Charles University in Prague

Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

Coexistence of Conventional and Islamic Banking: The Impact on Growth and Trade

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Declaration of Authorship

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Prague, May 13, 2016

Signature

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Abstract

This thesis aims at understanding the impact of Islamic banking development on economic growth and international trade in countries with a dual banking system. For this purpose we use a sample of twenty countries mainly from the Middle East, North Africa, and Southeast Asia during the time period from 1999 through 2014. We employ commonly used panel data estimators such as Pooled OLS and Fixed Effects, as well as the generalized method of moments (GMM) to address a possible endogeneity of the banking development indicators. Our findings show that on the one hand Islamic banking development in countries with a dual banking system hinders economic growth while on the other hand it boosts international trade. The study further discusses why Islamic banking might actually obstruct growth.

JEL Classification	G0, G21, O10, F10
Keywords	Islamic banking, Islamic finance, dual banking system, finance-growth nexus, international trade

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Abstrakt

Tato práce si klade za cíl objasnit vliv vývoje islámského bankovnictví na hospodářský růst a mezinárodní obchod v zemích s dvojím bankovním systémem. K tomuto účelu využíváme datový soubor tvořený z dvaceti zemí převážně ze Středního východu, severní Afriky a jihovýchodní Asie během období 1999-2014. Používáme běžně využívané regresní modely panelových dat, například Pooled OLS a Fixed Effects, společně s modelem GMM pro řešení případné endogenity ukazatelů bankovního rozvoje. Naše výsledky naznačují, že na jedné straně vývoj islámského bankovnictví v zemích s dvojím bankovním systémem brzdí ekonomický růst, zatímco na straně druhé zvyšuje mezinárodní obchod. Studie dále rozvádí, proč vývoj islámského bankovnictví ve skutečnosti ekonomickému růstu brání.

Klasifikace	G0, G21, O10, F10
Klíčová slova	Islámské bankovnictví, islámské finance, dvojí bankovní systém, ekonomický růst, mezinárodní obchod

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ACRONYMS

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
GCC	Gulf Cooperation Countries
GMM	Generalized Method of Moments
HAC	Heteroskedasticity and Autocorrelation Consistent
IDB	Islamic Development Bank
IFSB	Islamic Financial Service Board
MENA	Middle East and North Africa
MENAP	Middle East, North Africa, Afghanistan and Pakistan
OIC	Organisation of Islamic Cooperation
OLS	Ordinary Least Squares
PLS	Profit and Loss Sharing
SME	Small and Medium-Sized enterprise
SPV	Special Purpose Vehicle
SRI	Socially Responsible Investment

Master's Thesis Proposal

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Proposed Topic:

Coexistence of Islamic and Traditional Banking

Motivation:

Islamic finance assets represent less than 1 percent of global financial assets. Nonetheless, according to Kammer et al. (2015) these assets grew at double-digit rates during the past decade, from about US$200 billion in 2003 to an estimated US$1.8 trillion at the end of 2013 surpassing the growth of conventional banking assets by far. Furthermore, with the improvement of relations between the west and Iran, which is one of the most incorporated countries in Islamic finance, this growth is very likely to continue. Accordingly, and due to many other factors, Islamic finance is currently a topic, which is very much in demand.

Many papers that compare between conventional and Islamic banking have been published. After the financial crisis, the profitability and stability of Islamic banking was the subject of many studies. Surprisingly, the effects of Islamic banking in a dual banking system haven't been examined thoroughly. Such a research could prove to be beneficial for governments and supervisory authorities who are undecided about opening up to Islamic finance. Familiarizing regulators with the process of integrating Islamic finance into a conventional system could also be convenient for future policy making.

Hypotheses:

1. Hypothesis #1: Islamic banks favor macroeconomic development.
2. Hypothesis #2: Islamic banks lessen inequality.
3. Hypothesis #3: Islamic banking supports the inception and development of SMEs.

Methodology:

First, I intend to briefly familiarize the reader with Islamic banking and finance. I will touch up on the essence of Islamic finance and its relation to Islamic law, Sharia. I will briefly describe the most

important financial services and instruments used in Islamic banking. I will perform an intensive analysis of the abundant research on stability and efficiency of conventional and Islamic banks, which had been published after the financial crisis.

I will then move on to the empirical part of my thesis. I will use the data provided by Bankscope, which is currently the most widely used database in empirical studies on Islamic banking. Unfortunately, it is regarded by several experts as suffering from inaccuracies and data flaws. I will do my best to correct these insufficiencies as much as possible and thus hopefully create the most exhaustive Islamic banking database to date.

Using these data along with easily accessible macroeconomic data I will start by studying what factors mostly influence the spread of Islamic finance. I will do this using a panel data analysis where the dependent variable will be Islamic assets and independent variables will be for example Islamic population, GDP, conventional assets, inflation, etc... Next, using the new dataset I will reproduce the work of Gheeraert & Weill (2014), who use the stochastic frontier approach to study the effect of Islamic banking on macroeconomic efficiency. Afterwards I will study the relation between Islamic banks and development of SMEs using a Poisson regression. Finally to study whether Islamic finance has an effect on inequality I will use a panel data analysis. As a dependent variable I will use the Gini index and the share of people living below national poverty line in total population. As for the independent variables I will use Islamic assets and other control variables.

Afterwards, I shall proceed to the study of regulatory requirements needed for integrating Islamic finance into a conventional banking system with primary focus on the Czech Republic. Although there have already been some changes made to the law governing trust funds in Czech in January of 2014 enabling services like Mudaraba and Musharaka, the banking environment is still hostile for a fully fledged Islamic bank to function. I will make use of an IMF working paper by Song & Oosthuizen (2014) regarding effective regulation and supervision supplementing the presence of Islamic banking. Also Solé (2007) has studied the process by which Islamic banks are introduced into a conventional system, which I mean to benefit from, updating it where needed.

Expected Contribution:

With this thesis I expect to broaden the knowledge regarding Islamic finance. I aim to provide policy makers with evidence backed by empirical study, which would help them decide whether or not to adopt regulations aiding the inception of Islamic finance institutions. In case they decide to pursue such a direction, I will have provided information on the process of introducing Islamic finance and its demands. This research is suitable for use in international policy, monetary policy & banking regulations, foreign affairs, and economic summits.

Outline:

1. Abstract
2. Introduction
3. Literature review: Stability and efficiency of Islamic banks, their diffusion and effect on growth.
4. Hypothesis testing: I will use suitable econometric models to test the hypotheses. I will conduct a panel data analysis, relying on the Hausman test to differentiate between random and fixed effects models, otherwise I'll move to other models.
5. Results: I will discuss the results and check for robustness.
6. Conclusion: I will sum up my results.

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Author **Supervisor**

1. Introduction

Islamic finance assets represent less than 1 percent of all global financial assets. Nonetheless, according to Kammer *et al.* (2015) these assets grew at double-digit rates during the past decade, from about US$200 billion in 2003 to an estimated US$1.8 trillion at the end of 2013, surpassing the growth of conventional banking assets by far. According to a study by Pew Research Centre, Islam is the world's fastest growing religion, which will grow from 1.6 billion in 2010 to 2.76 billion by 2050. That is a 73% percent increase, more than twice the expected world population growth of 35%. The study further forecasts that by 2050 Muslims will make up 10% of the overall European population and will overtake Judaism to become the second largest religion after Christianity in the United States. The report claims that by 2050 India will overtake Pakistan as the country with the largest Muslim population. These demographic changes might have a drastic impact on Islamic banking and finance and its global presence. Furthermore, with the improvement of diplomatic ties and business relations between the west and Iran, which is one of the most incorporated countries in Islamic finance, the relevance of Islamic banking can be expected to rise. Iran, which holds over a third of the estimated total of Islamic banking assets globally, has since hinted it will be gradually opening up its financial system to accommodate conventional banks as well. As such, there is a great importance in understanding how Islamic banks affect different aspects of the economy in countries with a dual banking system.

There has been much research dedicated to studying financial development and its impact on economic growth (see Levine *et al.* 2000 and Levine 2005) with a

general consensus that there is a positive causal effect from financial development to growth. Nevertheless, some authors, such as Čihák *et al.* (2013), argue that if financial institutions do not perform their intermediation and other functions properly they might actually hinder economic growth. Beck *et al*. (2013) claim that in general there are no major differences between the business orientation, efficiency, asset quality, or stability of Islamic and conventional banks, however there are discrepancies between different country samples. In addition, Song & Oosthuizen (2014) list several challenges facing Islamic finance in terms of regulatory and supervisory policies that according to them need to be addressed. Yet in their work, Imam & Kpodar (2015) find a positive impact of Islamic banking development on economic growth in a sample of low and middle-income countries.

In this study, we attempt to find if the positive impact of Islamic banking development on growth also holds for countries with a dual banking system. For this purpose we use a sample of twenty countries mainly from the Middle East, North Africa, and Southeast Asia during the time period from 1999 through 2014. We also attempt to uncover whether the findings of Beck (2003) about the positive impact of financial development on international trade hold for Islamic banking development in our sample countries (excluding Palestinian territory) as well. We commence our empirical analysis with basic panel data estimators such as Pooled OLS for the growth model and Fixed Effects for the trade model. We then proceed to the more complex generalized method of moments to address the possible endogeneity issues caused by the banking development indicators. Our findings show that Islamic banking development is actually obstructive to growth while it is supportive of trade in countries with a dual banking system.

The thesis is structured as follows. Chapter two presents a simplified background and some essential information to familiarize readers who are not so conversant with Islamic finance with the subject. It also presents several topics that have been of interest in research related to Islamic finance, growth, and trade. The third chapter is dedicated to studying the effects of banking development on economic growth in countries with a dual banking system while focusing on Islamic banking. This chapter also presents the data and model used, methodology applied, as well as the results and their discussion. The fourth chapter studies the impact of banking development on trade with particular focus on Islamic banking. It is divided into two subchapters. The first one is dedicated to the impact on regional trade and includes the data description and trade model followed by the empirical procedures and their results. The second subchapter is dedicated to the impact on global trade as well as the empirical methodology and findings. The fifth and last chapter provides a general summary of the study and the findings, presents some implications, and suggests possible extensions.

2. Background and Literature Review

2.1. Islamic Banking

Islamic finance must be compliant with the Islamic jurisprudence known as Sharia (*Shari'ah*) in all its aspects. Sharia strictly prohibits charging interest at a predetermined rate and labels it as usury (*Riba*). This implies that Islamic banks must refrain from charging interest on loans and paying interest on deposits. Instead, Islamic banks use Profit-and-loss sharing (PLS) contracts, among other instruments,

which should set it apart from conventional banking. A requirement of Sharia is that transactions be backed by real economic activity and that all parties to the transaction bear part of the risk. Hence, loans in Islam are permitted only if interest is replaced with profit or loss arising from the transaction. Along with interest, all highly speculative transactions (*Gharar*), gambling (*Maysir*), short sales, and transactions used to fund forbidden activities deemed as illegal or *Haram* (e.g. tobacco, pornography, armament, pork, alcohol, and drugs) are prohibited.

Many academics and Islamic scholars have criticized Islamic finance and banking for not adhering completely to the Sharia requirements. Their main argument has been that in practice Islamic banking is not really different from conventional banking and has not really substituted interest-based products with Profit-and-loss (PLS) products. Chong & Liu (2009) show that in Malaysia in 2004 only 0.5% of the Islamic banking products were PLS based. They also found that deposits in Islamic banks pay out very similar returns as deposits in conventional banks. They even add that Islamic banks should not be regulated very differently from conventional banks. Khan (2010) explains that the inferior usage of PLS based instruments in Islamic banking is caused by the information asymmetry they induce. More precisely, adverse selection caused by ex-ante information of investors or borrowers and moral hazard resulting from their ex-post information are both harmful to Islamic banks. Furthermore, he argues that in current practice Islamic banking offers similar products simply rebranded with Arabic banking terminology, but at a higher cost.

2.1.1. Main Islamic Products

To satisfy the conditions set by Sharia law, the Islamic banking industry has developed products that resemble those of conventional banking to be used in practice. According to Hussain *et al.* (2015) Islamic products can be categorized into three groups: Profit-and-loss sharing (PLS), non-PLS contracts, and fee-based products.

PLS products are those that are considered closest to Islamic financial ethics. There are two types of PLS products on the market: *Mudarabah* and *Musharakah. Mudarabah* is a partnership contract between a funds provider and a beneficiary, who is solely responsible for managing and implementing the project. Profits are distributed according to a predetermined ratio in the contract. Losses are borne only by the investor, who may not interfere in the project unless there is proof of negligence, misconduct, or breach of contract. In *Musharakah,* however, all partners contribute capital for a shared investment project. Profits are distributed according to predetermined contractual ratio and losses are borne with respect to equity participation. *Musharakah* are commonly likened to joint venture agreements. All capital providers have the right not the obligation to participate in management. Two main types of *Musharakah* exist. Permanent *Musharakah* are agreements with no maturity usually used for longer-term projects. Diminishing *Musharakah* agreements are structured to allow the bank to progressively decrease the banks equity and eventually transfer the ownership to the investor.

Non-PLS products serve mostly as consumer and corporate credit or short and medium-term financing. According to Di Mauro (2013) these products are most

common in practice. They include *Murabaḥah, Salam, Istisna', and Ijarah*. *Murabahah* is the most commonly used Islamic banking product. It is similar to a markup sale with deferred payment, where the financier pays for the item and afterwards sells it to the debtor at a higher price predetermined in the contract. This seems to be very similar to products offered by conventional banking, however, in *Murabahah,* unless it can be proven that the debtor does not make timely payments or defaults intentionally, the deferred price cannot be altered nor can a penalty be charged. Ijarah is similar to an operating lease contract, where the bank purchases a good and rents it to the lessee while maintaining ownership of the good throughout the period of the contract. The necessary element of risk is introduced by imposing all maintenance costs related to the good on the bank, unless damages to the good are caused by the lessee's negligence. *Salam (Bai Salam)* resembles a forward contract where goods that are paid for in advance are to be delivered in the future. The contract must specify the goods, their quantity, quality, price, date, and place of delivery. In case the seller fails to supply the goods the buyer may keep the advance payment or wait for the delivery of the goods. To protect itself the bank is allowed to ask for some kind of collateral. *Istisna'* agreements are predominantly used to finance manufacturing, construction, or processing projects. By paying regular installments the buyer facilitates financing the different stages of a project gradually without putting a financial strain on the supplier.

2.2. Islamic Finance

2.2.1. Sukuk

Sukuk are Sharia-compliant financial instruments commonly recognized as the Islamic equivalent of bonds. The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) formally defines sukuk as: "certificates of equal value representing undivided shares in the ownership of tangible assets, usufructs and services or (in the ownership of) the assets of particular projects or special investment activity." Sukuk are somewhat similar to stock in terms of ownership claims and uncertainty of financial outcome. Nevertheless, sukuk also share several characteristics with conventional bonds such as a maturity date, installments, and a principal repayment at maturity. Typically, sukuk are asset-based, transferring partial ownership of the asset or pool of assets to the investor. This asset must be Sharia-compliant and must also be used in a Sharia-compliant manner. The face value of sukuk depends mainly on the market value of the underlying asset as well as the on issuer's credit worthiness. Sukuk investors receive profits generated by the assets and might face expenses related to these assets.

Essentially, three parties are involved in Sukuk agreements: the originator of the sukuk (the obligor), the Special Purpose Vehicle (SPV) issuing the sukuk certificates, and the investors that buy these certificates (Tariq & Dar 2007). The originator of the sukuk sells assets to the SPV, which is generally bankruptcy remote from the originator. The SPV leases back the assets to the originator and issues sukuk certificates which are sold to investors. The funds collected from the investors are

transferred to the originator. The SPV also collects rental payments from the originator and redistributes them to the investors proportionally to their ownership of assets. On the expiry date of the lease contract and the maturity of the sukuk the investor's ownership claims are terminated and payments stop.

2.2.2. Islamic Mutual Funds

According to Thomson Reuters' State of the Global Islamic Economy 2014 - 2015 Report, Islamic mutual funds have shown 14% year-on-year growth in 2013 making it one of the fastest growing sectors in Islamic finance. Islamic mutual funds in contrast with other mutual funds must be compliant with the Sharia law. This translates to their inability to invest in bonds, any activities that are deemed as Haram, or companies that have revenues from such forbidden activities. Ghoul & Karam (2007) explain that Socially Responsible Investment (SRI) funds, Islamic funds, and Christian funds have many similarities in their screening criteria. El-Gamal (2009) states that according to some Sharia scholars Islamic funds may invest in companies with tolerable proportions of revenues from prohibited activities if they purify the returns by donating equal amounts to charity. Nonetheless, these strict conditions narrow the investment options of Islamic funds potentially putting them in a disadvantage compared to conventional funds.

To shine more light on this subject, much literature has emerged comparing the performance of Islamic funds to conventional and other types of funds. For this purpose the analyses commonly rely on benchmarking and financial performance using Sharpe index, Jensen's Alpha, Treynor index, timing and selectivity abilities. Abdullah *et al.* (2007) found that Islamic funds performed better than the

conventional funds during bearish markets, while conventional funds showed better performance than Islamic funds during bullish economic conditions. They also found that conventional funds are slightly better diversified than Islamic funds. According to Abdelsalam *et al.* (2014) the average efficiency of socially responsible SRI funds is slightly higher than that of Islamic funds. Several papers concur that Islamic funds and conventional funds are similar in terms of their performance (see for example Haddad *et al.* 2009 and Hoepner 2011). Nonetheless, Hayat and Kräussl (2011) found that Islamic funds underperform compared to conventional funds.

2.3. Diffusion of Islamic Banking

In the "World Islamic Banking Competitiveness Report 2014-15" published by Ernst & Young, Islamic banking is reported to have grown by around 17% from 2009 to 2013. This makes it the fastest growing financial industry globally. Rivlin (2008) suggests that two factors were essential in the development of Islamic banking. First, the bottom-up process in Egypt with the Mit Ghamr experiment in the 1960s indicated the feasibility of Islamic banking. Second, the establishment of governing bodies such as the Islamic Development Bank (IDB) in 1975, which provided much needed support during the initiation stages of Islamic banking. Other organizations then followed such as the Islamic Financial Service Board (IFSB) in 2002. Their main objective has been to set common standards for Islamic banking and contribute to the innovation and application of specialized products.

Hussain *et al.* (2015) have implied that the economic growth in the Middle East and North Africa region is an obvious driver for the growth of the Islamic banking industry. They have also criticized the alleged relation between the oil

revenues and the real estate boom in some GCC countries and the growth of the Islamic banking industry. Furthermore, in a report by Thomson Reuters (2013) the authors have linked the growth in Islamic banking to the development of trade between member countries of the Organisation of Islamic Cooperation (OIC). Moreover, they have suggested that the Islamic values related to ethical banking have been found appealing, further supporting the growth of Islamic Banking. They have provided Malaysia, where the majority of Islamic banking customers are not Muslim, as an example. Neither of the publications has provided empirical evidence to support their claims.

In their paper, Imam & Kpodar (2010) analyze the possible determinants of Islamic banking diffusion relying on country-level data for the period 1992–2006. They note that income per capita, share of Muslims in the population, status as an oil producer, economic integration with Middle Eastern countries, and proximity to Islamic financial centers are all related to the expansion of Islamic banking. This expansion is hindered by increases in interest rates. They also studied the effect of the quality of institutions and the 9/11 attacks as being a driver for Islamic banking diffusion, both of which were insignificant. Furthermore, their study provides a positive significant link between the number of conventional banks and the number of Islamic banks suggesting a complementary relation.

2.4. Islamic Banking Performance

The performance of Islamic banks, mainly in terms of their efficiency and stability, has aroused the interest of many researchers subsequently producing many papers on the subject. These studies have been somewhat limited by the sparse data

availability. This has been mainly caused by the fact that Islamic banking is still far from mainstream and relatively mediocre in size compared to conventional banking. Nevertheless, data availability has been gradually improving. Furthermore, Islamic banking has gained heightened attention after the recent financial crisis, which portrayed the vulnerability of the conventional banking system.

2.4.1. Efficiency

Malaysia is widely recognized as a major center for Islamic finance, providing both conventional and Islamic banking. It is only natural that several papers focus on Malaysia in order to compare between Islamic and conventional banking efficiency. Samad (1999) used ratio measures and ANOVA to compare the efficiency of the Bank Islamic Malaysia Berhad and conventional banks in Malaysia. He found that managerial efficiency was higher for conventional banks than for the Islamic bank, but he had mixed results when comparing productivity efficiency. A similar study by Rosly and Abu Bakar (2003) found that Islamic banks are less likely to outshine mainstream banks on efficiency terms. In another research Mokhtar *et al.* (2006) studied the Malaysian Islamic banking industry over the 1997-2003 period. Using a Stochastic Frontier Approach they found that even though the overall efficiency level of Islamic banking had increased it was still lower than that of conventional banks. The study also revealed that full-fledged Islamic banks are more efficient than Islamic windows, while Islamic windows of foreign banks tend to be more efficient than those of domestic banks. More recently, Abdul-Majid *et al.* (2011) found that in Malaysia mergers, fully Islamic banks, and conventional banks operating Islamic

banking windows are all associated with lower efficiency compared to conventional banks.

With increased data availability several researchers focused on cross-country analysis to compare efficiency of Islamic and conventional banks in different countries. Mohamad *et al.* (2008) compare the cost and profit efficiency of 80 banks in 21 of Organisation of Islamic Conference (OIC) countries: comprising of 37 conventional banks and 43 Islamic banks, using the Stochastic Frontier Approach. They claim that there are no significant differences between the overall efficiency results of conventional versus Islamic banks, which are neither affected by size nor age of the bank. Using Data Envelopment Analysis on the same sample as Mohamad *et al.* (2008), Bader *et al.* (2008) also found that there are no significant differences between the overall efficiencies of conventional and Islamic banks. Al-Jarrah & Molyneux (2010) utilized the Fourier-flexible stochastic frontier approach to analyze 82 banks operating in Jordan, Egypt, Saudi Arabia and Bahrain over the 1992-2000 period. They found that Islamic banks are found to be the most cost and profit efficient while investment banks are the least. Abdul-Majid *et al.* (2010) claim that the relative efficiency of Islamic and conventional banks varies significantly across countries. Beck *et al.* (2013) focused only on countries with a dual banking system in their research. Thus they used a dataset that includes 510 banks across 22 countries, out of which 88 are Islamic banks over the period 1995–2009. They found that Islamic banks are less cost efficient. Johnes *et al.* (2014) studied a sample of Islamic and conventional banks located in 18 countries over the period 2004 to 2009. Using the meta-frontier analysis they found that the Islamic banking system is less efficient, however managerial efficiency is higher than that of conventional banking.

There is no general consensus on which type of banking is more efficient. On the single country level most of the research leans towards Islamic banking in terms of efficiency. On the cross-country level these views vary from indifferent efficiency of both types of banking to some claiming that Islamic banking is more efficient and others claiming the opposite.

2.4.2. Stability

After the recent financial crisis the financial system and banks came under a lot of scrutiny. Owing to the unique characteristics of the Islamic banking system some experts hypothesized it might be more stable than conventional banking. Čihák & Hesse (2010) state that the risk sharing feature incorporated in the PLS products provide another layer of protection to the bank, in addition to its book capital. They also claim that Islamic banks have a smaller risk appetite because of their lower availability of liquidity, the shareholders' responsibility for negligence or misconduct, and the need to provide stable and competitive returns to investors. Furthermore, depositors are much more engaged in overseeing the bank's management since they also share in the losses if they occur. Lastly, they state that compared to traditional banks, Islamic banks usually hold a larger proportion of their assets in reserve accounts with central banks or in correspondent account. Another feature, which might positively affect the stability of Islamic banking, would be the prohibition of investing in all speculative transactions and short selling. Abedifar *et al.* (2015) add that the religious factor may also play a role in reducing default and induce loyalty. Oppositely these authors suggest that Islamic banking could be riskier because of the complexity of Islamic loan contracts, limited default penalties, and moral hazard

incentives caused by PLS contracts. They also claim that even though Islamic banks do not include traditional interest in their activities they are still prone to interest rate risk through indirect transmission channels. A minority of authors such as Chong & Liu (2009) even argues that in practice competition causes Islamic banking, particularly in Malaysia, and conventional banking to homogenize. Beck *et al.* (2013) support a similar claim using empirical evidence. They did not find significant differences in the stability of Islamic banks, but found that Islamic banks have higher capital-asset ratios.

Some of the earlier studies on this topic such as Čihák & Hesse (2010) and Abedifar *et al.* (2013) coherently found that small Islamic banks outperform conventional banks in terms of stability, however large Islamic banks are less stable than their conventional counterparts and have a higher insolvency risk. Both studies mainly focus on the Z-score in their regression analysis. Čihák & Hesse (2010) study banks operating in 20 OIC member countries over 1993–2004, and Abedifar *et al.* (2013) use a sample from 24 OIC countries over 1999–2009. Pappas *et al.* (2014) relied on a different approach applying survival analysis modeling techniques to a comprehensive sample of 421 banks in 20 Middle and Far Eastern countries from 1995 to 2010. They found that the estimated failure risk of Islamic banks is lower than that of conventional banks. Saeed & Izzeldin (2014) examined the relationship between efficiency and default risk in Islamic banks and conventional banks in Gulf Cooperation Countries (GCC) and three non-GCC countries over the period 2002–2010. Using the Stochastic Frontier Approach and distance to default they found that for conventional banks there is a trade-off between efficiency and risk, which is not the case for Islamic banks where increased profit efficiency is associated with

improved financial stability. Baele *et al.* (2014) took an interesting approach by comparing default rates on conventional and Islamic loans in Pakistan over the period 2006–2009. They discovered that the default rate of Islamic loans is less than half the default rate of conventional loans. They also show a link between religion and default rates claiming that during Ramadan and if in big cities the share of votes to religious-political parties increases then defaults on Islamic loans are less likely.

2.5. Income Inequality and Poverty Alleviation

Income inequality and poverty alleviation are woven deeply in the essence of Islam and Islamic banking. Zakat, one of the five pillars of Islam, is a tax paid by Muslims who meet certain wealth criteria. It is a religious obligation used to contribute to the less fortunate. In Malaysia, Pakistan, and Saudi Arabia it is compulsory and collected by the state. Commonly, the rate of Zakat is 2.5% of the total wealth. Furthermore, in order to prevent the exploitation of the poor by the rich, charging interest is prohibited in all Islamic transactions. Qard Hassan, which roughly translates to benevolent loan in Arabic, requires that the debtors in need repay only the principal of the debt. Using primary data Dusuki (2008) found that in Malaysia stakeholders of Islamic banks expect the banks to contribute to social welfare and alleviate poverty. Fasih (2008) explains that Islamic banking has the potential to support agents with lower exposure to credit like farmers and Small and Medium Enterprises (SMEs). He argues that Islamic finance can attract investments from rich Gulf countries.

In order to test the effects of Islamic banking on income inequality and poverty alleviation Abedifar *et al.* (2015) use the Gini coefficient, the percentage of

population below the international poverty line defined as $1.25 a day (PPP), the percentage of population below the national poverty line, the poverty gap – measuring the intensity of poverty - at the international poverty line, and the percentage of rural population below the rural poverty line as proxies in their regression. They found that medium-size Islamic banks in predominantly Muslim countries are associated with a decrease in income inequality, percentage of population below the national poverty line, and rural population living below the national poverty lines. In low-income countries and countries with a high uncertainty avoidance index their analysis showed that medium-size Islamic banks are linked with poverty alleviation. Nevertheless, the low number of observations (28) that they used in their analysis casts doubt on the robustness of their results.

2.6. Islamic Banking and Economic Growth

Economic growth has been of focal interest in many macroeconomic papers and researches. Thus, it is imperative that this topic is also addressed in light of Islamic banking and finance. Much evidence has pointed in the direction that financial development is a driver for economic growth (see for instance Levine & Zervos 1998; Levine, Loayza, and Beck 2000; Beck and Levine 2004). Furthermore, Levine (2002) claims that overall financial development is robustly linked to economic growth regardless of it being bank-based or market-based. These findings provoke the question whether Islamic financial development boosts growth as well.

Gheeraert (2014), using the "IFIRST" database, covering Islamic commercial banks worldwide over the period 2000–2005, claims that the Islamic banking sector acts as a complement to conventional banking in Muslim countries when both

systems co-exist and the Islamic sector reaches a medium penetration in the total banking sector. He also found strong and consistent empirical evidence that the development of Islamic banking in Muslim countries leads to a higher banking sector development. This implies that Islamic finance might spur economic growth due to the effect it has on the development of the financial system. In accordance, using the stochastic frontier analysis, Gheeraert & Weil (2014) found that Islamic banking development favors macroeconomic efficiency, however just up to a certain point, beyond that point it becomes counter-efficient. They also add that there is no clear evidence that Islamic banking development is a driving force of growth through productivity.

In their work Furqani & Mulyany (2009) and Abduh & Omar (2012) examine the dynamic interactions between Islamic banking and economic growth by employing the cointegration test and Vector Error Model (VECM). They both rely on quarterly data for Malaysia and Indonesia respectively. Both papers suggest that there is a significant positive relationship between Islamic banking development and economic growth. Furthermore, Furqani & Mulyany (2009) found that increase in GDP in Malaysia causes Islamic banking to develop and not vice versa, that is they support a demand-following relationship. Abduh & Omar (2012), however, suggest that in Indonesia it appears to be a bi-directional relationship.

The finance-growth nexus has also been the subject of more recent research. Imam & Kpodar (2015) explain that Islamic banking can promote growth through its ability to encourage lending, raise savings, and enhance financial stability. Nonetheless, they claim that Islamic banking is held back by the lack of economies of

scale and liquid instruments, which might offset the benefits. Abedifar *et al.* (2015) mention that the religious aspect of Islamic banking might restrict entrepreneurship by promoting low-risk projects and by investing excessively in tangible assets. They however note that Islamic finance institutions favor allocating funds to the real economy and must refrain from investing in any speculative activities. Thus to test their hypotheses relating economic growth to Islamic banking development both papers rely on a panel data analysis. Abedifar *et al.* (2015) use data on 22 Muslim countries with dual-banking systems during the 1999–2011 period. They found a significant positive relation between medium-sized Islamic banks and economic growth in relatively low-income countries. In a more complex analysis, Imam & Kpodar (2015) use a sample of 52 low and middle-income countries, spanning over the period 1990–2010. The authors use a Generalized Method of Moments (GMM) estimator to control for an endogeneity bias from the banking indicators. Their results show that Islamic banking is positively associated with economic growth even after controlling for various determinants.

2.7. Islamic Banking and International Trade

A fundamental service provided by banks is trade financing. Banks offer products like Letters of Credit, Documentary Collection, Factoring, Forfaiting, among others, which are supposed to reduce the risks of international trade for the involved counterparties. Most Islamic banks offer Documentary Collection and Letters of credit, which are commonly marketed as "Murabaha Letters of Credit", with more complex trade finance products making large progress as of late. Islamic banking has mostly been established in the Middle East and North Africa (MENA)

and Southeast Asia regions. According to the World Bank's "Doing Business" dataset, these regions suffer from relatively low contract enforceability and low quality of judicial processes. Furthermore, many of the MENA region countries have been prone to increased political instability and violence. Such characteristics are known to negatively affect a country's attractiveness in terms of trade opportunity. Accordingly, Dennis (2006) suggests that the MENA region countries could experience substantial gains if trade facilitation inefficiencies are addressed, claiming at least triple the welfare gains compared to the scenario without trade facilitation improvements.

Another obstacle faced by many firms in the MENA region is access to finance. This obstacle is known for being negatively related to the formation of new businesses and their ability to expand into international markets. Berman & Héricourt (2010) assert the importance of firms' access to finance on their decision to enter the export market. They claim that entering the export market is accompanied by relatively high fixed start-up costs which are a challenge for firms with limited access to external finance. Beck (2003) claims that countries with better-developed financial systems have higher export shares and trade balances in industries that use more external finance. Using a large panel of bilateral trade for 27 industries Manova (2013) discusses the mechanisms through which credit constraints hinder global trade and shows that financial underdevelopment hinders firm selection into production, producers' entry into exporting, and exporters' foreign sales.

3. Islamic Banking Development and Growth

3.1. Data Description and Model

In this section we empirically study the effects of conventional and Islamic banking development on growth in countries that have a dual banking system. For this purpose we use a sample of twenty countries mainly from the Middle East, North Africa, and Southeast Asia during the time period from 1999 through 2014. The countries are Bahrain, Brunei, Egypt, Indonesia, Iraq, Jordan, Kuwait, Lebanon, Malaysia, Mauritania, Pakistan, Palestinian territory (West Bank and Gaza), Qatar, Saudi Arabia, Senegal, Thailand, Tunisia, Turkey, United Arab Emirates, and Yemen. We have excluded countries with Islamic banking as the exclusive type of banking like Sudan and Iran. We have also excluded some countries with a dual banking system due to unavailability of data (Oman, Bangladesh, Syria, and others…) or to reduce sample heterogeneity (United Kingdom and United States). A somewhat obvious common characteristic of our sample countries is a relatively large Muslim population, except for Thailand which has around 5.8%. Second comes Lebanon with 59.7% Muslim population. The average Muslim population in our sample is 83.4%. All sample countries are also members of the Organisation of Islamic Cooperation, again with exception of Thailand. The sample's time period is constrained by the fact that Islamic finance had not really developed and formalized until relatively recently.

The banking development data has been collected from the Bankscope database. It is widely used in research related to Islamic finance. It classifies banks according to specialization as Islamic, commercial, etc. Nevertheless, it should be pointed out that the database is not exhaustive and does not include Islamic banking windows. Furthermore, Čihák & Hesse (2010) claim that in some cases the database misclassifies Islamic and conventional banks, and vice versa. Thus, it cannot provide precise and complete information on the development of Islamic banking. To improve on data accuracy and completeness we visited banks' websites for additional information on their activities and balance sheets when available. We only do this process for the Islamic banks, as it would be arduous to also do the crosscheck for all the conventional banks because of their abundance.

Inspired by Imam & Kpodar (2015), we measure Islamic banking development by the amount of loans extended by Islamic banks to the private sector divided by real GDP. Even though this indicator should depict the size of the Islamic banking sector in a satisfactory manor, these authors claim that the indirect channels, such as mobilizing savings, diversifying risk, and lowering transaction costs, through which Islamic banking could augment growth, might not be fully represented. Consequently, we also add two other indicators of Islamic banking development: the ratios of Islamic banks' assets to real GDP and deposits in Islamic banks to real GDP. The assets represent the general magnitude of Islamic banks, which should perform their roles more effectively when they are larger due to economies of scale as claimed by past studies on conventional banking. The deposits, according to Imam & Kpodar (2015), should be an appropriate indicator to gauge the ability of Islamic banks to mobilize savings.

Since we are mainly studying the effect of Islamic banking on growth in countries with a dual banking system it is important to isolate the effect of Islamic banking development by including indicators of conventional banking development. Therefore, we utilize the ratios of loans extended by conventional banks to the private sector, their assets, and deposits to real GDP as indicators. We opt to extract the data from Bankscope opposed to the "Financial Development and Structure Dataset" by Beck *et al.* (2013) which is commonly used but has many missing values for our sample period and countries.

The Bankscope database provides annual data on a bank-level basis. To transform the data to country-level we simply sum the values of our indicators for all banks in a certain country for a specific year. We do this for both Islamic and conventional banking development indicators.

There has been a sense of consensus on the beneficial effects of financial development on economic growth. Pertaining to previous literature, such as Gheeraert & Weil (2014) and Imam & Kpodar (2015), which suggests a positive impact of Islamic banking development on growth, we also expect Islamic banking development to stimulate growth. Similarly, research presented notably by Levine (2005) and many others suggests that financial development in general matters for growth and that reverse causality alone is not driving this relationship. Accordingly, we also expect a positive effect of conventional banking on economic growth in our sample.

For our standard growth model we rely on a set a of control variables commonly used in the growth literature:

- Initial real GDP per capita (in US Dollars): It is used to control for the convergence effect, which implies that countries with a lower initial GDP tend to grow faster than other countries.
- Education: This indicator is proxied by the primary school enrolment rate to control for human capital accumulation. Since the available ratio had many missing values we constructed this percentage indicator by dividing the number of pupils enrolled at primary level in school by the population of ages 0 to 14 in each country.
- Quality of Institutions: This variable is widely considered to have an influence on economic growth. We use the "Control of Corruption" index, available through the World Bank's "Worldwide Governance Indicators" (WGI), as a proxy for this indicator.
- Trade Openness (% of GDP): It is an indicator frequently used in growth literature. Its effect can be positive if it leads to technological advancement or increases the effective size of the market. Nevertheless, it can slow growth through exogenous shocks that it might sometimes encourage. This indicator is calculated as the ratio of the sum of exports and imports of goods and services to GDP.
- Terms of Trade: This ratio is commonly linked with growth. When export prices exceed import prices income is channeled into the country, which has an effect on investments, savings, and consumption.

- Government expenditure (% of GDP): It has an effect on growth very much dependent on how and to what extent the funds are utilized. For example, government spending on infrastructure could have positive effects on productivity growth. Nonetheless, excessive government consumption could lead to improper spending and misuse of funds as well as crowding out private investments.

All the indicators were extracted from the World Bank's "World Development Indicators" database, unless stated otherwise.

Table 1. **Summary Statistics of Growth Model**

Variable	Observations	Mean	Minimum	Maximum	Std. Dev.
Growth Rate of Real GDP per Capita	320	1.53751	-34.8931	50.1159	5.51563
Initial GDP per Capita	320	10472.3	609.032	50693.7	14709.9
Government Expenditure	320	15.5943	5.74582	32.2322	5.61942
Terms of Trade	320	117.676	56.6697	248.681	41.1781
Trade Openness	320	90.6488	28.1296	220.407	37.9397
Quality of Institutions	320	-0.17762	-1.57621	1.72285	0.68135
Education	320	31.7435	23.7100	50.1300	6,28726
Loans by Islamic Banks to GDP	320	0.08134	0.00000	0.94151	0.15463
Loans by Conv. Banks to GDP	320	0.69404	0.00023	6.38666	0.87407
Assets of Islamic Banks to GDP	320	0.16253	0.00000	2.07339	0.32383
Assets of Conv. Banks to GDP	320	1.42811	0.00078	10.8139	1.79100
Deposits in Islamic Banks to GDP	320	0.12054	0.00000	1.44431	0.22764
Deposits in Conv. Banks to GDP	320	1.15635	0.00050	8.71181	1.45323

Source: Author's calculations based on the sources from the list of variables.

Our baseline growth model, similar to previous studies, is as follows:

$$G_{it} = \alpha + \beta\ IslBD_{it} + \gamma\ ConvBD_{it} + \delta\ X_{it} + c_i + \mu_t + \varepsilon_{it}$$

Where G_{it} is the growth rate of real GDP per capita, $IslBD_{it}$ is the indicator for Islamic banking development (ratio of loans, assets, or deposits in Islamic banks to GDP), $ConvBD_{it}$ is the indicator for conventional banking development (ratio of loans, assets, or deposits in conventional banks to GDP), and X_{it} is the set of control variables listed previously. Furthermore, the specification includes c_i as the unobserved country-specific time-invariant variable, μ_t the time-specific variable, and the error term ε_{it} with mean zero.

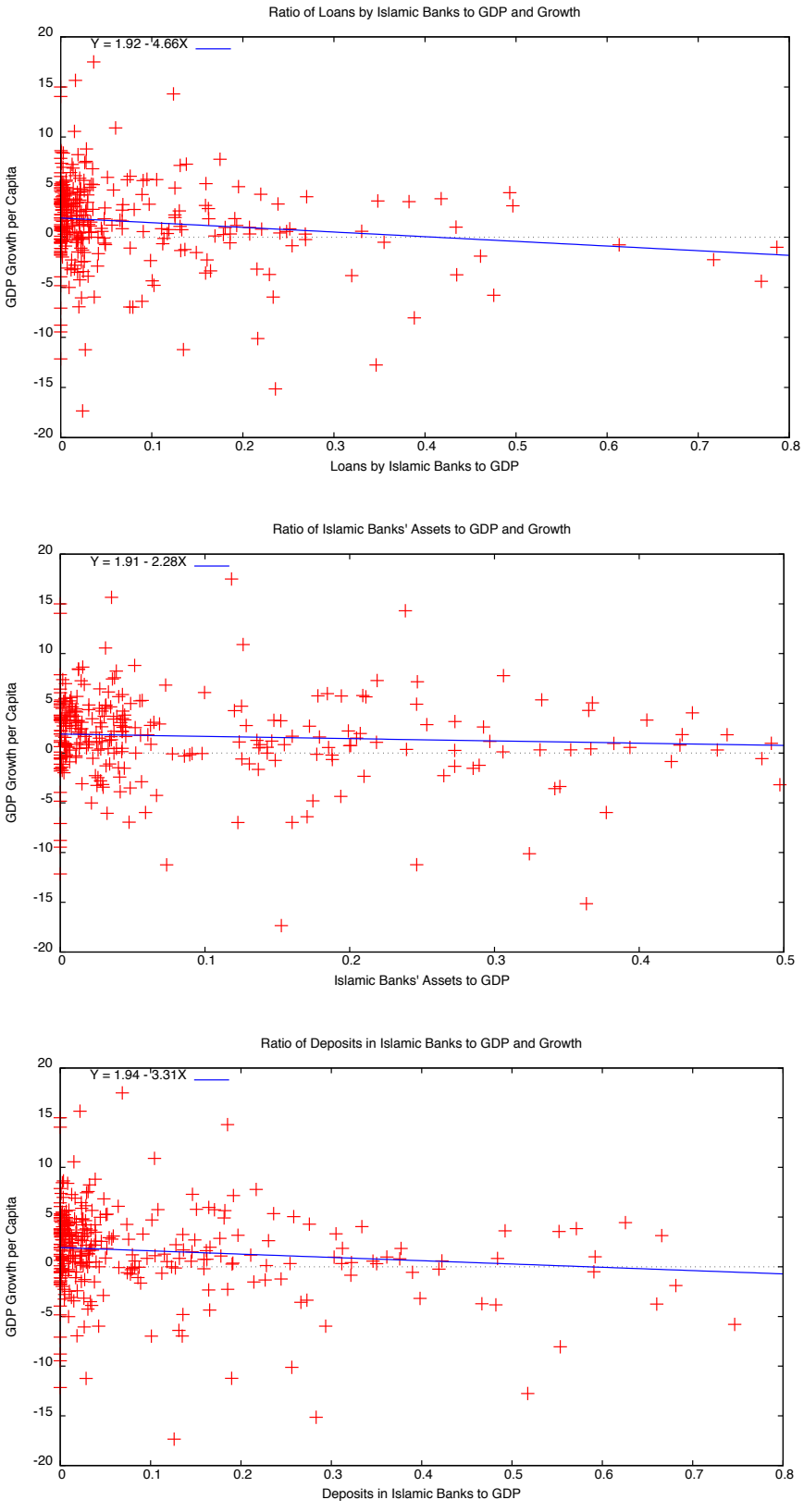
3.2. Methodology and Results

Similar to previous attempts to estimate the effects of Islamic banking (Imam & Kpodar 2015) we face several econometric challenges as well. First, one should keep in mind the small portion Islamic banking represents relative to GDP or even to conventional banking in the majority of countries. Being frequently very close to zero makes it difficult to derive statistically significant inferences. Second, as is the case with conventional banking development, it is not unlikely there may be a reverse causality from growth to Islamic banking development, raising an endogeneity issue that needs to be addressed.

We proceed by attempting to answer these challenges using a variety of appropriate econometric techniques. We begin our analysis with fundamental panel data estimators such as the pooled ordinary least squares (OLS). Afterwards, we

proceed to the more complex generalized method of moments (GMM) estimator to control for endogeneity bias. To get a basic intuition about the relationship between Islamic banking development indicators and GDP per capita growth we plot these variables (Figure 1). Islamic banking development indicators are surprisingly negatively correlated with the growth indicator. This simple illustration gives us an early idea of the impact Islamic banking development might have on growth.

Figure 1. **Islamic Banking Development and Economic Growth**



Source: Author's calculations based on the sources from the list of variables.

We opt for panel data which have become frequently used and often preferred to cross-sectional or time-series data in modeling. This is mainly attributable to more accurate inferences of model parameters and gains in efficiency. To quote Baltagi (2008): “Panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency”.

Our first step is choosing what estimator is most appropriate for our data. We begin by performing an F-test of the joint significance of the fixed effects intercepts to decide between pooled OLS and Fixed Effects estimator. We do not reject the null hypothesis that all of the fixed effects are zero and that pooled OLS is thus an adequate estimator. We then proceed to the Breusch-Pagan Lagrange multiplier test. The null hypothesis is that variance across entities is zero. That is, no panel effect with no significant difference across countries. Our test fails to reject the null hypothesis and we conclude that Random Effects estimator is not appropriate. Thus, no evidence of significant differences across countries implies that we can go ahead with a pooled OLS regression.

3.2.1. Pooled OLS

The pooled OLS assumes there is no observed individual heterogeneity in the data and the model reduces to:

$$G_{it} = \alpha + \beta\ IslBD_{it} + \gamma\ ConvBD_{it} + \delta\ X_{it} + \varepsilon_{it}$$

Furthermore we inspect the Durbin-Watson test, which indicates we have no autocorrelation violation present. This signifies that the errors are uncorrelated between observations and we can proceed. We also inspect if there is a

multicollinearity problem in our variables. We do this by comparing the values of the variance inflation factor (VIF) presented in Table 2 to a benchmark equal to ten. If the value of VIF exceeds ten this implies that the variable is highly correlated and should be addressed. There is no such problem with our variables.

Table 2. **Testing For Multicollinearity: Variance Inflation Factor (VIF)**

Variable	(1)	(2)	(3)	(4)
Initial GDP per capita	2.515	3.242	2.985	2.946
Government expenditure	1.103	1.182	1.137	1.134
Terms of Trade	1.067	1.113	1.132	1.146
Trade Openness	1.331	1.788	1.647	1.646
Quality of Institutions	2.959	3.442	3.226	3.202
Education	1.108	1.122	1.114	1.114
Loans by Islamic Banks to GDP		1.579		
Loans by Conv. Banks to GDP		2.160		
Assets of Islamic Banks to GDP			1.481	
Assets of Conv. Banks to GDP			1.804	
Deposits in Islamic Banks to GDP				1.506
Deposits in Conv. Banks to GDP				1.763

Source: Author's calculations based on the sources from the list of variables.

The results from the pooled OLS regression are presented in Table 3. We first run the model only with the control variables as shown in column 1. Only initial GDP per capita is significant. It has a negative coefficient, which supports the convergence theory. We continue by gradually adding the corresponding banking development indicators. These are loans by Islamic banks to GDP paired with loans by conventional banks to GDP, assets of Islamic banks to GDP paired with assets of conventional banks to GDP, and deposits in Islamic banks to GDP paired with deposits in conventional banks to GDP. In all three regressions only Islamic banking indicators are significant and have a negative coefficient (columns 2, 3, and 4). This suggests that Islamic banking development has an unfavorable effect on growth.

We then check if our model violates the assumption of homoskedasticity by applying White's Test. We reject the null hypothesis of homoskedasticity with a very low p-value. Even though estimates remain unbiased and consistent, heteroskedasticity is still an issue because the standard errors become biased when it is present. This in turn results in a bias in test statistics and confidence intervals and could affect the significance of variables. Fortunately, there are several techniques used to remedy heteroskedasticity.

The first and most common remedy is to redefine variables. We do so by transforming all the independent variables into their logarithmic values. The White Test then shows that this transformation managed to resolve the heteroskedasticity that was present. The findings are presented in table 3 (columns 5, 6, 7, and 8). We first run the regression without including the banking indicators. Again we find that only the initial GDP per capita indicator has a significant and negative coefficient. Afterwards, we gradually add the pairs of banking development indicators to the specifications. The results of the regressions including the indicators of banking development demonstrate a positive effect of conventional banking development on growth, which supports the broad body of literature related to this area of research. Furthermore, governmental expenditure is found to have a positive impact on growth. This generally indicates that the government expenditure is constructive and is not excessive thus does not crowd out private investments. Finally, we find that Islamic banking development has a negative impact on growth.

Table 3. **Islamic Banking and Growth: Pooled OLS**

	Pooled OLS				Pooled OLS with Logs			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control								
Initial GDP per	−0.007**	−0.004	−0.005	−0.005	−1.002**	−0.064	−0.049	−0.083
Capita	(0.003)	(0.004)	(0.004)	(0.004)	(0.477)	(0.606)	(0.600)	(0.603)
Government	0.040	0.053	0.042	0.041	0.892	3.159*	3.227*	3.041*
Expenditure	(0.051)	(0.053)	(0.052)	(0.052)	(1.367)	(1.629)	(1.652)	(1.639)
Terms of Trade	−0.001	0.002	0.003	0.002	0.504	0.518	0.770	0.648
	(0.007)	(0.007)	(0.007)	(0.007)	(1.452)	(1.632)	(1.645)	(1.649)
Trade Openness	0.004	0.0004	0.003	0.002	0.849	0.532	0.842	0.649
	(0.009)	(0.010)	(0.010)	(0.010)	(1.489)	(2.268)	(2.335)	(2.372)
Quality of	−0.037	−0.208	−0.045	0.010	0.178	0.300	0.337	0.343
Institutions	(0.768)	(0.827)	(0.801)	(0.797)	(0.554)	(0.605)	(0.600)	(0.607)
Education	0.035	0.034	0.033	0.032	2.928	2.795	2.827	2.934
	(0.024)	(0.024)	(0.024)	(0.024)	(2.971)	(3.517)	(3.501)	(3.495)
Banking Development								
Loans by Islamic		−4.308*				−0.922*		
Banks / GDP		(2.468)				(0.483)		
Loans by Conv.		0.648				1.013**		
Banks / GDP		(0.510)				(0.452)		
Assets of Islamic			−2.061*				−0.946**	
Banks / GDP			(1.142)				(0.467)	
Assets of Conv.			0.227				1.011**	
Banks / GDP			(0.228)				(0.437)	
Deposits in Islamic				−2.997*				−0.913*
Banks / GDP				(1.637)				(0.473)
Deposits in Conv.				0.277				1.026**
Banks / GDP				(0.278)				(0.446)
Constant	0.254	−0.232	−0.117	−0.088	−8.833	−23.635	−26.803	−24.837
	(1.691)	(1.727)	(1.717)	(1.713)	(13.011)	(16.848)	(17.370)	(17.558)
R-Squared	0.028	0.033	0.032	0.033	0.055	0.081	0.085	0.082
Observations	320	320	320	320	112	104	104	104

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively. All values of presented R-Squared are values of Adjusted R-Squared.
Source: Author's calculations based on the sources from the list of variables.

The second remedy we attempt is using heteroskedasticity and autocorrelation consistent (HAC) robust standard errors. Even though this procedure does not solve the heteroskedasticity issue in this case, it has some explanatory value nonetheless. We present the results of this regression in Table 4 (columns 1, 2, 3, and 4). The

regression we run using just the control variables implies that only initial GDP per capita has a significant impact on growth and it is negative. Once we include the banking development indicators we again find that Islamic banking development impedes growth. Conventional banking is shown to have a positive significant effect on growth only for the case when we use loans of conventional banks as an indicator for conventional banking development. Furthermore, our indicator for education is significant and positive in all cases. This is in accord with economic theory, as higher rates of enrollment in school have a positive impact on growth through improved labor productivity.

The third remedy for heteroskedasticity we apply is Weighted Least Squares (WLS). The software (Gretl) we use computes weighted least squares estimates with the weights based on the estimated error variances for the respective cross-sectional units in the sample. The results of this regression are shown in Table 4 (columns 5, 6, 7, and 8). The first regression, not including the banking development indicators, implies that both initial GDP per capita and education have a significant effect on growth, the former being negative and the latter positive. Furthermore this regression suggests a positive effect of trade openness on growth. It is reasonable to say that trade openness spurs growth possibly by increasing domestic competition and efficiency, increasing productivity, and importing new technologies and know-how. Once banking development indicators are included in the regression, only the development of Islamic banking seems to have an impact on growth and this impact is again negative. Furthermore, education seems to stimulate growth for the reasons mentioned previously. Lastly, initial GDP per capita is found to affect growth as well.

Table 4. **Islamic Banking and Growth: Pooled OLS and Weighted Least Squares**

	Pooled OLS with Robust Standard Errors (HAC)				Weighted Least Squares			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control								
Initial GDP per	−0.007*	−0.004	−0.005	−0.005	−0.009***	−0.006***	−0.007***	−0.007***
Capita	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)
Government	0.039	0.053	0.042	0.041	−0.037	−0.043	−0.050	−0.050
Expenditure	(0.068)	(0.073)	(0.069)	(0.069)	(0.035)	(0.035)	(0.035)	(0.035)
Terms of Trade	−0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Trade Openness	0.004	0.000	0.002	0.002	0.010**	0.007	0.009	0.009
	(0.006)	(0.007)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
Quality of	−0.036	−0.208	−0.045	0.010	−0.047	−0.033	0.025	0.065
Institutions	(0.878)	(1.028)	(0.937)	(0.929)	(0.530)	(0.531)	(0.528)	(0.529)
Education	0.034**	0.033**	0.032**	0.032**	0.025**	0.024**	0.023*	0.023*
	(0.015)	(0.016)	(0.016)	(0.016)	(0.012)	(0.013)	(0.012)	(0.012)
Banking Development								
Loans by Islamic		−4.307**				−3.067**		
Banks / GDP		(2.107)				(1.331)		
Loans by Conv.		0.648*				0.367		
Banks / GDP		(0.365)				(0.267)		
Assets of Islamic			−2.061**				−1.620***	
Banks / GDP			(1.014)				(0.604)	
Assets of Conv.			0.227				0.136	
Banks / GDP			(0.144)				(0.117)	
Deposits in Islamic				−2.997*				−2.344***
Banks / GDP				(1.581)				(0.903)
Deposits in				0.277				0.175
Conv. Banks /				(0.180)				(0.145)
GDP								
Constant	0.254	−0.231	−0.117	−0.088	1.255	1.362	1.361	1.385
	(2.069)	(2.194)	(2.131)	(2.123)	(1.044)	(1.030)	(1.030)	(1.029)
R-Squared	0.028	0.032	0.032	0.032	0.103	0.114	0.118	0.117
Observations	320	320	320	320	320	320	320	320

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively. All values of presented R-Squared are values of Adjusted R-Squared.
Source: Author's calculations based on the sources from the list of variables.

Finally, we attempt to enhance the robustness of our analysis by constructing a composite indicator for each type of banking development, which we then include in our model specifications. The composite indicator of Islamic banking is constructed using the principal component analysis as the first principal component

of the three Islamic banking development indicators. The same applies for the composite indicator of conventional banking development. We then utilize these composite indicators in the pooled OLS and WLS models we used previously. We also introduce a new estimator offered by the Gretl software called the Heteroskedasticity Corrected Model. This estimator involves an OLS estimation, followed by an auxiliary regression to generate an estimate of the error variance, and finally WLS, using as weight the reciprocal of the estimated variance. The results from these three regressions are presented in Table 5. Once again, the significance and sign of the variables' coefficients varies across the different specifications except for the composite indicator of Islamic banking development which is significant and negative in all three.

Table 5. **Islamic Banking and Growth: Composite Indicators Robustness Check**

Variable	Pooled OLS	WLS	Heteroskedasticity Adjusted Model
Control			
Initial GDP per Capita	−0.005	−0.007***	−0.008***
	(0.003)	(0.002)	(0.002)
Government Expenditure	0.046	−0.049	−0.011
	(0.052)	(0.035)	(0.037)
Terms of Trade	0.002	0.002	0.003
	(0.007)	(0.005)	(0.006)
Trade Openness	0.002	0.009	0.005
	(0.010)	(0.006)	(0.007)
Quality of Institutions	−0.077	0.021	0.770
	(0.808)	(0.528)	(0.596)
Education	0.034	0.024*	0.021*
	(0.024)	(0.012)	(0.012)
Banking Development			
Composite Indicator of Islamic Banking	−0.392*	−0.298**	−0.400**
Development	(0.217)	(0.118)	(0.159)
Composite Indicator of Conventional	0.270	0.161	0.211**
Banking Development	(0.246)	(0.127)	(0.020)
Constant	−0.130	1.327	1.217
	(1.701)	(1.037)	(1.114)
R-Squared	0.033	0.117	0.120
Observations	320	320	320

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively. All values of presented R-Squared are values of Adjusted R-Squared.
Source: Author's calculations based on the sources from the list of variables.

The results from tables 3, 4, and 5 are somewhat clouded with ambiguity. This applies especially for the control variables and development of conventional banking indicators, which are statistically significant in some regressions and insignificant in others. Nonetheless, our indictors of Islamic banking have a significant and negative coefficient across all our specifications. Hence, it is not unreasonable to say that Islamic banking development in countries with a dual banking system is in fact obstructive for economic growth. As we have mentioned earlier, we suspect there might be an endogeneity problem caused by the

measurement errors as well as the reverse causality from economic growth to banking development that needs to be addressed.

3.2.2. GMM

In this section we focus on the Generalized Method of Moments (GMM) estimator, developed by Hansen in 1982, to address the endogeneity problem. We consider government expenditure as well as all of the banking development indicators as endogenous variables in our specification. As such, we can address the possible reverse causality, omitted variable bias, and measurement errors. For these endogenous variables we use their first lag as an instrumental variable. This makes our model just-identified and we do not have to concern ourselves with any over-identification restrictions. Following Imam & Kpodar (2015), the variables of initial GDP per capita, terms of trade, trade openness, quality of institutions, and education are to be exogenous for practical and theoretical reasons.

As a robustness check, we also include the second lag of the endogenous variables as instrumental variables. Since, the model becomes over-identified we perform Hansen's J test to check the validity of the lagged variables as instruments. The null hypothesis is that the instrumental variables are not correlated with the error and are thus valid instruments. We do not reject the null in any of our specifications confirming the validity of our instruments.

The results from the two-step GMM estimator are presented in table 6. We include all three pairs of banking development indicators as well as the pair of composite indicators of banking development and government expenditure lagged by one and two years as instrumental variables. The results are comparable to the ones

we found in the previous section. Once more, only Islamic banking has a significant and negative impact on economic growth throughout all the specifications.

Table 6. **Islamic Banking and Growth: Generalized Method of Moments**

	First Lags as Instrumental Variables				First and Second Lags as Instrumental Variables			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control								
Initial GDP per	−0.005	−0.006	−0.006	−0.005	−0.005	−0.006*	−0.006*	−0.006
Capita	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Government	0.002	−0.008	−0.009	−0.005	0.025	0.011	0.016	0.019
Expenditure	(0.072)	(0.072)	(0.072)	(0.072)	(0.064)	(0.064)	(0.063)	(0.064)
Terms of Trade	0.006	0.007	0.007	0.007	0.010	0.010	0.011	0.010
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.008)
Trade Openness	0.002	0.005	0.005	0.004	0.000002	0.002	0.003	0.002
	(0.016)	(0.016)	(0.016)	(0.016)	(0.013)	(0.013)	(0.013)	(0.013)
Quality of	−0.211	−0.059	0.003	−0.086	−0.266	−0.055	−0.009	−0.138
Institutions	(1.676)	(1.685)	(1.692)	(1.677)	(1.277)	(1.282)	(1.278)	(1.275)
Education	0.026	0.026	0.026	0.026	0.030	0.029	0.029	0.029
	(0.027)	(0.028)	(0.028)	(0.028)	(0.021)	(0.021)	(0.021)	(0.021)
Banking Development								
Loans by Islamic	−5.353***				−7.162***			
Banks / GDP	(1.910)				(1.958)			
Loans by Conv.	0.664				0.788			
Banks / GDP	(0.451)				(0.436)			
Assets of Islamic		−2.517***				−3.162***		
Banks / GDP		(0.850)				(0.845)		
Assets of Conv.		0.235				0.284		
Banks / GDP		(0.216)				(0.197)		
Deposits in Islamic			−3.776***				−4.987***	
Banks / GDP			(1.342)				(1.369)	
Deposits in Conv.			0.290				0.361	
Banks / GDP			(0.276)				(0.245)	
Composite Indicator				−0.485***				−0.628***
of Islamic Banking				(0.170)				(0.171)
Composite Indicator				0.278				0.334
of Conv. Banking				(0.233)				(0.214)
Constant	0.236	0.325	0.326	0.240	−0.395	−0.096	−0.302	−0.445
	(3.001)	(2.993)	(2.993)	(3.128)	(2.074)	(2.091)	(2.063)	(2.143)
J-Test p-value					0.825	0.585	0.788	0.722
Observations	300	300	300	300	280	280	280	280

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively.
Source: Author's calculations based on the sources from the list of variables.

3.3. Discussion

The findings from the previous sections rather imply the statistical insignificance of conventional banking development in its impact on economic growth in countries with a dual banking system. This is supported by the findings of Barajas *et al.* (2013) who claim that banking sector depth produces a lower growth impact in countries of the MENA region, where most of the countries in our sample are situated, than in the rest of the world, while in Europe and Central Asia the impact is greater. They explain that the underperformance of the MENA region in financial intermediation could be related to strong state ownership, lack of competition, and lack of progress in financial reform.

Furthermore, our findings related to Islamic banking development and growth strongly suggest that this type of banking development actually hinders economic growth in countries with a dual banking system. We suspect that this is caused by a possible poor performance of Islamic banks' in conducting some of the main banking activities, such as mobilizing savings, efficiently allocating resources, exerting corporate governance, diversifying risk, and lowering transaction costs, which are considered as drivers for economic growth (see Levine 2005). Čihák *et al.* (2013) explain that when financial systems perform these functions poorly it has negative implications on economic growth and the economy in general. They add that if financial institutions allocate funds to privileged or politically connected clients instead of allocating them to clients who would utilize the funds efficiently in worthy projects it would impede economic growth. They also highlight banks' responsibilities in exerting sound corporate governance to prevent firms and

managers from exploiting funds for personal benefits. They further claim that banks and financial engineers might create complex financial products that they market and sell to unsophisticated investors and general public to increase their returns. This might negatively affect economic growth and even disrupt the financial system. We believe that this last point in particular is relevant to Islamic banking which is riddled with complex instruments tailored to be Sharia compliant with marketing targeted especially at devout Muslims.

We also acknowledge the claims of some authors that the potential benefits of Islamic banking might be held back by a lack of economies of scale. Nevertheless, based on the findings of Hasan *et al.* (2016) who suggest that it is the quality of financial institutions that matters and that quantity is largely irrelevant for long-term growth, we believe that quality shortcomings of Islamic banks in performing financial intermediation are the main issue that should be addressed.

As such, the findings do not necessarily imply that authorities should reduce or hamper Islamic banking development. Instead it would more appropriate if they improve their performance through the development of a unified regulatory and legislative framework that is essential to reap the benefits of Islamic banking's further development. Moreover, Song & Oosthuizen (2014) provide a comprehensive study of Islamic banking regulatory and supervisory challenges that need to be addressed and policy implications to be adopted. These include improved transparency of Sharia boards and their role, reforms in accounting standards and financial reporting, consistency of capital regulations, and better liquidity risk management to name a few.

4. Islamic Banking Development and International Trade

4.1. Data Description

In this section we empirically study the effects of conventional and Islamic banking development on trade in countries that have a dual banking system. For this purpose, we use a sample of nineteen countries mainly from the Middle East, North Africa, and Southeast Asia across the time period between 1999 and 2014 (included). The countries are Bahrain, Brunei, Egypt, Indonesia, Iraq, Jordan, Kuwait, Lebanon, Malaysia, Mauritania, Pakistan, Qatar, Saudi Arabia, Senegal, Thailand, Tunisia, Turkey, United Arab Emirates, and Yemen. Compared to the sample used previously we exclude Palestinian territory (West Bank and Gaza) because of data unavailability.

4.2. Regional Trade and Trade Model

To gauge the Islamic banking development we use the indicators that we have used previously, that is, loans extended by Islamic banks to the private sector, their assets, and deposits to real GDP. We isolate the effect of Islamic banking development by including the complementary indicators of conventional banking development as we have done before. We expect that both Islamic and conventional banking development will be beneficial for trade mainly through providing trade finance products to businesses and improving their access to finance.

We expect that Islamic banking development in our sample countries will have the strongest impact on trade with countries that have either fully established Islamic banks or Islamic banking windows in conventional banks. It is reasonable to assume that most of these countries are situated in the MENA region. Thus we expect that Islamic banking development in our sample countries will stimulate trade particularly with this region. To that end, we use the IMF's "Direction of Trade Statistics" database to obtain the indicators of trade between our sample countries and the Middle East, North Africa, Afghanistan and Pakistan (MENAP), which will serve to construct our dependent variables:

- Exports to MENAP: This indicator presents the value of merchandise exports to the Middle East, North Africa, Afghanistan, and Pakistan region. These values are presented on a free on board basis in US Dollars.
- Imports from MENAP: This indicator presents the value of merchandise imports from the Middle East, North Africa, Afghanistan, and Pakistan region. These values are presented on a cost, insurance, and freight basis in US Dollars.

To analyze the relationship between Islamic banking development and trade we refer to the model presented by Beck (2003):

$$Trade_{it} = \alpha + \beta\ IslBD_{it} + \gamma\ ConvBD_{it} + \delta\ X_{it} + \varepsilon_{it}$$

Where "Trade" represents either the "Exports to MENAP as a ratio of real GDP" or "Imports from MENAP as a ratio of real GDP" indicators. "IslBD" and "ConvBD" are the indicators for the Islamic banking development and conventional banking

development respectively, which have been discussed in length earlier. We also add several control variables analogous to the ones used by Beck (2003). To control for a causal link from the income level to trade we include the initial real GDP per capita. We use "Control of Corruption" as a proxy to control for the effect of distortionary governmental policies on both banking development and trade. Finally, "Terms of Trade" and "Total Population" are included as exogenous determinants of the trade shares. We expect countries with higher terms of trade to have a larger trade balance and more populated (larger) countries to have lower export and import shares. Data for all indicators, except trade, were extracted from the World Bank's "World Development Indicators" database.

Table 7. **Summary Statistics of Regional Trade**

Variable	Observations	Mean	Minimum	Maximum	Std. Dev.
Exports to MENAP / GDP	304	0.0472	0.00017	0.23909	0.04715
Imports from MENAP / GDP	304	0.0683	0.00038	0.41716	0.07366
Initial real GDP per capita	304	10942	609.032	50693.7	14945.8
Total Population (Tens of Millions)	304	3.9496	323812	25.445	5.9757
Terms of Trade	304	115.70	56.6697	244.165	39.2579
Control of Corruption	304	-0.1454	-1.5762	1.72285	0.68124
Loans by Islamic Banks to GDP	304	0.0840	0.00000	0.94152	0.15808
Loans by Conv. Banks to GDP	304	0.7263	0.00023	6.38666	0.88499
Assets of Islamic Banks to GDP	304	0.1673	0.00000	2.07339	0.33128
Assets of Conv. Banks to GDP	304	1.4924	0.00078	10.8139	1.81470
Deposits in Islamic Banks to GDP	304	0.1242	0.00000	1.44431	0.23271
Deposits in Conv. Banks to GDP	304	1.2080	0.00050	8.71181	1.47279

Source: Author's calculations based on the sources from the list of variables.

4.2.1. Methodology and Results

To choose an appropriate regression model for our data we begin with the F-test. The test indicates there is some unobserved heterogeneity across countries, thus

a Fixed Effects model would be more appropriate than Pooled OLS. Then we use the Breusch-Pagan Lagrange multiplier test to choose between the Random Effects model and Pooled OLS. This test points out that there is a significant random effect in the panel data, thus a Random Effects model is preferred. Finally, we utilize the Hausman specification test to choose between the Fixed Effects model and the Random Effects model as we suspect the existence of unobserved individual heterogeneity. The test rejected the null hypothesis, implying that there is a correlation between the regressors and unobservable country-specific effects, hence we cannot apply Random Effects model on our data, as it would be inconsistent. This outcome is also in accordance with our intent since we are mostly interested in the effects of time-variant variables on trade and would like to partial out the time-invariant effects and the possible omitted variable bias.

4.2.1.1. Fixed Effects

We start by regressing only our control variables on the exports to MENAP. The results presented in Table 8 indicate that terms of trade and total population have a positive impact on exports while control of corruption is statistically insignificant. The control variable's impact remains the same as we gradually add the banking development indicators (columns 2, 3, and 4). Essentially, the results suggest that both Islamic and conventional banking development positively impact exports to MENA, Afghanistan, and Pakistan.

We are also interested in the effect of banking development on imports from the MENAP region. Thus, we choose imports from MENAP as our dependent variable and repeat the regressions with the same variables used previously. In these regressions (columns 5, 6, 7, and 8) our terms of trade and total population are

significant with a positive coefficient, whereas control of corruption seems to have a negative effect on imports. Furthermore, the results indicate that Islamic and conventional banking development also stimulates imports from MENA, Afghanistan, and Pakistan.

The results from the Fixed Effects regressions support our hypothesis that in countries with a dual banking system Islamic banking development is beneficial for trade with MENAP region. This finding suggests that firms and individuals in our sample countries utilize the external funding and trade finance products provided by Islamic banks to enhance their trading activities with counterparties from the MENAP region. Nevertheless, we suspect that the banking development indicators suffer from measurement errors and that a reverse causality from trade to banking development might be present raising an endogeneity issue. Hence, we proceed by utilizing the GMM estimator.

Table 8. **Islamic Banking and Trade with the MENAP Region: Fixed Effects**

	Exports to MENAP / GDP				Imports from MENAP / GDP			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control								
Terms of Trade	0.020***	0.008**	0.006*	0.006*	0.029***	0.019***	0.017***	0.017***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)
Total Population	0.002***	0.001***	0.001***	0.001***	0.003***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control of	0.0005	0.004	0.007	0.007	−0.025***	−0.022***	−0.020**	−0.020**
Corruption	(0.006)	(0.005)	(0.005)	(0.005)	0.009	(0.008)	(0.008)	(0.008)
Banking Development								
Loans by Islamic		0.111***				0.094***		
Banks / GDP		(0.013)				(0.022)		
Loans by conv.		0.014***				0.013**		
Banks / GDP		(0.003)				(0.005)		
Assets of Islamic			0.059***				0.052***	
Banks / GDP			(0.006)				(0.011)	
Assets of conv.			0.009***				0.008***	
Banks / GDP			(0.002)				(0.003)	
Deposits in Islamic				0.084***				0.076***
Banks / GDP				(0.009)				(0.015)
Deposits in conv.				0.010***				0.007**
Banks / GDP				(0.002)				(0.004)
Constant	−0.036***	−0.025***	−0.026***	−0.025***	−0.070***	−0.060***	−0.061***	−0.060***
	(0.011)	(0.009)	(0.009)	(0.009)	(0.016)	(0.015)	(0.015)	(0.015)
R-Squared	0.189	0.462	0.466	0.457	0.235	0.333	0.333	0.330
Observations	304	304	304	304	304	304	304	304

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively. All values of presented R-Squared are values of Adjusted R-Squared.
Source: Author's calculations based on the sources from the list of variables.

4.2.1.2. GMM

In this section we use the GMM estimator to address the endogeneity problem. In our specification we consider the banking development indicators as endogenous variables. This allows us to address the possible reverse causality, omitted variable bias, and measurement errors from these indicators. For these endogenous variables we use their first lag as an instrumental variable. We also add the second lag in following regressions as a robustness check. As the model becomes

over-identified we perform Hansen's J test to check the validity of the lagged variables as instruments. We find that the instruments are valid in all the specifications. The results regarding the relation between banking development and exports to the MENAP region are presented in table 9 and between banking development and imports from the MENAP region in table 10. As we have done previously, we present the complementary banking indicators in several columns. We find that more populated countries have lower imports. We also find that an increase in control of corruption has a negative impact on imports from the MENAP region. This is somewhat counterintuitive, however corruption could be abused to bypass arduous bureaucratic procedures and thus facilitate import for businesses willing to operate in this manner. Nevertheless, the coefficients of banking development indicators, which are our main concern, remain significant and positive in all specifications for both Islamic and conventional banking. This strongly suggests that Islamic and conventional banking developments in countries with a dual banking system have a positive impact on trade with the MENAP region.

Table 9. **Islamic Banking and Exports to the MENAP Region: GMM**

	First Lags as Instrumental Variables			First and Second Lags as Instrumental Variables		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Control						
Initial real GDP	0.008***	0.008***	0.008***	0.008***	0.007***	0.007***
per capita	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Terms of Trade	−0.010**	−0.074	−0.083	−0.085*	−0.053	−0.067
	(0.049)	(0.050)	(0.051)	(0.048)	(0.048)	(0.050)
Total Population	−0.002	0.001	0.001	−0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Control of	−0.010**	−0.005	−0.004	−0.011***	−0.005	−0.004
Corruption	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Banking Development						
Loans by Islamic	0.085***			0.089***		
Banks / GDP	(0.130)			(0.015)		
Loans by conv.	0.027***			0.030***		
Banks / GDP	(0.004)			(0.004)		
Assets of Islamic		0.034***			0.038***	
Banks / GDP		(0.006)			(0.006)	
Assets of conv.		0.014***			0.014***	
Banks / GDP		(0.002)			(0.002)	
Deposits in Islamic			0.058***			0.064***
Banks / GDP			(0.008)			(0.009)
Deposits in conv.			0.016***			0.017***
Banks / GDP			(0.002)			(0.002)
Constant	0.022***	0.018***	0.019***	0.017***	0.014***	0.016***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
J-Test p-value				0.371	0.092	0.215
Observations	285	285	285	266	266	266

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively.

Source: Author's calculations based on the sources from the list of variables.

Table 10. **Islamic Banking and Imports from the MENAP Region: GMM**

	First Lags as Instrumental Variables			First and Second Lags as Instrumental Variables		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Control						
Initial real GDP	0.003	0.003	0.002	0.004*	0.004	0.002
per capita	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Terms of Trade	0.002	0.005	0.004	0.004	0.007	0.006
	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Total Population	−0.020***	−0.014***	−0.014***	−0.019***	−0.013***	−0.013***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Control of	−0.045***	−0.039***	−0.038***	−0.045***	−0.038***	−0.037***
Corruption	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Banking Development						
Loans by Islamic	0.098***			0.095***		
Banks / GDP	(0.022)			(0.023)		
Loans by conv.	0.040***			0.043***		
Banks / GDP	(0.009)			(0.009)		
Assets of Islamic		0.045***			0.044***	
Banks / GDP		(0.010)			(0.010)	
Assets of conv.		0.021***			0.022***	
Banks / GDP		(0.004)			(0.004)	
Deposits in Islamic			0.077***			0.079***
Banks / GDP			(0.015)			(0.015)
Deposits in conv.			0.025***			0.025***
Banks / GDP			(0.004)			(0.005)
Constant	0.026***	0.018**	0.021***	0.019**	0.014*	0.016**
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
J-Test p-value				0.925	0.484	0.541
Observations	285	285	285	266	266	266

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively.
Source: Author's calculations based on the sources from the list of variables.

4.3. Global Trade

We would like to further develop this study and analyze how Islamic and conventional banking development in countries with a dual banking system affects global trade. In addition to trade with the MENAP region, we presume that firms and individuals in countries with a dual banking system might rely on Islamic banking

solutions for trade with their worldwide partners as well. Furthermore, businesses inclined towards Islamic banking might even urge their indifferent trade partners to use Islamic banking in the trade activities between them. Hence, we expect that Islamic banking development in countries with a dual banking system will have a positive impact on their global trade activities.

For this purpose we introduce two new dependent variables:

- Ratio of Exports to Global Destinations to real GDP: This indicator presents the value of merchandise exports from our sample countries to countries worldwide. These values are presented on a free on board basis in US Dollars.
- Ratio of Imports from Global Destinations to real GDP: This indicator presents the value of merchandise imports from countries worldwide to our sample countries. These values are presented on a cost, insurance, and freight basis in US Dollars.

For consistency, we extracted these indicators from the IMF's "Direction of Trade Statistics" database. Real GDP values were extracted from the World Bank's "World Development Indicators" database. The control variables and banking development indicators remain unchanged from the previous section.

Table 11. **Summary Statistics of Global Trade**

Variable	Observations	Mean	Minimum	Maximum	Std. Dev.
Exports to Global Destinations / GDP	304	0.4787	0.03843	1.6178	0.34609
Imports to Global Destinations / GDP	304	0.4423	0.04393	1.3050	0.27533
Initial real GDP per capita	304	10942	609.032	50693.7	14945.8
Total Population (Tens of Millions)	304	3.9496	323812	25.445	5.9757
Terms of Trade	304	115.70	56.6697	244.165	39.2579
Control of Corruption	304	-0.1454	-1.5762	1.72285	0.68124
Loans by Islamic Banks to GDP	304	0.0840	0.00000	0.94152	0.15808
Loans by Conv. Banks to GDP	304	0.7263	0.00023	6.38666	0.88499
Assets of Islamic Banks to GDP	304	0.1673	0.00000	2.07339	0.33128
Assets of Conv. Banks to GDP	304	1.4924	0.00078	10.8139	1.81470
Deposits in Islamic Banks to GDP	304	0.1242	0.00000	1.44431	0.23271
Deposits in Conv. Banks to GDP	304	1.2080	0.00050	8.71181	1.47279

Source: Author's calculations based on the sources from the list of variables.

4.3.1. Fixed Effects

Once again we find that the Fixed Effects model is the most appropriate for our analysis. We first regress just the control variables on aggregate exports then proceed by gradually adding the banking development indicators. The results presented in Table 12 (columns 1, 2, 3, and 4) show that except for control of corruption all our variables are significant with a positive coefficient. This suggests that in countries with a dual banking system Islamic banking development does have a stimulating effect on exports to countries worldwide. The regressions with aggregate imports to real GDP as the dependent variable produce comparable results (columns 5, 6, 7, and 8). Thus, it is reasonable to say that conventional and Islamic banking development has a positive impact on global trade in countries with a dual banking system.

The results on the positive impact of Islamic and conventional banking development and global trade are very interesting; nevertheless, we suspect the presence of an endogeneity bias. Again, we expect that the banking development indicators suffer from measurement errors accompanied with a possible reverse causality from trade to banking development. To address this issue we use the generalized method of moments estimator (GMM).

Table 12. **Islamic Banking and Global Trade: Fixed Effects**

	Exports to Global Destinations / GDP				Imports from Global Destinations / GDP			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control								
Terms of Trade	0.347***	0.268***	0.255***	0.255***	0.169***	0.123***	0.115***	0.115***
	(0.025)	(0.021)	(0.021)	(0.021)	(0.026)	(0.025)	(0.025)	(0.025)
Total Population	0.007***	0.005***	0.005***	0.005***	0.013***	0.010***	0.010***	0.010***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Control of	−0.058	−0.036	−0.023	−0.022	−0.060	−0.047	−0.031	−0.027
Corruption	(0.037)	(0.029)	(0.029)	(0.029)	(0.038)	(0.035)	(0.035)	(0.036)
Banking Development								
Loans by Islamic		0.877***				0.242**		
Banks / GDP		(0.079)				(0.095)		
Loans by conv.		0.038**				0.122***		
Banks / GDP		(0.019)				(0.023)		
Assets of Islamic			0.461***				0.172***	
Banks / GDP			(0.038)				(0.046)	
Assets of conv.			0.026***				0.065***	
Banks / GDP			(0.010)				(0.012)	
Deposits in Islamic				0.649***				0.268***
Banks / GDP				(0.053)				(0.064)
Deposits in conv.				0.026**				0.073***
Banks / GDP				(0.013)				(0.015)
Constant	−0.204***	−0.131**	−0.129**	−0.122**	−0.269***	−0.214***	−0.225***	−0.223***
	(0.069)	(0.055)	(0.055)	(0.055)	(0.072)	(0.066)	(0.066)	(0.066)
R-Squared	0.451	0.664	0.667	0.665	0.294	0.414	0.415	0.411
Observations	304	304	304	304	304	304	304	304

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively. All values of presented R-Squared are values of Adjusted R-Squared.
Source: Author's calculations based on the sources from the list of variables.

4.3.2. GMM

In this section we use the GMM estimator to address the potential endogeneity problem. Once again, we consider the banking development indicators as endogenous variables. This allows us to address the possible reverse causality, omitted variable bias, and measurement errors from these indicators. To minimize clutter we only present results from regressions with banking development indicators lagged by one and two years as instrumental variables. These results are comparable to the ones from the regressions that employ only one lag. We perform Hansen's J test to check the validity of the lagged variables as instruments. We find that the instruments are valid in all our specifications.

The results regarding the relation between banking development and global exports and imports are presented in table 13. Terms of trade, population size, and control of corruption seem to have a positive impact on trade with global partners; meanwhile initial GDP per capita has a significant positive coefficient relative to global exports and a negative one relative to global imports. More importantly, the coefficient of conventional banking development remains significant and positive in all specifications while the coefficient of Islamic banking development is positive and significant in relation to global export and becomes statistically insignificant in relation to global imports. We can thus conclude that Islamic and conventional banking development has a positive impact even on global trade.

Table 13. **Islamic Banking and Global Trade: GMM**

	Exports to Global Destinations / GDP			Imports from Global Destinations / GDP		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Control						
Initial real GDP	0.004***	0.004**	0.004**	−0.002*	−0.003**	−0.003**
per capita	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Terms of Trade	0.003***	0.003***	0.003***	0.001**	0.001***	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total Population	0.012	0.032**	0.035**	0.012	0.024*	0.029**
	(0.016)	(0.016)	(0.016)	(0.011)	(0.013)	(0.013)
Control of	0.020	0.128**	0.133**	0.056	0.131***	0.148***
Corruption	(0.048)	(0.052)	(0.053)	(0.041)	(0.041)	(0.042)
Banking Development						
Loans by Islamic	1.014***			−0.080		
Banks / GDP	(0.112)			(0.084)		
Loans by conv.	0.117***			0.197***		
Banks / GDP	(0.023)			(0.018)		
Assets of Islamic		0.542***			−0.013	
Banks / GDP		(0.054)			(0.039)	
Assets of conv.		0.042***			0.090***	
Banks / GDP		(0.012)			(0.009)	
Deposits in Islamic			0.802***			0.040
Banks / GDP			(0.074)			(0.057)
Deposits in conv.			0.049***			0.109***
Banks / GDP			(0.015)			(0.011)
Constant	0.089	0.149	0.154	−0.206***	−0.149*	−0.131
	(0.078)	(0.164)	(0.110)	(0.068)	(0.081)	(0.082)
J-Test p-value	0.233	0.256	0.208	0.504	0.502	0.444
Observations	302	302	302	302	302	302

Note: Standard errors are presented in parenthesis. *, **, *** denote statistical significance at 10%, 5%, and 1% levels respectively.
Source: Author's calculations based on the sources from the list of variables.

5. Conclusions and Implications

This study aims at understanding the effect of Islamic banking development on economic growth and trade in countries with a dual banking system. Even though much research has been dedicated to studying conventional financial development with a general consensus that it boosts economic growth and trade, there remains a

lacuna in understanding the economic impacts of Islamic finance, which we partially try to fill. Imam & Kpodar (2015) contribute to this area of research with a comprehensive study supported by robust empirical techniques on the impact of Islamic banking on economic growth in fifty-two developing countries. In this study, we follow a comparable procedure, mostly regarding the choice of model and variables, to see if their findings still hold for a more up-to-date sample with a focus on countries that employ a dual-banking system. We further enhance the research by studying the impact of Islamic banking development on international trade.

We conduct a series of statistical tests to choose the most appropriate estimator for our data from a sample of twenty countries over the period from 1999 through 2014. The tests indicate there is no observed individual heterogeneity in our data, thus a Pooled OLS estimator is the most appropriate to study the effect of Islamic banking development on growth. Furthermore, we find that one of the assumptions of Pooled OLS is violated due to the presence of heteroskedasticity. Consequently, we use several remedies to tackle this issue, namely changing the variables to their logarithmic values, using heteroskedasticity-corrected robust standard errors, and weighted least squares. We also suspect the presence of an endogeneity problem caused by measurement errors of banking development indicators as well as a possible reverse causality from growth to banking development. To address this problem we utilize a generalized method of moments estimator and use the lagged values of the endogenous variables as instruments.

Our findings regarding the impact of banking development in countries with a dual banking system do not show a statistically significant impact of conventional banking on economic growth. This is in conformity with the findings of Barajas *et al.*

(2013) who claim that banking sector depth produces a lower growth impact in countries of the MENA region to which most of our sample countries belong. More importantly, we find that Islamic banking development hinders growth in countries with a dual banking system. Levine (2005) explains that financial intermediaries induce growth through functions such as efficient allocation of capital, exerting corporate governance, diversifying and managing risk, mobilizing and pooling savings, as well as facilitating trade and exchange of goods. We believe that Islamic banking might lack in quality when performing some of these functions and thus not contribute to growth but impede it instead.

Similar to conventional banks, Islamic banks could positively impact international trade by offering trade finance products and improving businesses' access to finance (see Dennis 2006 and Manova 2013). To study the impact of Islamic banking development on international trade in countries with a dual banking system we first break down trade into two types. The first one is regional trade with the Middle East and North Africa region including Afghanistan and Pakistan (MENAP). We expect that Islamic banking will have the greatest impact on trade between our sample countries and countries that have at least some form of Islamic banking. We have reasons to believe that most of these countries are found in the MENAP region. The second type of trade is global trade, that is trade between our sample countries and countries worldwide.

We utilize the Fixed Effects estimator on our trade model since statistical tests indicated to the presence of unobserved heterogeneity across the nineteen countries in our sample (Palestinian territory was excluded for lack of data). Once again we suspect that an endogeneity problem might be present as a result of measurement

errors of banking development indicators accompanied by a possible reverse causality from trade to banking development. Therefore, we employ a generalized method of moments estimator and use the lagged values of the endogenous variables as instruments.

The findings from these regressions imply that both conventional and Islamic banking development in countries with a dual banking system have a positive impact on international trade. This suggest that individuals and firms take advantage of the external capital and trade finance products offered by banks to enhance their foreign trade activities.

We believe that authorities in countries with a dual banking system should be keener on making supervisory and regulatory reforms related to Islamic banking taking into consideration a harmonious coexistence of the two types of banking. Furthermore, our findings have shown Islamic banking could be utilized by governments with intentions of improving their international trade position.

Finally, this study could be improved by advances in data availability especially those of Islamic banking development which could allow for more precise and robust inferences. Studying the effects of Islamic capital markets needs to be accompanied by the availability of data on Sukuk. Also, a longer time period of the sample would allow the averaging of all variables to smooth out short-term fluctuations in growth rates. A possible extension to this work would be studying the impact of Islamic banking development on poverty alleviation, inequality, and inception of small and medium-sized enterprises (SMEs).

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Appendix

Table A1. **Percentage of Muslim Population**

Country	Muslim Population (%)
Bahrain	70.2
Brunei	67
Egypt	94.7
Indonesia	87.2
Iraq	98.9
Jordan	98.8
Kuwait	86.4
Lebanon	59.7
Malaysia	61.4
Mauritania	100
Pakistan	96.4
Palestine	97.5
Qatar	77.5
Saudi Arabia	97.1
Senegal	95.9
Thailand	5.8
Tunisia	99.8
Turkey	98.6
UAE	76
Yemen	99
Average	83.4
Minimum (Thailand)	5.8

Source: PEW Research Center

List of countries from the MENAP region (IMF): Algeria, Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Mauritania, Morocco, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen.

Table A2. **Correlation Matrix**

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDP Growth per Capita	(1)	1.000											
Assets of Islamic banks to GDP	(2)	-0.134	1.000										
Deposits of Islamic banks to GDP	(3)	-0.137	0.992	1.000									
Loans by Islamic banks to GDP	(4)	-0.131	0.985	0.264	1.000								
Assets of conv. banks to GDP	(5)	0.051	0.390	0.365	0.401	1000							
Deposits of conv. banks to GDP	(6)	0.054	0.362	0.376	0.374	0.998	1.000						
Loans by conv. banks to GDP	(7)	0.054	0.395	0.414	0.426	0.952	0.942	1.000					
Initial GDP per capita	(8)	-0.188	0.330	0.344	0.373	-0.062	-0.072	-0.027	1.000				
Government expenditure	(9)	0.056	0.011	0.013	0.026	0.010	0.012	-0.018	-0.054	1.000			
Terms of Trade	(10)	-0.036	0.196	0.211	0.182	-0.115	-0.122	-0.082	0.103	0.086	1.000		
Trade Openness	(11)	0.012	0.264	0.270	0.290	0.493	0.489	0.552	0.217	0.220	-0.076	1.000	
Quality of Institutions	(12)	-0.115	0.365	0.385	0.409	0.235	0.219	0.305	0.750	0.076	-0.023	0.434	1.000

Source: Author's calculations based on the sources from the list of variables.