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FINANCIAL INTERMEDIATION COSTS IN A DUAL BANKING SYSTEM: THE ROLE OF ISLAMIC BANKING

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ABSTRACT

This paper empirically analyses the role of Islamic banking in financial intermediation costs as measured by net interest margins for a leading dual banking country, Malaysia. Controlling for theoretically motivated determinants of the margins, the paper compares the interest/financing margins of conventional and Islamic banks and examines the impacts of Islamic banking presence on bank margins. The analysis provides evidence of the higher margins of Islamic banks compared to those of conventional banks. Further, the difference in bank margins between the two types of banks can be attributed to differences in market power, operating costs, and diversification. Finally, Islamic banking presence or penetration, as represented by the ratio of Islamic financing to aggregate bank credit/financing and, alternatively, the share of Islamic banking assets, is robustly associated with lower bank margins, on average. These results bear important implications for the development of the Islamic banking industry and in fostering the efficient allocation of financial resources by the banking system.

Keywords: Interest margins; Dual banking system; Malaysia.
JEL Classifications: C33; G21; G32.

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I. INTRODUCTION

Islamic banking has demonstrated remarkable development, even amid the global financial crisis, and has risen into prominence in several dual banking jurisdictions. According to Ernst & Young's World Islamic Banking Competitiveness Report 2016, Islamic banking recorded an asset growth rate of 16% per annum from 2010 to 2014. While the growth of Islamic banking assets has slowed down in recent years, with a compound annual growth rate of 8.8% from the last quarter of 2013 to 2017 (Islamic Financial Services Board, or IFSB, 2018), they continue to outpace their conventional counterparts. Islamic banking is now systematically important in 10 dual banking countries, according to the IFSB, an international standard-setting organization for the Islamic financial services industry, based in Kuala Lumpur, Malaysia.[1] A natural question that arises, then, from this rapid emergence of Islamic banking is whether Islamic banking contributes to financial and economic development.

This paper aims to answer the question by addressing a core aspect of financial intermediaries, that is, financial intermediation costs. More specifically, focusing on Malaysia, we examine the extent to which the presence of Islamic banking affects financial intermediation costs as measured by net interest margins.[2] Among systematically important dual banking countries, Malaysia is at the forefront in the development of Islamic banking, with many countries attempting to emulate its model and framework (Lassoued, 2018; Solarin et al., 2018). Starting with only one full-fledged Islamic bank and a few Islamic windows of conventional banks before the 1997–1998 Asian financial crisis, the Islamic banking sector in Malaysia now comprises five full-fledged Islamic banks and 11 Islamic bank subsidiaries of conventional banks. Since the Asian crisis, the sector's asset and financing shares have increased uninterruptedly and surpassed 25% and 30%, respectively, in 2017.[3] Interestingly, the increase in Islamic banking presence has taken place against a backdrop of conventional banking consolidation and concern about its impact (Sufian and Habibullah, 2013). In light of this, we ask, do Islamic banks have lower intermediation costs? Can Islamic banks affect the pricing and margin behavior of the consolidated conventional banking sector or of the banking sector in general? Malaysia provides an ideal setting to address these questions.

Our contribution to the literature is twofold. First, we contribute to a growing list of studies on Islamic banking and its financial and economic roles. Predominantly, studies have focused on comparative analyses of Islamic and conventional banks based on various performance metrics, most notably efficiency (Beck et al., 2013; Johnes et al., 2014; Abdul-Majid et al., 2017; Alqahtani et al., 2017), risk/stability

[1] The IFSB categorizes a country as having a systematically important Islamic banking sector based on an asset share of 15% or higher. Excluding the full-fledged Islamic banking system in Iran and Sudan, there were 10 such countries by 2016: Bangladesh, Brunei, Djibouti, Jordan, Kuwait, Malaysia, Qatar, Saudi Arabia, the United Arab Emirates, and Yemen.

[2] Islamic banking strictly prohibits interest, and, hence, the margins for Islamic banks are normally referred to as net financing margins. To avoid repeating the term *interest/financing* in reference to conventional and Islamic banks, we use the terms *net margins*, *bank margins*, and simply *margins* throughout.

[3] The figures are based on Monthly Highlights and Statistics (January 2018), Table 1.7 (Banking System: Statement of Assets) and Table 1.71 (Islamic Banking System: Statement of Assets), published by Bank Negara Malaysia (i.e. the Central Bank of Malaysia).

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(Beck et al., 2013; Boukhis and Nabi, 2013; Kabir et al., 2015; Sorwar et al., 2016; Kabir and Worthington, 2017; Zins and Weill, 2017; Alqahtani and Mayes, 2018; Ibrahim and Rizvi, 2018), profitability (Olson and Zoubi, 2017; Trad et al., 2017; Yanikkaya et al., 2018), and financing/deposit behavior (Abdul Karim et al., 2014; Ibrahim, 2016; Ibrahim and Rizvi, 2018). The underlying premise of these studies is that, if Islamic banks are demonstrated to be more efficient, more stable, and more profitable and their financing behavior less procyclical, they would contribute more positively to the well-functioning of the financial system and, consequently, the health of the economy. Recent studies have also directly assessed the roles of Islamic banks in financial and economic development (Gheeraert, 2014; Gheeraert and Weill, 2016; Imam and Kpodar, 2016; Lebdaoui and Wild, 2016). We add to this literature by bringing to the fore the issue of financial intermediation costs.

Our second contribution stems from the fact that, compared to other dimensions of bank performance, the implications of Islamic banking on financial intermediation costs remain understudied. Arguably, Islamic banking presence can result in higher or lower bank margins. In the provision of banking services, Islamic banks face additional risk and requirements, such as Shari'ah non-compliant risk, Shari'ah governance requirement, and the complexity of contracts. This means that, at the outset, Islamic banking services involve higher costs. Accordingly, to account for the additional costs from adherence to Islamic law, or Shari'ah, Islamic banks can set larger margins. The increasing presence of Islamic banking, however, induces competitive pressure and can thus favorably influence pricing in the banking industry. In other words, indirectly, through bank competition, the presence of Islamic banks would lead to lower net margins in the banking sector. An analysis is therefore necessary to ascertain whether Islamic banking entails higher costs and whether Islamic banking presence shapes the intermediation costs of the banking sector. Such insight would be important for drawing policy initiatives to foster the efficient allocation of resources by the Islamic banking sector and the overall banking system.

After controlling for their differences in market power, capitalization or risk aversion, scale of lending activity, operating costs, and diversification, our analysis provides evidence that Islamic banks have higher net margins. Further, the difference in the margins of Islamic and conventional banks is attributed to the differences in their market power, operating costs, and diversification. Finally, Islamic banking presence, as represented by the ratio of Islamic financing to aggregate bank credit/financing and, alternatively, the share of Islamic banking assets, is robustly associated with lower bank margins, on average. Thus, to optimize the benefits of Islamic banking presence, the development of Islamic banking should be encouraged, however, measures are needed to reduce the incremental costs incurred by Islamic banks in their adherence to Shari'ah principles, as well as to reduce cost inefficiency and to expand into non-intermediation activities.

The paper is structured as follows. Section II reviews the literature. Section III describes the empirical approach. Section IV presents the data and estimation results. Finally, Section V concludes the paper with a summary of the main findings and policy implications.

II. RELATED LITERATURE

The theoretical basis for bank margins is the dealership model developed by Ho and Saunders (1981) and later augmentations by Allen (1988), Angbanzo (1997), and Maudos and Fernandez de Guevara (2004). According to the (augmented) dealership model, variations in margins across banks are accounted for by the following factors: market structure, transaction size, managerial risk aversion, interest rate uncertainty, operating costs, diversification, and credit risk. Taking advantage of the model's flexibility in terms of factors to be included, some studies have also considered regulations, institutional quality, and bank ownership to explain variations in bank margins (Poghosyan, 2010, 2013; Fungacova and Poghosyan, 2011; Birchwood et al., 2017). Beck and Hesse (2009) neatly categorize these factors under four views: a risk-based view, a small financial system view, a market structure view, and a macroeconomic view.

Empirically, research on bank margins comprises cross-country or single-country studies, focusing on either identifying which of the aforementioned theoretically motivated determinants explain the margins or assessing the margins' specific determinants. Among a multitude of theoretically motivated factors, operating costs, loan quality, diversification, and competition have featured prominently as significant determinants of bank margins in cross-country studies (Maudos and Fernandez de Guevara, 2004; Carbo-Valverde and Rodriguez-Fernandez, 2007; Williams, 2007; Kasman et al., 2010; Poghosyan, 2010, 2013; Chortareas et al., 2012; Birchwood et al., 2017). In addition to these variables, several studies have also considered institutional factors and bank ownership. For instance, according to Demirguc-Kunt et al. (2004), the institutional framework is key in explaining bank margins in their analysis of 1,400 banks from 72 countries. Poghosyan (2013) identifies institutional weaknesses in low-income countries as one of the main reasons for their sustained high margins. Beck and Hesse (2009) attribute the consistently high interest rate margins in Uganda, compared to other countries, to, among other factors, the country's institutional deficiencies. Regarding bank ownership, Beck and Hesse (2009) fail to document a significant impact of foreign bank presence on bank margins. Poghosyan (2010) corroborates the nonsignificance of foreign bank participation in directly or indirectly influencing financial intermediation costs in 11 Central and Eastern European countries. Interestingly, using foreign bank participation to represent the ease of bank entry requirements and banking sector openness, Birchwood et al. (2017) suggest the importance of foreign bank presence in the reduction of bank margins.

Noting that inefficiencies of financial intermediation as manifested by high margins are more a feature of developing countries, several single-country studies focus on countries known for having high margins, include those of Beck and Hesse (2009) for Uganda, Fungacova and Poghosyan (2011) for Russia, Hossain (2012) for Bangladesh, Were and Wambua (2014) for Kenya, and Trinugroho et al. (2014) for Indonesia. Although these studies generally support the dealership model and its extensions, they all highlight cost inefficiency, as measured by operating or administrative costs, as being central. In addition, as noted above, Beck and Hesse (2009) unequivocally support risk-related factors, as represented by institutional quality or deficiencies and exposure to risky sectors, in explaining financial intermediation costs for the case of Uganda.

Over recent years, Islamic banking has become a key financial development feature in various markets, particularly in Malaysia and the Middle East. Its ever-increasing presence in these countries notwithstanding, the public generally views Islamic banking as more expensive than its conventional counterpart. Corroborating this popular view, Ernst & Young's World Islamic Banking Competitiveness Report 2011–2012 notes higher margins of Islamic banks, compared to those of conventional banks. Beck et al. (2013) empirically suggest that Islamic banks are less cost efficient. While this is worrisome, since high margins are tantamount to the inefficient allocation of resources, a simple comparison of the margins of Islamic and conventional banks cannot provide a complete picture of the reasons behind higher Islamic bank margins and of the role of Islamic banking in financial intermediation costs.

Along with Poghosyan's (2010) evaluation of foreign bank penetration, we can argue that Islamic banking can exert both direct and indirect effects on bank margins. Being financial intermediaries, Islamic banks face similar risks as those of conventional banks, including credit risk, liquidity risk, and interest rate risk. However, distinct from conventional banks in their adherence to the principles of Shari'ah, Islamic banks' operations entail additional unique risks, including fiduciary risk, displaced commercial risk, and rate of return risk (Archer and Karim, 2006). Islamic banking transactions also run the risk of being Shari'ah non-compliant after contracts are concluded, also known as Shari'ah non-compliant risk. Apart from these risks, the financial contracts of Islamic banks are more complex compared to those of conventional banks. Further, Islamic banks normally have two layers of governance: a standard board and a Shari'ah board. Given these unique risk-related and institutional features, Islamic banking products are likely to be more costly. Since these characteristics are unlikely to be fully accounted for by the standard determinants of margins, the direct effect of Islamic banking is an increase in its margins.

Indirectly, increasing the presence of Islamic banking should lead to greater competition in the banking sector. As hypothesized by Abedifar et al., (2016), this would likely have a spillover effect on conventional banks, such that, in the presence of Islamic banking, conventional banks become more cost efficient. Utilizing bank-level data from 22 Muslim countries with a dual banking system, these authors document evidence of a positive relation between the cost efficiency of conventional banks in predominantly Muslim countries and the presence of large Islamic banks. Similarly, Meslier et al. (2017) find that conventional banks tend to set higher deposit rates in countries with a strong Islamic bank presence. We can further argue that, as more players enter the Islamic banking segment, increasing competition will make Islamic banks more efficient. Thus, unlike the direct effect stemming from the different pricing of Islamic banking products, the presence of Islamic banking can indirectly reduce financial intermediation costs in the banking sector.

Although empirical literature on Islamic banking is expanding, studies on the relations between Islamic banking and bank margins or intermediation costs remain limited. Further, such studies focus mainly on identifying the determinants of Islamic banks' net margins or, at most, comparing the determinants of bank margins for Islamic and conventional banks (e.g., Abdul Kader Malim et al.,

2017; Sun et al., 2017; Trinugroho et al., 2018). Accordingly, no inferences can be made about whether Islamic banking presence results in higher or lower financial intermediation costs. This paper fills this gap in the Islamic banking literature.

III. EMPIRICAL APPROACH

The model specification for bank margins takes the form of either a static panel model (Beck and Hesse, 2009; Poghosyan, 2010) or a dynamic panel model (Birchwood et al., 2017; Claessens et al., 2018). We opt for the static panel model to investigate the role of Islamic banking presence in financial intermediation costs. The key reason is our panel sample size does not fit the dynamic panel setting. For consistency, dynamic panel regressions are normally estimated using generalized method of moments (GMM) estimators (Iwanics-Drozdowska and Witkowski, 2016). The GMM approach, however, requires a panel of large N and small T. Its application to a panel data set such as ours, where $N < 40$, can result in serious bias. Moreover, due to the first differencing and employment of lagged variables as instruments, the use of GMM estimators would mean the loss of further observations. Given our small sample size, we deem the static panel regression more appropriate. Having cautioned against its use, we also experiment with the dynamic panel model specification estimated via the system GMM estimator, for the sake of robustness.

Building on the work of Poghosyan (2010), which is based on the dealership model of Ho and Saunders (1981) and its later extensions, we specify the following general specification to address the extent to which Islamic banking presence affects net margins:

$$BM_{it} = \beta_1 IB_i + \beta_2 IBShare_t + \theta Bank_{it-1} + \gamma Macro_t + \vartheta D_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

where *BM* is the net margin as a measure of financial intermediation costs; *IB* is an Islamic bank dummy; *IBShare* is the market share of the Islamic banking sector; *Bank* is a vector of bank-specific variables; *Macro* is a vector of macroeconomic variables; *D* is a vector of dummy variables, such as a foreign bank dummy and crisis dummies; μ_i is bank-specific effects, and ε_{it} is a standard error term. Note that the bank-specific variables are lagged by one year to address endogeneity concerns.

A more direct measure of net margins is the difference between lending/financing and deposit rates, which can be based on the implicit lending rate (interest/financing income on loans over total loans) and the implicit deposit rate (interest/financing expenses on customer deposits to total deposits), following Birchwood et al. (2017). However, the information on interest/financing income on loans and interest/financing expenses on customer deposits is only available for a short time. Accordingly, we use the ratio of gross interest/financing and dividend income net of total interest/financing expenses to average earning assets, which is another standard measure of *BM* in the literature (Beck and Hesse, 2009; Poghosyan, 2010; Claessens et al., 2018).

The key variables in Equation (1) are *IB* and *IBShare*, where *IB* is a dummy variable taking the value of one if the bank is Islamic, and zero otherwise. The inclusion of *IB* is to test whether the margins of Islamic banks are, on average, significantly different from the margins of conventional banks, which can be considered a direct effect of Islamic banking presence. We expect Islamic banks to have higher margins due to their specific, unique cost-related characteristics, such as Shari'ah non-compliant risk, Shari'ah governance, and the complexity of contracts. We use the Islamic banking share in the credit/financing markets for *IBShare*, in line with the work of Beck and Hesse (2009), who employ the share of foreign banks in lending markets to capture foreign bank penetration. The increasing presence of Islamic banks would exert competitive pressure on the banking sector and potentially alter the pricing behavior of not only Islamic banks, but conventional banks as well. We expect the coefficient of *IBShare* to be negative.

The bank-specific variables (*Bank*) include standard determinants of net margins, namely, bank competition or market power, capitalization or risk aversion, loan quality, the scale of lending activities or the size of banking operations, operating costs, and diversification. In the analysis, we use a nonstructural measure of bank competition, that is, the Lerner index (*LERNER*). Several studies have shed doubt on the traditional measures of market structure and competition, such as concentration ratios and the Herfindahl index (Demirguc-Kunt et al., 2004; Beck and Hesse, 2009). Capturing the ability to price their products above marginal costs, the Lerner index can better capture the degree of market power/competition banks face, which, reasonably, should be different across banks and over time. We expect market power to increase bank margins. For capitalization, we employ the ratio of equity to total assets (*EQA*). This measure is to reflect the degree of risk aversion and, hence, according to the dealership model, it is positively related to margins. Loan quality is represented by the ratio of non-performing loans to total loans (*NPL*). Its impact on margins is expected to be positive, since banks can require larger margins to compensate for potential loss. Following Poghosyan (2010), we use the natural logarithm of total loans (*Ln(LOAN)*) to capture the scale of operations or the size of banking transactions. While the dealership model expects a positive association between the size of operations and margins, the relation can be negative because of economies of scale. We measure operating costs as the ratio of operating expenses to total assets (*OPCOST*). We expect higher operating costs to result in higher margins. Finally, income from non-interest income activities, represented by the ratio of non-interest income to total income (*NII*), is expected to lower margins due to banks' potential cross-subsidization.

In line with the literature, we include the following macroeconomic variables (*Macro*) in the analysis: gross domestic product (*GDP*) growth (ΔY), inflation (*INF*), the interest rate (*INTR*), and interest rate uncertainty (σ(*INTR*)). The effect of GDP growth on bank margins cannot be signed a priori. On one hand, as noted by Poghosyan (2013) and Birchwood et al. (2017), economic growth expands investment activities and improves borrowers' creditworthiness. Accordingly, bank margins will be lower. On the other hand, the increases in credit demand and deposit supply from economic expansion can widen bank margins (Birchwood et al., 2017). Capturing macroeconomic uncertainty, inflation can increase bank margins. We employ the overnight interbank rate to represent the interest rate.

Representing monetary policy as well as the marginal costs of funds, higher interest rates can lead to larger margins. Interest rate uncertainty is measured by the standard deviation of the monthly overnight interbank rate. It captures the uncertainty that banks face in their provision of intermediation services. As the uncertainty heightens, banks are more likely to increase net margins. We also include a foreign bank dummy (Poghosyan, 2010) and two crisis dummies (for the Asian and global financial crises) to control for the potential pricing differences of foreign banks and the effects of financial crises, respectively.

The static panel model, such as Equation (1), is typically estimated using traditional panel estimators. However, in our case, two features in our model specification require attention: the inclusion of a time-invariant Islamic bank dummy and potential non-zero correlation between unobserved bank-specific effects and the explanatory variables, or the endogeneity problem. The use of bank-specific variables lagged by one period can address the endogeneity concern. Moreover, it is unlikely that a variable at the bank level, that is, bank margins, would affect macroeconomic variables. However, we argue that the Islamic banking market share can be correlated with bank-specific effects, such as managerial style and managerial risk aversion, and is therefore endogenous. In view of this and following Iwanics-Drozdowska and Witkowski (2016), we apply the panel-corrected standard errors (PCSE) approach, where the computation of standard errors allows for cross-correlation and heteroskedasticity. The approach, allowing autocorrelation in the data, is based on the Prais–Winsten estimator. With robust standard errors, the inferences made will not be spurious (Beck and Katz, 1995). We take Equation (1) estimated by the Prais–Winsten estimator as our baseline. For robustness checks, we experiment with alternative estimators, namely, the random effect, the Hausman–Taylor instrumental variable, and the system GMM estimators.

IV. DATA AND RESULTS

We employ unbalanced panel data for 21 conventional banks and 16 Islamic banks over the period from 1997 to 2015.[4] The bank-level data are obtained from Fitch Connect. The classification into Islamic and conventional banks, banking sector-specific data (e.g., number and financing shares of Islamic and conventional banks), and macroeconomic variables are obtained from the Monthly Statistical Bulletin published by Bank Negara Malaysia, Malaysia's central bank. Table 1 provides descriptive statistics of the variables for all banks, Islamic banks, and conventional banks, respectively. Table 2 presents their pairwise correlation coefficients.

[4] The time span is dictated by the availability of all the relevant data at the time this study began. Our look at recent data does not reveal many changes in the Islamic banking share, which is our key variable, and the data are available only up to 2017, and then only for some banks. Accordingly, we do not believe that the addition of one or two more years of observations is likely to have a material impact on the results.

Table 1.
Descriptive Statistics

This table reports descriptive statistics of the data used in the paper for a sample of all banks and two-subsamples of Islamic and conventional banks: *BM* is bank margins measured by net interest margins; *LERNER* is the Lerner index; *EQA* is the ratio of equity to total assets; *NPL* is ratio of non-performing loans to total loans; *Ln(LOAN)* is the natural logarithm of total loans; *OPCOST* is ratio of operating expenses to total assets; *NII* is the ratio of non-interest income to total income; *IBShare* is the financing share of Islamic banks; *σ(INTR)* is the standard deviation of the monthly overnight interbank rate; *INTR* is the overnight interbank rate; *ΔY* is GDP growth rate; *INF* is inflation rate.

Variable	All Banks		Islamic Banks		Conventional Banks	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
BM	2.335	0.772	2.445	0.830	2.290	0.743
LERNER	0.403	0.110	0.383	0.124	0.411	0.104
EQA	10.588	6.110	8.444	3.874	11.466	6.625
NPL	5.657	7.458	4.392	5.213	6.175	8.152
Ln(LOAN)	7.657	1.857	7. 707	1.009	7.636	2.109
OPCOST	1.368	0.523	1.389	0.547	1.359	0.513
NII	16.738	11.168	8.813	7.235	19.973	10.877
IBShare	13.455	7.794				
σ(INTR)	0.322	0.563				
INTR	3.468	1.654				
ΔY	4.632	3.949				
INF	2.446	1.294				

Several observations are worth noting in the tables. First, as anticipated, the intermediation costs or margins of Islamic banks are, on average, higher than those of conventional bank margins. This finding indicates that Islamic banking products are more costly. Second, in line with the international sample of Beck et al. (2013), Islamic banks have better loan quality, lend more, and have higher operating costs per unit of assets. However, Islamic banks in Malaysia tend to be different, in that they have lower capitalization. Moreover, their income depends heavily on financing. Interestingly, they have less market power. This could be due to the consolidation of domestic conventional banks since the Asian crisis, which has allowed them to set higher prices for their products. Third, Table 2 gives a first indication that Islamic banking participation likely brings down intermediation costs, as reflected in the negative correlation between bank margins and Islamic financing share.

Table 2.
Correlation Coefficients

This table reports the pairwise correlation coefficients between variables: *BM* is bank margins measured by net interest margins; *LERNER* is the Lerner index; *EQA* is the ratio of equity to total assets; *NPL* is ratio of non-performing loans to total loans; *Ln(LOAN)* is the natural logarithm of total loans; *OPCOST* is ratio of operating expenses to total assets; *NII* is the ratio of non-interest income to total income; *IBShare* is the financing share of Islamic banks; *σ(INTR)* is the standard deviation of the monthly overnight interbank rate; *INTR* is the overnight interbank rate; *ΔY* is GDP growth rate; *INF* is inflation rate.

Variable	BM	LERNER	EQA	NPL	Ln(LOAN)	OPCOST	NII	IBShare	σ(INTR)	INTR	ΔY	INF
BM	1.000											
LERNER	0.418	1.000										
EQA	-0.136	0.156	1.000									
NPL	0.118	0.095	0.072	1.000								
Ln(LOAN)	0.239	0.099	-0.636	-0.182	1.000							
OPCOST	0.293	-0.232	-0.043	0.299	-0.082	1.000						
NII	-0.309	0.112	0.295	0.091	-0.329	0.271	1.000					
IBShare	-0.347	-0.339	-0.088	-0.496	0.230	-0.155	-0.143	1.000				
σ(INTR)	0.353	0.201	0.006	0.134	-0.092	0.059	-0.010	-0.552	1.000			
INTR	0.287	0.111	-0.016	0.054	-0.052	0.011	-0.055	-0.428	0.814	1.000		
ΔY	-0.140	-0.077	-0.026	-0.031	0.030	-0.066	0.002	0.126	-0.377	-0.264	1.000	
INF	0.098	0.010	-0.036	-0.065	0.010	-0.031	-0.031	-0.085	0.279	0.507	-0.101	1.000

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We further note the potential importance of market power/competition and non-interest rate income in explaining bank margins. The higher margins of Islamic banks could stem from their inability to adopt a cross-subsidization strategy, given that they have substantially lower levels of non-interest income. In addition, the size of banking operations and operating costs tend to be important. Both are positively related to bank margins. Finally, we observe low correlation coefficients between the pairs of explanatory variables, except in very few cases. Thus, multicollinearity is unlikely to be a major issue.

A. Baseline Results

Table 3 reports the results of Equation (1) using the Prais–Winsten estimator. In the empirical implementation, we allow for different autocorrelation coefficients across banks.[5] We estimate six different specifications of Equation (1). In regressions (1) to (3), we include only bank-specific variables as control variables. Meanwhile, regressions (4) to (6) extend the control variables to include the macroeconomic variables. In all the regressions, we control for the effects of the foreign bank and crisis dummies on bank margins.

Table 3.
Estimation Results – Net Interest Margin

This table reports the baseline results. The estimations are performed using the Panel Corrected Standard Errors (PCSE) estimator allowing for autocorrelation in the data (the Prais - Winston estimator). *p*-values in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Independent Variables	Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
IB	-0.0639		0.1206*	-0.0419		0.1144*
	(0.236)		(0.057)	(0.381)		(0.067)
IBSHARE		-0.0223***	-0.0259***		-0.0204***	-0.0238***
		(0.000)	(0.000)		(0.000)	(0.000)
FB	-0.0075	0.0282	0.0703	0.0080	0.0316	0.0715
	(0.885)	(0.576)	(0.114)	(0.868)	(0.525)	(0.106)
LERNER	2.7089***	2.2435***	2.1301***	2.5888***	2.2266***	2.1232***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EQA	0.0033	0.0076**	0.0102**	0.0042	0.0075*	0.0100**
	(0.405)	(0.050)	(0.014)	(0.285)	(0.051)	(0.015)
NPL	0.0019	-0.0040	-0.0039	0.0018	-0.0039	-0.0038
	(0.539)	(0.238)	(0.277)	(0.556)	(0.273)	(0.309)
Ln(LOAN)	0.0461***	0.0800***	0.0988***	0.0550***	0.0807***	0.0984***
	(0.006)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
OPCOST	0.6740***	0.6170***	0.5934***	0.6580***	0.6183***	0.5964***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NII	-0.0279***	-0.0259***	-0.0242***	-0.0272***	-0.0259***	-0.0242***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

[5] The assumption of a common correlation coefficient across banks does not materially affect the results.

Table 3.
Estimation Results – Net Interest Margin (Continued)

Independent Variables	Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
σ(INTR)				0.1710***	0.0547	0.0555
				(0.000)	(0.221)	(0.262)
INTR				-0.0317	-0.0234	-0.0186
				(0.478)	(0.449)	(0.590)
ΔY				0.0283***	0.0223***	0.0220***
				(0.000)	(0.000)	(0.000)
INF				-0.0117	-0.0101	-0.0111
				(0.375)	(0.238)	(0.244)
AFC	1.1307***	0.9059***	0.8947***	1.4891***	1.3067***	1.2673***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GFC	0.0221	0.0007	0.0022	0.2028***	0.1509***	0.1513***
	(0.680)	(0.984)	(0.950)	(0.002)	(0.001)	(0.002)
Constant	0.3200*	0.6268***	0.5072***	0.2157	0.5432***	0.4178**
	(0.061)	(0.000)	(0.007)	(0.267)	(0.003)	(0.040)
N	470	470	470	470	470	470
# of Banks	37	37	37	37	37	37
R^2	0.5597	0.5756	0.5770	0.5669	0.5792	0.5803
Chi2	1025.2799	981.4577	873.4208	3441.0917	1516.8851	1237.8291
(*p*-values)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

The estimation results generally conform to expectations and lend themselves to intuitive interpretation. As Table 3 shows, market power, the equity-to-assets ratio, the size of lending activities, operating costs, and non-interest income are robustly and significantly related to bank margins. Market power, as measured by the Lerner index, enters positively and significantly at the 1% level in all regressions. Thus, conforming to expectations, banks in Malaysia are likely to exercise their market power by charging higher margins. The same result is reported by Trinugroho et al. (2018) for Islamic rural banks in Indonesia. It is also in line with Trinugroho et al. (2014) for Indonesia, Kasman et al. (2010) for new European members and candidate countries, and Birchwood et al. (2017) for Central America and the Caribbean. As expected, the degree of risk aversion as measured by the equity-to-asset ratio is associated with higher margins. Abdul Kadir Malim et al. (2017) also document a positive association between risk aversion and bank margins in a panel sample of 70 Islamic banks from 18 countries. Trinugroho et al. (2018), however, do not find a significant relation between the equity-to-assets ratio and bank margins.

The size of banking operations as measured by the size of loans is significantly and positively related to bank margins. This result conforms to the prediction of the dealership model. Since the size of lending activities is closely related to bank size, it likely reflects the dominance of "too big to fail" or moral hazard effects over the effect of economies of scale as banks grow. The result contradicts findings

for Islamic banks by Abdul Kadir Malim et al. (2017) and Trinugroho et al. (2018). Using total assets as a measure of bank size, these authors find, respectively, negative and nonsignificant coefficients of bank size. Compared to the banking literature in general, our results are in line with those of Poghosyan (2010) for 11 Central and Eastern European countries and those of Were and Wambua (2014) for Kenya; however, they contradict those of Kasman et al. (2010) for European countries, Poghosyan (2013) for low-Income countries and emerging markets, Fungacova and Poghosyan (2011) for Russia, and Trinugroho et al. (2014) for Indonesia. Note that, among these studies, Kasman et al. (2010) and Poghosyan (2010, 2013) employ the natural logarithm of bank loans, similar to the present study, as a measure of banking activity.

We also find operating costs to be consistently positive and significant in all regressions. In a similar vein probably indicating cross-subsidization strategy, non-interest income, as a measure of diversification, is significantly negative in all regressions. These results conform well with the above-noted literature. Interestingly, we do not find credit risk to be a significant determinant of bank margins in Malaysia. Similarly, there seems to be no pricing difference between domestic and foreign banks, as reflected in the nonsignificance of the foreign bank dummy. Finally, among the macroeconomic variables, only GDP growth is significantly related to bank margins, with a positive coefficient, suggesting that bank margins widen during economic upturns. Trinugroho et al. (2018) document a similar finding for rural Islamic banks in Indonesia. This suggests that the margin effects from the increasing credit demand and higher deposit supply outweigh the effects of improved business opportunities and lower risks during economic expansions.

Turning to our main theme, we find that the Islamic bank dummy (*IB*) enters significantly, albeit at the 10% significance level, when it is included together with the Islamic bank market share (*IBShare*) in the regressions. Based on regression (3) or (6), Islamic banks with comparable bank-specific characteristics and facing similar macroeconomic conditions as conventional banks have margins that are roughly 12 basis points higher, on average, equivalent to about 5% of the average bank margins in Malaysia. The significance of the *IB* dummy means that the differences in the theoretically based bank-specific variables do not fully explain the differences in Islamic and conventional banks' net margins. In other words, the relatively higher margins of Islamic banks are partly due to their distinct characteristics, such as their unique risks, complexity of contracts, and two-layer governance structure. These require additional resources and thus justify the higher margins set by Islamic banks.

Although, comparatively, Malaysia's Islamic banks tend to have higher intermediation costs, their increasing presence lowers the average margins of the banking sector. This is reflected in the negative coefficient of *IBShare*, which is distinguishable from zero at the 1% significance level in all regressions. Based on regression (6), the estimated coefficient suggests that a one-standard-deviation increase in the share of Islamic bank financing (i.e., roughly 7.8 percentage points) is associated with a reduction of roughly 18.5 basis points in the bank margin, which is roughly 8% of the average margin. Considering that the Islamic financing share increased from below 2% in 1997 to over 25% in 2015, the increasing presence

of Islamic banking has economic significance as far as the financial intermediation costs are concerned. Although Islamic banks tend to be more expensive, the competitive pressure that they bring to the banking system makes banks more efficient in the allocation of financial resources.

B. Robustness Checks

We provide robustness checks of our baseline results in several directions. First, instead of the financing share of Islamic banks, we use their asset share as a measure of Islamic banking presence or penetration (Gheeraert, 2014; Abedifar et al., 2016; Imam and Kpodar, 2016). Second, acknowledging that the banking sector in Malaysia underwent a tumultuous period during the 1998–1998 Asian crisis and, subsequently, a restructuring and consolidation period until 2002 (Ahmad, 2007), we begin the sample in 2003. Third, we exclude Islamic banks from the sample to focus specifically on the effect of Islamic banking presence on the intermediation costs of conventional banks. Finally, we employ alternative methods of estimation. The results of these robustness exercises for the first three cases are given in Table 4, and those from the alternative estimators are given in Table 5.

Table 4.
Estimation Results – Robustness

This table reports the results from robustness analysis using asset share as an alternative measure of Islamic banking share, shortening the sample, and excluding Islamic banks from the sample. The estimations are performed using the Panel Corrected Standard Errors (PCSE) estimator allowing for autocorrelation in the data (the Prais - Winston estimator). *p*-values in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Independent Variables	Asset Share		Shortened Sample		Islamic Bank Excluded	
	(1)	(2)	(3)	(4)	(5)	(6)
IB	0.1012	0.1002	0.1955**	0.1859**		
	(0.1047)	(0.1074)	(0.0275)	(0.0360)		
IBSHARE			-0.0388***		-0.0211***	
(Financing)			(0.0000)		(0.0000)	
IBSHARE	-0.0201***	-0.0182***		-0.0284***		-0.0173***
(Assets)	(0.0000)	(0.0000)		(0.0000)		(0.0000)
FB	0.0561	0.0604	-0.0566	-0.0711	0.0651*	0.0591
	(0.2221)	(0.1810)	(0.4063)	(0.3132)	(0.0797)	(0.1083)
LERNER	2.2423***	2.2049***	1.6736***	1.7593***	2.5516***	2.5952***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
EQA	0.0084**	0.0085**	0.0145***	0.0131***	0.0137***	0.0126**
	(0.0359)	(0.0343)	(0.0044)	(0.0087)	(0.0086)	(0.0143)
NPL	-0.0038	-0.0035	-0.0081	-0.0078	-0.0007	-0.0008
	(0.2886)	(0.3468)	(0.1046)	(0.1223)	(0.8580)	(0.8364)
Ln(LOAN)	0.0887***	0.0904***	0.1056***	0.0970***	0.1140***	0.1098***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
OPCOST	0.6083***	0.6057***	0.6563***	0.6679***	0.5708***	0.5740***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Table 4.
Estimation Results – Robustness (Continued)

Independent Variables	Asset Share		Shortened Sample		Islamic Bank Excluded	
	(1)	(2)	(3)	(4)	(5)	(6)
NII	-0.0245***	-0.0244***	-0.0234***	-0.0232***	-0.0230***	-0.0229***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
σ(INTR)		0.0939**	0.4277**	0.5652**	0.0660	0.0959**
		(0.0253)	(0.0285)	(0.0116)	(0.2354)	(0.0462)
INTR		-0.0163	0.0865	0.0978	0.0130	0.0224
		(0.6628)	(0.3208)	(0.2784)	(0.7835)	(0.5681)
ΔY		0.0242***	0.0131	0.0242**	0.0163***	0.0177***
		(0.0000)	(0.2169)	(0.0449)	(0.0065)	(0.0003)
INF		-0.0122	-0.0168	-0.0218	0.0068	0.0047
		(0.2398)	(0.2678)	(0.2148)	(0.6139)	(0.6805)
AFC	0.9308***	1.2735***			1.1087***	1.0650***
	(0.0000)	(0.0000)			(0.0000)	(0.0000)
GFC	0.0289	0.1899***	0.0570	0.1765*	-0.0244	0.0120
	(0.4055)	(0.0000)	(0.5512)	(0.0725)	(0.6660)	(0.7937)
Constant	0.5121***	0.3922**	0.4845*	0.3035	-0.0605	-0.0872
	(0.0059)	(0.0430)	(0.0967)	(0.2956)	(0.8216)	(0.7337)
N	470	470	389	389	339	339
# of Banks	37	37	37	37	21	21
R^2	0.5728	0.5773	0.6163	0.6105	0.6440	0.6426
Chi2	965.9754	1431.4006	870.4162	576.8230	1192.0317	1451.5450
(*p*-values)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

The results in Table 4 provide further support for our conclusions that (i) Islamic banking services are more costly and (ii) Islamic banking penetration lowers banking intermediation costs. The coefficients of *IB* remain positive and significant at better than the 5% significance level in the reduced sample, though their *p*-values are slightly higher than 10% in the regressions employing the asset share of Islamic banks. Meanwhile, the coefficients of *IBShare* are negative and significant in all cases. The results from excluding Islamic banks from the sample, in particular, confirm that Islamic banking presence does affect conventional banking efficiency in the allocation of financial resources, in conformity with the results of Abedifar et al. (2016). As for the controlled variables, the results further substantiate the positive effects of market power, the size of banking operations, operating costs, and the real GDP and the negative effects of income diversification on intermediation costs. Further, we find stronger evidence of the positive effects of the equity-to-asset ratio and interest rate uncertainty on bank margins.

Table 5.
Estimation Results using Alternative Estimators – Robustness

This table reports estimation results using alternative estimators. The RE estimator is implemented with robust standard errors. The HT estimator takes interest rate, real GDP growth and inflation to be endogenous. Finally, the two-step system GMM estimator applies Winmeijer's correction and its instrument validity and absence of autocorrelation of order 2 are well supported by respectively the Hansen and Arellano-Bond autocorrelation tests. *p*-values in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Independent Variables	Full Sample		Shortened Sample		Islamic Bank Excluded	
	Financing	Assets	Financing	Assets	Financing	Assets
Panel A: Random-Effects (RE) Estimator						
IB	-0.0392	-0.0534	0.0583	0.0406		
	(0.8235)	(0.7582)	(0.6584)	(0.7581)		
IBSHARE	-0.0112		-0.0230***		-0.0167***	
(Financing)	(0.1876)		(0.0001)		(0.0035)	
IBSHARE		-0.0078		-0.0152***		-0.0133***
(Assets)		(0.2650)		(0.0026)		(0.0097)
FB	-0.0806	-0.0963	-0.2144*	-0.2384*	0.0101	0.0026
	(0.4766)	(0.3986)	(0.0787)	(0.0522)	(0.9153)	(0.9784)
LERNER	3.2503***	3.3180***	2.4894***	2.5917***	3.0167***	3.0737***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NPL	-0.0036	-0.0033	-0.0077*	-0.0072*	-0.0020	-0.0021
	(0.2732)	(0.3104)	(0.0564)	(0.0827)	(0.5941)	(0.5772)
Ln(LOAN)	0.0213	0.0117	0.0125	-0.0013	0.0908**	0.0859**
	(0.5731)	(0.7534)	(0.7276)	(0.9732)	(0.0248)	(0.0361)
OPCOST	0.7871***	0.7953***	0.7796***	0.7940***	0.6536***	0.6599***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NII	-0.0295***	-0.0297***	-0.0243***	-0.0243***	-0.0258***	-0.0258***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ΔY	0.0255**	0.0267**	0.0133	0.0231*	0.0173	0.0186
	(0.0259)	(0.0204)	(0.2522)	(0.0518)	(0.1293)	(0.1020)
Panel B: Hausman-Taylor (HT) Estimator						
IB	-0.0357	-0.0480	0.0238	-0.0080		
	(0.7890)	(0.7251)	(0.8947)	(0.9663)		
IBSHARE	-0.0107*		-0.0168**		-0.0173***	
(Financing)	(0.0603)		(0.0148)		(0.0039)	
IBSHARE		-0.0073		-0.0096*		-0.0138***
(Assets)		(0.1316)		(0.0791)		(0.0068)
FB	-0.0774	-0.0917	-0.3358*	-0.3864**	-0.0025	-0.0129
	(0.5727)	(0.5112)	(0.0731)	(0.0483)	(0.9828)	(0.9114)
LERNER	3.2975***	3.3720***	2.5652***	2.6569***	2.9117***	2.9609***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
EQA	0.0033	0.0024	0.0080	0.0066	0.0118*	0.0107*
	(0.5912)	(0.6910)	(0.1790)	(0.2633)	(0.0519)	(0.0744)
Ln(LOAN)	0.0189	0.0095	-0.0475	-0.0739*	0.0902***	0.0845**
	(0.6203)	(0.8021)	(0.2838)	(0.0973)	(0.0069)	(0.0112)
OPCOST	0.7897***	0.7988***	0.7652***	0.7738***	0.6342***	0.6394***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Table 5.
Estimation Results using Alternative Estimators – Robustness (Continued)

Independent Variables	Full Sample		Shortened Sample		Islamic Bank Excluded	
	Financing	Assets	Financing	Assets	Financing	Assets
NII	-0.0296***	-0.0297***	-0.0236***	-0.0237***	-0.0252***	-0.0251***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ΔY	0.0250**	0.0262**	0.0119	0.0186	0.0171	0.0184
	(0.0416)	(0.0321)	(0.4589)	(0.2309)	**(0.1804)**	(0.1471)
Panel C: System-GMM Estimator						
BM_{t-1}	0.5158***	0.3950***	0.5416**	0.4635**	0.2226	0.2090
	(0.0008)	(0.0088)	(0.0297)	(0.0161)	(0.5672)	(0.7316)
IB	-0.1549	-0.1901	-0.2639	-0.1540		
	(0.7333)	(0.6265)	(0.5884)	(0.7166)		
IBSHARE	-0.0170		-0.0256**		-0.0581***	
(Financing)	(0.2237)		(0.0323)		(0.0030)	
IBSHARE		-0.0189**		-0.0234**		-0.0087
(Assets)		(0.0409)		(0.0403)		(0.6702)
NPL	0.0095	0.0082	0.0033	0.0049	0.0123*	0.0065
	(0.1343)	(0.2543)	(0.7353)	(0.6256)	(0.0822)	(0.3433)
Ln(LOAN)	-0.0302	-0.0301	-0.0115	-0.0260	0.5906***	0.0377
	(0.7447)	(0.7404)	(0.9150)	(0.7933)	(0.0019)	(0.8868)
σ(INTR)	-0.0685	0.0184	0.3981	0.4691*	0.1343	0.1587
	(0.5970)	(0.8615)	(0.1950)	(0.0751)	(0.4206)	(0.3527)
ΔY	0.0247**	0.0242**	0.0232**	0.0271**	0.0157	0.0215
	(0.0199)	(0.0137)	(0.0200)	(0.0378)	(0.2644)	(0.1015)

In Table 5, we report the results using alternative estimators, namely, the random effect (RE), the Hausman–Taylor instrumental variable (HT), and the system GMM (SGMM) estimators. The random effect estimator, as an alternative to the other traditional fixed effect estimator, allows for the inclusion of time-invariant variables, such as the Islamic bank and foreign bank dummies in our case (Ibrahim and Rizvi, 2018). However, the random effect estimator yields inconsistent estimates in the presence of endogeneity. We could argue that the Islamic banking market share can be correlated with bank-specific effects such as managerial style and risk aversion, and therefore it is endogenous. Accordingly, following Kafle et al. (2018) and Lepetit et al. (2018), we also apply the HT estimator. Finally, we incorporate dynamics in our model specification by including the lagged dependent variable and then estimating the model using the system GMM estimator. We limit the number of instruments to avoid the problem of instrument proliferation (Roodman, 2009). However, the GMM results should be viewed with caution, given the small number of cross-sectional units in our sample.

In the estimation, we include all explanatory variables, as in column (6) of Table 3. To conserve space, we do not tabulate the results for the two crisis dummies or the results for other variables that are nonsignificant in all the regressions. The results suggesting the benefit of Islamic banking penetration in reducing banking intermediation costs and hence improving the efficient intermediation

of financial resources are quite robust to the alternative estimators, as well as to the employment of the Islamic banking asset share, to the reduced sample, and to the exclusion of Islamic banks. By contrast, the *IB* dummy becomes nonsignificant throughout. The RE and HT estimators further reaffirm the significance of market power, operating costs, and diversification in affecting bank margins, in line with the previously documented findings. Use of the system GMM, however, makes most of the variables become nonsignificant, which could be attributed to the small sample size.

In a nutshell, our robustness checks further support the role of Islamic banking presence in reducing financial intermediation costs. Additionally, our robustness exercise shows some support for the greater cost of Islamic banks. Apart from these results, we could attribute the differences in the margins between Islamic and conventional banks to market power, operating costs, and diversification. The higher operating costs and lower non-interest income of Islamic banks in particular partly account for the higher margins. Taken together, the results strengthen the case for further penetration of the Islamic banking sector and its positive role in the economy, as well as a call for improvements in cost efficiency and expansion into non-intermediation activities by Islamic banks. Further, given evidence of the greater cost of Islamic banking, measures are needed to reduce the incremental costs incurred by Islamic banks in their adherence to Shari'ah principles.

V. CONCLUSION

The rapid penetration of Islamic banking in the global financial scene has captivated greater research interest, especially in its contribution to financial and economic development. In this paper, we address the extent to which Islamic banking presence affects financial intermediation costs, by comparing the net margins of Islamic and conventional banks (direct effect) and assessing the relation between Islamic banking penetration and the intermediation costs of the banking sector (indirect effect). The analysis provides evidence that Islamic banks have higher net margins. Islamic banking presence, as represented by the ratio of Islamic financing to aggregate bank credit/financing and, alternatively, the share of Islamic banking assets, is, however, robustly associated with lower bank margins, on average. Apart from these key findings, we note that market power, operating costs, and diversification appear to be the most robust determinants of bank margins in Malaysia. Thus, the higher cost inefficiency and lower diversification of Islamic banks seem to partly contribute to higher intermediation costs of Islamic banks.

These results provide firm grounds for further expansion of Islamic banking, since it improves efficiency in the banking system's allocation of financial resources. At the same time, several recommendations are made to lower the intermediation costs of Islamic banks. Namely, Islamic banks must look for ways to reduce the incremental costs related to their adherence to Shari'ah principles, for example, by improving risk management, simplifying financial contracts, and becoming more cost efficient. These could require a more competitive Islamic banking environment. Finally, Islamic banks need to diversify their income-generating activities by expanding into non-intermediation activities, which are presently at far lower levels than those of conventional banks.

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