

Islamic Banking: How Has it Spread?

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Abstract

This paper investigates the determinants of the pattern of Islamic bank diffusion around the world using country-level data for 1992–2006. The analysis illustrates that income per capita, share of Muslims in the population and being an oil producer are linked to the development of Islamic banking, as are economic integration with Middle Eastern countries and proximity to Islamic financial centers. Interest rates have a negative impact on Islamic banking, reflecting the implicit benchmark for Islamic banks. The quality of institutions does not matter, probably because the often higher hurdle set by Shariah law trumps the quality of local institutions in most countries. The 9/11 attacks are not found to have been important for the diffusion of Islamic banking. Islamic banks are also found to be complements to, rather than substitutes for conventional banks.

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I. INTRODUCTION

There is convincing evidence of a close correlation between financial sector development and growth. Countries with larger financial systems tend, all else being equal, to grow faster (King and Levine, 1993) because banks perform a fundamental economic role as financial intermediaries and as facilitators of payments. They help stimulate saving and allocate resources efficiently. Banks also allow for diversification of risk, monitor managers, and exert control (Levine, 1997). Moreover, even in a world of capital mobility, the evidence suggests that domestic savings and investment rates are highly correlated (the so-called “Feldstein-Horioka” paradox, Feldstein and Horioka, 1981), which makes domestic saving and financial development a major driver of economic growth.

Studies assessing the impact of banking development on growth have looked at “conventional” rather than Islamic banks because the importance of the latter has grown only in the last two decades. Islamic banking is now expanding out of its niche to become a market that could rival the conventional sector in many countries. It is an increasingly visible alternative to conventional banks in Islamic countries and in countries with large Muslim populations, such as the UK. Globally, the assets of these institutions have grown at double-digit rates for a decade, and some conventional banks have opened Islamic windows, with Shariah compliant financial assets reaching an estimated \$509 billion at end-2007 (Moody’s, 2008). But despite the rapid growth of Islamic banking in recent years, its diffusion is still poorly understood.

The aim of this paper is to look at Islamic banking around the world, identify causes for its expansion, and formulate policy advice on how to stimulate its further growth. The International Organization of Securities Commissions predicts that as much as half of the savings of the world’s 1.3 billion Muslims will be in Islamic financial institutions by 2015. Knowing the factors that stimulate Islamic banking is crucial to helping Islamic areas—which have remained largely under-banked and therefore also underdeveloped—to catch-up. These factors could also help developing countries with minority Muslim populations to benefit from an alternative source of financing and deepen their financial sectors.

To our knowledge, this is the first study that explicitly considers the diffusion of Islamic banking around the world. The paper is structured as follows: After a brief discussion of how the banking system has developed in Islamic countries, we delve into the growth of Islamic banks in recent decades. We then illustrate its geographical dispersion. In the next section, we use Poisson and Tobit models to analyze how Islamic banks have spread. Finally we draw policy implications.

II. WHAT IS ISLAMIC BANKING?

While Islamic banks respond to the needs of Muslim clients, they are not acting as religious institutions. Like other banks they are profit-maximizing entities. They act as intermediaries between savers and investors and offer custodial and other services found in traditional banking systems. The constraints facing Islamic banks are, however, different. They are proscriptions in Shariah law, which encompasses a set of duties that not only apply to commercial transactions but also express the hadith, the authentic tradition. Islamic law

affects how the banking system functions. Four factors in particular are unique to Islamic banking. We summarize them here only briefly (for a good exposition, see El-Gamal, 2006)

Prohibition of interest (*Riba*)

Riba is probably the main difference between Islamic and traditional banking. Islam prohibits all forms of riba (interest paid on loan) on the grounds that interest rates are a form of exploitation, inconsistent with the notion of fairness. Practically this implies that Shariah law does not allow fixing in advance a positive return on a loan as a reward for waiting. The argument is that riba implies an improper appropriation of other people's property and is bad for growth. Islam does recognize the importance of the time value of money, but the time value is not realized as part of a loan contract; it can be realized only as part of a real transaction. Thus, in a leasing agreement, the time value of money is an integral part of the rent to which the parties agree, with longer leases expected to yield higher returns.

In a sharing system, what matters is the productivity of the project, not the credit-worthiness of the borrower. In the Islamic view, it is fairer to share profits and losses; it is equity-based rather than debt-based—returns are state-contingent, i.e. dependent upon the situation. When debt-servicing becomes difficult in a debt-based system, entrepreneurs still have to pay the debt, which may throw them into bankruptcy based on liquidity problems rather than solvency. In Islamic banking, liquidity problems should in fact not be an issue with regard to payment because payments will be positive when profits are high and small or zero when profits are low or negative.² From a macroeconomic point of view, this reduces the possibility of liquidity problems in times of stress.

Prohibition of *maysir* (games of chance) and of *gharar* (chance)

Islamic banking does not allow for gambling and games of chance. Speculation (in the sense of gambling), which is increasing one's wealth by chance rather than productive effort, is also banned, though in practice the distinction between speculation and productive effort is often blurred. The idea is that increasing one's wealth without effort should not be rewarded. While entrepreneurship itself could be interpreted as a form of gamble, *maysir* refers to uncertainties that are not part of everyday life and that are unnecessary, such as going to the casino. Risk that is unavoidable is permitted.

A related concept is the prohibition of *gharar* contracts. It applies when cases are doubtful or uncertain. *Gharar* means to undertake a business venture without sufficient information or taking excessive risk. It is similar to asymmetric information; the objective is to minimize possibilities of misunderstanding and conflicts between contracting parties.

² For depositors, this means that returns on deposits are not guaranteed and will depend on the bank's profit or loss. Thus depositors are similar to shareholders: on the liability side of an Islamic bank, one has depositors, and on the asset side of banks, the returns depend on its profits from investment in businesses.

Prohibition of *haram* (illegal) activities

The code of behavior for Islamic banks allows them to only finance *halal* (legal) activities. They are not supposed to lend to companies or individuals involved in activities deemed to have a negative impact on society (e.g., gambling) or that are illegal (e.g. financing construction of a plant to make alcoholic beverages).³ Islamic banks should give priority to producing essential goods and services that satisfy the needs of the majority of Muslims. Financing luxury goods activities when Muslim societies lack such essential goods as food is considered unacceptable.

Payment of part of bank profits to benefit society (*zakat*)

Muslims believe that justice and equality in opportunity (not outcome) are crucial for a society to function. One mechanism to achieve this goal is to redistribute income to provide a minimum standard of living for the poor. This form of giving, *zakat*, is also one of the five tenets of Islam. It is generally agreed that the amount of *zakat* is 2.5 percent of assets held. In countries where *zakat* is not collected by the state, Islamic banks have to establish a *zakat* fund for collecting funds to be donated to religious institutions.

Would Islamic banking be good for growth? The analysis by Bhalla (2002) revealed that in comparison to the worldwide mean, Islamic countries are poor and not highly developed. It has been argued that Islam, by preaching fatalism, which negatively impacts growth (Kuran, 1997), might itself be the reason. However, there is no evidence to support this. First, the Golden Age of Islam between the 9th and 15th century, when advances were made in science, literature, navigation, law, and philosophy suggests that Islamic societies are capable of progress and highly innovative when the right environment is in place (Turner, 1997). More recently, Noland (2003), in an authoritative study, concludes that:

Predominantly Muslim countries are seldom outliers (either positively or negatively) in the cross-country regressions. In most cases, the coefficient on the Muslim population share is statistically insignificant. With one exception, where it is significant, it is always positive. The only case of a statistically significant negative coefficient is in the sub-national regression for Malaysia. Islam does not appear to be a drag on growth or an anchor on development as alleged. If anything, the opposite appears to be true. If one is concerned about economic performance in predominantly Muslim regions or countries, conventional economic analysis may yield greater insight than the sociology of religion.

³ As companies become increasingly complex, it is more and more difficult to find pure halal investments. Islamic scholars have found a way around this. Typically, when a small share of a company's business deals with haram activities, that part of the dividend that is deemed "tainted" should be donated to charity. So if 5 percent of a business of a company is deemed to be in activities not compatible with the Shariah, 5 percent of the dividend received should be given to charity.

In fact, not only does Islam not negatively impact growth, but Islamic banking has certain traits that could make it even more growth-enhancing than conventional banking. One crucial feature of Islamic banking is that it requires risk-sharing between bank and entrepreneur. In conventional banks, when a bank gives out a loan, the borrower bears all risks. Except in the case of bankruptcy, the bank would get a guaranteed reward without any risk. In Islamic banking both bank and entrepreneur share the rewards and failure in an equitable manner. In many developing countries such risk-sharing might allow entrepreneurs with few savings to fall on to undertake projects they could not otherwise contemplate in an environment where all the risk lay on them.

In conventional banking, too, banks consider the creditworthiness of the borrower as the main determinant of the lending decision and are interested only in the interest income on the loan. In Islamic banking, because profits and losses are shared, banks will receive a return only if a project is successful. Therefore, Islamic banks will finance sound projects, even if the entrepreneur has no credit history. Finally, there is the moral aspect of Islamic banking that is absent in conventional banking; Islamic banks are not allowed to activities that might be harmful for society.

While we do not believe it is possible at this stage to assess empirically how Islamic banking affects growth, it has certain distinctive factors that might make it more conducive to growth than conventional banking.

III. DEVELOPMENT OF BANKING IN ISLAMIC COUNTRIES

A. Colonization, Independence, and Recent Times

The development of a modern banking system in Islamic countries occurred when their colonizers were interested in establishing banks that could support mining extraction, agricultural production, manufacturing, and the financing of the public sector (see Epstein, 2006).

After becoming independent, many developing countries nationalized banks, and development banks were created to spur industrialization (Chang, 2002). Governments used banks to finance expansion of the public sector, especially in the Middle East and Africa, or to expand certain favored industries, as in Latin America and East Asia. Central banks were charged with assigning responsibility for credit allocation and economic development, rather than keeping the economy stable (see Epstein, 2006). In this situation, banks often could not become profitable, and banking systems remained underdeveloped.

In Islamic countries, moreover, banks were not addressing the need of Muslims (Iqbal and Mirakhor, 1987). Pious individuals would not want to put their money into a financial system that was not based on religious principles. This underbanking of an important segment of the population meant that some savings were not used efficiently.

Against a background of a banking system that was poorly run and not receptive to the needs of the pious, four decades ago the Islamic banking industry emerged on a modest scale to fill the gap. Two factors were crucial to this departure (Rivlin, 2008). First, bottom-up

experiments in Egyptian rural villages illustrated the feasibility of Islamic banking. These small rural experiments have grown into a tremendous industry in many countries, spreading from the Middle East to Indonesia, Malaysia, sub-Saharan Africa, and Europe and the Americas.

Second, top-down support from the creation of the Islamic Development Bank (IDB) in 1975 in Jeddah provided impetus to the diffusion of Islamic banking by centralizing expertise. In its infancy Islamic banking required systems to apply Islamic law in practice. The demand for Islamic banking led to a growing scholarship to address this problem. In the first few years basic implementation tools were created and widely accepted; the past few years have seen rapid innovations, particularly of products like *sukuks* (Islamic bonds). Among recent developments that have helped Islamic banks spread further was the establishment of the Islamic Financial Service Board (IFSB) in 2002, which has the mandate of setting prudential standards for Islamic banks.

For the first three decades, Islamic finance was focused on two core markets: the Middle East, especially Bahrain, and Malaysia. The two countries became pioneers, establishing the two leading financial centers for Islamic banking. By the early 1980s Malaysia had taken the lead in the Islamic world, thanks to official support that considered Islamic banking a pillar of development. The government was crucial to the establishment in 1983 of the country's first Islamic bank, the Bank Islam Malaysia Berhad. Similarly, Bahrain has pursued Islamic finance as a niche that could allow it to build on its strong banking sector and become a major financial center.

Elsewhere, government support in the Gulf and other regions was less evident. Gulf governments, unswayed by ideological commitment, mandated that financing be provided on the basis of conventional pricing and terms in recent years this has changed, especially in Saudi Arabia. Pakistan and Iran have taken steps to move their entire banking system towards Islamic finance, disallowing interest payments altogether (see Iqbal and Mirakhor, 1987).

The expansion of Islamic banking has in the past few years accelerated, with the industry diversifying out of traditional territories into the Muslim world and into countries like Britain with large Muslim populations. Africa in particular, with a Muslim population of over 400 million, has seen an expansion in recent years (see Moody's, 2008). Islamic finance has grown into a US\$1 trillion industry (see Banker, 2007).

Despite the Dubai World crisis late in 2009, the global financial crisis has not hit Islamic as conventional banks. Toxic assets by definition were "un-Islamic." Shariah-compliant rules prohibited Islamic bankers from dealing in second-hand interest-bearing mortgages—the financial assets at the root of the U.S. subprime property market crisis that precipitated the world-wide crisis. Islamic banks favor investment in utilities, telecoms, health care, and high-tech, sectors which have not done as badly as conventional banking or entertainment industries like casinos.

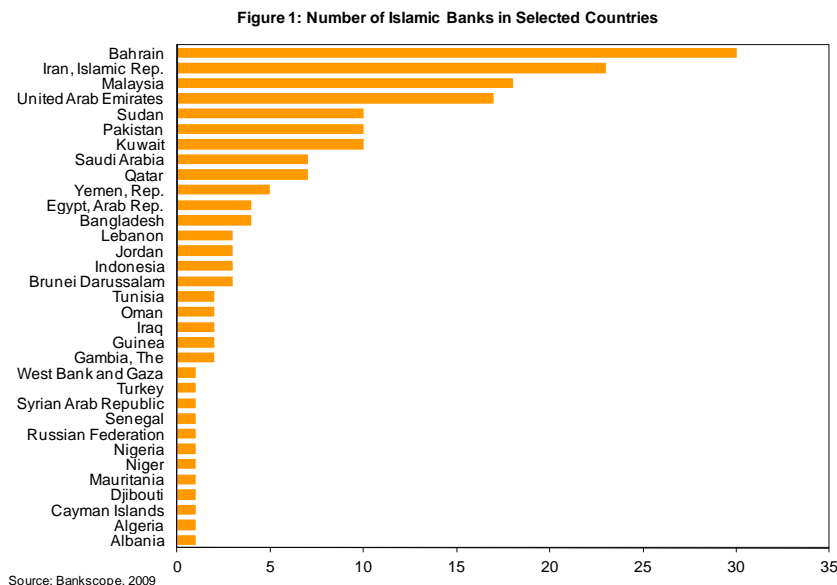
Islamic banks have not diversified out of their traditional niche markets, which are financing of trade, real estate, and infrastructural projects. The main focus has been on real estate, not

only in the Middle East and Malaysia but also beyond. Thus, as the property boom around the world has collapsed, Islamic banks have been affected. Many hold considerable real estate and private equity. Moreover, world trade collapse also affected Islamic banks. Therefore, although they have not been hit much by bad debt through lending, they have been hit by falling asset valuations—some of their portfolios are perhaps not as robust as they were in previous years, and falling trade.

IV. THE SPREAD OF ISLAMIC BANKING

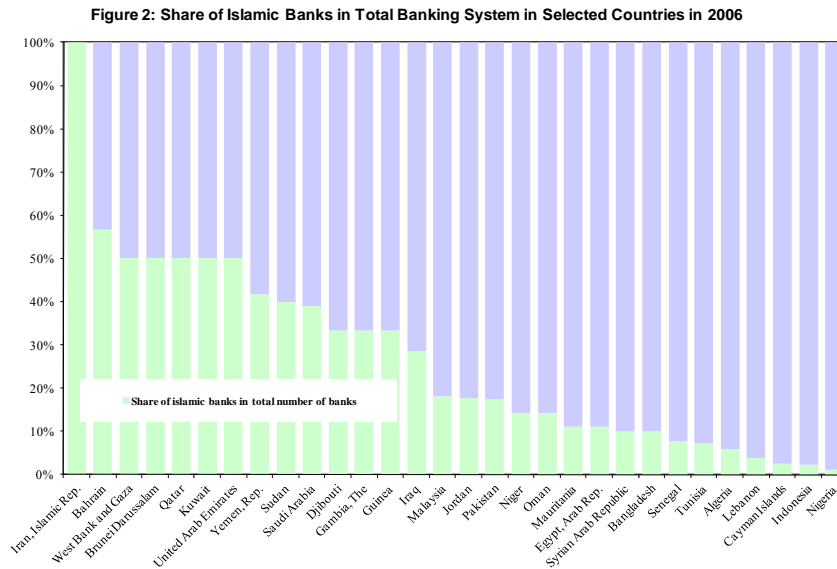
All bank-specific data used in this study are taken from Bankscope and aggregated by country. This database provides us with useful information on asset liabilities and revenues reported according to comparable standards. The database does have some limitations, however. First, it is difficult as yet to assess the size of Islamic banking accurately—it is an infant industry in a relatively fragmented market. While most of the world’s leading financial institutions have Islamic windows, they rarely disclose the importance of Islamic banking in their business (Banker, 2007). Moreover, small rural cooperatives run on Islamic principles are not accounted for. Thus current databases almost certainly underestimate the importance of Islamic banking, though the underreporting may diminish over the time,

Currently concentrated in the Middle East, North Africa, and Southeast Asia, Islamic banking is spreading to sub-Saharan Africa, Central Asia, and Western Europe. Of the 180 banks in the Bankscope database for 2006, 61 percent are in Middle Eastern countries, 21 percent in Southeast Asia, and 11 percent in Sub-saharan Africa. Figure 1 illustrates that the number of Islamic banks is highest in the Islamic financial centers Bahrain and Malaysia, in Islamic republics—Iran and Sudan for instance—, and in the Gulf Region more generally. The number is very low, however, in other Arab and Muslim countries, where there are often fewer than three.



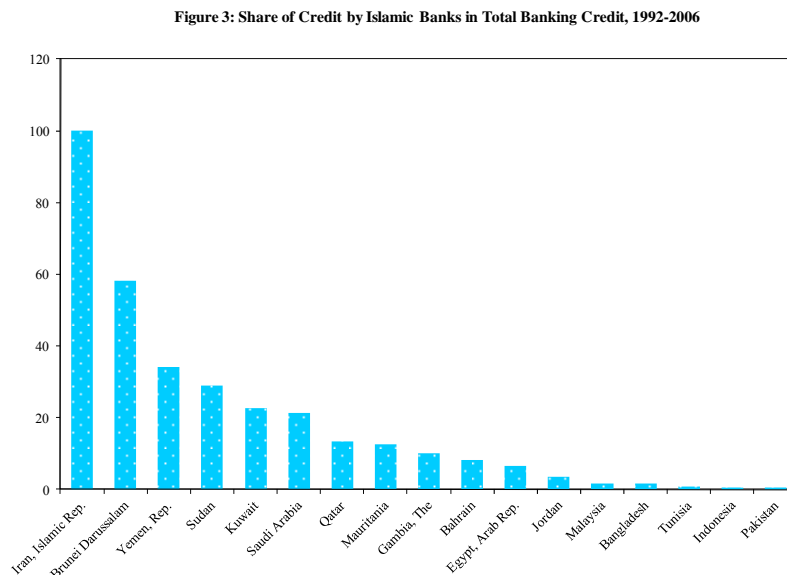
Because the number of banks alone does not give us a full picture of how important Islamic banks are in various economies, we compare the number of Islamic banks with the total

number of banks in different banking systems (Figure 2). It is apparent that even in some areas where there are only a few, such as Gaza and West Bank, Islamic banks have a strong presence. The picture that emerges is that in the Gulf region in general and in lightly populated African Islamic countries, the number of Islamic banks is relatively large within the banking system. In other regions, the share of Islamic banks is in the single digits, attesting to a much less important role.



Sources: Bankscope, and authors' calculations

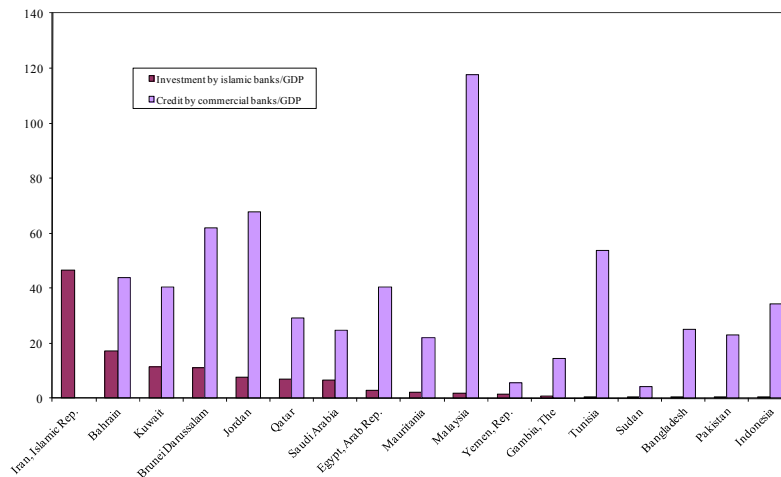
If we compare credit by Islamic banks to the depth of the financial system, it is clear that even in countries like Malaysia where Islamic banking is well-developed, it is dwarfed by conventional banks (Figure 3).



Sources: Bankscope, Financial Development and Structure Database, and authors' calculations

If we now measure the importance of Islamic banks in the economy by assets, it is apparent that in almost all countries, but Iran where the banking system is fully Islamic, the ratio of credit of commercial banks to GDP is substantially higher than the investment to GDP ratio by Islamic banks, which accounts for less than 20 percent of GDP in most countries (Figure 4). Therefore, the importance of Islamic banking varies, being high in the Gulf and East Asia in absolute number though relatively small in comparison with how much investment they finance as a share of GDP compared to conventional banks. Iran is a notable exception.

Figure 4: Comparing Investment by Islamic Banks as a share of GDP with Credit by Conventional Banks as a share of GDP in selected countries, 1992-2006



Sources: Bankscope, Financial Development and Structure Database, and authors' calculations

V. ECONOMETRIC ESTIMATION OF THE SPREAD OF ISLAMIC BANKS

A. Data

To capture the spread of Islamic banks, we use two main proxies: (i) the number of Islamic banks, and (ii) the share of the assets of Islamic banks in the entire banking system.

What factors could explain the diffusion of Islamic Banks? We hypothesis the following:

Islamic Population: All else being equal, we expect that the higher the percentage of Muslims in a country, the faster the diffusion of Islamic banking. Current estimates suggest, there are an estimated 1.2–1.5 billion Muslims worldwide, with high concentrations in the Middle East, North Africa, and South-East Asia but otherwise spread across the globe.⁴

Interest Rates: While Islamic banks are not allowed to charge interest, because they compete with traditional banks they have to offer competitive products. While pious

⁴ The data were obtained from Alesina et al. (2003).

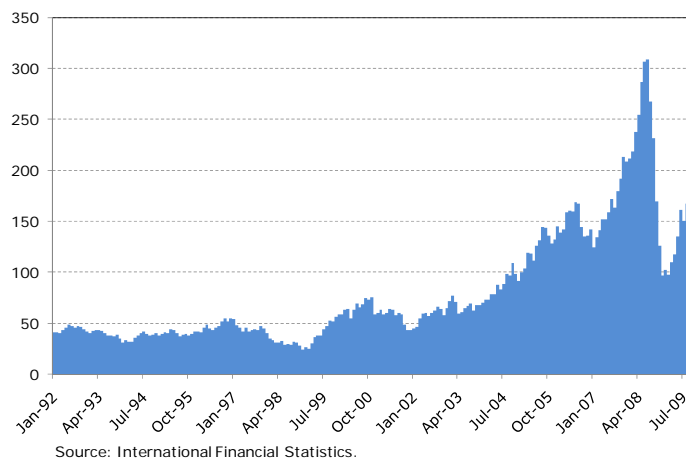
individuals will put their money only in Islamic banks, less pious Muslims, and non-Muslims, see the opportunity cost of putting their money with Islamic banks as the current prevailing interest rate. If it is low, the opportunity cost foregone is low, and hence Islamic banking should be stimulated. We use both real and nominal interest rate variables, with the data obtained from *International Financial Statistics* (IFS).

Income per capita: We would expect higher income per capita be associated with more demand for Islamic services. As income rises, typically savings rise, and the need for financial activities—lending, trade credit and other activities—similarly grows. The data stem from IFS.

9/11/2001: It has been suggested that an important driver of Islamic banking was the terrorist attacks of 9/11 (Rivlin, 2008). After that, money coming out of Islamic countries was viewed with some suspicion in Western countries. The risk of funds being seized by Western governments made it more appealing for Islamic investors, who traditionally had exported their savings to the West, to keep their money in their own region. A step-dummy variable after 9/11 should therefore show a positive effect on the spread of Islamic banks.

Petroleum Exporters: Islamic countries, particularly in the Middle East, are highly dependent on extraction of petroleum products. Since 2000 oil prices have risen substantially (see Figure 5). Positive improvements in the terms of trade for these countries should therefore lead to a rise in purchasing power, which by raising income should stimulate diffusion of Islamic banking. Positive terms of trade shocks have a positive effect on income not only in oil-exporting countries but also in countries where a large share of the population works as migrants in oil exporters, as is the case, for instance, for Egypt, Pakistan, and Yemen. While many oil-producing countries have created sovereign wealth funds that invest much of their assets overseas, enough money is entering the economy and spilling over to the domestic sector to have a noticeable impact on growth. To capture this effect, we used a dummy variable for net oil-exporter countries, as well as the oil price index (based on average oil price in dollars per barrel).

Figure 5. Oil price index, January 1992 - October 2009
(Jan 2005=100)



Economic Integration with the Middle-East: How much a country's economy is integrated with the Middle East—as proxied by the share of exports and imports into that region—is also likely to be a crucial factor in determining Islamic banking diffusion. Countries that have closer trade ties with the Middle East are more exposed to businesses dealing with Islamic banking systems, and hence will be more likely to develop their own Islamic banking back home. We use the share of a country's exports and share of its imports to the Middle East,⁵ as provided by the Direction of Trade Database.

Distance from Islamic Centers: Bahrain and Malaysia are at the heart of Islamic finance. We would expect that the closer a country is to one of them, the more information is diffused is, and hence the more likely Islamic banks are to develop. The data is derived from Gleditsch and Ward (2001).

Financial System Development: The effect of a country's current banking system on Islamic banking is ambiguous. On the one hand, a more sophisticated banking system could act as a substitute for Islamic banks, making their diffusion more difficult. At the same time, a sophisticated banking system, by providing infrastructure (e.g., human capital) on which Islamic banks can build, could also promote the diffusion of Islamic banking. In this latter scenario, Islamic banks would act as a complement to conventional banks. To measure the size of conventional banks, we use two variables: credit to the private sector as a share of GDP, and the number of non-Islamic banks. The data is from IFS and Bankscope.

Macroeconomic Stability: A key determinant of diffusion of the banking system is macroeconomic stability (Kaminsky and Reinhart, 1996). We use two standard proxies, inflation and budget balance as a share of GDP. Typically, as an economy becomes less stable, disintermediation should be expected. Lower investment returns should negatively affect diffusion of Islamic banks, because their basic principle is to share risks with investors. The data was obtained from IFS.

Institutions: Because most Islamic countries were colonized, they hence typically inherited the institutions of their colonizers. For Muslim countries, this means either English common law or French civil law. Some scholars (for instance La Porta et al., 1998; Beck, Demirgüç-Kunt, and Levine, et al., 2003) have argued that English common law is likely to have a more positive effect on financial and economic development than civil law, on the grounds that the latter tends to place less emphasis on protecting private property rights. We use a dummy variable taken from La Porta et al. (1998) to capture the legal origin. We also use two indicators compiled by Kaufmann, Kraay, and Mastruzzi et al. (2007): the index of rule of law, which captures the quality of contract enforcement, and the index of regulatory quality, which measures the ability of the government to formulate and apply sound policies for regulation. We would expect that Islamic banks, like commercial banks, are more likely to grow in environments where the regulatory system is built on a solid foundation. Individuals

⁵ The Middle East country group consists of Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen.

trusting the banking system are more likely to put their money in banks and use banking services.⁶

We do not use bank profitability as an independent variable. The profitability of Islamic banks cannot easily be compared to that of conventional banks due to different accounting treatment (e.g., Islamic banks are not allowed to take nonperforming loans off their books). Other reasons are structural: for instance, Islamic banks are by definition not leveraged, and we would need to adjust for this risk factor in any profitability comparison.

B. Regression Analysis

Below we use various econometric estimation techniques to model how Islamic banking is spreading around the world. We first estimate a model where we look at what determines the number of Islamic banks in various countries. Because the dependent variable—number of Islamic banks—is a count variable, we use a Poisson distribution method. The sample consists of 117 countries, and the data are averaged over 1992–2006, since the number of Islamic banks varies little over the period. The disadvantage of this method is that it is a cross-country rather than a panel estimation technique, meaning that it ignores changes across time. Therefore, as a consistency check, we also use the share of assets of Islamic banks in total banking assets as a dependent variable to account for the size and importance of Islamic banks in each country. Because this is a continuous variable, we use a Tobit model, which also has the advantage of allowing us to do the estimation in panels and therefore take account of country-specific effects.

Determinants of the Number of Islamic Banks in a Country

We start by using the number of Islamic banks as a dependent variable in measuring Islamic bank diffusion. Because it can lead to negative predicted values, ordinary least square (OLS) regression is not the most appropriate model to explain variation when the dependent variable takes on values of zero or greater, because event count variables measure how often one type, such as Islamic banks, occurs over a time interval i . Instead we use Poisson distribution, a suitable method for discrete variables. We do not normalize by total number of banks because we aim first to study what explains the absolute size of the Islamic banking sector across countries.⁷

Poisson Distribution

The Poisson distribution is a discrete probability distribution that expresses the probability of a number of events occurring in a fixed period if the events occur at a known average rate

⁶ When they were first established, Shariah Supervisory Boards were extremely cautious in their advice, and sometimes even obstructive. In the last few years, they seem to have become less cautious in their interpretations.

⁷ The ratio of the number of Islamic banks to total banks is “noisy”. If the ratio drops for a country, it could mean that the number of Islamic banks either declines or increases less than the number of commercial banks.

and independent of the time since the last event (see Winkelmann, 2003). The Poisson, which is a one-parameter distribution, finds a probability distribution of Islamic banking by

$$\Pr(Y = y|\lambda) = \frac{\exp(-\lambda)\lambda^y}{y!} \text{ for } y = 0, 1, 2, \dots \quad (1)$$

where λ , the parameter, must be positive and is the mean and the variance of the Poisson. It is assumed that λ is a log-linear function of the explanatory variables x_i that account for observed sample heterogeneity as follows:

$$\lambda_i = \exp\left(\beta_0 + \sum_j x_{ij}\beta_j\right) \quad (2)$$

where β_j is the relative change in $E(y|x)$ associated with a small change in x_j . However, the marginal effect differs between individuals.

The likelihood function for the Poisson model is given by

$$L(\beta|y, X) = \ln \prod_{i=1}^N \Pr(y_i|\lambda_i) = \ln \prod_{i=1}^N \frac{\exp(-\lambda_i)\lambda_i^{y_i}}{y_i!} \quad (3)$$

where $\lambda_i = E(y_i|x_i) = \exp(x_i\beta)$,

The Results

Table 1 sets out the results related to determinants of the number of Islamic banks. Overall, the pseudo R-squared,⁸ which measures the goodness of fit, is relatively high—between 0.4 and 0.6—which suggests that much of the variation in the dependent variable data is driven by explanatory variables, and that the model is relatively well specified.

Income per capita is in all specifications strongly significant and has the correct sign. As with conventional banking, rising income per capita tends to raise the number of Islamic banks in a country.

⁸ The pseudo R squared is given by the following formula: $Pseudo R^2 = 1 - \frac{L(\hat{\lambda}_i, y_i)}{L(\bar{y}, y_i)}$, where $L(\hat{\lambda}_i, y_i)$

is the log-likelihood for the Poisson model fit by Maximum likelihood estimation, and $L(\bar{y}, y_i)$ is log-likelihood of the model with only a constant term.

Similarly, as the share of Muslims in the population rises, the number of Islamic banks also tends to rise. The coefficient is positive and significant at the 1 percent level regardless of the specification.

Being a net oil exporter positively impacts the diffusion of Islamic banking, though this is not statistically significant under every specification. This implies that the importance of being a net oil exporter is not as important as might be thought.

The distance to the two main Islamic financial centers, Bahrain and Malaysia, does matter for the diffusion of Islamic banks across countries. Islamic banks seem to spread faster when they are close to one of the two centers. Distance to Islamic financial centers matters probably more for the diffusion of sukuks and other Islamic financial products that are traded. However, any importance of being close to one of the centers might fade with time because banks in major financial centers from London to Hong Kong are all introducing Islamic banking units.

Financial development has a positive impact on Islamic banking. The results suggest that the number of Islamic banks is positively correlated with the number of conventional banks. Given the dominance of conventional banks, one can conclude that the more sophisticated or competitive a banking system is, the more accommodative it is to Islamic banking. More importantly, this implies that Islamic banking acts as a complement to rather than a substitute for the current banking system and is covering a niche that had so far not been served.

Thanks to a period of great moderation (see, for instance, Bernanke, 2004) interest rates have been declining in most countries, including those in our sample, leading to lower interest rates.⁹ With falling interest rates, the opportunity cost of putting one's money into Islamic banking has therefore fallen because the cost of forgone interest has come down. Our results imply that the effect is non-linear. Low interest rates do indeed help Islamic banking, but as the rates rise they slow the diffusion of Islamic banking. While we found that Islamic banks and conventional banks appear to be complementary for some individuals, notably pious people, the finding that interest rates matter supports the view that less pious or nonreligious consumers view traditional and Islamic banks as substitutes, and they put more money into Islamic banks when opportunity costs rise and move money into conventional banks when they fall.

⁹ In our sample, real interest rates declined by about 10 percent on average for 1992–2006.

Table 1. Determinants of Islamic Banking Diffusion: Number of Islamic Banks, Poisson model, Cross-country, 1992–2006.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
GDP per capita (log)	0.491 [0.00]***	0.377 [0.00]***	0.291 [0.00]***	0.466 [0.00]***	0.557 [0.00]***	0.384 [0.00]***	0.350 [0.00]***	0.485 [0.00]***	0.436 [0.00]***	0.238 [0.10]	0.243 [0.04]**
Population share of Muslims	0.031 [0.00]***	0.035 [0.00]***	0.025 [0.00]***	0.037 [0.00]***	0.039 [0.00]***	0.031 [0.00]***	0.034 [0.00]***	0.029 [0.00]***	0.026 [0.00]***	0.034 [0.00]***	0.034 [0.00]***
Dummy for net oil exporters	0.503 [0.01]**	0.944 [0.00]***	0.052 [0.83]	0.569 [0.01]**	-0.116 [0.66]	0.640 [0.00]***	0.600 [0.01]***	0.512 [0.01]**	0.297 [0.15]	0.626 [0.02]**	0.637 [0.02]**
Distance from Malaysia (log)		-0.338 [0.03]**									
Distance from Bahrain (log)			-0.440 [0.00]***								
Number of conventional banks				0.007 [0.00]***							
Real interest rate					0.092 [0.01]**						
Square real interest rate					-0.013 [0.00]***						
Inflation (log)						2.881 [0.04]**					
Square inflation (log)						-4.020 [0.06]*					
Budget balance							0.087 [0.00]***				
Share of exports to Middle East								0.011 [0.13]			
Share of imports from Middle East									0.038 [0.00]***		
British legal origin										1.482 [0.00]***	1.463 [0.00]***
Rule of law										0.124 [0.62]	
Regulatory quality											0.112 [0.52]
Constant	-5.494 [0.00]***	-2.522 [0.10]*	-0.272 [0.86]	-5.977 [0.00]***	-6.036 [0.00]***	-4.916 [0.00]***	-4.313 [0.00]***	-5.418 [0.00]***	-5.068 [0.00]***	-4.517 [0.00]***	-4.584 [0.00]***
Observations	117	115	115	114	107	108	87	110	110	113	113
Pseudo R2	0.46	0.54	0.42	0.49	0.58	0.47	0.54	0.46	0.50	0.57	0.57

Notes: p value in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Inflation, a proxy for economic stability, has (as in most studies) a negative impact on the spread of Islamic banks beyond a certain threshold. With rising inflation the intermediation effect of Islamic banking breaks down, and people invest (save) by transforming their banking assets into hard assets, from housing to foreign exchange. In this way, the diffusion of Islamic banking is like that of conventional banking.¹⁰ Similarly, our second indicator of economic stability, the government budget balance as a share of GDP has a positive coefficient and is significant at 1 percent, suggesting that sound fiscal policies matter for the development of financial systems, including Islamic banks.

The share of exports to and imports from the Middle East does raise the probability that Islamic banks will be created, though at 13 percent exports are only marginally significant. The cause may be a demand-pull or a supply-push factor. If a country deals more with the Middle East, customers there might request that the transaction use an Islamic bank. This could stimulate Islamic banking in the exporting country. Similarly, as exporters or importers get more accustomed to dealing with Islamic banks in the Middle-East, a demand for Islamic banks at home might arise, which would stimulate their diffusion.

Institutional variables —whether measured by rule of law or regulatory quality— do not statistically influence the diffusion of Islamic banks. Unlike studies that have found that institutions matter for financial development (see Beck and Levine, 2003 for a survey), we find that diffusion of Islamic banks is impervious to the institutional environment. It may be that regardless of the institutional environment, how Islamic banks are permitted to behave is driven by relatively strict Shariah law, making the institutional environment less important than for conventional banks. Disputes typically tend not to be settled in courts or using other instructions but by Islamic scholars, for instance. The one exception is countries that had been British colonies. As illustrated by La Porta et al., (1998), common law countries generally have stronger legal protections of investors than French civil law countries.

Of all the institutional variables, the protection of property rights therefore appears to be the only one that matters for the diffusion of Islamic banks.¹¹ Note that for the Poisson distribution, we are not able to assess the impact of 11th September attack because it is a cross-section methodology. Its impact will be estimated in the next section.

¹⁰ In fact, the impact of inflation on banking system activity is far more complex, and has been studied by, among others, Wachtel and Rousseau (2000), and Boyd, Levine, and Smith (2001).

¹¹ One problem Islamic banks face is that there is not a single set of rules that governs Islamic banking. Like Shariah law, the rules are subject to interpretation and tend to change over time. Some conservative Islamic scholars have concluded that investing in stock markets is a form of gambling prohibited by the Koran. But others interpret the Koran to mean that they should not get involved in day trading with the intention of selling the equity soon after for a profit. Another issue is the guarantee of savings deposits. Instead of collecting interest on savings, a person who deposits money into an Islamic bank collects a fee based upon a contractual profit-and-loss sharing agreement with the Islamic bank. That makes savings accounts at Islamic banks much riskier than a guaranteed savings account at a conventional Western bank that also is backed by government insurance plans. If an Islamic bank invests money from savings accounts into a firm that fails, the holders of the savings accounts can actually lose their money.

We refine our analysis using techniques appropriate for count data: a zero inflated Poisson model and a negative binomial model (see appendix tables). The first corrects for the excessive number of zeros arising from underreporting, and the fact that Islamic banks have begun to spread only the recent years. The second allows for overdispersion, relaxing the Poisson model assumption of equal mean and variance. However, the results are broadly similar to those of the Poisson model.

Determinants of the Share of Islamic Bank Assets in Total Banking Assets

So far, we have only looked at how the numbers of Islamic banks diffuse across countries, without taking into account their relative share in the banking system. In this section, we use as a dependent variable the assets of Islamic banks as a share of total banking assets to account for relative size, and test whether the factors determining Islamic bank diffusion shape financial sector assets toward more Islamic finance.

We will use a Tobit, which is useful when the data are continuous and censored, that is, when the zeros are actual observations.¹² In addition, in many countries, Islamic banking is only reported separately once a minimum number of banks are in place; therefore the dependent variable is censored below a value. OLS is again not appropriate because it can lead to negative predicted values, and a linear model may not fit a population distribution over positive values, when there is a clustering at the value zero.

Tobit Model

Let Y be the proportion of Islamic banks (by assets) in each country, given their characteristics X . Then $Y > 0$ if the country has Islamic banks, and $Y = 0$ if not. We assume that the latent variable Y^* is only observed if $Y^* > 0$; the actual dependent variable is $Y = \max(0, Y^*)$.

The Tobit model is a convenient way of modeling this type of data (see Winkelmann, 2003). In our case, we have “left-censoring” because countries have no Islamic banks. With $y_i \geq 0$, some countries have Islamic banks and some do not; the latent model is given by

$$y_i^* = X_i\beta + \varepsilon_i \quad (4)$$

where X is a k -vector of regressors, and the error term ε_i is $N(0, \sigma^2)$ distributed, conditionally on X ; y_i^* is unobservable, and

$$y_i = 0 \text{ if } y_i^* = X_i\beta + \varepsilon_i < 0 \quad (5)$$

$$y_i = X_i\beta + \varepsilon_i \text{ if } y_i^* = X_i\beta + \varepsilon_i \geq 0 \quad (6)$$

¹² Wooldridge (2001) suggests using the term "corner solution zeros" when the dependent variable takes the value zero with positive probability but is a continuous random variable over strictly positive values. These zeros are the result of a utility maximization problem by economic agents: they are real values, real observations.

The unconditional expectation of y given X is

$$E(y_i | X) = (1 - \Phi(-X_i\beta / \sigma))X_i\beta + \sigma\phi(-X_i\beta / \sigma) \quad (7)$$

The marginal effect of a change in the k -th explanatory variable $x_{k,i}$ on the expectation of y_i is

$$\frac{\partial E[y_i | X_i]}{\partial x_{k,i}} = (1 - \Phi(-X_i\beta / \sigma))\beta_k \quad (8)$$

The Results

What do the results suggest for our Tobit model? They largely confirm the findings of the Poisson models, suggesting that both the number of Islamic banks and the share of Islamic bank assets in total banking assets are positively determined by income per capita¹³ and the share of Muslims in the population.

Our results appear to suggest that the September 11th attack on the United States had a positive impact on assets of Islamic banks, perhaps because Muslim investors, who have traditionally put some in the West, were compelled to keep more of it at home for fear, for instance, of expropriation. However, as both 9/11 and oil price increases happened at about the same time, we regress them together to see if they have different effects on the diffusion of Islamic banking. The result shows that the significance of the coefficient on 9/11 vanishes once oil prices are accounted for. This implies, contrary to conventional wisdom, that the impact of 9/11 on the diffusion of Islamic banking was not important.

As we found in our earlier regressions, distance to Malaysia matters for the diffusion of Islamic banking, though the coefficient is less significant.¹⁴ It may be that being close to an Islamic banking center stimulates the creation of Islamic banks, but not necessarily big ones. Also, banking systems might be less dependent on being close to a financial system than on Islamic financial products, such as sukus.

Financial development measured by private credit to GDP appears not to be significantly correlated with a higher share of Islamic bank assets. This suggests that better financial intermediation favors conventional and Islamic banks similarly.

While we saw that interest rates do have a negative impact on the diffusion of the number of banks above a certain threshold, there is a more direct impact on Islamic bank assets.

¹³ It is only significant in one-third of regressions, probably because we are estimating the impact on the relative share of Islamic banks in total assets.

¹⁴ Distance to Bahrain, however, appears not significant at conventional levels (the result is not reported).

Table 2. Determinants of Islamic Banking Diffusion: Share of Islamic Bank Assets in Total Banking Assets, Tobit model, Panel, 1992-2006.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDP per capita (log)	0.056 [0.10]	0.064 [0.08]*	0.019 [0.63]	-0.036 [0.33]	0.003 [0.94]	0.056 [0.07]*	0.027 [0.43]	0.031 [0.37]	0.053 [0.09]*	0.035 [0.27]	0.069 [0.04]**	0.040 [0.13]
Population share of Muslims	0.009 [0.00]***	0.010 [0.00]***	0.008 [0.00]***	0.009 [0.00]***	0.009 [0.01]***	0.009 [0.01]***	0.009 [0.00]***	0.006 [0.00]***	0.008 [0.00]***	0.008 [0.00]***	0.008 [0.00]***	0.008 [0.00]***
Dummy for net oil exporters	0.162 [0.13]	0.185 [0.09]*	0.207 [0.15]	0.356 [0.00]***	0.279 [0.03]**	0.026 [0.80]	0.167 [0.14]	0.250 [0.11]	0.195 [0.03]**	0.151 [0.10]	0.069 [0.39]	0.155 [0.03]**
Dummy for Sep 11			0.045 [0.00]***	0.021 [0.10]*	0.022 [0.18]	0.047 [0.00]***	0.037 [0.00]***	0.018 [0.12]	0.035 [0.00]***	0.012 [0.32]	0.005 [0.66]	0.009 [0.42]
Distance from Malaysia (log)		-0.125 [0.06]*										
Private sector credit to GDP				0.023 [0.29]								
Oil price index					0.001 [0.03]**							
Real interest rate						-0.001 [0.09]*						
Square real interest rate						0.000 [0.27]						
Inflation (log)							0.321 [0.00]***					
Square inflation (log)							-0.074 [0.15]					
Budget balance								0.005 [0.00]***				
Share of exports to Middle East									0.003 [0.02]**			
Share of imports from Middle East										0.007 [0.00]***		
British legal origin											0.286 [0.00]***	0.247 [0.00]***
Rule of law											-0.035 [0.34]	
Regulatory quality												0.012 [0.43]
Constant	-1.403 [0.00]***	-0.545 [0.40]	-1.155 [0.00]***	-0.737 [0.02]**	-1.094 [0.00]***	-1.275 [0.00]***	-1.224 [0.00]***	-0.852 [0.00]***	-1.455 [0.00]***	-1.317 [0.00]***	-1.498 [0.00]***	-1.198 [0.00]***
Observations	1520	1494	1520	1289	1520	1206	1354	577	1421	1421	821	824
Number of id	113	111	113	97	113	99	104	83	106	106	109	109
Wald test	23.79	28.63	38.33	53.15	46.10	42.86	36.35	57.31	47.86	80.57	48.96	70.25

Notes: p value in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

As expected, terms of trade changes, especially the evolution of oil prices, have a statistically significant impact on the diffusion of Islamic banks, which tend to increase whenever the price of oil goes up. This is to be expected: whether the extra income is treated as permanent or as a transitory windfall, it should stimulate savings and demand for banking services ranging from mortgages to savings products.

The result for inflation is puzzling: inflation is negative but not significant at conventional levels. However, the result with our second indicator of economic stability, budget balance, is consistent with the expectations that economic instability reduces investment demand and, as underlined by Dixit (1992), uncertainty raises the threshold for an individual to invest and hence use banking services.

Trading with the Middle East, as proxied by the share of imports and exports from that region, has a positive and statistically significant impact on Islamic bank assets, which confirms our earlier results. Given that Islamic banks are involved in trade finance, this is not unexpected. Interestingly, the impact of imports from the Middle East is larger—as tested by an F-test¹⁵— than the impact of exports to the Middle East. This may suggest that Middle Eastern exporters favor the use of Islamic banking more than Middle Eastern importers.

Finally, if we look at institutional variables, the findings from the Poisson regressions on determinants of the diffusion of banks by country are confirmed in Tobit regressions. Having a British colonial heritage favors development of Islamic banking in a positive and statistically significant way more than other colonial heritages do. Other forms of institutional variables are not significant. As argued earlier, this reflects the fact that Shariah law as an institution is stronger than the laws prevailing in most countries we cover, so that the impact of the laws is marginal.

VI. CONCLUSION

In this paper we investigated the determinants of the diffusion of Islamic banking across the world. Because Muslim populations are underbanked, and given the tremendous need for infrastructural projects like roads and housing across the Muslim world, development of Islamic banking can spur growth in these regions.

We found that the probability for Islamic banking to spread in a given country rises with the share of the Muslim population, income per capita, and whether the country is a net exporter of oil. Trading with the Middle East and economic stability also are conducive to diffusion of Islamic banking. Proximity to Malaysia and Bahrain, the two Islamic financial centers, does matter. We found that rising interest rates hinder the development of Islamic banking because they raise the opportunity cost for less pious individuals to put their money with an Islamic bank.

¹⁵ The difference between the two coefficients is significant at 5 percent.

Two findings must be highlighted:

1. Contrary to what many observers say, our results suggest that the attacks of 9/11 were not crucial to the diffusion of Islamic banking. However, they coincide with rising oil prices, which are the real drivers of Islamic banking growth.
2. The Islamic World is often considered to be stifled by a lack of well-functioning institutions (Kuran, 1997). Our results demonstrate that the quality of institutions, which traditionally matter for conventional banking, is not important for the diffusion of Islamic banking. Because Islamic banking is guided by Shariah law, it is largely immune to poorly functioning institutions—from the judiciary to the bureaucracy—because there is little resort to them; disputes are instead settled within Islamic jurisprudence.

The implication is that Islamic countries can build the banking system even if a country makes little progress at reforming institutions. This is very different from conventional banking systems, which are inherently intertwined with the domestic institutional environment.

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Table 3. Determinants of Islamic banking diffusion: Number of Islamic banks, Negative Binomial Model, Cross-country, 1992-2006.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
GDP per capita (log)	0.505 [0.00]***	0.218 [0.16]	0.499 [0.01]***	0.385 [0.03]**	0.572 [0.00]***	0.628 [0.01]***	0.455 [0.04]**	0.496 [0.00]***	0.508 [0.00]***	0.649 [0.06]*	0.400 [0.16]
Population share of Muslims	0.048 [0.00]***	0.050 [0.00]***	0.050 [0.00]***	0.058 [0.00]***	0.053 [0.00]***	0.053 [0.00]***	0.055 [0.00]***	0.046 [0.00]***	0.043 [0.00]***	0.053 [0.00]***	0.052 [0.00]***
Dummy for net oil exporters	0.723 [0.13]	1.507 [0.00]***	0.774 [0.22]	1.073 [0.05]*	-0.196 [0.75]	0.314 [0.62]	0.643 [0.31]	0.598 [0.23]	0.362 [0.49]	0.259 [0.64]	0.549 [0.38]
Distance from Malaysia (log)		-0.395 [0.28]									
Distance from Bahrain (log)			0.147 [0.74]								
Number of conventional banks				0.016 [0.05]**							
Real interest rate					0.111 [0.21]						
Square real interest rate					-0.011 [0.04]**						
Inflation (log)						6.073 [0.12]					
Square inflation (log)						-6.183 [0.09]*					
Budget balance							0.100 [0.17]				
Share of exports to Middle East								0.017 [0.51]			
Share of imports from Middle East									0.031 [0.22]		
British legal origin										1.966 [0.00]***	1.850 [0.00]***
Rule of law										-0.457 [0.43]	
Regulatory quality											0.036 [0.95]
Constant	-6.814 [0.00]***	-2.280 [0.52]	-8.063 [0.09]*	-7.401 [0.00]***	-7.376 [0.00]***	-8.305 [0.00]***	-6.450 [0.00]***	-6.687 [0.00]***	-6.717 [0.00]***	-9.181 [0.00]***	-7.187 [0.00]***
Observations	117	115	115	114	107	108	87	110	110	113	113
Pseudo R2	0.22	0.29	0.21	0.25	0.29	0.25	0.24	0.22	0.22	0.28	0.28

Notes: p value in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Determinants of Islamic banking diffusion: Number of Islamic banks, Zero-Inflated Poisson Model, Cross-country, 1992-2006.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
GDP per capita (log)	0.435 [0.00]***	0.307 [0.00]***	0.124 [0.22]	0.467 [0.00]***	0.666 [0.00]***	0.302 [0.00]***	0.311 [0.00]***	0.435 [0.00]***	0.379 [0.00]***	0.344 [0.05]**	0.383 [0.02]**
Population share of Muslims	0.026 [0.00]***	0.034 [0.00]***	-0.011 [0.03]**	0.029 [0.00]***	0.036 [0.00]***	-0.012 [0.04]**	0.003 [0.59]	0.024 [0.00]***	-0.011 [0.03]**	0.032 [0.00]***	0.031 [0.00]***
Dummy for net oil exporters	0.474 [0.03]**	0.961 [0.00]***	-0.307 [0.21]	0.715 [0.00]***	-0.442 [0.15]	0.321 [0.11]	0.240 [0.31]	0.418 [0.07]*	-0.126 [0.55]	0.204 [0.53]	0.128 [0.71]
Distance from Malaysia (log)		-0.293 [0.07]*									
Distance from Bahrain (log)			-0.500 [0.01]***								
Number of conventional banks				0.016 [0.00]***							
Real interest rate					0.031 [0.59]						
Square real interest rate					-0.006 [0.15]						
Inflation (log)						1.025 [0.56]					
Square inflation (log)						-5.154 [0.08]*					
Budget balance							0.054 [0.04]**				
Share of exports to Middle East								-0.001 [0.95]			
Share of imports from Middle East									0.037 [0.00]***		
British legal origin										1.461 [0.00]***	1.481 [0.00]***
Rule of law										-0.086 [0.75]	
Regulatory quality											-0.147 [0.52]
Constant	-4.419 [0.00]***	-2.108 [0.19]	5.231 [0.02]**	-5.358 [0.00]***	-6.333 [0.00]***	0.177 [0.85]	-0.891 [0.24]	-4.190 [0.00]***	-0.823 [0.23]	-4.740 [0.00]***	-4.922 [0.00]***
Observations	117	115	115	114	107	108	87	110	110	113	113
Vuong test	1.31	1.38	0.39	1.35	0.89	0.31	0.52	1.25	0.48	1.27	1.18

Notes: p value in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. The Vuong test has a standard normal distribution, with large positive values favoring the Zero-Inflated Poisson model, and large negative values favoring the Poisson model.