition in dual banking system and the unique characteristics of Islamic banks affect the effectiveness of the bank lending channel in transmitting monetary policy impacts. Besides contributing to the

broader literature on emerging markets and the OIC region, this paper adds to the literature of dual banking system by investigating the impact of bank competition on the effectiveness of monetary policy, and the role of Islamic banks in this framework.

Our findings reveal two crucial insights. First, in a highly competitive banking system, bank lending does not serve as an effective channel for monetary policy transmission. Specifically, interest rate changes only become effective when market competition, as measured by the Lerner index, reaches a certain threshold (0.35). In simpler terms, the bank lending channel operates effectively only under lower to average levels of competition. Second, we find the inconsequential influence of monetary policy on credit growth within Islamic banks. By clarifying these aspects, we shed light on the nuanced relationships between banking competition, and the effectiveness of monetary policy channels, particularly in emerging economies with dual banking systems.

The remainder of this paper is organized as follows: Section 2 provides a review of the relevant literature. Section 3 outlines the research methodology, including the econometric models employed and the data sources. Section 4 presents the empirical results and offers an in-depth analysis of the findings. Section 5 concludes the paper, summarizing the key findings and suggesting avenues for future research.

B. Literatur Review

The effectiveness of the bank lending channel as a conduit for monetary policy has long been a subject of empirical scrutiny. Understanding this channel is crucial for policymakers who aim to optimize monetary policy impacts on the real economy. This literature review is partitioned into four thematic areas to offer a comprehensive overview of existing research and theoretical underpinnings. The first section delves into studies that examine the influence of monetary policy on credit channels, focusing particularly on loan growth. The second section narrows the scope to scrutinize the specific dynamics in dual banking systems, examining how they alter or moderate the bank lending channel. The third section explores the role of bank competition in shaping the lending channel, while the fourth section considers the state of bank competition within dual banking systems. By juxtaposing these interconnected strands of literature, this review aims to elucidate the intricate factors that govern the efficacy of the bank lending channel, especially in the nuanced context of dual banking systems.

Impact of monetary policy on credit channel (loan growth)

The function of commercial banks is integral to the monetary transmission process, as actions in monetary policy aim to shape bank lending behavior. Commercial banks maintain a direct relationship with the real economy through both their deposit and lending channels. Bernanke's seminal 1983 study offers empirical support for the existence of a bank lending channel in the transmission of monetary policy. Further, Bernanke and Gertler (1995) assert that bank lending behavior is a pivotal element in the mechanism of monetary

policy transmission. This channel elucidates the direct effects of monetary policy actions on banks' balance sheets, manifesting as variations in loan supply and, consequently, economic output. Dhungana (2016) contends that the bank lending channel and the monetary transmission mechanism are inextricably linked; the efficacy of banks is contingent upon a thorough understanding of the impact of monetary policy actions. Correspondingly, the central bank's capacity to formulate apt policy measures is reliant on a comprehensive understanding of bank lending behavior.

Nonetheless, recent shifts within the banking industry have reignited interest in the role that banks occupy within the monetary transmission mechanism (Morris and Sellon, 1995). Ibrahim (2017) argues that fluctuations in monetary policy are conveyed to the real sector through multiple channels, including but not limited to interest rates, exchange rates, asset prices, and the credit channel.

Research on the transmission of monetary policy through the lending channel has extensively explored this relationship from various angles. Some studies focus on how commercial banks reconfigure their portfolios during periods of monetary tightening, while others examine alterations in the price and non-price terms of credit (Romer & Romer, 2000; Bernanke & Blinder, 1988; Gertler & Gilchrist, 2003; Dhungana, 2016). Consequently, a plethora of research has scrutinized how banks adapt their loans, securities, deposit, and non-deposit liabilities in response to changes in monetary policy. Notably, Kashyap and Stein (2000) posit that the impact of monetary policy on lending behavior is particularly pronounced for banks possessing less liquid balance sheets. In addition, Romer and Romer (2000) indicate that any subsequent contraction in bank credit tends to coincide temporally with a downturn in economic activity, as gauged by industrial production metrics. Furthermore, Amidu (2006) employed regression analysis to quantify the effect of monetary policy actions on bank lending, finding a significant relationship between banks' lending behaviors and both national economic activities and shifts in money supply. However, Amidu (2006) contends that central bank prime rates and inflation rates exert a negative but statistically insignificant impact on bank lending

Sengonul and Thorbecke (2005) investigated the effects of contractionary monetary policy on loan supply in Turkey and found that such a policy disproportionately reduces lending at banks with less liquid balance sheets. This result aligns with the findings of Kashyap and Stein (2000). Nevertheless, the literature presents diverging views on the consequences of monetary policy tightening on bank lending (Dhungana, 2016). For instance, Gertler and Gilchrist (2003) focused their research on the response of bank business lending to policy contractions. Contrary to some previous studies, their findings indicate that business lending does not diminish in the face of tightened monetary policy. They concluded that the overall reduction in total lending emanates exclusively from decreases in consumer and real estate loans. Furthermore, when narrowing the scope of their analysis to loans extended to manufacturing firms, they observed a significant increase in bank lending in response to more stringent monetary conditions.

In an examination of the monetary policy-lending relationship through the lens of policy tools employed by the Central Bank of Nepal, Dhungana (2016) discovered that open market operations and cash reserve ratios negatively impact bank lending, while the bank rate exerts a positive influence. The asymmetric consequences of monetary policy on output via lending have also been the subject of several studies. For example, Chang (2005) concluded that asymmetries in bank lending responses to monetary policy do not substantially influence the divergent output reactions to contractionary and expansionary policies. Ozsuca (2022) explored these effects considering bank size and discovered asymmetric responses; small, liquidity, and capital-constrained banks exhibited significant contractions in lending following monetary policy tightening, whereas larger banks exhibited the opposite behavior. This finding was corroborated by Glindro et al. (2022), who observed similar trends between small and large rural banks in the Philippines. Dang & Dang (2021) assessed the effects of monetary policy in a diversified banking landscape and concluded that the efficacy of the monetary policy lending channel diminishes in a banking system where a larger share of income is derived from non-interest activities.

Borio and Gambacorta (2017) analyzed to assess the efficacy of monetary policy on bank lending within the context of a low-interest-rate environment. Their empirical findings indicate that when interest rates reach exceedingly low levels, the potency of reductions in short-term interest rates to stimulate bank lending is diminished. These conclusions remain consistent even after accounting for varying conditions in the business and financial cycles as well as diverse bank-specific attributes such as liquidity, capitalization, funding costs, risk profile, and income diversification.

Similarly, Morris and Sellon (1995) presented empirical evidence suggesting that monetary policy constrains bank lending. Their study, which reviewed four periods of restrictive monetary policy spanning two decades from 1975 to 1995, demonstrated that banks managed to sustain their business lending by compensating for declines in core deposits through the sale of securities and the issuance of managed liabilities. Furthermore, their examination of the terms governing bank business lending found limited empirical support for the hypothesis that banks curtail loan supply or engage in credit rationing during periods of monetary tightening.

From a different angle, the rate at which monetary policy changes are passed through to the banking sector often serves as an indicator of the policy's effectiveness or the speed at which its impact is felt (Becker, Osborn, & Yildirim, 2012). Matemilola et al. (2014) probed into the long-term interest rate pass-through from the money market rate to the bank lending rate, as well as the asymmetric adjustments of the bank lending rate in the context of South Africa. Their study indicated that the bank lending rate exhibits a nuanced response to fluctuations in the money market rate.

To summarize, the body of research examining the influence of monetary policy and its associated instruments on bank lending is both extensive and insightful. The literature in

this domain offers a rich array of perspectives on how monetary decisions impact various aspects of the banking sector, including loan growth.

Impact of Monetary policy on bank lending channel in dual banking systems

The impact of monetary policy within conventional financial systems has been comprehensively investigated, as evidenced by a substantial body of empirical literature (Sims, 1992; Christiano et al., 1999; Bernanke and Gertler, 2000; Jiménez et al., 2014). However, recent scholarship has increasingly turned its attention to exploring the ramifications of monetary policy within Islamic financial systems, particularly focusing on Islamic banks (Yungucu & Saiti, 2016). Islamic banking institutions have emerged as pivotal actors in the effectiveness of monetary policy transmission mechanisms within dual banking systems (Boukhatem & Djelassi, 2022).

The extant literature that delves into Islamic bank financing and its correlation with monetary policy has yielded heterogeneous findings, underscoring the necessity for additional empirical investigation. Ibrahim (2017) critiques the prevalent approach within this research domain, which primarily relies on aggregate lending data to analyze the lending channel in dual banking systems. Such an approach, he contends, engenders a well-documented identification issue; specifically, it remains unclear whether observed alterations in bank loans in response to monetary policy shifts are indicative of changes in the supply of loans or in the demand for them.

Various empirical studies have been conducted across countries with dual banking systems to assess the influence of monetary policy or interest rates on the bank lending channel within these frameworks. The findings from these studies exhibit considerable divergence regarding the impact of monetary policy on lending behavior. For instance, Ibrahim (2017) provides empirical evidence that fluctuations in monetary policy in Malaysia exert an impact on the lending growth rates of both Islamic and, to a lesser degree, conventional banks. He contends that Islamic financing exhibits a more pronounced sensitivity to shifts in monetary policy. Furthermore, his study discerns no significant discrepancies in the responsiveness to monetary policy between fully integrated Islamic banks and their subsidiary counterparts. In a parallel investigation, Asbeig & Kassim (2015) report that alterations in monetary policy do not significantly influence the magnitude of financing provided by either Islamic or conventional banks in Malaysia. However, they argue that bank-specific determinants such as size and liquidity are pivotal in shaping the lending patterns of both types of institutions, while capitalization appears to be a significant factor solely for Islamic banks.

Investigating the responsiveness of Islamic banks to interest rate fluctuations, Hakan and Gulumser (2011) discovered that both deposits and loans of Islamic banks in Turkey are markedly affected by interest rate shifts. They therefore argue that the susceptibility of Islamic banks to interest rate variations should be incorporated into the strategic formulation of monetary policies. This viewpoint is corroborated by Bacha (2004), who empirically

demonstrates that Islamic banks operating within a dual banking framework are also exposed to interest rate risks, which subsequently give rise to liquidity risks and asset-liability mismatches. This assertion is further substantiated by Kassim et al. (2009), who examined the sensitivity of Islamic and conventional banks in Malaysia to changes in interest rates. Contrary to prevailing expectations, their study found that balance sheet items of Islamic banks are comparatively more responsive to monetary policy adjustments, while conventional loans display relative insensitivity to interest rate fluctuations.

Conversely, Naveed (2015) investigated the responsiveness of the dual banking sector in Pakistan to monetary policy shocks and concluded that Islamic banks in the country display relatively low sensitivity to such shocks. This lack of sensitivity, according to Naveed (2015), can be attributed to the unique financing mechanisms employed by Islamic banks in Pakistan.

In an extensive literature review, Yungucu & Saiti (2016) examined the impact of monetary policy on the Islamic financial services sector. They found that the bulk of the existing research highlights the adverse effects of conventional monetary policy on Islamic banks, with only a few exceptions. They posit that the transmission of monetary policy to Islamic banks occurs through multiple channels, including interest rate risk, asset-liability mismatches, and fluctuations in deposits and financing. Importantly, the studies under review largely corroborate the effectiveness of Islamic monetary policy, particularly emphasizing the utility of profit-sharing mechanisms.

Some research has expanded the discussion on monetary policy and lending to include considerations from the interbank market, specifically focusing on the Islamic inter-bank money market in a dual banking system (Yungucu & Saiti, 2016). Bacha (2008) argues that, even within a Shariah-compliant, interest-free environment, the risk factors inherent in conventional money markets remain relevant. This is due to a high correlation in profit rates and yields, the fluidity of fund flows, and cross-linkages with conventional financial systems. Bacha further posits that the Islamic interbank money market, particularly as it operates within Malaysia's existing dual banking system, tends to bring the Islamic banking system closer to its conventional counterpart. This convergence is largely because the immediate effects of any changes in monetary policy are first felt within the money market.

Impact of bank competition on the lending channel

From a theoretical standpoint, alterations in banking competition can influence the transmission of monetary policy via the bank lending channel in three ways. First, a rise in competition, owing to an increased market share of larger banks, is expected to weaken the bank lending channel's role in transmitting monetary policy. Second, heightened competition can further dilute the lending channel's efficacy if it leads to a decrease in informational asymmetries between banks and their borrowers. Lastly, competition in the banking sector can alter the effectiveness of monetary policy by affecting how sensitively bank loan rates respond to monetary policy changes. While increased competition has the

potential to weaken the impact of monetary policy in the first two scenarios, it may actually strengthen the lending channel in the third case.

Support for the banking structure-lending channel hypothesis posits that monetary policy impacts banks in multiple ways. Not only does it affect bank reserves via mechanisms like open market operations or reserve requirements, but it also influences marginal costs through the interest rates paid on bank liabilities. The structure of the banking market plays a critical role in this context. The extent of market power that banks possess dictates how shocks to their marginal costs are translated into changes in lending rates and loan volumes. Studies have shown that in markets characterized by high levels of bank concentration, lending tends to decline due to elevated lending rates (Amidu and Wolfe, 2013).In an empirical study grounded on bank-level data, Oliver et al. (2010) presented strong evidence that heightened competition in the banking sector attenuates the transmission of monetary policy via the lending channel, particularly for banks that are smaller, less liquid, and less capitalized. This corroborates the findings of Adams and Amel (2005), who explored the influence of U.S. bank concentration on monetary policy transmission and concluded that the effect of monetary policy on loans is diluted in markets with higher concentration.

Further reinforcing this viewpoint, studies by Gunji et al. (2009) and Olivero et al. (2011) employed the H-statistic as a measure of competition and determined that increased competition in banking diminishes the impact of policy measures on lending. Amidu and Wolfe (2013) conducted an extensive analysis using data from 55 countries to examine the degree to which bank competition affects monetary policy transmission. Their findings, robust across multiple sensitivity checks—including alternative measurements of the Lerner index, various samples, and different methodological specifications—indicated that greater competition in the banking sector weakens the efficacy of monetary policy on bank lending.

Other studies, such as those by Karakuş (2014), Jearviriyaboonya & Sethapramote (2019), Hussain & Bashir (2019), and Kamta et al. (2020), align with these findings, offering evidence that rising concentration in the banking sector attenuates the bank lending channel, thereby making monetary policy less effective. This attenuation is particularly pronounced for smaller and less capitalized banks. Fungacova et al. (2014) introduced a temporal dimension by considering the impact of the 2008 financial crisis, revealing that banks with less market power were more sensitive to monetary policy, but only before the onset of the crisis.

However, not all research concludes that competition weakens the effectiveness of the bank lending channel. In contrast, studies by Huseynov et al. (2013) and Liebersohn (2017) contend that increased competition actually enhances the efficiency and quality of bank lending. They argue that it can also serve to bolster the effectiveness of the bank lending channel in transmitting monetary policy. This suggests a more nuanced picture, where the impact of competition on the bank lending channel is neither universally positive nor negative but may depend on a range of factors including market conditions, regulatory frameworks, and the specific characteristics of the banks involved.

However, examining the impact of competition on lending channel in dual banking systems is still unexplored which is the main objective of this paper.

Bank competition in dual banking systems

In the realm of dual banking systems, the subject of competition has only recently begun to garner academic attention. Salim (2017) notes that despite the rising significance of Islamic banking – which now commands over 20% market share in several dual banking systems – there's a conspicuous paucity of studies examining the nature and implications of competition within these systems. This is especially pertinent given that a majority of Islamic banks are situated within OIC (*Organisation of Islamic Cooperation*) nations, making it imperative to comprehend competition dynamics in such environments (Azmi & Manap, 2016).

Other studies were more specific in their scope. For example, Salim (2017) studied the effect of competition/concentration on the efficiency of both Islamic and conventional banks. He found that both competition-inefficiency and quite life hypothesis work simultaneously, arguing that the positive impact of concentration on efficiency is higher for Islamic banks while the quite life hypothesis is less probable to exist in Islamic banks due to their distinct business model and corporate governance.

Ali, M. et al. (2021) found that increased competition can reduce credit risk, while Khattak et al. (2022) found that higher competition nudges banks toward riskier assets. Abojeib (2017) showed empirical evidence of a nonlinear relationship between competition and stability for both types of banks—Islamic and conventional. Specifically, he found that while market power initially enhances stability, its benefits taper off after crossing a particular threshold, turning the impact negative. This nuanced finding aligns with Louati and Boujelbene's (2015) study, which concluded that increased competition fosters overall stability in the Islamic banking sector. However, they add a layer of complexity by suggesting that the positive effect of capitalization on stability is primarily evident when competition is low. These studies collectively highlight the intricate relationship between competition and stability within dual banking systems.

Azmi and Manap (2016) assessed the impact of competition on both Islamic and conventional banks in OIC countries, using various measures, including the Boone index. Their results indicate that Islamic banks were more stable compared to their conventional counterparts during times of crisis, but profitability measures for both types of banks were comparable. Furthermore, the study found that competition influences stability and profitability similarly in both Islamic and conventional banks. Al-Muharrami and Matthews (2009) took a different approach by focusing on the GCC banking systems, which hold a significant place in dual banking systems worldwide. Their research highlighted that it is concentration, not market share, that primarily determines profitability.

Turk Arris (2010) took a global perspective to assess competitive conditions in Islamic and conventional banking markets, focusing on the differences in profitability using

various competition metrics. The study found that Islamic banking is generally less competitive compared to conventional banking. Interestingly, while market power was found to significantly increase profitability, this did not necessarily translate into higher profitability levels for Islamic banks. In a similar vein, Weill (2010) aimed to determine whether Islamic banks wield more market power than their conventional counterparts. The study, covering the period from 2000 to 2007, initially found no significant difference in market power between the two types of banks. However, when accounting for control variables, the results suggested that Islamic banks actually possess less market power than conventional banks. This array of studies enriches the understanding of competition in dual banking systems. However, a gap remains in the literature regarding the specific impact of competition on the lending channel in dual banking system.

To sum up the extensive body of literature on the impact of monetary policy and competition on the bank lending channel, it is evident that studies have shown a wide array of effects. These effects vary depending on the type of financial system (conventional or Islamic), the geographical location, bank-specific factors, and the market structure. Moreover, while substantial research has focused on the individual impact of competition and monetary policy in single banking systems, a noticeable gap exists in the literature when it comes to understanding how competition influences the bank lending channel in dual banking systems. This under-researched area presents an interesting avenue for exploration and constitutes the primary objective of this paper.

C. Research Methodology

We obtained bank-specific data from eight countries with dual banking systems: Bahrain, Bangladesh, Kuwait, Malaysia, Pakistan, Qatar, Saudi Arabia, and Turkey. The data were sourced from the Fitch-Connect database. To enable a comparison between Islamic and conventional banks, we relied on unconsolidated data, as some Islamic banks operate as subsidiaries of conventional entities. We also excluded data related to development financial institutions and offshore banks, as their behavior and competition with other commercial banks may differ. Additionally, we omitted observations for banks that had merged or had data available for less than three consecutive years to enhance the quality of the estimations. Ultimately, our dataset comprised an unbalanced panel of data from 170 commercial banks (both Islamic and conventional) across the eight dual banking systems for the years 2003-2016.

For the analysis, we selected several bank-specific variables namely: size, capitalization, liquidity, and asset quality. The proxy for size is total assets, while equity to total assets (EQTA) serves as a proxy for capitalization. Liquid assets to total assets (LIQ) is used to measure liquidity, and the ratio of reserves for impaired loans to gross loans (LLRR) serves as a proxy for asset quality. In addition to bank-specific variables, we also incorporated

macroeconomic variables, including the inflation rate and real GDP growth rate. These were sourced from the World Development Indicators database maintained by the World Bank.

The two primary variables in this study are monetary policy changes and banking competition. For representing monetary policy changes, we use short-term interest rates as a proxy. These rates are retrieved from the International Monetary Fund (IMF). For assessing competition in the banking sector, Lerner index of market power is used as a proxy. The Lerner index $Ler_{it}x$ it for bank i at time t is calculated as:

$$Ler_{it}{}^{=} \; Lerner_{it} = \frac{P_{it} - MC_{it}}{P_{it}} \qquad (1)$$

Here, Pit is the price of the bank's output and MCit represents marginal cost. A higher value of the Lerner index indicates reduced competition, that is, more market power for the bank. $P_{it}_$it is calculated by dividing total revenue by total assets. Marginal cost MC_{it} it is derived from the following translog cost function:

$$\begin{aligned} lnTC_{it} = {} & \alpha_0 + \alpha_1 lnQ_{it} + \frac{\alpha_2}{2}(lnQ)^2_{it} + \sum_{j=1}^{3} \delta_i lnw_{jit} + \frac{1}{2}\sum_{j=1}^{3}\sum_{k=1}^{3} \delta_{jk} lnw_{jit} lnw_{kit} \\ & + \sum_{j=1}^{3} \gamma_{jit} lnQ_{it} lnw_{jit} + \tau_1 Trend + \frac{\tau_2}{2} Trend^2 + \tau_3 Trend \times lnQ_{it} \\ & + \sum_{j=1}^{3} \theta_j Trend \times lnw_{jit} + \varepsilon_{it} \end{aligned} \qquad (2)$$

After imposing conditions for homogeneity and symmetry in the estimation of the cost function, marginal cost MC_{it} is calculated as:

$$MC_{it} = \frac{TC_{it}}{Q_{it}}\left[\alpha_1 + \alpha_2 lnQ_{it} + \sum_{j=1}^{3} \gamma_{jit} lnw_{jit} + \tau_3 Trend\right] \qquad (3)$$

To examine the bank lending channel, we follow existing literature (Ibrahim, 2017; Yang & Shao, 2016; Olivero et al., 2011) and employ the model:

$$\Delta \ln (Loan_{it}) = \alpha_i + \gamma \Delta \ln (Loan_{it-1}) + \beta Intr_t + \sum_{j=1}^{k} \theta_j BS_{it-1} + \delta \Delta \ln(GDP_t) + \tau INF_t + \varepsilon_{it} \qquad (4)$$

To further investigate the impact of banking competition on the bank lending channel, we extend the model by adding the proxy for competition (Lerner index) and an interaction term with the proxy for monetary policy (Intr):

$$\Delta \ln (Loan_{it}) = \alpha_i + \gamma \Delta \ln (Loan_{it-1}) + \beta Intr_{tw} + \vartheta Ler_{it} + \varphi Intr_{wt} * Ler_{it} + \sum_{j=1}^{k} \theta_j BS_{it-1} + \delta \Delta \ln(GDP_{wt}) + \tau INF_{wt} + \varepsilon_{it} \qquad (5)$$

In these equations:

$\Delta \ln (Loan_{it})$ represents the change in loans for bank i in year t, denoted as d_loans in the estimation tables.

$Intr_{wt}$ is the short-term interest rate for country w in year t.

Ler_{it} is the Lerner index for bank i in year t, calculated as described earlier.

$Intr_{wt} * Ler_{it}$ is the interaction term between the Lerner index and the interest rate.

BS_{it} refers to bank-specific variables, including size, capitalization, liquidity, and asset quality.

$\Delta \ln(GDP_{wt})$ is the growth rate of the gross domestic product, denoted as GDP in the estimation.

INF_{wt} is the inflation rate.

For our empirical analysis, we employ a dynamic panel specification, utilizing the generalized method of moments (GMM) estimators. To ensure the validity of our dynamic panel model, we carry out the Arellano-Bond autocorrelation test. This test helps us confirm the absence of second-order autocorrelation in the residuals, which is a crucial assumption for the consistency of the GMM estimator. Additionally, we conduct the Hansen test to verify the relevance of the instruments. We utilize a two-step GMM estimator and apply Windmeijer's (2005) finite sample correction.

Through this methodological approach, we aim to generate unbiased and consistent estimates that can adequately test our hypotheses regarding the interaction effects of banking competition and monetary policy on the lending behavior of banks in dual banking systems.

D. Results And Discussion

We first present the estimation results of the basic equation, i.e. equation (1), in table (i). Four different specifications are tested. The first column gives the results for the standard specification for studying the bank lending channel; we include bank size, capitalization, liquidity, loan loss reserve, inflation and GDP growth. The second column control for the impact of global financial crises (2008-2009). In the third column, we add the Lerner index to capture the possible impact of market power. The interaction of Lerner index with Monetary policy is added to fourth column. The Arellano-Bond autocorrelation test statistics reported at the bottom of the Table (i) indicate the presence of first-order autocorrelation and absence of second-order autocorrelation in the residuals. Moreover, the Hansen statistics fail to reject the over-identifying restrictions for instrument validity. Accordingly, given that these two tests are satisfied, the coefficient estimates are consistent.

Based on our analysis, we observed a negative association between bank size and lending growth, aligning with findings from Ibrahim (2016) and Ibrahim (2017). Recent developments in the banking sector suggest that larger banks are increasingly engaged in non-lending activities, which might limit their lending growth, as pointed out by Ibrahim (2016).

Our results do not indicate a strong relationship between a bank's liquidity or inflation and its lending growth. Interestingly, the loan loss reserve coefficient is positive and statistically significant in both Model 1 and Model 2.

Model 1 indicates that in countries with a dual banking system, lending tends to increase during economic upturns, as shown by the positive coefficient of real GDP growth. However, this observation is not consistent across all models. Similarly, the effects of capitalization vary depending on the model.

In the context that is most relevant to our research, we observe that the coefficient corresponding to changes in monetary policy is both negative and statistically significant. Specifically, fluctuations in interest rates exhibit an inverse relationship with loan growth rates. These findings serve as preliminary evidence for the considerable influence of monetary policy on bank lending within dual banking systems.

Incorporating the Lerner index into Models 3 and 4 yields a statistically significant negative effect on credit growth. Most notably, the interaction term for the Lerner index and monetary policy in Model 4 is also significantly negative. This reinforces the hypothesis that variations in bank competition adjust banks' reactions to the changes in monetary policy, thereby substantiating the existence of a bank lending channel in dual banking systems through the mechanism of bank competition.

Our analyses further reveal that an augmentation in the market power of banks enhances the efficacy of monetary policy transmission. Conversely, heightened competition appears to impede the successful transmission of monetary policy.

Table (I) : The Effectiveness Of Bank Lending Channel

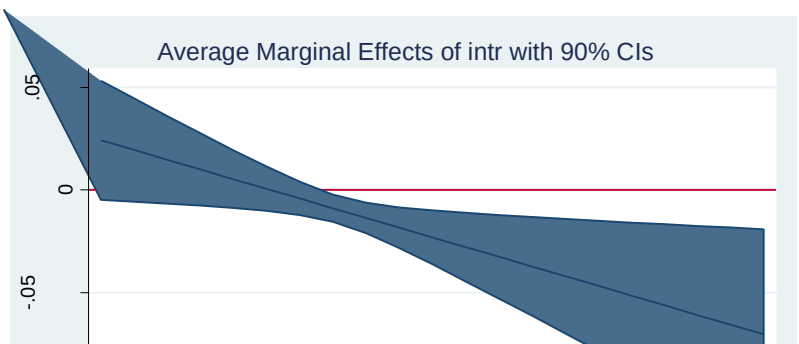
	(1) d_loan	(2) d_loan	(3) d_loan	(4) d_loan
L.d_loan	0.0205 (0.44)	0.0206 (0.41)	-0.0021 (-0.03)	0.0171 (0.24)
Monetary policy	-0.0148***	-0.0144***	-0.0080**	0.0242
	(-2.82)	(-2.80)	(-2.08)	(1.37)
Lerner Index			-1.591***	-1.585***
			(-3.13)	(-3.19)
Monetary policy*Lerner				-0.0946**
				(-1.97)
Size	-0.234***	-0.273***	-0.261***	-0.260***
	(-6.21)	(-7.55)	(-7.32)	(-6.99)
Capitalization	-0.0215* (-1.73)	-0.0129 (-0.85)	-0.0035 (-0.41)	0.0042 (0.45)

Liquidity	-0.000 (-0.59)	-0.000 (-0.60)	-0.0000 (-0.11)	-0.0001 (-0.21)
Asset Quality	0.0313*** (6.28)	0.0246** (2.42)	0.0117 (0.94)	0.0115 (0.88)
Inflation	-0.0013 (-0.39)	-0.0006 (-0.17)	0.0028 (0.70)	0.0003 (0.09)
GDP growth	0.0075*** (2.98)	-0.0007 (-0.27)	0.0032 (0.97)	0.0008 (0.28)
Cris08		-0.0883***	-0.137**	-0.136***
		(-2.64)	(-3.58)	(-3.43)
Cris09		-0.141***	-0.165**	-0.169***
		(-4.79)	(-5.29)	(-5.22)
N. of observations	1160	1160	1147	1147
N. of groups	162	162	161	161
N. of instruments	19	21	33	34
AR1 (p-value)	0.0129	0.0175	0.00518	0.00313
AR2 (p-value)	0.549	0.974	0.257	0.309
Hansen (p-value)	0.0800	0.176	0.369	0.196

t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. The dependant variable is the change in loan. Monetary policy is proxied by short term interest rate. Bank size is measured by total assets. Capitalization is measures by Equity to total assets. Liquidity is measured by Liquid assets to total assets. Asset quality is measured by the ratio of reserves for impaired loans to gross loans. Inflation rate and real GDP growth rate are the macroeconomic variables. Cris08 and Cris09 are dummy variables to capture the impact of the global financial crises. Lerner index the proxy of market power (competition).

To elucidate the impact of the Lerner index on the bank lending channel, it is imperative to plot its marginal effect across a spectrum of market power values. Figure (i) delineates the marginal influence exerted by market power on the bank lending channel.

Figure (I): The Marginal Effect Of Market Power On Bank Lending Channel



The graphical representation substantiates the presence of a bank lending channel in dual banking systems, mediated by the degree of bank competition. The efficacy of this lending channel is notably diminished for banks possessing minimal market power. Nevertheless, upon surpassing a specific market power threshold—quantitatively, a value greater than 0.35—the lending channel begins to significantly influence credit growth in a negative manner. Additionally, the magnitude of this impact escalates as market power continues to increase.

In order to scrutinize the variance in the relationship between banking competition and the efficacy of monetary policy transmission across different types of banks, we partition our dataset into two distinct subsamples: Islamic banks and conventional banks. These findings are elaborated upon in Table (ii) which segregates the dataset into these two categories of banks.

Columns 1 and 2 present findings related to Islamic banks, while Columns 3 and 4 elucidate the results for conventional banks. Notably, Columns 2 and 4 incorporate the interaction of the Lerner index with monetary policy variables. Diagnostic statistics, displayed at the lower section of table (ii), confirm the robustness of our Generalized Method of Moments (GMM) estimations.

A comparative analysis between Column 1 and Column 3 reveals the relative effectiveness of the bank lending channel for Islamic banks, as indicated by a negative and statistically significant monetary policy coefficient. Contrarily, monetary policy appears to exert a less pronounced impact on conventional banks' lending activities. Thus, the data suggest that Islamic banks demonstrate a more vigorous response to monetary policy shifts. These observations are consonant with earlier research (Ibrahim, 2017; Ergec & Arslan, 2013), which posits that Islamic banks, due to their greater dependence on customer deposits and fewer alternative funding avenues, are generally more sensitive to interest rate fluctuations. Additionally, the relative novelty of Islamic banks in the sector may render them more susceptible to financial frictions, as opposed to their well-established conventional counterparts.

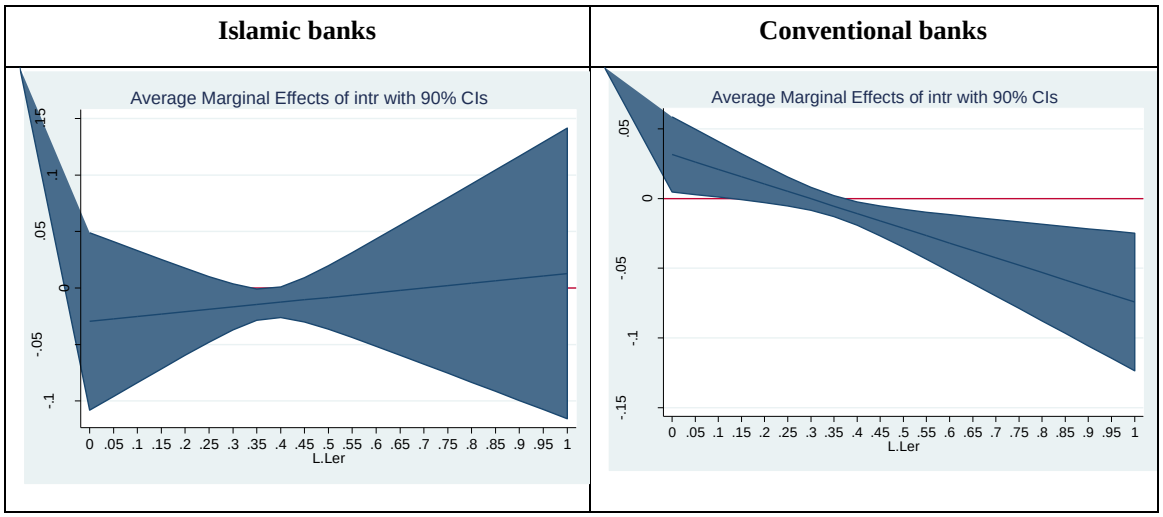
In Columns 2 and 4, we introduce the interaction of the Lerner index with monetary policy variables. Corresponding marginal effects are graphically represented in Figure (ii) for further clarification.

Table (ii): The Effectiveness Of Bank Lending Channel, By Bank Type

	(1) d_loan	(2) d_loan	(3) d_loan	(4) d_loan
L.d_loan	0.0888 (0.68)	0.0941 (0.71)	-0.0422 (-0.95)	-0.0209 (-0.41)
Monetary Policy	-0.0139* (-1.77)	-0.0296 (-0.62)	-0.00406 (-1.00)	0.0316* (1.92)
Lerner Index	-1.200* (-1.91)	-1.229** (-1.97)	-1.990*** (-3.42)	-1.937*** (-3.27)
Monetary policy*Lerner		0.0424 (0.34)		-0.106** (-2.33)
Size	-0.288*** (-4.02)	-0.287*** (-3.95)	-0.238*** (-5.29)	-0.237*** (-5.09)
Capitalization	0.0139 (1.41)	0.0145 (1.43)	-0.0126 (-1.12)	-0.00229 (-0.19)
Liquidity	-0.00156 (-0.55)	-0.00161 (-0.58)	0.000228 (0.37)	0.000239 (0.38)
Asset Quality	0.00524 (0.45)	0.00552 (0.47)	0.0174 (1.46)	0.0162 (1.23)
Inflation	-0.00633 (-0.67)	-0.00574 (-0.58)	0.00517 (1.28)	0.00351 (0.82)
GDP Growth	-0.00648* (-1.74)	-0.00639* (-1.72)	0.00559 (1.32)	0.00200 (0.47)
Cris08	0.0625 (0.56)	0.0626 (0.57)	-0.174*** (-4.26)	-0.173*** (-4.05)
Cris09	-0.144* (-1.84)	-0.141* (-1.79)	-0.182*** (-5.41)	-0.185*** (-5.35)
N. of observations	233	233	914	914
Bank type	Islamic	Islamic	Conventional	Conventional
N. of groups	45	45	116	116
N. of instruments	33	34	33	34
AR1 (p-value)	0.0455	0.0458	0.00850	0.00615
AR2 (p-value)	0.795	0.831	0.178	0.246
Hansen (p-value)	0.511	0.520	0.378	0.230

t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. The dependant variable is the change in loan. Monetary policy is proxied by short term interest rate. Bank size is measured by total assets. Capitalization is measures by Equity to total assets. Liquidity is measured by Liquid assets to total assets. Asset quality is measured by the ratio of reserves for impaired loans to gross loans. Inflation rate and real GDP growth rate are the macroeconomic variables. Cris08 and Cris09 are dummy variables to capture the impact of the global financial crises. Lerner index the proxy of market power (competition).

Figure (ii): The Marginal Effect Of Market Power On Bank Lending Channel, By Bank Type



Remarkably, upon incorporating market power into the analytical model, we observe an inconsequential influence of monetary policy on credit growth within Islamic banks.

The graphical depiction for conventional banks aligns with our overarching findings, substantiating the presence of a bank lending channel in dual banking systems mediated by the variable of bank competition. The efficacy of this lending channel remains limited for banks with marginal market power. Nevertheless, upon crossing a specific threshold—explicitly a market power value greater than 0.38—the channel significantly constrains credit growth. The magnitude of this inhibitive effect amplifies as market power escalates further.

For the sake of robustness and to garner additional insights, we examine subsamples partitioned by bank size. Specifically, we investigate the underlying relationships for both larger and smaller banking institutions separately, utilizing the median size per country-year for categorization. The empirical outcomes reveal an absence of significant impacts on smaller banks, while corroborating the negative influence on their larger counterparts. This is congruent with our prior observations, indicating that the bank lending channel operates effectively for banks possessing either substantial market power or larger scale but seems ineffective for smaller institutions or those with limited market power.

E. Conclusion

This paper is set out to explore the effectiveness of the bank lending channel in transmitting monetary policy in dual banking systems, with a specific focus on a group of countries from the Organisation of Islamic Cooperation (OIC). Our study aimed to contribute to the existing literature by addressing two main gaps: the impact of banking competition on the bank lending channel, and the role of Islamic banks in this framework.

Our findings reveal two major points. First, the effectiveness of the bank lending channel is significantly influenced by the degree of market power. Specifically, increases in interest rates are effective in altering bank lending only when market power, measured by the Lerner index, reaches a certain threshold (0.35). This suggests that the bank lending channel is only effective at lower to average levels of competition (i.e. high market power). Second, while the presence of Islamic banks adds a unique dimension to market dynamics, our findings indicate insignificant influence of monetary policy on credit growth within Islamic banks, an area worthy of further research. The implications of our study are especially relevant for policymakers in emerging economies and dual banking systems.

Our results suggest that regulatory measures aimed at enhancing competition in dual banking systems should be carefully calibrated, taking into account their potential impact on the effectiveness of monetary policy transmission through the bank lending channel.

This study opens the door for several avenues of future research. Given the specific focus on OIC countries, extending the scope to include other emerging economies would provide a more comprehensive view. Additionally, the role of Islamic banks in the bank lending channel remains a significant subject for future studies. Further exploration is also required to understand the varying impacts of different monetary policy instruments.

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