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Master Thesis

Does the banking system affect banks' performance? Islamic vs. conventional banking

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As a last point, I want to clarify that I do not intend to promote any political opinions.

Gratefully,
Sophie B. Blasig

Abstract

In recent years, Islamic banking experienced an upturn and gained importance on the world's financial markets. However, evidence in the literature on differences in performance with respect to conventional banks is often diverging or inconclusive. In this master thesis, both bank types are compared in terms of profitability, efficiency, liquidity, solvency and credit risk based on financial ratios. Investigated are banks from Bangladesh, Bahrain, Jordan, Kuwait, Malaysia, Oman, Qatar, Saudi Arabia and the United Arab Emirates for the years 2008 to 2015. The results of a two sample t-test reveal that conventional banks outperform Islamic banks in respect of most dimensions. Although Islamic banks are more liquid and perform better in one efficiency ratio, conventional banks prevail with respect to profitability, solvency and credit risk. A logistic regression analysis shows that banks can be significantly categorized into being conventional or Islamic based on efficiency, liquidity and credit risk ratios. Finally, ordinary least squares regressions show that the financial performance as such is determined largely similar for both Islamic and conventional banks as significant differences exist only for three out of ten ratios. Some of the findings contradict studies that were carried out before the onset of the financial crisis in 2008 and support the results of more recent studies. The results further indicate that there are differences in performance across countries, especially with respect to Islamic banks.

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List of abbreviations

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
AOSSG	Asian-Oceanian Standard-setters Group
ASEAN	Association of Southeast Asian nations
BD	Bangladesh
BH	Bahrain
CB	Conventional bank
CTA	Cash-to assets ratio
CTD	Cash-to-deposits ratio
DTA	Debt-to-assets ratio
DTE	Debt-to-equity ratio
GCC	Gulf Cooperation Council
IASB	International Accounting Standards Board
IB	Islamic bank
IFSB	Islamic Financial Services Board
JO	Jordan
KW	Kuwait
LTA	Loans-to-assets ratio
LTD	Loans-to-deposits ratio
MY	Malaysia
OEA	Operating expenses-to-assets ratio
OER	Operating expenses-to-operating income ratio
OLS	Ordinary least squares
OM	Oman
QR	Qatar
RIA	Restricted investment account
ROA	Return on assets ratio
ROE	Return on equity ratio
SME	Small- and medium-sized enterprise
SR	Saudi Arabia
UAE	United Arab Emirates
URIA	Unrestricted investment account
USA	United States of America

1. Introduction

Islamic finance is a phenomenon that is increasingly recognized on the world's financial markets. It is originating in the Middle East where today the growth rates of Islamic financing assets are exceeding those of conventional banking assets (e.g. in Saudi Arabia, Bahrain, Kuwait and Qatar). In 2014, the assets of Islamic banks grew by 34% in the Gulf Cooperation Council (GCC)[1] countries (EY, 2015). As a result, Islamic finance is now systemically important in the Middle East but also in Asia (IMF, 2017). In 2015, total worldwide Islamic financial services comprised $1.88 trillion of which $1.497 trillion are Islamic banking assets (IFSB, 2016).

Recently, Saudi Arabia drew the attention of global investors when it announced the issuance of Islamic bonds ('sukuk'), amounting to $9 billion. According to the Ministry of Finance, investors placed bids of more than $33 billion attesting a grand interest in Islamic financing products not only stemming from the Middle East (Narayanan & Sharif, 2017). Financing in accordance with the Sharia[2] is also spreading to non-Muslim countries. For example the London stock exchange designed different indices that cover Islamic financing activities. Especially in the light of the devastating consequences of the subprime mortgage crisis in 2007 in the USA and its development to a global financial crisis which was caused and fuelled by speculative transactions, exorbitant gearing as well as a large gap between savings and expenditure in the USA, Islamic financing is considered as an arising alternative because these procedures are forbidden in Islamic banking (McKibbin & Stoeckel, 2010; Saeed & Izzeldin, in press).

Islamic banks differ from conventional banks as they face a couple of prohibitions imposed by the Sharia. They do not pay or receive interest since it is not allowed to generate money with money (Al-Hares, AbuGhazaleh, & El-Galfy, 2013). Further, they must not transact business with customers that earn money with products which are forbidden in the Islam, e.g. gambling, pork or alcohol. As mentioned before, excessive risk, uncertainty or exploitation is not permitted (El-Hawary, Grais, & Iqbal, 2004; Khediri, Charfeddine, & Youssef, 2015). Risk is further dispersed by the principle of profit and loss sharing according to which both customer and bank bear potential gains or losses. This shall prevent making advantage of the other party and recklessness in managing the funds (El-Hawary et al., 2004; Khediri et al., 2015). Islamic banks claim this principle as one of their key advantages, however, it is often criticized that Islamic banking does not differ from conventional banking and is not more ethical or religious (Khan, 2010). Some even argue that Muslims are exploited by Islamic banks (Khediri et al., 2015). The focus of this research is different. It examines financial reasons to choose or avoid an Islamic bank, for instance the solvency and liquidity of banks that convey security.

As Islamic banking became more prominent in recent years, it is an increasingly researched topic. Nevertheless, the extent of academic literature on Islamic finance is still comparatively small (Beck, Demirgüç-Kunt, & Merrouche, 2013). A couple of studies compare Islamic and conventional banks on various dimensions based on accounting ratios but yet the results are diverging and not precise. Jawadi, Cheffou and Jawadi (2016) for instance compare ten conventional and ten Islamic banks on whether they achieve different returns but do not find significant results. Samad (2004) studies the profitability, liquidity and credit risk of both Islamic and conventional banks in Bahrain but the results reveal substantial significant differences in credit risk only. On the contrary, a study also based on

[1] The GCC is an economic and political regional agreement. It was established in 1981 and consists of Bahrain, Kuwait, Qatar, Oman, Saudi Arabia and the United Arab Emirates (UAE) (Sikimic, 2015).

[2] The Islamic religious law

financial ratios in the GCC yields that Islamic banks are significantly more profitable than conventional banks (Olson & Zoubi, 2008). Khediri et al. (2015) confirm this in their research on the GCC countries excluding Oman. Further, they also find Islamic banks to be more liquid. In their study on 24 countries Beck et al. (2013) show that Islamic banks are less cost-efficient. Similarly, Johnes, Izzeldin and Pappas (2014) detect that Islamic banks are less efficient in the method of banking; but more efficient in terms of managerial efficiency than conventional banks. On the contrary, Olson and Zoubi (2008) state that Islamic banks are generally less efficient. Another point of deviation is risk management. Some studies find Islamic banks to be better at managing credit risk (Khediri et al., 2015; Samad, 2004). In contrast, Rahman, Rahman and Azad (2015) suggest that conventional banks are better at handling risk and have more advanced risk management techniques in Bangladesh.

Summarizing the previous studies, the differences between conventional and Islamic banks are still ambiguous. Especially in terms of financial ratios, consistent results are lacking thus far. Moreover, the fact that there is no theory yet that explains differences between Islamic and conventional banks constitutes a gap in the literature. This research contributes to the discussion of this topic in the literature and provides starting points for further research as the issue of Islamic banking is expanding and increasingly also addressing non-Muslim countries. Even in non-Islamic countries conventional banks increasingly provide Sharia-compliant services (e.g. Warde, 2000). Thus, it might also be interesting for Western officials to study how Islamic banks are structured and operating in order to monitor potential competitors or even stimulate conventional banks to broaden their offer to attract additional customers.

In this thesis I examine whether Islamic and conventional bank performance differs in terms of five dimensions: profitability, efficiency, liquidity, solvency and credit risk. Each is measured by two financial ratios. Additionally, it is assessed whether the financial performance of both bank types is determined equally. Financial performance is measured by return on assets (ROA) and return on equity (ROE). This leads to the following research question:

To what extent do the dimensions of bank performance and the determinants of financial performance (which is measured by ROA and ROE) differ between Islamic and conventional banks in Asian countries?

In order to answer the research question, the following three sub-questions are formulated:

- Which banking system is outperforming the other?
- Which dimensions are able to discriminate between conventional and Islamic banks?
- Is financial performance determined differently for conventional and Islamic banks?

To answer the first sub-question, a two sample t-test is performed. The latter two sub-questions are resolved by means of logistic and ordinary least squares (OLS) regressions.

The t-test results reveal that conventional banks outperform Islamic banks. Islamic banks are more liquid and perform better in one indicator of efficiency but conventional banks prevail with respect to profitability, solvency and credit risk. Some of the results deviate from the findings in the majority of literature, for instance it is indicated that the financial crisis terminated the predominance in terms of profitability of the mean of Islamic banks in this sample.

The results of the logistic regression show that efficiency, liquidity and credit risk are most powerful in distinguishing between Islamic and conventional banks where especially one efficiency ratio and one credit risk ratio achieve high coefficients. However, it is not possible to significantly discriminate between both bank types based on the profitability and solvency dimensions.

The financial performance of both bank types is determined largely similar, though differences exist with respect to three indicators. Operating expenses-to-total assets are deemed to measure efficiency, while a higher ratio signals less efficiency. The financial performance of Islamic banks is negatively affected by higher inefficiency; however that of conventional banks is positively affected. Furthermore, the measures of liquidity, cash-to-total assets and cash-to-customer deposits are positively affecting the financial performance of Islamic banks but do not have a significant relationship with that of conventional banks. At the same, time it becomes apparent that the relationship of the independent variables with financial performance sometimes varies depending on whether ROA or ROE is utilized as the dependent variable. The results further emphasize that there are differences in performance between countries, especially with respect to Islamic banks.

This research makes different contributes to the literature. First, in contrast to the previous literature considered here (e.g. Bashir, 2003) I make use of lagged independent variables in the OLS regressions. It seems reasonable that for instance (in)efficient operations in one year affect the financial performance in the next year. Second, as opposed to an extensive part of the literature that relies on data from Bankscope (e.g. Beck et al., 2013; Johnes et al., 2014; Khediri et al., 2015; Rashwan, 2012; Samad, 2004), a platform that reports data for over 29,000 financial institutions worldwide including 80 Islamic banks in 2005, this research makes use of hand-collected data (Gheeraert, 2014). Scholars detected problems related to Bankscope as for instance interest revenues and expenses reported for Islamic banks (Beck et al., 2013). Moreover, Čihák and Hesse (2008) criticize that data limitations prevent the distinction between profit and loss sharing contracts and other investment contracts and thus impede more detailed analyses. More importantly, Gheeraert (2014) states, that Bankscope labels some banks as Islamic which do not carry out any Islamic operation, whereas a number of important Islamic banks are not included. By hand-collecting the data from the annual reports of the particular banks the data can be checked for (non-)Islamic operations. Third, the latest studies (e.g. Khediri et al., 2015; Siraj & Pillai, 2012) find evidence that Islamic banks were also hit by the financial crisis but later than conventional banks. Moreover, whereas Islamic banks outperformed conventional banks before the crisis, this relationship reversed after 2008 at least with respect to profitability and efficiency (Rashwan, 2012). This research investigates the subsequent years 2008 to 2015 and provides new insights into the consequences of the financial crisis.

The thesis is structured into the following sections: the literature review firstly introduces the general function of a bank. Then, the development of Islamic banking is described and the particular contracts and concepts common in Islamic banking are explained and differences to the conventional banking system are highlighted. This is followed by an assessment whether both bank types can be compared in terms of accounting rules and a literature review of previous research related to the five dimensions under study. The third section explains the data collection method, the operationalization of the variables and mentions the research methods. The fourth section presents the results of the data analysis, followed by an interpretation and discussion in section five. The thesis ends with the conclusion, limitations of this research and suggestions for further research.

2. Literature review

To compare the performance of Islamic and conventional banks, it is pivotal to first understand how banks operate and how both bank types differ in general. This section provides information on the role of banks in general, outlines the development of Islamic banking and its global spread today, and introduces some of the distinct characteristics of Islamic banking. It is also assessed whether a comparison of both bank types is feasible in terms of accounting regulations. The literature review concludes with an examination of the results of previous research and the hypotheses development.

2.1 Tasks and purposes of banks in general

According to Wright (2012), the worldwide technological and economic progress is owed to financial intermediaries. Within the financial system entrepreneurs in need of financing are brought into contact with financial intermediaries and individuals that provide loans. Both entrepreneurs and loan-providers benefit from this business relationship. Loans are also benefitting the economy since money is usually borrowed to make major investments e.g. in real estate or cars. In general, there are different types of financial intermediaries, such as venture capitalists, insurance companies, hedge funds or banks (Hillier, Grinblatt, & Titman, 2011). They are linked with other financial institutions and different markets in a financial system. The financial system as such serves to share risks and facilitates trading and the allotment of funds (Wright, 2012).

Banks as one kind of financial intermediary interact within a national and international banking system. Often, a central bank, responsible for a country's monetary policy and price stability, oversees the national banks (Deutsche Bundesbank, 2015). Central banks can also be a multinational institution as in case of the European Central Bank for the banks in the euro area in the European Union. Today almost all countries' banking systems have a central bank including the countries studied here but central banks are not part of this research.

Banks are often further distinguished according to the type of assets they operate with. For instance, commercial and savings banks receive short-term deposits but invest in long-term assets such as businesses (in case of commercial banks) or mortgage loans to private people (savings bank) (Wright, 2012). Investment banks rather engage in the capital markets in issuing public debt and equity for the customers or they provide advice to the customers (Karim, 2001; Wright, 2012). The major risk for commercial banks is credit risk (clients cannot pay be the loan) whereas investment banks mainly face risks related to the trading of securities (Karim, 2001; Wright, 2012). While the non-tradable assets of commercial banks were "typically held on the balance sheet until maturity", securities involve more risks (Karim, 2001, p. 176). In case the securities tank, it is likely that depositors suffer huge losses, because the bank's assets are worth more in the state of going concern than under liquidation (Karim, 2001). Banks can also conduct both commercial and investment banking operations. This is called a universal banking model, e.g. applied in Germany (Wright, 2012).

The general business model of a bank can be characterized as follows: banks make profit by giving credits to customers on whom they charge interest. To be able to provide these credits, banks administer the funds of depositors. For medium- and long-term deposits, the bank pays interest to the lenders, however the interest paid is lower than the interest that is received from the loans (Deutsche Bundesbank, 2015). This appears on the balance sheet as follows: shortly outlined, the asset side lists cash reserves and loans granted to private persons, companies and banks, whereas the liabilities side lists loans obtained from banks and liabilities to companies and private individuals

plus equity and reserves (Deutsche Bundesbank, 2015). These liabilities are for instance current or demand deposits that can be withdrawn by the customer at any time. Another deposit would be the savings account that pays varying interest but money can be withdrawn without a financial penalty. Time deposits cannot be withdrawn before an agreed point in time. Usually customers with a time deposit receive a higher and fixed interest than savings account holders (Wright, 2012). A more detailed version of a bank's balance sheet is given in Sub-section 2.3.

In order to realize this business model the bank has to perform certain tasks. One of them is the issuance of debt or equity to the public for themselves or companies, called underwriting. The bank acts as the underwriter and advises the company which security to issue and at what price. Simultaneously, the bank takes on related risks like being unable to sell all securities (Hillier et al., 2011). El-Hawary et al. (2004) describe four additional purposes. One is the role as broker or intermediary between borrowing and lending clients as explained above.

Another task is to ensure a well-functioning accounting and payment system, and the implementation of payments that are conducted e.g. with bank transfers or via electronic payment transactions (El-Hawary et al., 2004).

The third task of banks is risk transformation. According to Allen and Gale (2000) non-diversifiable risk can be averaged over time so that individuals are less affected. This is called intertemporal smoothing. Banks can establish reserves in times of high ROA and distribute them in times of low ROA. Thus they are able to pay out a relatively stable amount each period and reduce the risk of depositors (Allen, Carletti, & Gu, 2015; Allen & Gale, 2000). For the purpose of further reducing risk, several hedging instruments as currency swaps (to reduce the risk stemming from exchange rate movements) or forward contracts (to hedge against price fluctuations) were created (Hillier et al., 2011). However, nowadays derivatives do not fulfill their original objective anymore, but rather constitute an instrument for speculative transactions (Khan, 2010).

Finally, asset transformation which refers to the transformation of deposits into loans is the fourth purpose of banks. The deposits are typically short-term for commercial banks and transformed into long-term loans (Wright, 2012). Therefore, different aspects as the scale and maturity of the items have to be considered (El-Hawary et al., 2004). In alignment with this, bank employees have to manage assets and liabilities for three reasons. The first is liquidity management: bankers have to ensure that enough resources are available to repay deposits that reach maturity or are withdrawn but on the other hand it has to be guaranteed that not too much cash is unused (Wright, 2012). Often a minimum of reserves is required the central bank and/ or the government. All reserves that exceed this level are called excess reserves. However, since banks major revenue sources loans and reserves do not generate interest, banks avoid having too much cash (Wright, 2012). The second reason is to make profit. Assets have to be managed in such a way that assets are profitable and liabilities should be obtained low-priced. Still, credit risk has to be taken into account here. Banks can charge higher interest rates for riskier loans. In order to estimate the risk involved, banks collect information about the borrowers and so reduce asymmetric information. Often banks specialize in loan target groups and further reduce costs and time invested in customer screening (Wright, 2012). The third reason for managing assets and liabilities is capital adequacy management. It means that banks possess a certain amount of equity to keep operating in times of financial distress but not too much to be unprofitable, similar to liquidity management (Wright, 2012).

In relation to this, van Greuning and Iqbal (2009) argue that conventional banks are inherently subject to a mismatch of assets and liabilities since deposits directly create an obligation before its

funds can be invested or it is assured whether investment opportunities are available. Moreover, the fact that short-term funds are used to make long-term loans creates the risk of maturity mismatch and rather hampers investment in non-liquid assets (van Greuning & Iqbal, 2009). This is different for Islamic banks. Due to the sharing of profit and loss and the special nature of other investment and financing contracts, the money allocated to depositors is linked to the profit generated by the bank's assets (van Greuning & Iqbal, 2009).

2.1.1 Banking in the countries under study

The practice of commercial banking is prevalent in the GCC countries and Jordan, but an increase in Islamic banking assets is noticeable (Maghyereh, 2004; Turk-Ariss, 2009). Still, these countries are considered as emerging economies with rather poorly developed capital markets and finance mainly originating from banks (Turk-Ariss, 2009). Their banking system is characterized as monopolistically competitive (Turk-Ariss, 2009). So, despite a rather high degree of concentration in the banking sector (e.g. in Qatar the three largest banks represent approximately 70% of the total assets), competition is given (Al-Hassan, Khamis, & Oulidi, 2010). During the last decades many of these countries were subject to interventions as financial liberalization in terms of deregulation and privatization of banks with the purpose of promoting (international) competition (Turk-Ariss, 2010). According to Turk-Ariss (2010), the majority of countries with developing markets promote financial liberalization which fosters the transition to a universal banking system around the world. Likewise, five nationalized banks were operating in Bangladesh until the 1980s when first attempts towards denationalization were undertaken (Samad, 2008). Today, private and foreign banks are in operation as well. Bangladesh, Jordan and the GCC are considered as bank-based systems whereas Malaysia is identified as market-based system (Al Karasneh & Bolbol, 2006; Demirgüç-Kunt & Levine, 1999). In the former, banks are responsible for the provision of financing and connecting investors with companies/ individuals in need of money, as opposed to the latter system where financial markets assume these tasks (Hillier et al., 2011). It corresponds to the argumentation of Turk-Ariss (2009) that capital markets in GCC countries and Jordan are "weak or almost non-existent" (p. 694). In some of these countries the minority of citizens possesses a bank account (see Appendix A). Islamic banks can facilitate financial inclusion, especially in countries with a large and "relatively unbanked Muslim population" (Kammer et al., 2015, p. 8). In addition to private individuals, Islamic banking institutions also promote the access to financing and thus foster the financial inclusion of small and medium-sized enterprises (SMEs) that can provide for economic development (Kammer et al., 2015).

2.1.2 Differences for Islamic banks

Islamic banks differ in their operations in a few respects from conventional banks. Islamic banks mostly perform both commercial and investment banking activities. Still, they apply a model different from a universal banking model. Islamic banks mix the funds received from investment accounts and shareholders and invest them in the same portfolios. Furthermore, the returns of customer deposits depend on the banks ROA instead of interest rates. Thus there arise additional aspects as "the estimation and accrual of ex-post returns and the treatment of intra-period deposit withdrawals" (Saeed & Izzeldin, in press, p. 3).

Since Islamic banks provide asset-backed financing, the volume of investment is determined and restricted by the amount of assets available (Saeed & Izzeldin, in press; van Greuning & Iqbal, 2009). Thus, next to the risk of customer default, risks related to the transaction of the goods arise

(Al-Hares et al., 2013; Saeed & Izzeldin, in press). Finally, due to the prohibition of incurring debt without an underlying asset, Islamic banks might be disadvantaged because they cannot rely on quick and cheap debt financing; however, they might also be more stable and rather capable of coping with a financial crisis than conventional banks (Saeed & Izzeldin, in press; van Greuning & Iqbal, 2009). These differences are reflected in different concepts on and sometimes a slightly different structure of the balance sheet of Islamic banks. Sub-section 2.3 introduces these concepts and compares the typical balance sheets of Islamic and conventional banks.

2.2 The rise of Islamic banking and its scope today

The practice of banking is relatively new to the GCC countries, as the first conventional banks opened in the 1950s in Qatar (Khediri et al., 2015; Standard Chartered Bank, n.d.). Similarly, the first private bank in Jordan was established in 1930 (Hudairi, 2014). In Malaysia however, banks are present since 1875 (Hamdan, 2015). The first conventional bank in Bangladesh was the Bank of Hidostan, established 1770 in Calcutta (Cooke, 1863). Bangladesh belonged to British India at that time and later to Pakistan. It became a fully independent country in 1971 (Samad, 2008).

According to Imam and Kpodar (2010), banks in these regions were established by the colonial powers to "support mining, agriculture, manufacturing, and financing of the public sector" (p. 5). When the countries became independent, many banks were nationalized until the governments took efforts in the end of the 20th century to liberalize the financial sector, for instance in Bangladesh and Jordan (Mghyereh, 2004; Samad, 2008).

The date of the establishment of the first Islamic banking institutions is difficult to identify. Since the end of the 1940s, researchers were investigating the realization of a bank that would comply with the laws of the Sharia (Warde, 2000). The Organization of the Islamic Conference, a transnational entity for discussion about relevant topics, concluded the establishment of the inter-governmental Islamic Development Bank in 1974 with the main task of providing (profit-sharing) financing to the member countries and fostering the emergence of further Islamic banking institutions (Warde, 2000). In 1975, the Dubai Islamic bank was established, agreed upon as first modern and non-governmental Islamic bank by most researchers (e.g. Olson & Zoubi, 2008; Warde, 2000). Kuwait followed with the first Islamic bank in 1977 and then Bahrain (1979) and Qatar (1982) established their first Islamic banks (Wilson, 2012). One year later, Islamic banks in Malaysia and Bangladesh started their operations (Chong & Liu, 2009; "IBBL at a glance", n.d.). The first Saudi Arabian and Jordanian Islamic banks were established in 1987 (Nazzal, 2015; Wilson, 2012). In Oman, Islamic banking was introduced recently in 2012 (Stubing, 2014). Beforehand, interest-based loan transactions were commonplace. The lending activities of financiers in Islamic countries included interest payments before World War II and already during the 17th century interest-based lending was common in the Ottoman Empire (Khan, 2010). The charge of interest is not only forbidden by the Quran, as Torah and Bible condemn it too (Abou-Zaid & Leonce, 2014). So why did Islamic banks emerge in the 20th century and not earlier? One reason might be that except for Oman, most considered countries did not gain independence before the second half of the 20th century (see Appendix A for country information). Before, the majority of them belonged to the British Empire that probably did not seek the creation of Islamic banks.

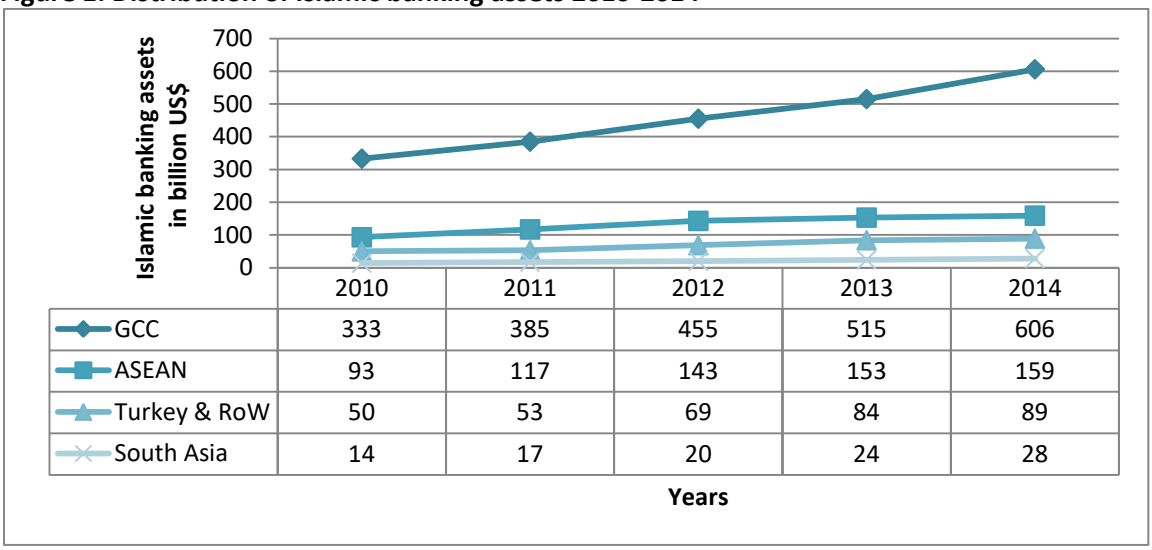
Further, scholars describe a causal relationship between economic growth and a consequent need for (more) financial institutions (e.g. Ang & McKibbin, 2007). The resulting competition might encourage banks to create and offer niche services, as banking for religious Muslims. The 1970s were

shaped by the oil boom in the Middle East which was one of the main trigger of the rise of Islamic banking (Warde, 2000). It also boosted the economic development of the Middle East which resulted in a massive rural-to-urban migration but also in-migration from other countries (Karl, 2004; see Appendix A). Malaysia and Bangladesh implemented financial liberalization policies that aimed at fostering economic growth. In Malaysia the reforms were enacted during the 1970s. Bangladesh gained independence in 1971, and implemented its policies in the 1980s (Murshed & Robin, 2012). Malaysia and Bahrain were the major hubs for Islamic finance at that time (Imam & Kpodar, 2010).

Another factor that most likely contributed to the growth of Islamic finance during the 1970s was the global resurgence of Islam and the resulting demand for financial services that comply with it (Chong & Liu, 2009). Chong and Liu (2009) go so far to state that this is the key reason instead of profit and loss sharing characteristics. Furthermore, until 9/11, many investors from the Middle East deposited their money in the USA. However, after the attacks and the following wars in Iraq and Afghanistan, the USA imposed visa restrictions and froze assets which led customers to withdraw their funds and deposit them in local (Islamic) banks (Badawy, 2005 as cited in Chong & Liu, 2009; Olson & Zoubi, 2008).

The oil crisis at the beginning of the 1980s put the economy and banks likewise under pressure. By the end of the decade, the political and economic systems worldwide changed massively and the growth of Islamic banking slowed down (Warde, 2000). Today, Saudi Arabia and Malaysia are major Islamic finance hubs but it has also spread to non-Muslim countries for instance in form of Islamic windows in conventional banks (IFSB, 2016). According to Warde (2000) the fact that conventional banks are increasingly opening their businesses by running Islamic windows (e.g. BNP Paribas) or Islamic subsidiaries (e.g. RHB bank) is evidence that Islamic and conventional banks are converging. Moreover, the offer of Islamic products in non-Islamic countries and the approach to attract non-Muslim customers decreases the disparity between both bank types.

Figure 1: Distribution of Islamic banking assets 2010-2014



	2010	2011	2012	2013	2014
GCC	333	385	455	515	606
ASEAN	93	117	143	153	159
Turkey & RoW	50	53	69	84	89
South Asia	14	17	20	24	28

Data source: EY (2015)

In 2014, the Islamic banking database created by the World Bank listed Islamic financial institutions (excluding insurance institutions) operating in 58 countries (The World Bank Group, 2014). In absolute numbers, the World Islamic Banking Competitiveness Report 2016 shows that the worldwide share of Islamic banking activities grew over the last five years by 16% from $490 billion to

$882 billion (EY, 2015). Figure 1 shows the share of Islamic banking in billion US$ in different regions worldwide. It can be seen that countries from the GCC region have the largest amount of Islamic banking assets in the first place as it is more than twice as often utilized in the GCC countries than in the rest of the world. Islamic banking assets comprise the banking services and Islamic bonds. The prevalence of Islamic banking assets in GCC countries might be due to the reason that the report only reviews two countries for ASEAN and south Asia but all six countries of the GCC. ASEAN[3] has ten member states today; however, this figure only respects Malaysia and Indonesia. South Asia consists of Pakistan and Bangladesh and rest of the world includes Jordan among other countries (EY, 2015). Nevertheless, it can be seen that the amount of money invested in Islamic banking assets nearly doubles in all regions between 2010 and 2014.

The countries that I investigate in this research were selected according to different criteria which are elaborated in the methodology section. However, one important condition is that a certain number of Muslims has to live in these countries. Table 1 shows that all countries comprise a Muslim population of more than 60%.

Table 1: Share of Muslim population in the countries under study in 2010

Country	Bahrain	Bangladesh	Jordan	Kuwait	Malaysia	Oman	Qatar	Saudi Arabia	UAE
Muslim population	70.3%	89.8%	97.2%	74.1%	63.7%	85.9%	67.7%	93.0%	76.9%

Data source: Pew Research Center (2012)

Furthermore, the countries should include both bank types, conventional and Islamic banks. Table 2 depicts the magnitude of Islamic banking in the countries under study on the global and national level. The global share indicates the share of a country in total Islamic banking assets traded worldwide, whereas the national share depicts the extent of Islamic banking assets traded within the countries, next to conventional banking assets. It can be seen that on a global scale, the share of Islamic banking in Malaysia is larger than the share of most of the GCC countries alone.

Table 2: Share of Islamic banking per country in 2015

Country	Bahrain	Bangladesh	Jordan	Kuwait	Malaysia	Oman	Qatar	Saudi Arabia	UAE
Global share	1.7%	1.6%	0.6%	5.9%	9.3%	n/a	5.1%	19.0%	8.1%
National share	13.5%	19.4%	14.0%	38.9%	23.0%	6.5%	26.1%	49.0%	18.4%

Data source: IFSB (2016)

Moreover, Table 2 gives some indication of how established Islamic banking is in the countries. The numbers for the global share of Islamic banking assets have to be interpreted with caution as for instance Jordan has a share of 0.6%. This does not seem meaningful but one has to keep in mind that Jordan has 7.5 million inhabitants and only 25% of the population older than 15 years possessed a

[3] Association of Southeast Asian nations: established in 1967. The member states are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Its aim is to achieve economic and social progress, foster peace and stability and collaboration among the member states (ASEAN, n.d.).

bank account in 2014 compared to Saudi Arabia with 31.5 million inhabitants and 70% having a bank account (see Appendix A).

It strikes to the eye that Bahrain and Kuwait have a similar share of Muslim population but Islamic banking is more common in Kuwait (38.9%) than in Bahrain (13.5%). Moreover, Jordan has a Muslim population of almost 100% but only 14% of its banking assets are Islamic banking assets. Here again, a reason might be that only a quarter of the population older than 15 possesses a bank account at all in a less developed capital market (Maghyereh, 2008; see Appendix A). Nevertheless, there are apparently other influencing factors than religious belief for choosing Islamic or non-Islamic banks. In certain countries Islamic banks are growing faster than conventional banks for instance in Saudi Arabia, Malaysia, Kuwait, Qatar and Bahrain in 2014 (EY, 2015).

Table 2 shows that looking at the countries in particular instead of classifying the countries into groups as in Figure 1, gives a more accurate picture. For example, it is now apparent that the share of Islamic banking of the total banking assets in Oman is lower than in the other countries. It is highly probable that this is due to the reason that Islamic banking was established in Oman in 2012 (Stubing, 2014).

2.3 Principles and concepts of Islamic banking

The Islamic religion does not distinguish between religion and state and similarly not between religion and business. Instead, everything is governed by the Sharia (Chong & Liu, 2009). One principle from the Sharia, important in the context of Islamic banking, is the maximization of human welfare and reduction of distress (Iqbal, 2014).

The Islamic financial system is resting on four main pillars (El-Hawary et al., 2004). The first is risk-sharing, according to which both risk and return of financial transactions have to be shared equally by all parties participating in this deal. Second, the materiality claim requires that the financial transaction taking place needs to at least indirectly involve a real asset. Third, the transactions must not exploit one of the parties involved and fourth, the financial transactions are not allowed to serve the financing of sinful products or activities as gambling, pork products, alcohol, drugs and prostitution (El-Hawary et al., 2004; Khediri et al., 2015). In order to guarantee that Islamic banks stick to these principles, each bank has a Sharia Committee (Khediri et al., 2015). Usually, the Sharia Committee is also expressing its opinion in a section in the annual report.

Khan (2010) critically assesses whether these four characteristics are adhered to in practice. He finds that risk-sharing contracts are the exception rather than the rule since usually conventional banking products are more or less copied. The further text will make reference to that. Moreover, he criticizes that often the underlying real asset is lacking and thus violating the materiality claim. Khan (2010) mentions that for Islamic investment or mortgage funds often higher fees are charged than for the counterparts in conventional banks. In view of the fact that the mimicked Islamic products are more expensive, Muslim customers are exploited as they believe that they are using interest-free products but instead Sharia law is violated. In the opinion of El-Gamal, an Islamic finance scholar, making use of conventional banking and donating the money that you would pay extra would be more Islamic (Morais, 2007). Following Khediri et al. (2015), the religiosity of the clients is simply exploited as Islamic banks may charge higher fees to borrowers and pay lower ‘gifts’ to depositors. As another point of critique, it cannot be guaranteed that Islamic banks do not invest in sinful products since necessary inspections are seldom or not sufficient (Khan, 2010). For instance, a Pakistani Islamic bank did not mention in their annual report that 13% - 20% of their gross financings in 2005 and 2006 were attributed to conventional, interest based activities (Khan, 2010). For Khan

(2010) “it seems clear that Islamic Banking and Finance is virtually indistinguishable from conventional banking and finance” (p. 817).

Next to the four characteristics introduced above Khediri et al. (2015) distinguish two additional fundamental principles. The first is the prohibition of excessive uncertainty (‘ghrar’), risk and speculative investments (‘maysar’). However, not all risk can be banned or prohibited. As Warde (2000) states: “rather than avoiding risk, financiers must learn to control it” (p. 61).

The second additional principle is the prohibition of interest often referred to as ‘riba’. However, riba means increase and does not only relate to usury (Warde, 2000). In Islamic finance, usury is replaced by a premium that the borrower has to pay additionally to his repayment. This principle is criticized by several researchers as being comparable to conventional interest payments under the pretext of being Sharia-conform. Some even argue that the mark-up is tied to the interest rates of conventional banks. Yusof, Bahlous and Tursunov (2015) however found results that mark-up and conventional bank interest rates are not corresponding, they correlate occasionally but rather due to economic factors that affect interest rates and mark-ups. Tantawi, a former mufti of Egypt, went so far to say that interest payments are virtually more Islamic than risk sharing, because with the former, borrowers receive more information about the actual price they have to pay (AFP, 1995). As mentioned, informing the debtor about the exact price is an important premise in Islamic finance.

In Islamic law it is denied that money has an intrinsic value which entails the prohibition of making profit on the basis of trading with money (Al-Hares et al., 2013). As an alternative, several financing means were created, building either on the principle of profit and loss sharing or being defined by fixed fees on capital (Iqbal, Ahmad, & Khan, 1998). These means are introduced now, together with other items that typically appear on the balance sheet of an Islamic bank.

Debt-like financing instruments

In Islamic finance, there are several contracts that enable a client to receive funds from an Islamic bank. The most common contract is the murabaha contract.

‘**Murabaha’** financing relates to the mark-up financing which is often used for trade financing (Chong & Liu, 2009). In essence, the bank buys an asset for the customer and sells it to him with a mark-up, either in installments or a single payment (Mansour, Ben Jedidia, & Majdoub, 2015; Oslon & Zoubi, 2008). The mark-up is seen as a fee for providing the service instead of interest payment which would be unlawful (Pollard & Samers, 2007). The bank has to inform the buyer about the price at which he bought the product. Informing the borrower about the price and preventing opaque businesses is important in Islamic finance. Then, a percentage that forms the mark-up is communicated to the buyer and agreed upon (Al-Hares et al., 2013). The risks of the goods, e.g. the customer opts out from the agreement, are borne by the bank until it is shipped to the customer (Ali, 2011). Declared by a fatwa (legal opinion) in 1994, the bank has to possess the good and provide evidence thereof (Mansour et al., 2015; Pollard & Samers, 2007). However, this rule is often broken by Islamic banks as they want the customer to buy the good himself and so avoid commercial risk or the risk that the customer cancels the agreement (Mansour et al, 2015; Pollard & Samers, 2007). The murabaha contract is one of the assets on the balance sheet of an Islamic bank. Sometimes banks conclude murabaha contracts with each other, thus it can also appear as a liability.

According to critics, the mark-ups as such also violate the principles of Islamic banking in two ways. (1) The risk is not shared with the debtor (Warde, 2000). In case the borrower does not pay as agreed upon, the bank cannot charge an additional payment because that would rate as riba (Iqbal et

al., 1998). It could sell the asset that it holds for the customer and keep the proceeds. Nevertheless, Iqbal et al. (1998) argue that this is one of the main problems of Islamic banks for which specific laws have to be brought out and implemented. (2) Taking an economic perspective, mark-ups resemble the interest payments of conventional banks (Warde, 2000). Pollard and Samers (2007) state that 45% to 65% of Islamic finance transactions worldwide are murabaha contracts. According to other researchers (e.g. Khan, 2010) the number is even higher, around 80%. This would mean that the majority of financing contracts in Islamic banking does not rely on the promoted sharing of profit and loss but on a mechanism that is criticized to copy conventional loans and the related interest payments labeled with an Arabic name. The reasons for the frequent application of murabaha are twofold. First, short-term financing is requested by customers regularly. Therefore, murabaha contracts tend to be more suitable than profit and loss sharing contracts that are arranged for longer terms (Ahmad, 1994). Second, as Islamic banks have to subsist next to conventional banks that receive interest payments Islamic banks try to generate as much return as possible from the mark-up financing. This provides a more certain source of capital than profit and loss sharing contracts and additionally, the mark-ups can initially be defined in a way that the required returns will be generated (Ahmad, 1994).

Murabaha contracts are intended to finance major tangible purchases, as houses or cars but in some cases the funds are used to finance other expenses as salaries for instance (Mansour et al., 2015). Furthermore, as customers sometimes use the funds for other purchases than defined in the contract, the Islamic bank runs the risk of involuntarily financing unlawful products.

'**Ijara'** is comparable to a conventional financial leasing contract (IFRS, 2010; Warde, 2000). An asset is bought by the bank and lend to the lessee. The rental payments are fixed and laid down in the leasing contract; however both parties can stipulate different payments for the future (Iqbal, 2014). Ownership and all related obligations of the assets stay with the bank and it is therefore listed on the balance sheet minus depreciation (Ali, 2011). There are different designs of this contract, for instance the 'Ijarah-wa-Iktena' contract includes the purchase of the asset by the lessee at an agreed point in time for an amount agreed beforehand (Al-Hares et al., 2013). The leasing period is written down in the leasing contract. If both parties agree it can be terminated earlier. The lessor assumes the costs related to insurance and maintenance, the lessee only has to pay for damages caused by him (Iqbal, 2014). Sometimes banks charge a certain amount of money to make sure that the customer is accepting the contract, comparable to a security (Iqbal, 2014).

Under a '**Bai' salam'** contract, the goods are fully paid when the contract is made and the delivery of the goods takes place in the future at a specified date (Olson & Zoubi, 2008). This constitutes an exception to the Sharia rule that only goods of which one possesses the ownership can be sold, albeit the price should be set as precisely as possible (Iqbal, 2014).

The '**Istisna'** contract is comparable to bai' salam except that the good does not have to be paid completely in advance. It can be paid in equal installments or partly upfront and the other part later (Ali, 2011). Contrary to the bai' salam contract, the good involved has to be manufactured and the contract can be cancelled before the good is produced (Chong & Liu, 2009; Kammer et al., 2015).

'**Qard'/ 'Qard al-Hasan'** is a loan that is given to customers without interest, mark-up or other form of payoff. The creditor rather expects to be compensated by God (Ali, 2011). Qard and the two contracts mentioned directly above can be found on the asset side of the balance sheet.

‘**Sukuk’** are comparable to conventional bonds or commercial papers as they are certificates of the possession of an asset and can be traded in secondary markets (Iqbal, 2014; Khan, 2010). Since they involve a tangible asset they are often used in lease agreements and constitute a securitization of the underlying good (Ariff & Lewis, 2014; IFRS, 2010). They are traded at face value and return is related to (a fraction of) the underlying asset instead of interest rates. Often the rate of return is additionally related to market indicators as EURIBOR or LIBOR (Ariff & Lewis, 2014; Khan, 2010). The securitized underlying assets can either be “ijara, murabaha, istisnaa or musharaka receivables, or combinations of them, and the rates of return can be fixed, floating or zero coupon” (Ariff & Lewis, 2014, p. 64). In Islamic finance, debt can only be traded at face value but the price of ownership of assets can be negotiated (Obaidullah, 2007). In this way, sukuk related to leasing transactions enable the creation of a secondary market and therefore this type of sakk (singular form) and the other sukuk offer new investment options for both banks and investors (Ariff & Lewis, 2014).

At the same time, the sukuk related to leasing transactions can be seen as a means to elude the materiality convention since often the assets are not transferred or “no new asset is being financed” (Khan, 2010, p. 817). Khan (2010) calls this fictional materiality. Correspondingly, in 2008 the Pakistan Supreme Court ruled that the majority (80%) of the outstanding sukuk worth $80 billion were too similar to conventional bonds and thus not Sharia-compliant (Khan, 2010). Sukuk appear on both sides of the balance sheet either as investment on the asset side, and/ or in case the bank issued sukuk they are listed on the liabilities side.

Profit and loss sharing

The sharing of profit and loss is a fundamental principle in Islamic finance. There are two major contracts that enable clients and banks to share risks and benefits. Sometimes they are also referred to as partnerships. The two contracts described below are to be found on both asset and liabilities side of the balance sheet.

‘Mudaraba‘ is a contract that is concluded between a party providing the financing and a party contributing expertise and knowledge (IFRS, 2010; Al-Hares et al., 2013). The latter is investing the money of the former, acting as an agent. Thus, it is sometimes referred to as agency contract (Ali, 2011). The contract can be terminated at any time except the bank already started to invest the funds or if agreed otherwise (Iqbal, 2014). In case a profit can be generated, it is shared according to a predefined ratio, in case of losses, the first party bears the financial loss and the other party bears the waste in time (IFRS, 2010). The financial losses borne by the bank are limited to the amount of money that was contributed. It is not liable for the losses that the customer might incur, except the bank broke the contract (Ariff & Lewis, 2014). At the outset of Islamic financing, often a two tier mudaraba model was applied in order to decrease the impact of potential financial shocks (Ali, 2011). Therefore, a mudaraba contract was concluded between depositor and bank in which the bank acts as an agent and invests the money in a business. The bank concludes an additional mudaraba contract with the business in which it invests the customers’ funds. Thus, profit or loss that the company generates is shared between bank and company. The return from this is then shared between depositor and bank according to a pre-determined ratio (Ali, 2011). With a two tier mudaraba system the liability side of the balance sheet is able to respond to changes on the asset side and the risk is shared among further individuals and entities. This is contributing to the stability of the economy and the financial system in general (Ali, 2011).

However, in order to make this model work, a lot of information is required but the company may not be willing to reveal in-depth insights into their operations. This could make the calculation of

the profit or loss share difficult. Simultaneously, there is a risk of information asymmetry which could lead to adverse selection or a moral hazard (Ali, 2011). This was one of the reasons for the development of another model in Islamic banking that is common these days. In principle it is build up as the two tier mudaraba, but here the bank does not only invest in mudaraba contracts on the asset side but also in murabaha contracts. Thus, this model "retains the stability feature and adds accessibility" (Ali, 2011, p. 6). Often, Islamic banks also invest in ijara and other instruments as described in Table 3 to provide a larger variety of products (Ali, 2011).

'Musharaka' is comparable to a joint venture to which different parties contribute in the form of money, expertise, goods, etc. An example would be one person contributing a fruit tree, and another person being accountable for cultivation and harvests (IFRS, 2010). Profit and losses are shared according to a ratio which is defined by how much each party contributes (Al-Hares et al., 2013). The difference to the mudaraba contract lies in the fact that with a musharaka all partners are entitled to the management of capital in order to maximize profits (Iqbal, 2014). The contract can either be in force for an agreed period or not binding. In the second case, the party that wants to quit informs the other partners and receives his stake in the partnership. Since profits and losses are shared, no partner is liable alone, except he acted against the rules set out in the contract (Iqbal, 2014).

The musharaka contract is seen as the most Islamic way of financing since risks and benefits are justly shared (Wilson, 1997). Mortgage contracts for real estate are often formed as a 'declining musharaka'. The ownership of the asset in this 'diminishing partnership' is shared between bank and client, as opposed to a leasing contract where the lessor retains the ownership for the whole period (El-Gamal, 2000). Here, the bank purchases the real estate and rents it to the client. The monthly payments include a rent payment for the house on the one hand and another payment for buying the share of the bank (El-Gamal, 2000). In an example by Rammal (2004), a house is bought for $150,000. 80% ($120,000) are financed by the bank and 20% ($20,000) are paid by the customer. If the monthly rent is $1,000, $800 (80%) of it is accounted as extra payment in order to buy the banks' share (Rammal, 2004). Excluding taxes, etc., the customer will attain full ownership of the house after 15 years. Khan (2010) shows that a conventional mortgage loan at 8% interest would result in the exact same payment schedule (excluding taxes and insurance). Often, the rate for the rent installments is derived from the interest rate of conventional banks and some of the Islamic banks seem to openly admit that their rate is not derived from a comparison to other houses in the same area as demanded (Khan, 2010).

In general, profit and loss sharing contracts are the most Islamic way of financing and investing. However, several researchers criticize the underrepresentation of these contracts. In Malaysia in particular, 70% of the items on the liabilities side are profit and loss sharing instruments, however, on the asset side they only represent 0.5% of all assets (Chong & Liu, 2009). According to Warde (2000) merely 5% of all Islamic products were musharaka or mudaraba contracts. Khan (2010) calculated the share of profit and loss sharing contracts for seven banks in 2005 and 2006 and found that the share declined for all banks, except for the Al Rajhi Bank which had 0% in both years. The highest amount of profit and loss sharing was undertaken by the Dubai Islamic bank in 2005 with 25% and in 2006, 20% of the contracts of the Kuwait Finance House were profit and loss sharing contracts (Khan, 2010). One explanation might be that these contracts are riskier and costlier for banks than murabaha contracts (Mansour et al., 2015). Pollard and Samers (2007) add that the contracts might scare off profitable entrepreneurs because their profits are shared and attract customers with rather unsecure investment returns or riskier ventures. Thus, Islamic banks favor

debt-like contracts that promise more secure gains and less uncertainty (Pollard & Samers, 2007). As Khan (2010) adds, profit and loss sharing contracts provide space for problems as adverse selection or moral hazard due to information asymmetry. Thus, banks could either reject financially weak customers or customers that doubt the admissibility of certain measures. For instance in Pakistan, subject to a high inflation, clients only repaid the principal and declared the residual settlement to be interest and thus forbidden (Khan, 2010). Islamic banking is mostly common in emerging economies that are usually subject to a higher information asymmetry and less efficient judicial institutions which further reduces the incentive for profit and loss sharing (EL-Hawary et al., 2004; Khan, 2010).

If Islamic banks would rely on sharing profits and losses as they often advertise themselves, one could talk about a model that enables banks to operate fairer and less risky. However, as this is often only a small share of a bank's activities or not carried out at all, the Islamic banking model indeed resembles the conventional banking model. Nevertheless, a bank has to make sure to remain profitable in order to keep their customers because all Islamic conviction aside, how long would customers be willing to bear the losses of others?

Services

'Wakala' is an agency contract in which one person pays another person, usually with a fixed remuneration, for doing a specific task (Ali, 2011). This could be administering a murabaha transaction for the customer for instance. Another common circumstance is that customers can buy units from a mutual fund, set up by the bank for which the agent acts as the investment manager. The difference to the mudaraba contract lies in the fact that losses are exclusively borne by unit holders and no sharing of profits and losses takes place (Iqbal, 2014). Wakala can be found on both sides of the balance sheet.

'Wadiah' describes a contract where the bank is responsible for the safekeeping of a good and usually not expects a compensation, sometimes however, the bank charges a fee that covers the cost of administering the good (Ali, 2011). Wadiah is located on the liabilities side of the balance sheet.

Non-balance sheet item

'**Zakat'** is a religious tax that is supposed to distribute wealth from the rich to the poor. It is regarded as one of five pillars of the Islam and as opposed to the other instruments it serves an exclusively ethical purpose (Samad, 2004). However, it is an additional tax payment next to the corporate tax and thus leaves Islamic banks in a worse position compared to conventional banks that only pay corporate taxes. It appears on the income statement and is deducted from gross profit. The data collection showed that for some banks it is common to deduct zakat from their dividend payments.

A number of the introduced terms and contracts are criticized for being not compliant with the Sharia and/ or simply imitating conventional banking products. An important principle that Islamic banks predicate on is to operate ethically. The banks fail in this respect since they "collect resources from a large spectrum and make them available to a smaller one, which is not Islamic since it impairs the equality and justice values advocated by Islam" (Mansour et al., 2015, p. 71). Islamic banks have Sharia boards that review the compliance of the offered products and contracts, so why do they let these practices pass? Khan (2010) offers two explanations for why Sharia boards seem to wave through these products: first, as long as Islamic banks can convince their clients that they are participating in banking activities that are Islamic, Sharia scholars are pleased. They put less emphasis on guaranteeing that the products are Islamic and differ from conventional products in actual fact,

than on the semblance of being Sharia-conform. The second reason is that there are only around 20 Sharia scholars that are licensed to declare products compliant with the Islamic law (Morais, 2007). These scholars are members of 40 to 50 boards. Since Islamic banks are keen on being certificated as Sharia-compliant, they are willing to pay a great deal of money. As a result, Sharia scholars earn $20,000 to $30,000 per board they sit on (Morais, 2007). It is a debatable point whether the scholars have enough time to review the practices of all of these banks and whether their excessive salaries comply with Islamic values. Moreover, an Islamic investment banker admitted that if one scholar does not give his consent, another scholar is contacted and offered money until he approves an operation (Iqbal, 2014).

Taken together, Table 3 provides an example of a balance sheet of an Islamic bank compared to the balance sheet of a conventional bank and shows the location of the relevant concepts described above on the asset and liability side.

According to Yusof et al. (2015), the balance sheets differ in form but not significantly in substance. One of the differences between Islamic and conventional banks is that the former are not exposed to the maturity mismatch of assets and liabilities as mentioned in Sub-section 2.1. Furthermore, Islamic banks do not distribute loans as conventional banks, they rather provide financial assistance to customers via investment and financing contracts that can be seen as equivalent to loans and are treated as such in this analysis (van Greuning & Iqbal, 2009). In the GCC in 2008, the majority of money was invested in murabaha contracts (Ali, 2011). Moreover, derivatives such as futures, forwards and options are forbidden in Islamic finance, since they lack an underlying asset and are mainly used for speculative purposes (Khan, 2010). Islamic banks sometimes report their wakala contracts on their balance sheet and related income and expenses on the income statement. Conventional banks only report their income and expenses from fees and commissions on their income statement.

A further striking difference is that next to liabilities and equity, sometimes the balance sheet comprises an additional term, namely the equity of profit-sharing investment accounts. This distinction is common in Bahrain but for instance in Kuwait the unrestricted investment accounts (URIA) are counted as liabilities. During the data collection process the URIAs were added to the total liabilities in order to achieve coherent data. Current accounts can be withdrawn by the customer if desired and appear under liabilities. Compared to conventional banks current accounts however, depositors do not obtain a return but sometimes 'gifts' derived from the bank's capital are granted to the customers that are similar to interest payments of conventional banks (Ali, 2011; Awadzi, Chartouni, & Tamez, 2015).

An URIA can either be shaped as an agency contract (wakala) or take the form of a partnership such as mudaraba and musharaka (Awadzi et al., 2015). It can yield a return for depositors based on the sharing of profit and loss between bank and account holders. The ratio of the profit (or loss) that is borne by both parties is agreed upon in advance (Awadzi et al., 2015). They are distinguished in unrestricted and restricted investment accounts. URIAs can yield a return for depositors based on the sharing of profit and loss between bank and account holders. The ratio of the profit (or loss) that is borne by both parties is agreed upon in advance (Awadzi et al., 2015). This refers to profit or losses from all operations of the bank combined. The funds deposited are invested in the banks financing and investment activities, where the bank decides about the objective, method and period of investment. Depositors are allowed to withdraw their money earlier though; but this implies less profit for the customers. A problem that could arise relates to the fact that the

Table 3: Balance sheet of an Islamic and a conventional bank

Islamic bank	**Conventional bank**
Assets	**Assets**
Cash and cash equivalents	Cash and cash equivalents
Placements with banks and other fin. institutions	Placements with banks and other fin. institutions
Investment in securities (*sukuk* and shares)	Investment in securities (bonds and shares)
Investment property	Investment property
Investment in subsidiaries	Investment in subsidiaries
Other investments	Other investments
Financing assets, e.g.: - *Murabaha* - *Mudaraba* - *Musharaka* - *Ijara* - *Salam* - *Istisna* - *Qard* - *Fee-based transactions (wakala)* - *Others*	Loans and advances, e.g.: - *Loans to customers* - *Other loans* - *Financial leasing assets* - *Assets held in joint ventures* - *Others*
Fixed assets	Fixed assets
Intangible assets	Intangible assets
Other assets	Other assets
Liabilities	**Liabilities**
Placements from banks	Placements from banks
Customer deposits: - Current accounts, e.g.: o *Wakala* o *Wadiah* - Saving and time deposits o Mudaraba, etc.	Customer deposits - Current accounts, e.g.: o *Current accounts* o *Safe deposit locker* - Saving and time deposits
Other liabilities	Other liabilities (e.g. liabilities arising in joint ventures)
Equity of profit-sharing investment account	
Unrestricted investment account - *Mudaraba* - *Musharaka* - *Wakala*	
Profit equalization reserve	
Investment risk reserve	
Owner's equity	**Owner's equity**
Share capital	Share capital
Reserves	Reserves
Retained earnings	Retained earnings
Non-controlling interests	Non-controlling interests
[Off-balance sheet] *Restricted investment account* - *Mudaraba* - *Musharaka* - *Wakala*	*Off-balance sheet*
[Letters of credit, guarantees]	*[Letters of credit, guarantees, derivatives]*

The information is derived from Ali (2011) and Kammer et al. (2015). It was complemented and amended based on the experiences gathered in during the data collection. The balance sheets sometimes differ in the amount of information displayed. Items that do not necessarily appear are written in italics.

bank is basically free to act in order to realize its vision of return that can be achieved and the risk that has to be borne therefore, which could discomfort investors (Ali, 2011). Certainly, they can withdraw their funds earlier if they are dissatisfied but this would leave both parties worse off. The bank loses funds to invest and perhaps also a bit of their reputation and the customer cannot benefit from the investment as he initially intended to. Since this account contains attributes of equity instruments like the discretion of the bank about investment spending and attributes of debt instruments such as curtailed investment periods if needed, it takes the form of an in-between item on some of the balance sheets (Ali, 2011). As opposed to the conventional banking system, the claims of investment account holders and those of shareholders are coequal (Karim, 2001). Karim (2001) emphasizes that the unrestricted investment account is not a hybrid of debt and equity items.

The profits and losses of restricted investment accounts (RIA) on the other hand, are shared between bank and account holder based on the amount of money contributed. Therefore, only profits or losses generated by RIAs are shared, as opposed to URIAs (Awadzi et al., 2015). The investment targets are agreed upon in advance, so the depositor has a say in where his funds will be invested. However, he is not allowed to withdraw the money earlier (Ali, 2011). Ali (2011) compares these accounts to an equity instrument with limited voting rights such as closed end mutual funds of conventional financial intermediaries. Due to the fact that RIAs have a narrower scope of investment and cannot be withdrawn before maturity, the investor faces a higher risk but at the same time they can also generate higher returns than URIAs (Ali, 2011). It is debatable whether this is in line with the Sharia since the depositor is rewarded for taking on additional risk. RIAs are rather offered to sophisticated or affluent customers as the conditions for investment are stricter (Ali, 2011). Since these accounts are not reported on the balance sheet and not often used as the data collection showed, they are disregarded in this research. Profits or losses related to these accounts are only shared among restricted account holders and are thus not affecting the performance of other deposits and financing contracts.

2.4 Comparability of Islamic and conventional banks

Despite the differing financial products and operations it is important that both bank types are comparable in terms of auditing regulations and practices to achieve valid conclusions. In general, several rules and standards apply for accounting. With these rules it is possible to produce data applicable as basis for comparing a company's financial results over time or cross-sectional with other companies. Furthermore, it prevents managers from embellishing the financial results (Palepu, Healy, & Peek, 2016). In most countries, listed companies are required to work with independent auditing firms when preparing the financial statements according to commonly adopted standards. These standards are for instance issued by the International Accounting Standards Board (IASB) which is in charge of preparing International Financial Reporting Standards (IFRS). The IFRS foundation carried out research in 143 jurisdictions out of which 119 are currently applying IFRS and in most of the other jurisdictions IFRS are permitted (IFRS Foundation, 2016c).

In Bahrain, Kuwait, Qatar, Bangladesh and Oman all companies are required to prepare their financial statements according to IFRS (DTTL, 2016; IFRS Foundation, 2016a). In Jordan and UAE, IFRS are required for banks and in Malaysia local standards were adopted, based on IFRS standards (DTTL, 2016). In Saudi Arabia, IFRS are generally not permitted however for banks and insurance companies that are listed, IFRS are required by the Saudi Arabian central bank (DTTL, 2016; IFRS, 2016b).

Consequently, the financial ratios of Islamic and conventional banks as such can be compared when the banks have to comply with the IFRS, or standards based upon them.

In a meeting of the Asian-Oceanian Standard-setters Group (AOSSG) in 2010, it was discussed whether Islamic financial intuitions should be accounting their business differently than conventional institutions subject to the IFRS (IFRS, 2010). The opinions deviate on two particular topics. The first is the time value of money, and its irrelevance when no interest is charged. The second topic is that some claim to rather report the form of the economic transactions than its substance which would constitute a manipulation of accounting data (Chen, 2009). Here, it is argued that reporting the form over the substance of a transaction paves the way for selling conventional banking products under the pretext of being Islamic (Hayat, 2013). However, the Malaysian Accounting Standards Board concludes that "(a) the financial reporting principles in the IFRS do not conflict with Shariah; and that (b) financial reporting is a recording function that would neither sanctify nor nullify the Shariah validity of a transaction" (IFRS, 2010, p.11). The major difference between the reporting of Islamic and conventional banking is the scope of information published (IFRS, 2010).

Besides, there are two institutions for Islamic financial institutions that are publishing accounting standards. The first is the Islamic Financial Services Board (IFSB) which provides new and adjusted Sharia compliant standards. From 2003 onwards, it aims to guarantee stability and health of the Islamic financial system (IFSB, n.d.). Secondly, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) was established by Islamic banks and the Islamic Development Bank in 1991. It aims at enabling the standardization in accounting of Islamic banks (Iqbal et al., 1998). However, adherence to the regulations set out by the AAOIFI is voluntary and thus its impact might be limited (Iqbal et al., 1998). The majority of banks in the sample requires bank to report financial data in accordance with IFRS and AAOIFI standards. A number of banks in Bahrain, Qatar and Jordan state in the financial statements that they use AAOIFI standards and adhere to IFRS were no AAOIFI standard exists. However, according to Sarea (2012), the central bank of Bahrain requires Islamic banks to comply with both standards and in Jordan and Qatar Islamic banks are required to comply with International Accounting Standards. According to an AOSSG paper (IFRS, 2010), AAOIFI standards and IFRS are not clashing, the main difference is that the former require the disclosure of additional information (IFRS, 2010). Nevertheless, in these cases it is checked that financial statement reporting does not conflict with IFRS reporting.

2.5 Literature review and hypothesis development

To develop hypotheses about the performance of conventional and Islamic banks with respect to each indicator, the knowledge gained from previous studies that compare both bank types is summarized and discussed.

2.5.1 Consensus and ambiguities

Although Islamic banking is becoming more prominent, the extent of academic literature on Islamic finance is still comparatively small (Beck et al., 2013). Previous research differs for instance in the precise research topic and in the choice of countries under study. A large body of literature compares Islamic and conventional banks on different aspects but there are also studies that focus on Islamic banks only. The focus lies for instance on differences in risk management practices (Rahman et al.,

2015), business models (Beck et al., 2013), or compliance with international standards (Al-Hares et al., 2013). Many studies focus on the performance of conventional banks compared to Islamic banks (Jawadi et al., 2016; Johnes et al., 2014), differences in profitability of both bank types (Khediri et al., 2015), or how bank performance changes during financial recession (Siraj & Pillai, 2012).

However, the results are mixed: Jawadi et al. (2016) do not find any significant differences in the performance indicators of both bank types leading to the suggestion that Islamic banks are rather competitors for conventional banks than an alternative to the conventional banking system. Their sample comprises 20 banks from 16 countries, where Islamic banks are from Asia but conventional banks also include banks from European countries that are subject to different economic conditions. Khediri et al., (2015) however argue that Islamic banks are more profitable and both types of banks were affected by the global financial crisis but shifted in time which might have been evoked by the trading of tangible assets only and the prohibition of financial speculation in Islamic finance. In their research on six conventional and six Islamic banks, Siraj and Pillai (2012) find similar results and conclude that Islamic banks were less affected by the crisis than conventional banks. Johnes et al. (2014) were looking at the efficiency of both bank types and found that Islamic banks are less efficient considering the method of banking, but more efficient in terms of managerial efficiency.

The differences that exist between Islamic and conventional banks are intensified or mitigated depending on the size of the banks and the country in which they are operating (Beck et al., 2013). The results of Rahman et al. (2015) indicate that conventional banks in Bangladesh make use of more advanced risk management techniques but other results suggest that Islamic banks are better at dealing with credit risk (Khediri et al., 2015; Samad, 2004).

Previous research is partly focused on one country only, for instance Bahrain (Samad, 2004; Sarea, 2012) or Malaysia (Chong & Liu, 2009). When multiple countries are studied, the researchers mostly look at the GCC countries (Al-Hare et al., 2013; Bashir, 2003; Olson & Zoubi, 2008; Saeed & Izzeldin, in press; Yusof et al., 2015).

2.5.2 Bank performance and its dimensions

Bank performance

The goal of this research is to compare Islamic and conventional banks in terms of their (financial) performance by means of five dimensions that are measured by accounting ratios. In this research, bank performance is used as an umbrella term that refers to the quality/ performance of a bank's operations measured by accounting ratios. Accounting ratios are an appropriate means to assess the prosperity of banks in general as they are capable of analyzing performance in respect of various dimensions (Bashir, 2003). For instance, Al-Hares et al. (2013) argue that investigating the profitability, liquidity, efficiency, solvency and growth of a bank is helpful to assess its performance. Samad (2004) additionally uses credit risk as dimension of bank performance. Similarly, research focusing exclusively on conventional banks brings forward that profitability, liquidity, efficiency and credit risk are important dimensions of bank performance (Kumbirai & Webb, 2010**;** Lin & Zhang, 2009).

Here, bank performance is defined by the indicators: profitability, efficiency, liquidity, solvency and credit risk. Three of them are considered as key aspects of financial health (Atrill & McLaney, 2014). Therefore, the composition of those five dimensions should provide a comprehensive and accurate picture of bank performance.

The term financial performance refers to the profitability indicators ROA and ROE that are used as dependent variables in the regression analyses which test whether the five dimensions affect the financial performance of both bank types similarly.

As mentioned before, the results of previous research on these dimensions are not always consistent. Therefore, the results of previous research on each dimension are presented in the following and summarized in Table 4. The majority of the scientific literature considered aims to compare Islamic and conventional banks on their performance, often on basis of financial ratios.

Table 4: Studies related to the six dimensions

Findings	Method	Time period	Study
Islamic banks are significantly more profitable than conventional banks.			
6 countries: GCC	T-test	2003-2011	Al-Hares et al. (2013)
5 countries: GCC excl. Oman	T-tests; classification techniques	2003-2010	Khediri et al. (2015)
6 countries: GCC	T-tests; classification techniques	2000-2005	Olson & Zoubi (2008)
There is no significant difference in the profitability of Islamic and conventional banks.			
1 country: Bahrain	T-test	1991-2001	Samad (2004)
The financial crisis had an effect on the profitability of conventional and Islamic banks.			
15 countries: GCC excl. Oman, Bangladesh, Egypt, Iran, Jordan, Pakistan, Palestine, Sudan, Syria, Turkey, UK	MANOVA	2007-2009	Rashwan (2012)
Islamic banks are significantly more efficient than conventional banks.			
6 countries: GCC	DEA	1993-2002	Al-Muharrami (2008)
Islamic banks are significantly less efficient than conventional banks.			
6 countries: GCC	T-tests; classification techniques	2000-2005	Olson & Zoubi (2008)
22 countries: GCC excl. Oman, Bangladesh, Caiman Islands, Egypt, Gambia, Indonesia, Jordan, Lebanon, Malaysia, Mauritania, Pakistan, Singapore, Sudan, Syria, Tunisia, Turkey, UK, Yemen	Regression	1995-2009	Beck et al. (2013)
There is no significant difference in the efficiency of Islamic and conventional banks.			
6 countries: GCC	T-test	2003-2011	Al-Hares et al. (2013)
The financial crisis had an effect on the efficiency of conventional and Islamic banks.			
15 countries: GCC excl. Oman, Bangladesh, Egypt, Iran, Jordan, Pakistan, Palestine, Sudan, Syria, Turkey, UK	MANOVA	2007-2009	Rashwan (2012)
Islamic banks have significantly more liquidity than conventional banks.			
5 countries: GCC excl. Oman	T-tests; classification techniques	2003-2010	Khediri et al. (2015)
1 country: Bahrain	T-test	1991-2001	Samad (2004)
There is no significant difference in the liquidity of Islamic and conventional banks.			
6 countries: GCC	T-test	2003-2011	Al-Hares et al. (2013)

6 countries: GCC	T-tests; classification techniques	2000-2005	Olson & Zoubi (2008)
Islamic banks are significantly more solvent than conventional banks.			
6 countries: GCC	T-test	2003-2011	Al-Hares et al. (2013)
5 countries: GCC excl. Oman	T-tests; classification techniques	2003-2010	Khediri et al. (2015)
Ambiguous results about which bank type is more solvent.			
6 countries: GCC	T-tests; classification techniques	2000-2005	Olson & Zoubi (2008)
Islamic banks have a significantly higher credit risk than conventional banks.			
6 countries: GCC	T-tests; classification techniques	2000-2005	Olson & Zoubi (2008)
Islamic banks have a significantly lower credit risk than conventional banks.			
5 countries: GCC excl. Oman	T-tests; classification techniques	2003-2010	Khediri et al. (2015)
1 country: Bahrain	T-test	1991-2001	Samad (2004)

DEA = data envelopment analysis; The particular classification techniques applied by Khediri et al. (2015) and Olson and Zoubi (2008) can be found in Appendix B.

Profitability

The dimension profitability describes the profit a bank generates with its operations with respect to taxes and its other expenses (Al-Hares et al., 2013). It is regarded as "the most common measure of bank performance" (Kumbirai & Webb, 2010, p. 39). Profitability is important for banks and companies in general as it enables them to finance their operations and stay competitive.

A number of researchers expect Islamic banks to be more profitable (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008) than conventional banks. By applying linear and non-linear statistical tests (see Appendix B for more information on each scientific paper) they find evidence for their hypotheses. It is suggested that the higher profitability of Islamic banks stems from their restricted access to equity financing from the inter-bank market. Thus, they have to rely on cheaper and safer sources of financing e.g. investment deposits (Al-Hares et al., 2013).

In contrast, Samad (2004) expects conventional banks to be more profitable since Islamic banks have less investment opportunities as they are not allowed to invest in *ḥarām* (forbidden) products. However, the results of the t-test of 15 conventional and 6 Islamic banks from Bahrain could not verify a variation in the profitability between both bank types.

MANOVA results of Rashwan (2012) reveal that the crisis had an impact on the profitability of both banks types as conventional banks became more profitable than Islamic banks after 2008. His research includes 15 countries compared to the six GCC countries investigated by the scholars that found Islamic banks to be more profitable (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008). Though, the work of Rashwan (2012) examines three years only. It is worthwhile to see whether this trend continues. Al-Hares et al. (2013) also find an increase in profitability for conventional banks, but in their sample Islamic banks are still more profitable in total.

The exact ratios applied by the researchers are presented in Appendix B, with the sample size, the years investigated and the applied research methods. Bold printed ratios highlight the ratios that achieved significant results. Almost all studies considered used ROA and ROE to measure profitability (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008; Rashwan, 2012; Samad, 2004). All of them found significant results for these ratios, except for two of those studies that could not achieve significance for ROE (Khediri et al., 2015; Samad, 2004). Nevertheless, the mean value of ROA of those studies is 2.30% for Islamic banks and 1.76% for conventional banks (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008; Rashwan. 2012; Samad, 2004). With regards to ROE, the ratio should be 11% or more (Rizzi, 2013). A ROE of more than 20% often involves a high amount of risk. The literature consulted suggests a mean ROE of 12.48% for Islamic banks and 13.52% for conventional banks (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008; Rashwan, 2012; Samad, 2004). Related to the dimension profitability it is hypothesized:
H1: There is no significant difference in the profitability of Islamic and conventional banks.

Efficiency
Efficiency reveals how well a bank is performing in making profit out of its assets (Al-Hares et al., 2013). So to speak, high operating costs are associated with a lower efficiency. Beck et al. (2013) suggest that Islamic banks might be less efficient due to their younger existence which could evoke higher cost structures.

Researchers are at odds over which type of bank is more efficient. Olson and Zoubi (2008) find evidence for their hypothesis that Islamic banks are operating less efficient than conventional banks. They suggest that Islamic banks are generally smaller and thus less capable of exploiting economies of scale. A regression analysis conducted by Beck et al. (2013) confirms this result. Al-Hares et al. (2013), achieve similar results with a t-test, however their findings are not significant which might be owed to a larger sample size and a larger period of study.

Rashwan (2012) finds that the financial crisis in 2008 has the same impact on efficiency as on profitability. Thus, it appears that either Islamic banks are using their assets less efficient in times of crisis, or conventional banks can benefit from financial crises in terms of efficiency. However, as mentioned before, this study examines three years only. Thus, a study of further years might reveal a change in this tendency after a few years. In contrast to the other researchers, Al-Muharrami (2008) hypothesizes Islamic banks to be more efficient than conventional banks. By means of a data envelopment analysis, he finds support for this hypothesis. He is studying the years before the crisis (1993-2002) and thus supporting the results of Rashwan (2012) for the pre-crisis time period, but countering the results of Olson and Zoubi (2008).

Two measures of efficiency are operating expenses-to-assets (OEA) and operating expenses-to-operating revenue/ income (OER). Previous research tested these ratios and achieved significant results for OEA with an average value of 2.18% for conventional and 2.57% for Islamic banks (Beck et al., 2013; Olson & Zoubi, 2008). Results for OER are only significant in the study of Beck et al. (2013). Nevertheless, the literature employed for this research found mean values of 51.60% for Islamic banks and 46.93% for conventional banks (Al-Hares et al., 2013; Beck et al., 2013; Olson & Zoubi, 2008). The hypothesis related to this dimension is:
H2: There is no significant difference in the efficiency of Islamic and conventional banks.

Liquidity

Liquidity describes the ability to counterbalance the withdrawal of savings by customers which can be achieved by possessing enough assets that can be liquidated on a short-time basis (Akhtar, Ali, & Sadaqat, 2011; Samad, 2004).

Khediri et al. (2015) can confirm their hypothesis that Islamic banks have more liquidity than conventional banks. They argue that Islamic banks have a narrower scope to acquire short-term cash since they can only invest in Sharia-conform products and cannot simply borrow money from the central bank. Therefore, Islamic banks arrange a higher liquidity a priori. The work of Samad (2004) confirms these results by stating that Islamic banks invest in more liquid assets due to constrained investment opportunities. However, only one of his applied ratios achieves significant results.

On the contrary, Al-Hares et al. (2013) are expecting conventional banks to have a higher liquidity but do not find any significant results. Olson and Zoubi (2008) cannot find significant evidence for differences in the liquidity structures of both bank types either. This provides an incentive to conduct further research on the liquidity of Islamic and conventional banks.

Ratios that are common for measuring liquidity are cash-to-assets (CTA) and cash-to-deposits (CTD). CTA was investigated by Khediri et al. (2015) and Olson and Zoubi (2008) but significant only in the former t-tests. The average mean values of these studies suggest that conventional banks have more cash compared to total assets than Islamic banks, namely 15.81% compared to 13.36% (Khediri et al., 2015; Olson & Zoubi, 2008). CTD was studied by Al-Hares et al. (2013), Khediri et al. (2015) and Olson and Zoubi (2008) but t-test results were in neither case significant. Previous research shows that conventional banks have a CTD of 20.44% on average and Islamic banks an even higher ratio of 22.60% (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008). Based on these results, the hypothesis related to liquidity is as follows:

H3: There is no significant difference in the liquidity of Islamic and conventional banks.

Solvency

Solvency determines to what extent the bank is able to meet its long-term obligation and implies whether a bank is rather debt- or equity-financed (Al-Hares et al., 2013). Leverage can help to make profits and investments that would not have been possible with investing own funds only. However, at the same time it increases the risk of financial distress and the likelihood of default.

According to Olson and Zoubi (2008), Islamic banks do not make use of debt financing. For this reason they expect Islamic banks to rely more on equity financing than conventional banks. This suggests a lower debt-to-equity ratio for Islamic banks. However, only two of their ratios achieve significant t-test results but they are indicating opposite conclusions about the solvency of Islamic and conventional banks. Similar to the hypothesis of Olson and Zoubi (2008), Al-Hares et al. (2013) expect Islamic banks to be more solvent than their conventional counterpart which can be confirmed by their t-test results. Khediri et al. (2015) can support these findings as they find that Islamic banks have a lower insolvency risk than conventional banks.

In general, it is important to review the solvency of a bank since it can become unable to pay its obligations when too much debt is in place, leading to bankruptcy at worst. Solvency is for instance investigated by the debt-to-assets (DTA) ratio and debt-to-equity (DTE) ratio. DTA is examined by Khediri et al. (2015) and Al-Hares et al. (2013), whereby only results of the latter study are significant. The ratio investigates to what extent banks assets consist of debt. According to the average value of these studies for DTA, conventional banks (83.63%) are more solvent than Islamic banks (86.60%) (Al-Hares et al., 2013; Khediri et al., 2015). However both studies by itself draw opposite conclusions about which bank type has higher levels of DTA. Al-Hares et al. (2013) also

studied the DTE in the GCC countries with significant evidence. Average values suggest that Islamic banks are on average more solvent in terms of DTE with a ratio of 6.26 compared to conventional banks that have a DTE of 6.84 (Al-Hares et al., 2013; Olson & Zoubi, 2008). Nevertheless, it is hypothesized:

H4: There is no significant difference in the solvency of Islamic and conventional banks.

Credit risk

The fifth dimension credit risk refers to the ability to absorb the losses of a loan default (Samad, 2004). If several debtors are not able to pay back their loans, credit risk is exacerbated and it will lead the bank into financial distress. A bank is regarded as insolvent as soon as its liabilities exceed the value of its total assets (Khediri et al., 2015). Therefore, credit risk is one of the most crucial risks a bank has to face (Elgari, 2003). A study of Rahman et al. (2015) reveals that in Bangladesh credit risk is the type of risk that causes most concern for both bank types.

Elgari (2003) argues in his descriptive research that Islamic banks have a higher credit risk, since they have to stick to the rules of the Sharia. For instance, under the conventional banking system, a debtor is more pressured to refund his debt within the agreed time period; otherwise he would face additional interest or fines. Islamic banks are not allowed to apply this kind of pressure since this would constitute riba (Iqbal et al., 1998). Instead, according to the principle of sharing profits and losses, credit risk is also shifted to the depositors (Čihák & Hesse, 2008). Additionally, Olson and Zoubi (2008) find that Islamic banks are lending more money than they receive in form of deposits compared to conventional banks. This implies a higher credit risk for Islamic banks.

Khediri et al. (2015) however hypothesize and prove with a significant t-test result that Islamic banks face a lower credit risk. Samad (2004) finds similar results and argues that a lower credit risk might be owed to the fact that these banks a priori employ more equity per capital to cushion defaulted loans.

The loans-to-assets (LTA) ratio was tested by several researchers and achieved an average value of 51.44% for Islamic banks and 53.45% for conventional banks (Al-Hares et al., 2013; Khediri et al., 2015; Samad, 2004). But only one of these studies found significant t-test results (Khediri et al., 2013). The second ratio, loans-to-deposits (LTD) was assessed in the same studies with significant evidence found by Khediri et al. (2015) and Samad (2004). The average LTD amounts to 81.00% for Islamic banks and a slightly higher LTD of 83.15% for conventional banks (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008). The hypothesis related to credit risk is:

H5: There is no significant difference in the credit risk of Islamic and conventional banks.

Next to the comparison of performance of both bank types with respect to each dimension it is relevant to examine whether it is possible to predict the bank type based on these dimensions. By means of a logistic regression analysis, Khediri et al. (2015) find significant evidence that the bank types can be discriminated based on their insolvency risk, whereby Islamic banks are exposed to a lower risk. They also test two measures of credit risk but one indicates a higher credit risk for Islamic banks, whereas the other ratio indicates the opposite. According to Olson and Zoubi (2008), higher levels of profitability and efficiency are more likely to characterize an Islamic bank, than a conventional bank. However, their results for the ratios that measure solvency risk are ambiguous. Generally, I expect Islamic banks to be more profitable, liquid and solvent, but also less efficient and exposed to a lower credit risk than conventional banks, based on these results and the t-test results from previous studies. However, in both logistic regression analyses mentioned here, only the minority of variables achieved statistically significant results. Therefore, it is hypothesized:

H6: It is not possible to significantly predict the bank type based on the dimensions profitability, efficiency, liquidity, solvency and credit risk.

Financial performance

The previous literature review and hypotheses aim to contrast the general performance of conventional banks with Islamic banks in five dimensions. But how does the performance in each of the dimensions affect financial performance? And is the financial performance of conventional banks determined differently than the performance of Islamic banks? A study that investigates the financial performance of Islamic banks is carried out by Bashir (2003). His results often reveal different impacts depending on which ratio is used as measure of financial performance. Whereas higher levels of leverage and insolvency risk affect ROE positively, the same ratios are negatively related to ROA. One of the liquidity ratios is positively related to ROA but negatively affecting ROE. The results for the other liquidity ratio are inconclusive. Furthermore, a higher level of operating costs to total assets is positively affecting financial performance measured by ROE but not significantly related to ROA as dependent variable. Taken as a whole, I do not expect the drivers of financial performance to differ substantially for both bank types. I assume that higher levels of profitability benefit financial performance irrespective of bank type, whereas higher levels of inefficiency, insolvency and credit risk negatively affect financial performance. Furthermore, I expect liquidity and financial performance to be significantly related. Therefore, it is hypothesized:

H7: There is no significant difference in how financial performance is determined for Islamic and conventional banks.

3. Methodology

To investigate bank performance it is necessary to operationalize the variables that are tested. In turn it is important to elaborate on the research methods that are applied in order to test these variables and the hypotheses.

3.1 Country selection

The countries were selected based on a certain Muslim population, following Johnes et al. (2014) who only consider countries with a Muslim population of at least 60% for their comparison of conventional and Islamic banks. The Muslim population in the countries investigated here ranges between 63.7% in Malaysia and 97.2% in Jordan (see Table 1). Further, only those countries that include both Islamic and conventional banks are included to ensure that the bank types are subject to similar economic and political conditions. It excludes Sudan and Iran since they prohibit conventional banking activities. The highest share of Islamic banking assets in the selected countries is 49% in Saudi Arabia (see Table 2). Consequently, all countries include companies and individuals that make use of conventional banking. Hence, they are more appropriate to study than Western countries where Islamic finance is growing but not yet as common as conventional finance. A third selection criterion is the compliance of the financial statements with IFRS or accounting standards adopted by the AAOIFI. Finally, only annual reports published in English could be analyzed. This precluded many annual reports from Indonesia for instance.

Taken together, I selected nine countries. The GCC countries are located centrally within the Islamic countries and witness a growth in banks and Islamic financial assets. The services of Islamic banks in this region are more innovative and thus able to provide an alternative to conventional banks (Al-Hares et al., 2013). Besides, countries with less developed (Islamic) financial systems are included. Jordan is closely located to the GCC and possesses an almost exclusively Muslim population (97.2% in 2010) but with a share of 14% a relatively low amount of Islamic banking assets (see Table 1 and Table 2). Malaysia is considered as an important driver and major hub of Islamic finance and therefore included (Imam & Kpodar, 2010). Bangladesh also inherits a large Islamic population (89.8%) but its economy is not as developed as the economy of the GCC states (see Table 1). Including the latter three countries adds to the generalizability of the results of this research.

3.2 Data collection

The data is derived from two sources. That of conventional bank is to a large extent derived from the Orbis database. This database encompasses private and public companies from all over the world, including banks. However, often data is not available for all of the years from 2008 to 2015. These gaps are filled with data from annual reports of the banks. Additionally, it was checked whether the data from Orbis complied with the data in the annual reports. Data for Islamic banks is exclusively derived from the financial statements in the annual reports of the particular banks that were downloaded from their websites. The reporting period of the majority of financial statements ends at the end of the year. The reporting periods of several Malaysian banks that often end during the calendar year are included as well, as long as the time period encompasses 12 months[4]. The banks were selected based on the lists of banks provided by central banks, banks studied in previous

[4] Many Malaysian banks changed their reporting period in 2011 from June to December. Thus, there are six months that are omitted in this analysis for the respective banks.

research and the availability of data of these banks. The final sample consists of 42 Islamic and 40 conventional banks (see Table 6 in the next section).

3.3 Operationalization of variables

The variables in form of financial ratios were selected based on their appearance in previous research and mostly achieved significant results. The definitions of the original (dependent) and lagged (independent) variables are presented in Table 5.

Table 5: Variables applied in this study

Abbreviation	Variable	Definition
ROA_t	Return on assets	Net $profit_t$/ total $assets_t$
ROE_t	Return on equity	Net $profit_t$/ total $equity_t$
Profitability		
ROA_{t-1}	Return on assets	Net $profit_{t-1}$/ total $assets_{t-1}$
ROE_{t-1}	Return on equity	Net $profit_{t-1}$/ total $equity_{t-1}$
Efficiency		
OEA_{t-1}	Operating expenses-to-total assets	Operating $expenses_{t-1}$ / total $assets_{t-1}$
OER_{t-1}	Operating expenses-to-operating income	Operating $expenses_{t-1}$ / operating $income_{t-1}$
Liquidity		
CTA_{t-1}	Cash-to-assets	$Cash_{t-1}$/ total $assets_{t-1}$
CTD_{t-1}	Cash-to-deposits	$Cash_{t-1}$/ customer $deposits_{t-1}$
Solvency		
DTA_{t-1}	Debt-to-assets	Total $debt_{t-1}$/ total $assets_{t-1}$
DTE_{t-1}	Debt-to-equity	Total $debt_{t-1}$/ total $equity_{t-1}$
Credit risk		
LTA_{t-1}	Loans-to-assets	Loans to $customers_{t-1}$/ total $assets_{t-1}$
LTD_{t-1}	Loans-to-deposits	Loans to $customers_{t-1}$/ customer $deposits_{t-1}$
	Country dummy	CBs: for 8 out of 9 countries IBs: for 7 out of 8 countries

The ratios appear in Al-Hares et al. (2013): ROA, ROE, OER, DTA, DTE, LTA, LTD; Khediri et al. (2015): ROA, ROE, CTA, CTD, DTA, LTA, LTD; Olson & Zoubi (2008): ROA, ROE, OEA, OER, CTA, CTD, DTE, LTA, LTD. They are calculated based on the data derived from the annual reports of the banks and data from the Orbis database. CBs denote conventional banks, IBs denote Islamic banks.

ROA_t and ROE_t serve as dependent variables in the OLS regression. In order to prevent confusion, they are referred to as measuring financial performance, whereas the variables studied in the t-tests and logistic regression are measuring (bank) performance.

Profitability ratios:

ROA: its value can be both negative and positive. The higher the value, the more profit a bank generates with its assets, i.e. the better the performance.

ROE: In general, the higher the ratio, the higher is the profitability/ bank performance. However, a high ROE can also be the result of a high leverage (Al-Hares et al., 2013).

Efficiency ratios:

OEA: measures how efficient the banks are using their assets. The result shows the amount of operating expenses as proportion of total assets. A lower ratio signals a more efficient use of the bank's total assets.

OER: shows the size of the proportion of operating revenue that is used for operating expenses. A lower OER shows that a bank is operating more efficiently (Al-Hares et al., 2013).

Liquidity ratios:

CTA: measures how much cash a bank has, relative to its total assets including cash, loans to clients and other assets. Higher levels of CTA imply more liquidity.

CTD: displays how much cash a bank possesses in comparison to the total deposits of its customers. It shows to what extent a bank would be able to outweigh the withdrawal of customer deposits in the short run. The higher the outcome, the higher is the liquidity. Nevertheless, the amount of cash should not be too vast as this would result in wasted opportunities to invest and generate money.

Solvency ratios:

DTA: shows how much of the total debt has to be covered by total assets. A lower ratio signals a lower amount of assets that are financed with debt and thus a higher solvency.

DTE: displays how much debt is covered by a bank's equity. Here again, a lower ratio signals a higher solvency.

Credit risk ratios:

LTA: determines the share of total assets that is attributed to loans. The lower the ratio, the less likely it is that the bank gets into financial distress because a borrower fails to pay back his loan.

LTD: shows to what extent the loans granted to customers are covered by customer deposits. A higher ratio indicates a higher risk of not being able to outweigh deposit withdrawals.

3.4 Research methods

In order to answer the research questions and test the hypotheses, three research methods are applied. They have different objectives and the data have to meet certain assumptions.

3.4.1 Bivariate analysis

The first research sub-question is answered by means of a two-sample t-test which examines the differences in means between Islamic and conventional banks with respect to each financial ratio. On the basis of differing means, propositions can be made about whether the performance indicators of both bank types significantly differ from each other and which bank type on average performs better with respect to each ratio. Therefore, the data should satisfy a few assumptions to be applicable for this method, for instance mentioned by De Veaux, Velleman and Bock (2012):

1. Independence assumption: the data have to be independent, i.e. the performance of one bank must not depend on the performance of another bank. The banks operate independently of each other and thus the performance of one bank does not directly influence the performance of another.

2. Nearly normal condition: it stipulates that the distribution of both bank type samples has to be approximately unimodal without extreme outliers or highly skewed distributions. Histograms and normal probability plots are used to examine the distribution of the data.
3. Independent group assumption: the data of both samples have to be independent from each other. This condition is fulfilled since the banks were assigned based on their bank type.

3.4.2 Multivariate analysis

Logistic regression

The second research sub-question is answered with the aid of logistic regression. This method enables to determine which of the accounting ratios discriminate between Islamic and conventional banks and whether these ratios have a positive or negative for the respective bank types. According to Hair, Black, Babin, and Anderson (2014), logistic regressions does not require the assumptions of OLS regression analyses to be met. The following conditions apply to logistic regression analyses:

1. Multicollinearity: the Pearson correlations of all variables are assessed first. In case there is a risk of multicollinearity, different models will be created.
2. The dependent variable has to be dichotomous (Hair et al., 2014). Here a zero is assigned for the conventional banks and a one is assigned to the Islamic banks.
3. The observations for each category should not overlap. This is not possible here, since each observation is either from a conventional or an Islamic bank.
4. A linear relationship between the independent variables and the log odds of the dependent variable. This will be tested within the analysis.

The model fit can be assessed by the Hosmer and Lemeshow (HL) test that examines whether the observed and the predicted values are significantly different. A non-significant value would indicate a good model fit. The pseudo R^2 is comparable to the R^2 in OLS regression. Here, the Nagelkerke R^2 is considered. The logistic regression equation with all independent variables is the following:

$$\text{Log}\left(\frac{p}{1-p}\right) = \alpha + \beta_1\text{ROA} + \beta_2\text{ROE} + \beta_3\text{OEA} + \beta_4\text{OER} + \beta_5\text{CTA} + \beta_6\text{CTD} + \beta_7\text{DTA} + \beta_8\text{DTE} + \beta_9\text{LTA} + \beta_{10}\text{LTD}$$

OLS regression

In order to predict financial performance with the defined independent variables and answer sub-question three, OLS regression analyses are carried out. The aim of a regression analysis is to predict the metric dependent variable with metric independent variables. The results give indication about (1) which indicators are significantly affecting the financial performance, (2) whether it is positively or negatively affected and (3) the extent of this impact. Therefore, four OLS regressions are performed, one for each bank type and dependent variable. In this way, it will become evident whether the financial performance of both bank types is determined by different accounting ratios, or whether particular accounting ratios are differently affecting the financial performance per bank type. The assumptions that apply for OLS regressions are:

1. Independence assumption: requires that the error terms have to be independent of each other. This is checked with residual plots.
2. Nearly normal condition: as for the t-tests, histograms and normal probability plots are used to validate this assumption.
3. Linearity assumption: residual plots are examined to check for curvilinear patterns in the residuals.

4. Equal variance assumption: it stipulates that the regression residuals, expressed in a scatter plot against the independent variables, must not show a clear pattern in order to be independent (de Veaux et al., 2012). Residual plots are for patterns that indicate heteroskedasticity.

If the latter assumption that requires the residuals to be homoskedastic is not fulfilled, the significance of the results can be distorted. Hayes and Cai (2007) suggest that a heteroskedasticity-consistent standard error estimator (HCSE) test should always be applied in addition to the OLS regression in order to check whether heteroskedasticity that can also occur unnoticed is affecting the regression results. A further advantage is that transformations of the variables are not necessary. The coefficients of the variables are the same but the standard errors are often higher, resulting in higher p-values. Hayes and Cai (2007) describe the development of four HC estimators. HC3 is applied here as it is the recommended method for samples smaller than 250 (Long & Ervin, 2000).

Furthermore, the correlation of the variables is assessed to check whether there is a risk of multicollinearity among the independent variables which would bias their precision as predictors. Additionally, the variance inflation factor (VIF) and the tolerance are checked. In this research, only variables with a VIF lower than 2.9 and a tolerance larger than 0.35 are utilized. If variables exceed these thresholds, they are employed in different models to capture the effect of all suitable variables.

Another drawback is the problem of omitted variables. There are most likely other factors than the ten accounting ratios that could explain financial performance, e.g. regulations, expectations of clienteles or diverse business philosophies. Therefore the adjusted R^2 of each regression model is assessed. It gives indication about the extent of differences in financial performance that can be explained by the included accounting ratios.

In order to increase the likelihood that the independent variables have a causal effect in time on the dependent variable, the OLS regression is conducted with lagged independent variables. Since a large amount of data is derived from the balance sheets that display the position of a bank at one point in time (end of the year) it is likely that causality in time exists. For instance the efficiency of operations in one year is likely to affect the financial performance in the next year. As the independent variables of this study are lagged by one period only, the OLS regression equations appear as follows:

$$ROA_{j,t} = \alpha + \beta_1 ROA_{j,t-1} + \beta_2 ROE_{j,t-1} + \beta_3 OEA_{j,t-1} + \beta_4 OER_{j,t-1} + \beta_5 CTA_{j,t-1} + \beta_6 CTD_{j,t-1} + \beta_7 DTA_{j,t-1} + \beta_8 DTE_{j,t-1} + \beta_9 LTA_{j,t-1} + \beta_{10} LTD_{j,t-1} + e_{j,t}$$

$$ROE_{j,t} = \alpha + \beta_1 ROA_{j,t-1} + \beta_2 ROE_{j,t-1} + \beta_3 OEA_{j,t-1} + \beta_4 OER_{j,t-1} + \beta_5 CTA_{j,t-1} + \beta_6 CTD_{j,t-1} + \beta_7 DTA_{j,t-1} + \beta_8 DTE_{j,t-1} + \beta_9 LTA_{j,t-1} + \beta_{10} LTD_{j,t-1} + e_{j,t}$$

Where
α: the value of Y when all Xs are 0
β: is the effect of a change in Y that is evoked by a change in one X and all other Xs stay constant
e: is the prediction error
t: is the time, here the year of study
j: bank type

4. Data analysis

To examine differences in performance of Islamic and conventional banks, bivariate and multivariate analyses are carried out. The results are illustrated and related to the hypotheses in this section.

4.1 Sample characteristics

In Table 6 the number of conventional and Islamic banks in the sample is displayed. It shows the number of banks per country and the years of observation for each bank type and country.

Table 6: The sample

	Conventional banks			**Islamic banks**		
Country	No. of banks	Years of available ratios	Avg. total assets (billion US$)	No. of banks	Years of available ratios	Avg. total assets (billion US$)
Bahrain	2	8	2.081	2	8	1.913
Bangladesh	10	8	1.494	8	8	1.947
Jordan	6	8	3.757	2	8	2.937
Kuwait	4	8	18.773	4	8	20.258
Malaysia	5	8	32.717	7	8	12.194
Oman	3	8	4.309	4	3	0.372
Qatar	5	5	15.469	4	8	12.449
Saudi Arabia	0	0	0	4	8	24.892
UAE	5	8	4.455	7	8	12.351
Sum/ average	**40**		**10.382**	**42**		**9.924**

The data comprises the years 2008 to 2015. The data for conventional banks were derived from Orbis if available. All other data were gathered from the annual reports of the banks that were downloaded from the respective websites. Average total assets are the values at the end of the reporting year. The data were converted to US dollars based on the mean exchange rate from beginning, half and end of the reporting period.

The sample does not include Saudi Arabian conventional banks as all of their banks are either full-fledged Islamic banks or offering both, conventional and Islamic products. This was checked with a list of local banks published by the Saudi Arabian central bank and the Saudi Arabian banks covered by Orbis. Four of the Qatari conventional banks also provided Islamic services until in 2011 the central bank required all conventional banks to terminate Islamic banking operations. Thus, Qatari conventional banks have fewer years of observations than banks from other countries. Only three years of observation are available for Oman as Islamic banking was introduced in 2012.

The illustration of total assets shows that on average, conventional banks are slightly larger than Islamic banks. Looking at the countries independently this is true for the majority, especially for Malaysia. Nevertheless, in Kuwait and UAE, Islamic banks tend to be larger than conventional banks. However, it has to be taken into account that these conclusions are drawn from the banks in this sample only and examining two banks per country (e.g. Bahrain) is not representative.

4.2 Descriptive statistics

Table 7 presents the descriptive statistics of both bank types, together with a two sample t-test[5]. A few major outliers have been deleted although these outliers are not due to measurement errors.

[5] The assumptions outlined in the previous section are fulfilled.

Table 7: Descriptive statistics

Panel A: Descriptives based on original variables

	Conventional banks						Islamic banks						T-test
Variable	**Mean**	**Median**	**SD**	**Min**	**Max**	**N**	**Mean**	**Median**	**SD**	**Min**	**Max**	**N**	**T-value**
ROA_t	0.014	0.014	0.009	-0.006	0.052	272	0.011	0.011	0.012	-0.054	0.055	283	4.240***
ROE_t	0.116	0.116	0.063	-0.068	0.359	272	0.098	0.110	0.098	-0.584	0.307	283	2.593***
Profitability													
ROA_{t-1}	0.015	0.014	0.009	-0.006	0.052	237	0.011	0.011	0.013	-0.054	0.055	241	4.069***
ROE_{t-1}	0.120	0.120	0.065	-0.069	0.359	237	0.098	0.111	0.103	-0.584	0.307	241	2.746***
Efficiency													
OEA_{t-1}	0.019	0.017	0.009	0.006	0.047	236	0.017	0.016	0.007	0.006	0.058	241	3.038***
OER_{t-1}	0.420	0.419	0.127	0.167	0.957	236	0.488	0.443	0.274	0.156	2.755	241	-3.516***
Liquidity													
CTA_{t-1}	0.089	0.076	0.044	0.004	0.243	236	0.113	0.089	0.086	0.010	0.423	247	-3.767***
CTD_{t-1}	0.133	0.108	0.073	0.012	0.417	236	0.154	0.119	0.111	0.018	0.596	247	-2.433***
Solvency													
DTA_{t-1}	0.868	0.874	0.059	0.328	0.948	236	0.863	0.891	0.105	0.098	0.968	247	0.645
DTE_{t-1}	7.673	7.017	3.108	0.488	18.083	236	9.073	8. 322	4.935	0.109	30.376	247	-3.749***
Credit risk													
LTA_{t-1}	0.588	0.627	0.146	0.024	0.820	237	0.622	0.631	0.125	0.065	0.885	247	-2.731***
LTD_{t-1}	0.850	0.876	0.198	0.032	1.254	237	0.864	0.877	0.184	0.383	1.875	247	-0.841

Panel B: Descriptives based on winsorized variables

	Conventional banks						Islamic banks						T-test
Variable	**Mean**	**Median**	**SD**	**Min**	**Max**	**N**	**Mean**	**Median**	**SD**	**Min**	**Max**	**N**	**T-value**
ROA_t	0.014	0.014	0.007	0.000	0.032	272	0.011	0.011	0.010	-0.021	0.035	283	4.376***

ROE_t	0.116	0.116	0.058	0.000	0.260	272	0.102	0.110	0.074	-0.107	0.239	283	2.340**
Profitability													
ROA_{t-1}	0.014	0.014	0.008	0.000	0.036	237	0.011	0.011	0.011	-0.021	0.037	241	4.229***
ROE_{t-1}	0.119	0.120	0.061	0.000	0.270	237	0.102	0.111	0.079	-0.138	0.241	241	2.655***
Efficiency													
OEA_{t-1}	0.019	0.017	0.009	0.008	0.041	236	0.016	0.016	0.006	0.006	0.034	241	3.523***
OER_{t-1}	0.417	0.419	0.116	0.207	0.691	236	0.474	0.443	0.199	0.190	1.061	241	-3.832***
Liquidity													
CTA_{t-1}	0.089	0.076	0.041	0.034	0.197	236	0.112	0.089	0.083	0.023	0.365	247	-3.916***
CTD_{t-1}	0.133	0.108	0.070	0.050	0.326	236	0.153	0.119	0.107	0.045	0.476	247	-2.537**
Solvency													
DTA_{t-1}	0.872	0.874	0.040	0.787	0.937	236	0.868	0.891	0.081	0.572	0.955	247	0.640
DTE_{t-1}	7.669	7. 017	2.944	3.691	14.825	236	9.008	8.322	4.652	1.339	21.347	247	-3.798***
Credit risk													
LTA_{t-1}	0.591	0.627	0.135	0.206	0.764	237	0.625	0.631	0.111	0.371	0.852	247	-3.077***
LTD_{t-1}	0.855	0.876	0.175	0.413	1.179	237	0.861	0.877	0.165	0.498	1.216	247	-0.368

See Table 5 for the definition of the variables and Table 6 for the data sources. Panel A shows the descriptives for the original variables; Panel B displays the variables after winsorizing at the 95 percentile. The two sample t-test was calculated based on the mean. ***, ** signify a relationship between independent and dependent variable that is statistically significant at the 1% and 5% level respectively.

But since banks face stricter regulations than ordinary businesses, years of maladministration cannot be tolerated. Panel A shows the descriptive for the original data. These data still include some outliers; therefore the data was winsorized at the 95 percentile, presented in Panel B. The further analyses will be based on the winsorized ratios. The values for DTE seem to be distinctly higher than the values of the other variables. That is because this variable is not measured in percent.

The two sample t-test reveals that except for DTA and LTD, the ratios are significantly different for the conventional and Islamic banks in this sample. Both, original and lagged ROA and ROE are significantly higher for conventional banks, which is also visible in Figure 2 and Figure 3 respectively. Throughout the years, ROA is constantly higher for conventional banks and ROE is higher for those banks until 2013. This is not in line with the majority of previous studies related to profitability but higher levels of ROE of conventional banks were already suggested by the average value of the results of previous studies, mentioned in Sub-section 3.4.2 (CBs 13.52%; IBs 12.48%). Nevertheless, the t-test results and Figure 2 and Figure 3 reject H1 that there is no statistically significant difference in the profitability of both bank types. The impact of the financial crisis on the mean of the banks employed in both samples is visible in both figures. In 2009, the profitability declines for both bank types but increases again in 2010, for conventional banks to a level comparable to that of 2008. In 2008, ROA and ROE of both bank types are nearly equal for both bank types but the crisis affected the mean of the Islamic banks more severely. Though, whereas the level of ROA and ROE of Islamic banks remain relatively constant in the following years, the profitability ratios of conventional banks constantly decrease after 2010 and converge to the profitability of Islamic banks.

The mean OEA is significantly higher for conventional banks as opposed to the mean value of previ-

Figure 2: ROA between 2008 and 2014[6]

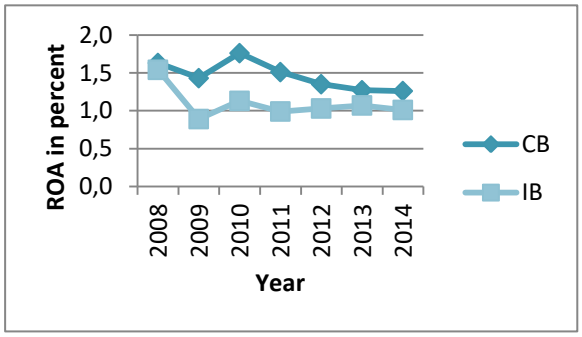


Figure 3: ROE between 2008 and 2014

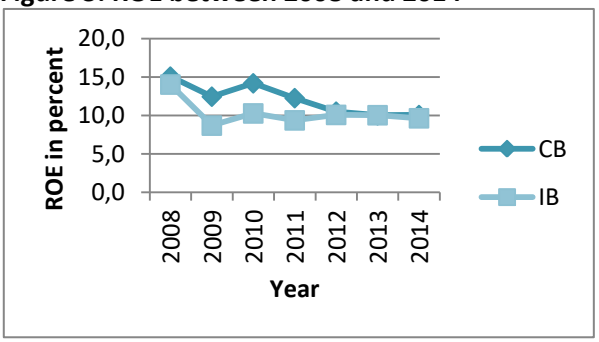


Figure 4: OEA between 2008 and 2014

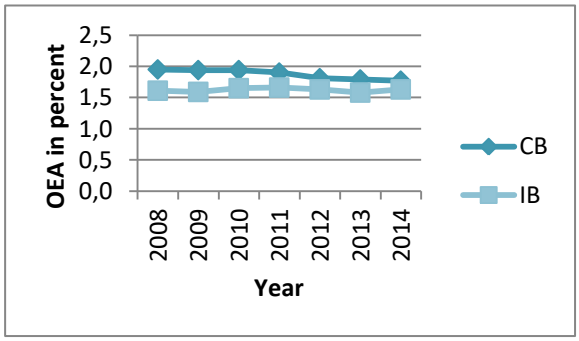
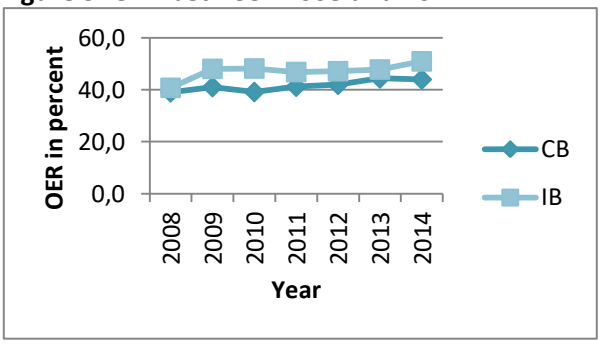


Figure 5: OER between 2008 and 2014



[6] Due to the lag of the variables, the year 2015 drops out of the sample. The lagged variables are used to facilitate a comparison to the two sample t-test results.

Figure 6: CTA between 2008 and 2014

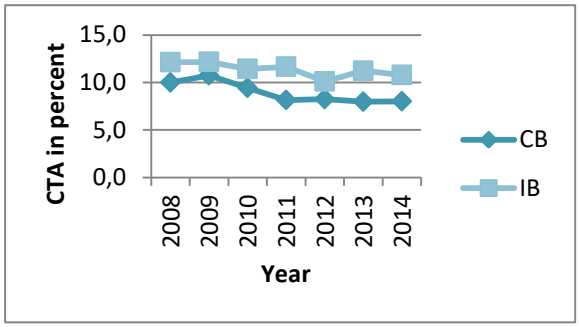


Figure 7: CTD between 2008 and 2014

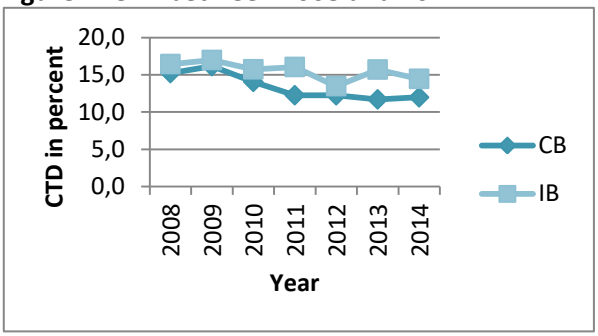


Figure 8: DTA between 2008 and 2014

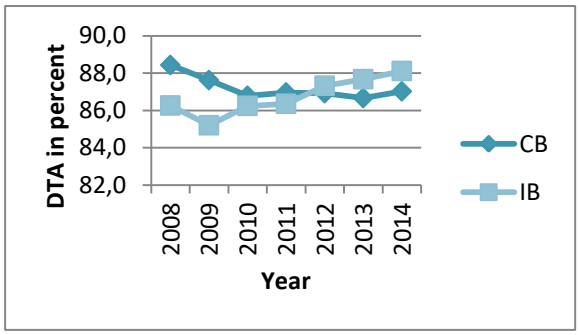


Figure 9: DTE between 2008 and 2014

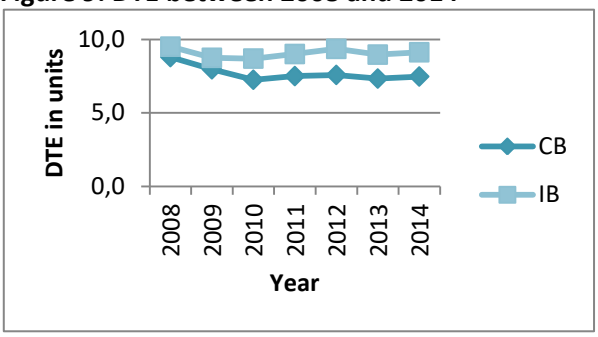


Figure 10: LTA between 2008 and 2014

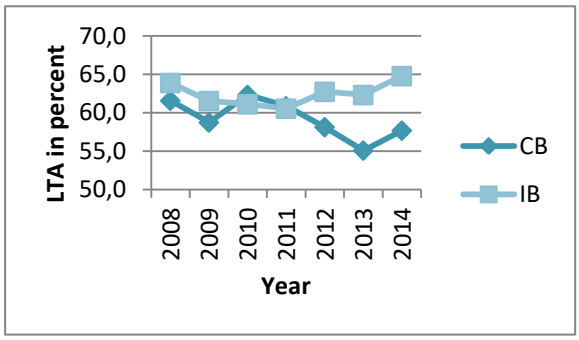
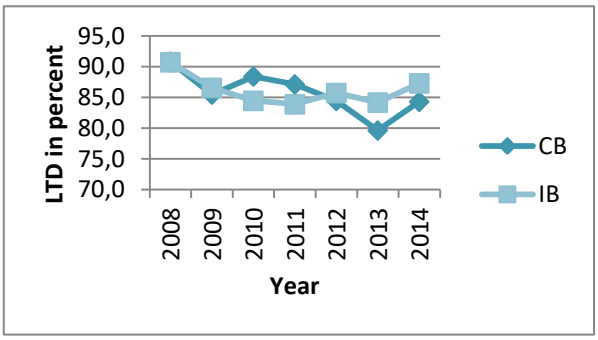


Figure 11: LTD between 2008 and 2014



Source: Orbis, annual reports of conventional and Islamic banks

ous studies. On the contrary, the mean OER is higher for Islamic banks in line with the average value from previous research. This is visible in both significant t-test results and Figure 4 and Figure 5 that show constantly higher mean values for conventional banks (OEA) or Islamic banks (OER) respectively. Although the results of both ratios indicate opposite conclusions about which bank type is operating more efficiently, the second hypothesis is disproved since there is a significant difference between both bank types with respect to efficiency.

H3 assumes that Islamic and conventional banks are not significantly different with respect to liquidity. The t-test rejects this hypothesis since Islamic banks have significantly higher liquidity ratios than conventional banks. This tendency is underlined with Figure 6 and 7 that show higher levels of CTA and CTD throughout the years, although the average liquidity decreases after the financial crisis hit the global economy in 2009. Further, these results are in line with the average values of previous studies for CTD (CBs: 20.44%; IBs: 22.60%) but not for CTA (CBs: 15.81%; IBs: 13.36%).

A t-test applied to examine the solvency ratio DTA cannot detect a significant difference between both bank types. Whereas the mean value is higher for conventional banks and thus indicates a lower solvency, the median suggests the opposite. Figure 8 reveals that the predominance in DTA changes during the period of study. While the solvency of conventional banks increases over the years, the DTA of Islamic banks first decreases in 2009 after the global spread of the financial crisis but then increases in the following years and exceeds the mean ratio of conventional banks in 2012. DTE also declines for both bank types after 2008, where conventional banks always have a higher solvency than Islamic banks (Figure 9). This is in line with the t-test results that indicate a significantly higher DTE for Islamic banks. These findings contradict the average values found in previous studies that suggest a DTE of 6.26 for Islamic banks and a DTE of 6.84 for conventional banks. Figure 9 shows that the mean DTE of both bank types in this sample was already much higher in 2008 and then declining in the following years. Consequently, a potential negative influence of the crisis on a bank's solvency can only be assumed for DTA and Islamic banks after 2009. Since the banks significantly differ with respect to one ratio only, the implications of the solvency ratios ambiguous. Still, the results do not support the hypothesis that there is no significant difference in the solvency of Islamic and conventional banks and thus H4 has to be rejected.

Based on the t-test results, Islamic banks have significantly higher levels of LTA. Figure 10 confirms this finding on average, although in 2010 conventional banks are exposed to a slightly higher credit risk. Between 2011 and 2013 conventional banks on average decreased their credit risk, while Islamic banks experienced an increase in LTA. With regard to the other indicator of credit risk, the t-test does not reveal a statistically significant difference but both mean and median suggest higher levels of LTD for Islamic banks. Correspondingly, Figure 11 shows similar values for 2008 and 2009. In the following two years, conventional banks are exposed to a higher credit risk but this reverses again in 2013 and 2014. Consequently, it is difficult to make unambiguous conclusions about the differences in LTD. Similar to solvency, the credit risk ratios have opposite implications on H5. Nevertheless, there is evidence for significant differences in the credit risk of both bank types and thus H5 is rejected.

4.3 Empirical results

To test sub-question two and three, two statistical tests are performed. Thus, the correlations between all variables are shown to investigate whether it is feasible to perform these tests. Then, the logistic regression results related to sub-question two are presented. Finally, the OLS regression results are illustrated and their implications, associated with sub-question three, are reported.

4.3.1 Correlation

Table 8 shows the correlations among the independent and dependent variables. On the left hand side, the data for conventional banks are presented, whereas the right hand side illustrates the data for Islamic banks. It becomes apparent that especially variables that are selected to measure the same dimension often exhibit a high correlation (e.g. ROA and ROE; CTA and CTD; DTA and DTE). This might be natural since the numerator of the ratio is the same for both variables and the denominators (e.g. total assets and total equity) are related to each other. When total assets increase it is likely that total equity increases as well. Moreover, the majority of independent variables is significantly associated with the dependent variables.

Table 8: Correlations

		Islamic banks											
		ROA_t	ROE_t	ROA_{t-1}	ROE_{t-1}	OEA_{t-1}	OER_{t-1}	CTA_{t-1}	CTD_{t-1}	DTA_{t-1}	DTE_{t-1}	LTA_{t-1}	LTD_{t-1}
Conventional banks	ROA_t	1	0.818***	0.770***	0.611***	-0.297***	-0.568***	-0.098	-0.124*	-0.045	-0.152**	0.252***	0.163***
	N		283	240	240	240	240	246	246	246	246	246	246
	ROE_t	0.793***	1	0.610***	0.775***	-0.429***	-0.614***	0.122*	0.068	0.321***	0.316***	0.361***	0.099
	N	272		240	240	240	240	246	246	246	246	246	246
	ROA_{t-1}	0.712***	0.539***	1	0.816***	-0.356***	-0.732***	-0.124*	-0.139**	-0.123*	-0.194***	0.240***	0.205***
	N	232	232		241	241	241	241	241	241	241	241	241
	ROE_{t-1}	0.548***	0.733***	0.803***	1	-0.455***	-0.748***	0.119*	0.083	0.255***	0.301***	0.332***	0.128**
	N	232	232	237		241	241	241	241	241	241	241	241
	OEA_{t-1}	0.085	0.353***	0.117*	0.350***	1	0.676***	-0.138**	-0.123*	-0.357***	-0.413***	-0.194***	-0.112*
	N	231	231	236	236		241	241	241	241	241	241	241
	OER_{t-1}	-0.415***	-0.155**	-0.467***	-0.250***	0.574***	1	0.056	0.068	-0.198***	-0.134**	-0.342***	-0.207***
	N	231	231	236	236	236		241	241	241	241	241	241
	CTA_{t-1}	-0.089	-0.159**	-0.103	-0.156**	-0.086	0.057	1	0.955***	0.267***	0.433***	-0.368***	-0.490***
	N	231	231	236	236	236	236		247	247	247	247	247
	CTD_{t-1}	-0.022	-0.215***	-0.047	-0.196***	-0.251***	-0.138**	0.874***	1	0.128**	0.348***	-0.448***	-0.396***
	N	231	231	236	236	236	236	236		247	247	247	247
	DTA_{t-1}	-0.241***	0.297***	-0.294***	0.269***	0.273***	0.267***	-0.091	-0.244***	1	0.787***	0.286***	-0.212***
	N	231	231	236	236	236	236	236	236		247	247	247
	DTE_{t-1}	-0.243***	0.299***	-0.300***	0.261***	0.308***	0.281***	-0.116*	-0.265***	0.944***	1	0.157**	-0.182***
	N	231	231	236	236	236	236	236	236	236		247	247
	LTA_{t-1}	0.041	0.220***	0.103	0.250***	0.207***	-0.014	-0.177***	-0.386***	0.239***	0.272***	1	0.654***
	N	232	232	237	237	236	236	236	236	236	236		247
	LTD_{t-1}	0.094	0.011	0.169***	0.080	-0.146**	-0.349***	-0.181***	-0.019	-0.128**	-0.103	0.642***	1
	N	232	232	237	237	236	236	236	236	236	236	237	

See Table 5 for the definition of the variables and Table 6 for the data sources. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The data on the left side represents the correlations between the dependent and independent variables of conventional banks, the data on the right hand side displays the correlations among the variables of Islamic banks.

4.3.2 Logistic regression analysis

The logistic regression is conducted to predict the bank type with the familiar independent variables. In that way it can be checked whether the variables are powerful enough to distinguish between conventional and Islamic banks and whether rather positive or negative coefficients are likely for a specific bank type. Since multicollinearity is also a concern to logistic regressions, two models are computed[7]. The column expectation shows the anticipated relationship between dependent and independent variables mentioned in the hypothesis development in Sub-section 2.5.2.

All of the variables in Table 9 are statistically significant at the 1%, 5% or 10% level, except for the profitability and solvency ratios. Both ROA and ROE hint at higher levels of profitability for Islamic banks which would contradict the results of the previous sub-section. Nevertheless, the results for these variables are not statistically significant and thus not interpretable reliably. Consequently, the profitability ratios are not appropriate to distinguish whether a bank rather follows the conventional or the Islamic banking model. Further, the results reveal that it is not possible to distinguish Islamic and conventional banks solely based on the solvency ratios.

In line with the t-test results, banks with lower levels of operating expenses to total assets are more likely to be Islamic. The positive significant coefficient related to OER, the other indicator of efficiency implies that Islamic banks have higher levels of OER, confirming the t-test results. Both CTA in model 1 and CTD in model 2 have positive significant coefficients. Islamic banks have higher cash ratios than conventional banks, confirming the results of the previous section. Compared to conventional banks, Islamic banks are characterized by higher levels of LTA but lower levels of LTD. These results are in accordance with the t-test results for LTA. As opposed to the t-test results, the logistic regression achieved significant results for LTD which contradicts the higher mean and median values of Islamic banks reported in Table 7.

Taken together, it was possible to distinguish between both bank types with the majority of ratios and therefore H6 is disproved. Further, the results largely support the results of the two sample t-tests. The pseudo R^2 amounts to 35.90% for model 1 and 34.32% for model 2. The Hosmer and Lemeshow test is not significant, meaning that there is no significant difference between the values that are observed and those that are predicted by the model. Furthermore, model 1 classified 70.60% of the banks correctly and model 2 classified with 68.60% slightly less correctly. In both models Islamic banks were more often correctly classified than conventional banks.

4.3.3 OLS regression analysis

As can be seen in the correlation table (Table 8) some of the variables are highly correlated. Based on these values and the VIF scores, different OLS regression models were computed in order to prevent that multicollinearity distorts the regression outcome[8]. The models serve the purpose of capturing the effect of all independent variables on the dependent variable. At first the models are computed with the ratio variables explained in Table 6. Then, these models are computed again but this time including country dummies to check whether there are differences that affect the outcome. For instance, the Bangladeshi banks represent almost one fourth of the sample of conventional banks. Thus, it is possible that these banks are overly affecting the regression outcome. With the utilization of country dummies the coefficients often slightly change. In some cases, coefficients that were not statistically significant become significant in the other model, and vice versa but the signs of the

[7] All other assumptions outlined in the previous section are fulfilled.
[8] All other assumptions outlined in the previous section are fulfilled.

Table 9: Logistic regression with values in percentages

	Expectation	Model 1	Model 2
ROA	+	0.208	
		[0.175]	
ROE	+		0.034
			[0.022]
OEA	+	-0.357***	-0.353***
		[0.057]	[0.056]
OER	+	0.001***	0.001***
		[0.000]	[0.000]
CTA	+	0.003***	
		[0.001]	
CTD	+		0.001***
			[0.000]
DTA	-	-0.000	
		[0.000]	
DTE	-		-0.000
			[0.000]
LTA	-	0.101***	0.078***
		[0.017]	[0.015]
LTD	-	-0.023**	-0.015*
		[0.010]	[0.009]
Constant		-3.467**	-4.815***
		[1.511]	[0.837]
N		554	554
Pseudo R^2		0.359	0.342
HL Test		9.006	13.682
P-value		0.342	0.090
Hit rate (%)			
Conventional bank		67.90	67.90
Islamic bank		73.10	69.30
Overall		70.60	68.60

See Table 5 for the definition of the variables and Table 6 for the data sources. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The standard errors for each variable are shown in brackets. + indicates a positive expected relationship with Islamic banks, whereas – represents a negative expected relationship. They were defined based on the results of previous studies. 0 = conventional bank; 1 = Islamic bank

N.B.: the variables were multiplied by 100 in advance to the analysis. All statistics are the same, only the coefficients are smaller. Results for original variables can be found in Appendix C.

coefficients do not change. For each bank type two sets of regressions were calculated. In the first, ROA_t is employed as the dependent variable and in the second, ROE_t is the dependent variable. As a consequence, there are four different settings. The models were additionally tested with the HC 3 test.

Conventional banks

Table 10 shows the OLS regression results for conventional banks with ROA_t employed as the dependent variable. The lagged dependent variable and ROE_{t-1} have a positive effect on financial performance that is statistically significant. The insert of country dummies slightly decreases the coefficients but profitability is still positively and significantly related to financial performance as expected. It is expected that a higher level of inefficiency negatively affects financial performance. OEA_{t-1} shows a positive effect on the dependent variable ROA_t as well. That means that a higher OEA_{t-1}, i.e. less efficiency, leads to a better financial performance of conventional banks as opposed to the expectation. The coefficients of all three models even increase when taking into account the country dummies. The same can be observed for OER_{t-1} however, this variable is negatively affecting the financial performance measured by ROA_t. Consequently, the efficiency ratios indicate opposite effects on financial performance. Contrary to the expectation, CTA_{t-1} and CTD_{t-1} do not show a statistically significant relationship with the dependent variable. It suggests that liquidity does not affect financial performance. DTA_{t-1} and DTE_{t-1} are both negatively affecting financial performance measured by ROA_t. These results are also statistically significant when taking into account the country dummies. Consequently, less solvency results in a lower financial performance in line with the expectation. LTA_{t-1} has a rather positive effect on financial performance; however this effect is not statistically significant. LTD_{t-1} on the other hand negatively affects financial performance but this relationship is significant in one model only. The adjusted R^2 of the models is between 50% and 55% which means that more than half of the variation in financial performance (ROA_t) is accounted for by the variables in the respective models. The adjusted R^2 of model 1 to model 3 ranges between 50% and 52%, whereas the variation in the dependent variable, accounted for by the independent variables is with 53% to 55% slightly higher for models including country dummies.

In Table 11, the OLS regression results for conventional banks are presented but this time ROE_t is employed as the dependent variable. A difference is directly observable in the first independent variable ROA_{t-1} which is substantially higher than in the previous regression models. In model 4 the coefficient slightly decreases as well when country dummies are introduced to the model. The same applies to ROE_{t-1} whose coefficient is smaller when country effects are taken into account but generally higher than within the models in Table 10. The differences measurable for ROA_{t-1} and ROE_{t-1} when applying ROE_t compared to ROA_t as a dependent variable are also visible for OEA_{t-1}. Here the effects on the dependent variable are positive and significant comparable to the results in Table 10, but the coefficients are clearly higher. Looking at OER_{t-1}, it becomes apparent that it is less often significantly related to the dependent variable when ROE_t is used as indicator for financial performance. The coefficients that are interpretable with significance are negative as in Table 10. CTA_{t-1} and CTD_{t-1} are also not significantly related to ROE_t as dependent variable. Here however, the coefficients are first negative and become positive when country dummies are included in the models. According to the OLS regression models in Table 11, DTA_{t-1} is positively affecting financial performance. However, this effect is only statistically significant in one model when country dummies are included. This suggests that the result is not biased by differences among countries.

Table 10: OLS regression: Conventional banks with ROA as dependent variable

		OLS regression			OLS regression with country dummies		
Expectation		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
ROA_{t-1}	+	0.545***			0.433***		
		[0.088]			[0.122]		
ROE_{t-1}	+		0.061***	0.058***		0.049***	0.048***
			[0.011]	[0.008]		[0.014]	[0.014]
OEA_{t-1}	-	0.147**	0.169***	0.187***	0.244**	0.283**	0.269**
		[0.060]	[0.063]	[0.063]	[0.110]	[0.114]	[0.114]
OER_{t-1}	-	-0.016**	-0.020***	-0.021***	-0.020**	-0.024***	-0.024***
		[0.007]	[0.006]	[0.006]	[0.009]	[0.008]	[0.008]
CTA_{t-1}	*	0.000			0.011		
		[0.007]			[0.010]		
CTD_{t-1}	*		0.001	0.000		0.008	0.008
			[0.005]	[0.005]		[0.007]	[0.007]
DTA_{t-1}	-		-0.069***			-0.049***	
			[0.010]			[0.014]	
DTE_{t-1}	-			-0.001***			-0.001***
				[0.000]			[0.000]
LTA_{t-1}	-	-0.001	0.001	0.002	0.005	0.009	0.008
		[0.004]	[0.004]	[0.004]	[0.005]	[0.007]	[0.007]
LTD_{t-1}	-	-0.001	-0.004	-0.003	-0.003	-0.006*	-0.006
		[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.004]
Constant		0.012***	0.074***	0.021***	0.013**	0.057***	0.020***
		[0.004]	[0.009]	[0.004]	[0.006]	[0.011]	[0.005]
Country dummies		No	No	No	Yes	Yes	Yes
N		231	231	231	231	231	231
R^2		0.532	0.517	0.512	0.571	0.563	0.560
Adjusted R^2		0.519	0.501	0.496	0.545	0.535	0.532

See Table 5 for the definition of the variables and Table 6 for the data sources. ROA is employed as dependent variable. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The standard errors for each variable are shown in brackets. + indicates a positive effect on the dependent variable, - a negative effect and * signals an expected effect, albeit uncertain whether positive or negative. Each model was additionally tested with the HC 3 test and the respective results are reported. The latter three models include country dummies in order to test for country effects.

Table 11: OLS regression: Conventional banks with ROE as dependent variable

		OLS regression			OLS regression with country dummies		
Expectation		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
ROA_{t-1}	+	4.921***	3.929***		4.613***	3.109***	
		[0.575]	[0.654]		[0.702]	[0.835]	
ROE_{t-1}	+			0.528***			0.442***
				[0.078]			[0.102]
OEA_{t-1}	-		1.544***	1.326***		2.738***	2.182**
			[0.535]	[0.507]		[0.954]	[0.957]
OER_{t-1}	-	0.011	-0.085**	-0.087**	0.010	-0.137**	-0.116**
		[0.034]	[0.045]	[0.038]	[0.044]	[0.063]	[0.058]
CTA_{t-1}	*	-0.042	-0.031		0.017	0.074	
		[0.055]	[0.052]		[0.069]	[0.070]	
CTD_{t-1}	*			-0.017			0.042
				[0.033]			[0.047]
DTA_{t-1}	-			0.108			0.166*
				[0.072]			[0.096]
DTE_{t-1}	-	0.009***	0.007***		0.009***	0.007***	
		[0.001]	[0.001]		[0.001]	[0.002]	
LTA_{t-1}	-		0.033	0.029		0.093**	0.088*
			[0.024]	[0.024]		[0.037]	[0.049]
LTD_{t-1}	-	-0.017	-0.039**	-0.032**	-0.010	-0.060***	-0.059***
		[0.014]	[0.018]	[0.015]	[0.019]	[0.018]	[0.021]
Constant		-0.015	0.022	-0.020	-0.017	0.040	-0.061
		[0.030]	[0.031]	[0.058]	[0.036]	[0.038]	[0.072]
Country effects		No	No	No	Yes	Yes	Yes
N		231	231	231	231	231	231
R^2		0.522	0.551	0.569	0.538	0.584	0.601
Adjusted R^2		0.511	0.536	0.556	0.513	0.558	0.575

See Table 5 for the definition of the variables and Table 6 for the data sources. ROE is employed as dependent variable. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The standard errors for each variable are shown in brackets. + indicates a positive effect on the dependent variable, - a negative effect and * signals an expected effect, albeit uncertain whether positive or negative. Each model was additionally tested with the HC 3 test and the respective results are reported. The latter three models include country dummies in order to test for country effects.

The regression models further suggest that a higher DTE_{t-1} leads to a better financial performance. These results are statistically significant also when country effects are taken into account. As opposed to the expectation, a lower solvency positively affects financial performance in this setting. Interestingly, the positive influence of LTA_{t-1} on financial performance is statistically significant with the inclusion of country dummies only. This indicates that one or a few countries drown the true relationship between LTA_{t-1} and ROE_t. Higher levels of LTD_{t-1} are negatively affecting financial performance. When introducing the country dummies, this effect almost doubles. Both ratios make different conclusions about the effect of credit risk on financial performance. The adjusted R^2 of the models without country dummies varies between 51% and 56%, whereas the variables in the models that include country effects account for 51% to 58% of the variation in ROE_t.

The financial performance of conventional banks is studied with two different dependent variables, ROA_t and ROE_t. The OLS regression results are similar for both of the dependent variables although some differences are identifiable. First, the coefficients have a larger effect (both positive and negative) when ROE_t is employed as dependent variable except for LTA and LTD. Second, the signs of the variables that are significantly affecting the dependent variable are the same in both models except for DTA_{t-1} and DTE_{t-1} that are negatively affecting ROA_t but positively affecting ROE_t. The coefficients for the other variables are generally consistent except for CTA_{t-1} and CTD_{t-1} which are positively affecting ROA_t but when ROE_t is utilized as the dependent variable it is only positively affecting financial performance after the country dummies were introduced. Nevertheless, the results for the liquidity ratios are not statistically significant and thus not reliably interpretable.

Islamic banks

In Table 12, the results for the OLS regressions for the sample of Islamic banks with financial performance measured by ROA_t are presented. The results indicate that ROA_{t-1} and ROE_{t-1} positively affect ROA_t. Again, the value of both coefficients decrease when country dummies are introduced to the models. The results further imply that a higher OEA_{t-1} impairs financial performance. However, this variable is only significant in one model when country dummies are not included. Financial performance is also significantly and negatively affected by OER_{t-1}. Both ratios confirm that financial performance is negatively affected by a lower efficiency. There is no significant relationship between CTA_{t-1} and ROA_t. Higher levels of CTD_{t-1} benefit financial performance in this setting. For one of the models the relationship is statistically significant at the 10% level. An increase in DTA_{t-1} of Islamic banks results in a lower ROA_t. This relationship is only significant when country effects are not taken into account. Thus, the effect cannot be generalized for all countries in the sample. A higher DTE_{t-1} ratio decreases the financial performance of Islamic banks. As expected, higher levels of debt i.e. less solvency negatively affect financial performance. LTA_{t-1} has a positive relationship with the dependent variable ROA_t. Again, the strength of the relationship increases when country dummies are added to the models. In line with the expectation, higher levels of LTD_{t-1} are negatively affecting ROA_t in this setting, but this relationship is only significant in one model as soon as country effects are taken into account. The correlation suggests a positive association however this could be due to a different sample size. The adjusted R2 is varying between 39% and 60% depending on the model without country dummies. When country effects are included, the range as such is smaller and the variation in ROA_t that is accounted for by the variables is with 54% to 64% higher.

In Table 13 the regression results for the sample of Islamic banks are presented with ROE_t as dependent variable. As in the regressions before, ROA_{t-1} and ROE_{t-1} both are significantly and

positively related to the dependent variable, with the relationships slightly losing strength when country dummies are included in the models. Further, the coefficients for ROA_{t-1} are substantially higher than the coefficients of the other independent variables. The results for OEA_{t-1} are mixed and not significant. The correlation between OEA_{t-1} and ROE_t however suggests a negative association (Table 8). OER_{t-1} exhibits a negative relationship with financial performance measured by ROE_t that is significant. This means a higher OER_{t-1}, results in a lower ROE_t as anticipated. CTA_{t-1} and CTD_{t-1} show a positive significant relationship with ROE_t, meaning that higher levels of liquidity lead to a better financial performance. The regression results further suggest that a higher DTA_{t-1} and a higher DTE_{t-1} benefit financial performance as opposed to the expectation. LTA_{t-1} is positively and significantly related to financial performance which means that higher levels of LTA_{t-1} result in a higher ROE_t. Moreover, the results for LTD_{t-1} suggest a negative relationship with the dependent variable but they are not statistically significant. Besides, the adjusted R2 of model 1 to 4 range between 46% and 62%, whereas the adjusted R2 of the models that include country dummies varies between 53% and 64%.

As well as for conventional banks, the financial performance of Islamic banks is also examined with two distinct dependent variables, ROA_t and ROE_t. The regression sets show similarities, for instance, both ROA_{t-1} and ROE_{t-1} are positively related to financial performance measured by ROA_t and ROE_t. OEA_{t-1} however has a significant relationship with the dependent variable in only one of the models in both sets of regressions. When ROA_t is utilized as dependent variable, the relationship is negative; with ROE_t as dependent variable however not significant. The results for OER_{t-1} are consistent. Both measures of financial performance are negatively affected by an increase in OER_{t-1}. A significant effect of CTA_{t-1} on financial performance can only be observed when ROE_t is the dependent variable. With respect to CTD_{t-1} a significant relationship exists for both measures. The relationships of CTA_{t-1} and CTD_{t-1} with financial performance are both positive. DTA_{t-1} and DTE_{t-1} have a positive relationship with ROE_t but a negative relationship with ROA_t. This means that higher levels of debt result in a higher ROE_t but when it comes to ROA_t, financial performance is lower. For both dependent variables, LTA_{t-1} shows a positive relationship that is statistically significant. LTD_{t-1} negatively affects both measures of financial performance, though the relationship is statistically significant in one model only (ROA_t) with the most generous significance level applied here.

Overall, three of the independent variables are consistently and significantly affecting financial performance, irrespective of the bank type or the measure of financial performance. A higher ROA_{t-1} as well as a higher ROE_{t-1} positively affect financial performance. Consequently, a higher profitability of banks leads to a better financial performance. Similarly, higher levels of inefficiency measured by OER_{t-1} impair financial performance in all four settings.

Both measures of solvency DTA_{t-1} and DTE_{t-1} positively affect financial performance when ROE_t is the dependent variable, but the relationship with ROA_t is negative. This pattern can be observed for both bank types. For this reason, an unambiguous conclusion about the effect of the level of solvency on financial performance cannot be made.

The OLS regression results suggest that at least the relationship between credit risk and financial performance slightly differs for both bank types. Although higher levels of LTA_{t-1} result in a higher financial performance measured by both ROA_t and ROE_t for both bank types, the relationship between LTA_{t-1} and ROA_t is not statistically significant for conventional banks. Moreover, higher levels of LTD_{t-1} result in lower financial performance in all settings albeit not statistically significant for Islamic banks with ROE_t as dependent variable.

Table 12: OLS regression: Islamic banks with ROA as dependent variable

		OLS regression			OLS regression with country dummies		
Expectation		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
ROA_{t-1}	+	0.662***			0.512***		
		[0.067]			[0.095]		
ROE_{t-1}	+		0.080***			0.061***	
			[0.009]			[0.011]	
OEA_{t-1}	-	-0.097	-0.316***	-0.043	-0.010	-0.149	0.101
		[0.108]	[0.100]	[0.146]	[0.133]	[0.122]	[0.188]
OER_{t-1}	-			-0.027***			-0.019***
				[0.005]			[0.006]
CTA_{t-1}	*	0.000			0.014		
		[0.007]			[0.010]		
CTD_{t-1}	*		-0.003	0.007		0.011	0.018*
			[0.006]	[0.007]		[0.008]	[0.009]
DTA_{t-1}	-	-0.014*			0.000		
		[0.008]			[0.008]		
DTE_{t-1}	-		-0.001***	-0.001***		-0.001***	-0.000*
			[0.000]	[0.000]		[0.000]	[0.000]
LTA_{t-1}	-	0.014**	0.011	0.019**	0.020**	0.024**	0.030**
		[0.007]	[0.008]	[0.009]	[0.009]	[0.010]	[0.012]
LTD_{t-1}	-	-0.006	-0.007	-0.007	-0.005	-0.008*	-0.008
		[0.005]	[0.005]	[0.005]	[0.005]	[0.004]	[0.005]
Constant		0.014	0.016***	0.024***	-0.001	0.007	0.012
		[0.009]	[0.005]	[0.006]	[0.009]	[0.007]	[0.009]
Country effects		No	No	No	Yes	Yes	Yes
N		240	240	240	240	240	240
R^2		0.604	0.551	0.405	0.660	0.647	0.566
Adjusted R^2		0.594	0.540	0.390	0.639	0.625	0.538

See Table 5 for the definition of the variables and Table 6 for the data sources. ROA is employed as dependent variable. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The standard errors for each variable are shown in brackets. + indicates a positive effect on the dependent variable, - a negative effect and * signals an expected effect, albeit uncertain whether positive or negative. Each model was additionally tested with the HC 3 test and the respective results are reported. The latter three models include country dummies in order to test for country effects.

Table 13: OLS regression: Islamic banks with ROE as dependent variable

		OLS regression				OLS regression with country dummies			
Expectation		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
ROA_{t-1}	+	3.780***	3.797***			3.172***	3.168***		
		[0.444]	[0.440]			[0.646]	[0.644]		
ROE_{t-1}	+			0.593***				0.500***	
				[0.058]				[0.078]	
OEA_{t-1}	-	-0.763	-0.771	-0.975	1.058	0.101	0.115	-0.223	1.879
		[0.727]	[0.724]	[0.617]	[0.935]	[0.998]	[0.992]	[0.856]	[1.347]
OER_{t-1}	-				-0.206***				-0.172***
					[0.033]				[0.043]
CTA_{t-1}	*	0.178***				0.168**			
		[0.053]				[0.076]			
CTD_{t-1}	*		0.141***	0.035	0.105**		0.135**	0.087*	0.129**
			[0.039]	[0.034]	[0.046]		[0.054]	[0.052]	[0.065]
DTA_{t-1}	-	0.205***	0.198***	-0.001		0.217***	0.215***	0.105*	
		[0.075]	[0.075]	[0.042]		[0.079]	[0.080]	[0.056]	
DTE_{t-1}	-				0.002**				0.004***
					[0.001]				[0.001]
LTA_{t-1}	-	0.166***	0.199***	0.133***	0.194***	0.121	0.152*	0.143**	0.209**
		[0.057]	[0.061]	[0.051]	[0.060]	[0.078]	[0.084]	[0.072]	[0.088]
LTD_{t-1}	-	-0.008	-0.032	-0.043	-0.044	-0.002	-0.022	-0.033	-0.051
		[0.038]	[0.038]	[0.028]	[0.032]	[0.042]	[0.043]	[0.033]	[0.038]
Constant		-0.223***	-0.218***	0.005	0.064	-0.208**	-0.209**	-0.094	0.039
		[0.074]	[0.073]	[0.039]	[0.040]	[0.083]	[0.085]	[0.058]	[0.058]
Country effects		No	No	No	No	Yes	Yes	Yes	Yes
N		240	240	240	240	240	240	240	240
R^2		0.557	0.561	0.627	0.469	0.608	0.612	0.662	0.561
Adjusted R^2		0.545	0.549	0.617	0.455	0.584	0.587	0.641	0.533

See Table 5 for the definition of the variables and Table 6 for the data sources. ROE is employed as dependent variable. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The standard errors for each variable are shown in brackets. + indicates a positive effect on the dependent variable, - a negative effect and * signals an expected effect, albeit uncertain whether positive or negative. Each model was additionally tested with the HC 3 test and the respective results are reported. The latter three models include country dummies in order to test for country effects.

A higher OEA_{t-1}, representing less efficiency, benefits the financial performance of conventional banks. The ROA_t of Islamic banks however decreases with higher OEA_{t-1}, whereas the relationship with ROE_t is not significant. As a consequence, the levels of OEA_{t-1} are not only significantly different from each other; OEA_{t-1} is also differently affecting the financial performance of banks depending on the respective bank type. Taking into account OER_{t-1} as well, a general conclusion about the implication of efficiency on financial performance cannot be made.

Significant evidence for an effect of CTA_{t-1} and CTD_{t-1} on financial performance can only be found in the sample of Islamic banks. CTD_{t-1} is positively affecting financial performance with both measures, CTA_{t-1} however only as long as ROE_t is the dependent variable. The results for conventional banks and ROA_t as dependent variable are positive as well, but mixed. When ROE_t is utilized to measure financial performance the results are mixed and not significant. Here again, the difference in liquidity between both bank types that became apparent in the t-tests manifests in a distinct relationship between liquidity and financial performance. Whereas for Islamic banks higher levels of liquidity positively affect financial performance, a relationship is absent for conventional banks.

H7 presumes that there is no significant difference in how financial performance is determined for both bank types. The OLS regression results show that this is mostly true. Only OEA_{t-1}, CTA_{t-1} and CTD_{t-1} have significantly different effects on financial performance depending on whether a bank applies conventional or Islamic banking activities. Though, there are significant differences for three ratios and therefore H7 is disproved.

Taken together, the results of the two sample t-test disprove H1 as Islamic banks are more profitable than Islamic banks. The logistic regression results make opposite conclusions about which bank type is more profitable but these results are not statistically significant. Further, higher levels of profitability affect the financial performance of both bank types positively.

Both t-tests and logistic regression make opposite but significant conclusions about which bank type is more efficient and thus disprove H2. As the OLS regression shows, OER_{t-1} negatively affects the financial performance of both bank types but OEA_{t-1} has differing implications.

The results of all statistical tests clearly indicate that conventional and Islamic banks differ with respect to liquidity, providing evidence to reject H3 among others.

Regarding solvency, the results are not conclusive. While one of the ratios is significantly different for both bank types based on a t-test, the other is not. Still, H4 needs to be rejected. Also, the logistic regression cannot significantly discriminate between Islamic and conventional banks based on solvency ratios. Furthermore, the financial performance of both bank types is not affected differently by the solvency ratios.

Finally, in terms of credit risk the t-test results are significant for one ratio only. Consequently, the results disprove H5. However, it is possible to discriminate between both bank types based on a logistic regression analysis. The relationship between credit risk and financial performance slightly differs for conventional and Islamic banks.

Taken together, the dimensions profitability and solvency provide evidence that support H6 and H7. However, all other dimensions can significantly discriminate between Islamic and conventional banks and reveal significant differences in the determinants of financial performance. Consequently, H6 and H7 are rejected as well. Hence, the results of the bivariate and multivariate analyses disprove all of the seven hypotheses tested in this thesis.

5. Discussion

The goal of this master thesis is to test whether there are differences in the (financial) performance of conventional and Islamic banks. The five dimensions profitability, efficiency, liquidity, solvency and credit risk were defined in order to study (financial) performance, each measured by two accounting ratios. In general, the data analysis has shown that the performance on each dimension indeed differs between both bank types. Already the descriptive statistics table (Table 7) revealed that almost each accounting ratio is significantly different for conventional and Islamic banks.

The majority of the scientific journal articles considered for this thesis provides evidence for a higher profitability of Islamic banks (Al-Hares et al., 2013; Khediri et al., 2015; Olson & Zoubi, 2008). This research could not support their results since both indicators of profitability ROA and ROE are significantly higher in the sample of conventional banks, based on a t-test. The results at hand support the findings of Rashwan (2012) that conventional banks became more profitable than Islamic banks after 2008. The same change is visible for ROA and ROE in the sub-sample results of Khediri et al. (2015) for 2009 to 2010, indicating that the crisis terminated the predominance in terms of profitability of Islamic banking. The study of Olson and Zoubi (2008) encompasses the period before the financial crisis and Al-Hares et al. (2013) only published results for the total period of study from 2003-2011. Thus, one reason for the deviation of my results from the overall results found in the literature could be the effects of the financial crisis that started in 2008. In a further two sample t-test, only reported in Appendix D, I repeat the analysis and split the dataset into two samples to check whether the effect of the crisis on the profitability levels of both bank types reverses again. One sample is covering 2008 to 2011 when the world economy was hit by the crisis as well as the years immediately afterwards and the second covers 2012 to 2015. The proposition that the profitability levels of both bank types reverse again could not be confirmed but the mean values approach over time and in case of ROE the difference between both bank types becomes insignificant. However, possible effects of the financial crisis should be interpreted with caution since not all countries were similarly affected. For instance Oman is not highly connected to the global financial markets and in Malaysia different measures that were implemented after the Asian financial crisis prevented a spillover to the banking sector (Al-Hassan et al., 2010; bin Ibrahim, 2010). An in-depth look into the profitability ratios of these countries confirms that ROA and ROE remain at the same level and it illustrates that the ratios of Bangladesh increase until 2010. Generally, the banks in the investigated countries were less affected than the banks in Europe or the USA for instance (Hasan & Dridi, 2010). Further, in previous research it is stated that the crisis affected Islamic banks later in time (Khediri et al., 2015). This proposition cannot be supported in this research as profitability ratios of both bank types decline in 2009, based on Figure 2 and 3.

On the contrary, the results of the logistic regression suggest that Islamic banks are rather characterized by higher levels of ROA and ROE but this cannot be confirmed with significance. Thus, it is not possible to discriminate between both bank types based on ROA and ROE, at least in the models that I applied. It counters the logistic regression results of Olson and Zoubi (2008) who detect that Islamic banks are rather characterized by higher levels of ROE.

Especially with respect to the dimension efficiency, the findings in the literature disagree. This becomes apparent in my research as well. As opposed to the results of Beck et al. (2013) and Olson and Zoubi (2008) the mean OEA is higher for conventional banks, indicating less efficiency. The coefficients of the logistic regression predict lower levels of OEA for Islamic banks. Here as well,

Olson and Zoubi (2008) find a significant and positive coefficient for OEA in their logistic regression, contrary to my results.

However, Islamic banks have a significantly higher OER and are thus less efficient than conventional banks in this regard. This is in line with the results of Beck et al. (2013) and the logistic regression results reported in Table 9. Nevertheless, it is not possible to draw a final conclusion about which bank type is more efficient based on the t-test and logistic regression as both variables indicate opposite relationships. Moreover, as the further analysis shows, higher levels of OEA result in a better financial performance for conventional banks. Consequently, the fact that conventional banks have higher levels of OEA has positive implications for both bank types.

The results in the literature that examine the liquidity of both bank types consistently found higher ratios for Islamic banks (Khediri et al., 2015; Samad, 2004) or could not significantly prove the opposite (Al-Hares et al., 2013; Olson & Zoubi, 2008). The two-sample t-tests applied here are in line with the former and thus suggest that Islamic banks have a higher liquidity than conventional banks. This indeed reinforces the reasoning that Islamic banks accumulate more liquid assets due to constrained investment opportunities (Khediri et al., 2015; Samad, 2004). Furthermore, the logistic regression proves this relationship. Here again, Olson and Zoubi (2008) could not find statistically significant results with their logistic regression. Nevertheless, the banks should not accumulate too much cash and cash equivalents since long-term investments are often more profitable and in this way too much liquidity would result in forgone investment opportunities and thus less ROE.

Regarding DTA, the two sample t-test results are not significant but the means of both bank types suggest that Islamic banks have lower levels of DTA. With respect to the median however, the results are opposite but in support of the results of Al-Hares et al. (2013) and Khediri et al. (2015). Figure 8 illustrates that from 2008 to 2011, Islamic banks had a lower mean DTA until this relation reversed from 2012 to 2014. The results of the logistic regression are similar. It is not possible to predict whether a bank is conventional or Islamic based on DTA.

As opposed to the logistic regression results found in previous studies that reveal a lower risk of insolvency for Islamic banks, my results do not reveal any significantly different implications for both bank types regarding DTE (Khediri et al., 2015; Olson & Zoubi, 2008). Based on the t-test however, conventional banks have less debt in relation to total assets. This is contradictory to the findings of Al-Hares et al. (2013). The numbers found here are remarkably higher for both bank types than the mean values from previous research mentioned in Sub-section 2.5.2. Is that a consequence of the financial crisis? The t-test with the split samples reveal that the value for conventional banks decreases in the second time period while DTE for Islamic banks increases from 8.97 to 9.14. However, in light of Figure 9, the mean levels of DTE are generally higher than the mean values from Sub-section 2.5.2 and do not show much fluctuation throughout the years. Thus, a potential effect of the financial crisis on the mean levels of DTE is not visible for this time period.

The t-test results for LTA and LTD indicate that Islamic banks face a higher credit risk. It clashes with the expectation that Islamic banks have a lower credit risk due to fewer investment opportunities and the stipulation that each transaction has to be backed by a tangible asset. The studies using LTA before could seldom achieve significant results. Only Khediri et al. (2015) whose period of study is closest to mine find similar and significant results for LTA in both t-test and logistic regression.

Although Samad (2004) found significant evidence for a higher LTD ratio of conventional banks, the t-test could not prove a significant difference. However, both mean and median suggest

that LTD is higher for Islamic banks, which would support the results of Beck et al. (2013) and Olson and Zoubi (2008). The logistic regression on the other hand shows that Islamic banks are characterized by significantly lower levels of LTD compared to conventional banks. A higher credit risk of Islamic banks could also be reflected in the fact that conventional banks have more advanced techniques whereas Islamic banks have to deal with a lack of qualified bankers (Rahman et al., 2015).

Taken together, the results of this research illustrate that conventional banks are more profitable, whereas Islamic banks are more liquid. In terms of efficiency the results deviate. One ratio suggests that conventional banks are operating more efficiently but the other indicates a higher efficiency of Islamic banks. For solvency and credit risk only one indicator can be interpreted which points to a higher solvency and a lower credit risk of conventional banks. In sum, conventional banks outperform Islamic banks in most dimensions. Though, Islamic banks possess higher levels of liquidity than conventional banks and perform better in one efficiency indicator.

With respect to the results of the logistic regression it can be stated that based on the dimensions profitability and solvency it is not possible to significantly discriminate between both bank types. Efficiency, liquidity and credit risk are most powerful in discriminating between Islamic and conventional banks whereby especially OEA and LTA achieve high coefficients.

To study the drivers of financial performance OLS regressions were carried out. In particular it was examined how the dimensions affect financial performance and whether it is determined by different indicators and dimensions per bank type. Generally speaking, only a few differences are identifiable and so financial performance is determined largely similar for both bank types. This is not surprising since aside from different financing contracts, both bank types face similar regulations and are active on the same markets.

The lagged profitability indicators affect both measures of financial performance positively and significantly. ROA constantly achieves the highest coefficient but is clearly higher when financial performance is defined as ROE. ROE increases by 2.5 to 4.5 units for each unit increase in ROA, depending on the model. In the reversed case however, ROA 'only' increases by approximately 0.5 units for both bank types for each unit increase in ROE (depending on the model). This leads to the conclusion that ROA has a bigger effect on ROE than ROE on ROA and this effect can be even bigger when a conventional bank is concerned rather than an Islamic bank.

The first efficiency measure affects the financial performance of conventional and Islamic banks differently. As mentioned before, higher levels of OEA result in less efficient operations. The results of the OLS regression show this is true for Islamic banks, when ROA depicts financial performance. Bashir (2003) also finds that OEA positively affects the financial performance of Islamic banks; but his results are only significant with ROE as dependent variable. For conventional banks however, the results for both dependent variables indicate that higher levels of OEA result in a higher financial performance as opposed to the results for Islamic banks. This is surprising since it suggests that increasing costs, for instance for wages and depreciation, result in a higher ROA and ROE. The general trend in the banking sector is towards the replacement of employees by online banking services and automated teller machines. On the other hand, a higher ratio of operating expenses to operating income connotes a decrease in both ROA and ROE in line with my expectations. This trend is visible for both bank types with a higher influence on ROE as dependent variable.

The financial performance of Islamic and conventional banks differs in its sensitivity to liquidity ratios. The financial performance of the latter is not significantly related to either CTA or CTD. With respect to Islamic banks on the other hand, higher levels of CTA and CTD exert a positive influence on financial performance, especially when it is measured by ROE, contrary to the overall results of Bashir (2003) for the years 1993 to 1998. A potential explanation could be that Islamic banks establish and manage a certain level of liquidity a priori, whereas conventional banks can offset fluctuations at short notice with short-term cash. Nevertheless, conventional banks are required to keep a certain amount of liquid assets as well. All in all, it can be concluded that a higher liquidity is positively affecting financial performance, at least for Islamic banks.

Both solvency ratios have different implications on financial performance, albeit they are equal for conventional and Islamic banks. High ratios signal a high amount of debt compared to total assets or total equity. This would indicate a lower solvency and consequently a lower financial performance. As long as ROA characterizes financial performance, this assumption is confirmed, although not significantly for Islamic banks when country effects are included. However, when ROE is utilized, the coefficients of both ratios are positive for both bank types. This is in line with the observation of Islamic banks by Bashir (2003). Nevertheless, the results are logical. Using the basic accounting equation: assets – liabilities = equity (e.g. Atrill & McLaney, 2014), an increase in liabilities results in an increase of assets and a decrease of equity. This in turn reduces ROA and increases ROE.

The results reveal a positive influence of LTA on financial performance for both indicators and bank types, although not statistically significant for conventional banks and ROA. It indicates a higher credit risk on the one hand, but at the same time the bank can generate higher revenues through income from interest or profit and loss sharing mechanisms and mark-ups respectively. Consequently, as long as these revenues exceed loan defaults the financial performance is not impaired. Further, the profit and loss sharing mechanisms shift the credit risk to the depositors and thus do not immediately harm financial performance (Čihák & Hesse, 2008). Bashir (2003) studied this variable as well but he found both positive and negative significant effects. The indicator LTD represents a more critical issue since the fundamental business model of a bank is to accept the customer deposits and provide this money in form of loans to other customers. Having roughly as much loans as deposits or even more, creates a mismatch of assets and liabilities and could lead to serious problems. In line with this, financial performance is negatively affected by higher levels of LTD in all four settings. However, the results are not significant for Islamic banks and ROE as dependent variable. Further, the relationship is significant at the 10% level in one model only when financial performance is determined by ROA for both bank types and when country dummies are included. As a result, LTD might not be as influential as expected for financial performance.

The empirical results exhibit that conventional and Islamic banks perform significantly different from each other in respect of most financial ratios. It is further revealed that the financial performance is determined largely similar for both bank types since significant differences only exist for the minority of ratios (OEA, CTA, CTD). Solvency ratios achieve different results based on which ratio determines financial performance rather than bank type. Furthermore, country differences in bank performance become visible with the inclusion of country dummies in OLS regressions, especially when Islamic banks are studied.

6. Conclusion

Islamic banking is a growing and interesting phenomenon that gained additional attention after the financial crisis when people lost confidence in conventional banks. It took up the cause of being less speculative, more just and charitable. However, in reality Islamic banking is similar to conventional banking or as some critics argue it is copying the conventional model but claiming to be more ethical and thus exploiting trustful Muslims (Khan, 2010; Khediri et al., 2015). Studying whether this is true would have gone beyond the scope of this thesis. Thus, it is examined whether both bank types differ in terms of financial aspects. Even if the critics are right, there might be instances where Islamic banks are performing better. Then, customers would rather have an economic than a religious incentive to choose an Islamic bank. Thus, the research question asks to what extent the dimensions of bank performance and the determinants of financial performance differ between Islamic and conventional banks. To answer this question, three sub-questions were formulated.

Relating to the first sub-question, it was tested which bank type outperforms the other. The results indicate that conventional banks outperform Islamic banks. Islamic banks are more liquid and perform better in one indicator of efficiency but conventional banks prevail with respect to profitability, solvency and credit risk. Although it is argued that Islamic banks copy conventional banking products, the performance of both bank types with respect to each dimension is distinct.

Almost all of the ratios found significant differences between both bank types within the t-tests. But which indicators make it possible to predict whether a bank is conventional or Islamic? The logistic regression showed that it is possible to categorize banks into being conventional or Islamic based on efficiency, liquidity and credit risk indicators only. Especially OEA and LTA achieve high coefficients. Consequently, the bank type cannot be predicted by the profitability and solvency indicators used here. To answer sub-question two, it is possible to discriminate between conventional and Islamic banks based on the following ratios: OEA, OER, CTA, CTD, LTA and LTD that comprise the dimensions: efficiency, liquidity and credit risk.

Some of the findings related to the dimensions found in previous research are disproved by the results of this thesis. Many of those scientific papers either examine only the time before the financial crisis, or their sample encompasses the crisis but the years before prevail. It is conceivable that with respect to profitability Islamic banks were initially hit worse by the crisis. But while Islamic banks were able to keep the profitability ratios stable in the following years, ROA and ROE of conventional banks declined over the years to a level similar to Islamic banks. The crisis terminated the predominance of Islamic banking in profitability that was reported in previous research. However, it has to be kept in mind that not all countries in particular were (equally) affected by the crisis.

Furthermore, this thesis studies the drivers of financial performance of both bank types with an OLS regression. Roughly speaking, they are largely similar. For instance, profitability measured by ROA and ROE is positively affecting financial performance. The efficiency measure OEA affects financial performance differently. A higher ratio i.e. less efficiency is associated with a better financial performance for conventional banks, but results in a worse financial performance of Islamic banks. It becomes apparent that the ratios cannot be interpreted in black or white only. The implications for one bank type cannot necessarily be applied to the other. Financial performance further differs in its sensitivity to liquidity measures. While having no significant effect on financial performance of conventional banks, Islamic banks achieve a better financial performance with higher levels of

liquidity. Further, financial performance is negatively affected by higher levels of LTD, though the results are often not significant. Regarding sub-question three, it can be stated that financial performance is determined largely similar for both bank types; however differences exist with regard to efficiency and liquidity.

Taken together and with reference to the main research question, the bank performance of both bank types measured with a t-test significantly differs in all dimensions that were examined. Also the logistic regression results suggest that it is possible to discriminate between both bank types with the majority of ratios. The drivers of financial performance for both conventional and Islamic banks are largely similar with differences existing in respect of efficiency and liquidity.

To be able to make generalizations from the results, I selected countries with different backgrounds. The country dummies in the OLS regression indicate that there are differences in performance across countries, especially for Islamic banks. Thus, one limitation of this research is that it was not possible to adequately test the countries separately. This would require a larger sample or more precisely more observations for some of the countries, e.g. Oman. Unfortunately, it was not possible to collect additional data because data from before 2008 was seldom available. Further, some of the countries have a highly concentrated banking sector resulting in a small number of banks. Another limitation is that the dimensions and ratios that were applied in this research are not exhaustive as such as they only represent a small part of bank performance. Two variables per dimension can only shed a small light on each facet. Nevertheless, the goal was to study different aspects and dimensions of performance. The dataset used here is with slightly more than 200 observations per bank type relatively small and therefore it was not possible to include a multitude of independent variables.

Future research, preferably with a larger dataset, could investigate additional aspects of bank performance, or likewise additional indicators for each dimension. I do not expect completely different results for other indicators; however it might reveal further interesting observations as for instance the differing effect of OEA on financial performance discovered in this thesis.

A larger dataset would also enable the examination of separate countries that could not be carried out in this analysis. It would further contribute to the knowledge about Islamic banking. Since the countries in this sample are distinct as suggested by the country dummies, country differences are likely to be found. Certainly, it would also be interesting to study additional countries or expand the research to African countries, the European Union or the USA.

With respect to the beginning of this section, it would be relevant to investigate the Islamic financing contracts as such in further research, to examine why the financial performance of conventional and Islamic banks is often similar. Is this due to the fact that profit and loss sharing schemes are often neglected and the remaining banking products are indeed similar? This would also reveal whether there are country differences in the application of Islamic financing contracts.

All ethical considerations aside, the financial performance of Islamic and conventional banks as such is determined largely similar. Nevertheless, they perform significantly different from each other on each dimension. Customers have to figure out on which characteristics they put emphasis. In case they favor banks that generate high revenues they should chose a conventional bank. However if they place more value on a high liquidity they should pick an Islamic bank. With regard to the title of this master thesis it can be concluded that a banks' performance differs depending on which banking systems it belongs to.

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Appendix A: Country information

Country	Population 2015	Migration stock 2015	Year of independence	Account at a financial institution (age 15+ in %) 2011	Account at a financial institution (age 15+ in %) 2014
Bahrain	1.377.237	51.1%	1971 (from UK)	64.5%	81.9%
Kuwait	3.892.115	73.6%	1961 (from UK)	86.8%	72.9%
Oman	4.490.541	41.1%	1650 (expulsion of the Portuguese)	73.6%	n.a.
Qatar	2.235.355	75.5%	1971 (from UK)	65.9%	n.a.
Saudi Arabia	31.540.372	32.3%	1932 (unification of the Kingdom)	46.4%	69.4%
UAE	9.156.963	88.4%	1971 (from UK)	59.7%	83.2%
Jordan	7.594.547	41.0%	1946 (from league of nations mandate under British administration)	25.5%	24.6%
Malaysia	30.331.007	8.3%	1957 (from UK)	66.2%	80.7%
Bang-ladesh	160.995.642	0.9%	1971 (from West Pakistan; Pakistan itself belonged to British India until 1947)	31.7%	29.1%

Country	Account at a financial institution, female (age 15+ in %) 2011	Account at a financial institution, female (age 15+ in%) 2014	Account at a financial institution, male (age 15+ in %) 2011	Account at a financial institution, male (age 15+ in%) 2014
Bahrain	48.8%	66.7%	79.0	90.2%
Kuwait	79.6%	64.0%	93.0	79.3%
Oman	63.5%	n.a.	83.7	n.a.
Qatar	61.6%	n.a.	68.6	n.a.
Saudi Arabia	15.2%	61.1%	72.7	75.3%
UAE	47.2%	66.3%	68.8	89.8%
Jordan	17.4%	15.5%	33.7	33.3%
Malaysia	63.1%	78.1%	69.2	83.0%
Bangladesh	26.0%	25.2%	37.3	32.9%

Data sources: CIA (2016); Demirgüç-Kunt, Klapper, Singer, & van Oudheusden (2015)

Appendix B: Summary of previous research

Study	Ratio	Definition	Time period/ countries	Sample of banks	Method
Profitability					
Al-Hares et al. (2013)	**ROA**	Net profits after tax/ total assets	2003-2011 GCC region	55 CBs 20 IBs	T-test for equality of means
	ROE	Net profits after tax/ owners' equity			
	NIM	(Interest income - interest expense)/ avg. earning assets IBs: profits from interest– free lending contracts			
	ROD	Net profits after tax/ total deposits			
Khediri et al. (2015)	**ROA**	Net income/Total assets	2003-2010 GCC except for Oman	44 CBs 18 IBs	T-test of differences in means; linear discriminant analysis, logistic regression model, neural network method and tree of classification
	ROE	Net income/ Stockholders' equity			
Olson & Zoubi (2008)	**ROA**	Net income/ avg. total assets	2000-2005 GCC region	13-29 CBs 12-18 IBs	T-test for equality of means; linear: logistic regression; non-linear: neural network models, k-means nearest neighbors
	ROE	Net income/ avg. stockholders' equity			
	PM	Net income/ operating income			
	ROD	Net income/avg. total customer deposits			
	ROSC	Net income/ shareholder contributed capital			
	NOM	Operating profit or income/interest income			
Rashwan (2012)	**ROAA**	Net profits after tax/ total assets	2007-2009 GCC excl. Oman, UK, Iran, Sudan, Syria, Turkey, Pakistan, Jordan, Palestine, Bangladesh, Egypt	49 CBs 46 IBs	MANOVA
	ROAE	Net profits after tax/ owners' equity			
Samad (2004)	ROA	Net profit/total assets	1991-2001 Bahrain	15 CBs 6 IBs	Student's t-test
	ROE	Net profits/equity			
	COSR	Total cost/total income			
Efficiency					
Al-Hares et al. (2013)	AUR	Total revenue/ total assets	2003-2011 GCC region	55 CBs 20 IBs	T-test for equality of means
	OER	Total operating expenses/ total operating revenue			
Beck et al. (2013)	Cost income ratio	Overhead costs / gross revenues	1995-2009 GCC excl. Oman, UK, Bangladesh, Caiman Islands, Egypt, Gambia, Indonesia, Jordan, Lebanon, Malaysia, Mauritania, Pakistan, Singapore, Sudan, Syria, Tunisia, Turkey, Yemen	422 CBs 88 IBs	Regression
	Over-heads	Total operating costs/ total assets			
	Loss reserves	Loss reserves/ gross loans			
Olson &	IEE	(Interest income−interest	2000-2005	13-29	T-test for equality of

Zoubi (2008)		expenses)/ avg. total loans and advances	GCC region	CBs	means;
	OEA	Operating expenses/avg. total assets		12-18 IBs	linear: logistic regression;
	OIA	Operating income/avg. total assets			
	OER	Operating expenses/operating income (revenue)			non-linear: neural network models, k-means nearest neighbors
	ATO	Interest income/avg. total assets			
	NIM	(Net interest income−net interest expenses)/ avg. total assets			
	NNIM	(Net non-interest income−net non-interest expenses)/ avg. total assets			
Rashwan (2012)	**NL/ TA**		2007-2009 GCC excl. Oman, Turkey, Iran, Egypt, Pakistan, UK, Sudan, Bangladesh, Syria, Palestine, Jordan	49 CBs 46 IBs	MANOVA
	LLR/ GL				
Liquidity					
Al-Hares et al. (2013)	LDR	Loans/ deposits ratio	2003-2011 GCC region	55 CBs 20 IBs	T-test for equality of means
	LAR	Loans (or financings)/ total assets ratio			
	CPIDR	Cash and portfolio investments/ total deposits			
	CBBC	Cash and balances at the central bank and other banks or financial institutions/ total deposits			
Khediri et al. (2015)	**CTA**	Cash/ total assets	2003-2010 GCC excl. Oman	44 CBs 18 IBs	T-test of differences in means; linear discriminant analysis, logistic regression model, neural network method and tree of classification
	CTD	Cash/ total customer deposits			
Olson & Zoubi (2008)	CTA	Cash/avg. total assets	2000-2005 GCC region	13-29 CBs 12-18 IBs	T-test for equality of means; linear: logistic regression; non-linear: neural network models, k-means nearest neighbors
	CTD	Cash/avg. total customer deposits			
Samad (2004)	NetLTA	Net loans/ total assets	1991-2001 Bahrain	15 CBs 6 IBs	Student's t-test
	LdASF	Liquid asset/ customer deposit and short term funds			
	LDBR	Net loans/ total deposit and borrowings			
Solvency/ insolvency risk					
Al-Hares et al. (2013)	**DE**	Total debt/ owners' equity	2003-2011 GCC region	55 CBs 20 IBs	T-test for equality of means
	DTAR	Total debt/ total assets			
	EM	Total assets/ owners' equity			
	CAR	(Tier 1 capital + Tier 2 capital)/ risk weighted assets			
Khediri et al. (2015)	**ETA**	Total equity/ total assets	2003-2010 GCC excl. Oman	44 CBs 18 IBs	T-test of differences in means; linear discriminant analysis, logistic regression model, neural network
	DA	Total debt/total assets			
	DTA	Deposits/ total assets			
	DTE	Deposits/ stockholder's equity			

					method, tree of classification
Olson & Zoubi (2008)	DTA	Av. total customer deposits/ avg. total assets	2000-2005 GCC region	13-29 CBs 12-18 IBs	T-test for equality of means; linear: logistic regression; non-linear: neural network models, k-means nearest neighbors
	EM	Avg. total assets/ avg. stockholders' equity			
	ETD	Avg. shareholders' equity/ avg. customer total deposits			
	TLE	Avg. total liabilities/ avg. stockholders' equity			
	TLSC	Avg. total liabilities/ shareholder contributed capital			
	RETA	Retained earnings / avg. total assets			
Credit risk					
Khediri et al. (2015)	**LLR**	Loans loss reserves/ gross loans	2003-2010 GCC excl. Oman	44 CBs 18 IBs	T-test of differences in means; linear discriminant analysis, logistic regression model, neural network method, tree of classification
	NPL	Non-performing loans/ gross loans			
	LTA	Loans/ total assets			
	LTD	Loans/ total customer deposits			
Olson & Zoubi (2008)	**PEA**	Provision for loan losses/ avg. total loans and advances	2000-2005 GCC region	13-29 CBs 12-18 IBs	T-test for equality of means; linear: logistic regression; non-linear: neural network models, k-means nearest neighbors
	APL	Allowance for loan losses at the end of the year/ avg. total loans and advances			
	WRL	Write-off of loans during the year/ avg. total loans and advances			
	LR	Avg. total loans and advances/ avg. total assets			
	LTD	Avg. total loans and advances/ avg. total customer deposits			
Samad (2004)	**EQTA**	Common equity/ assets	1991-2001 Bahrain	15 CBs 6 IBs	Student's t-test
	EQL	Total equity/ net loans			
	IMLGL	Impaired loans/gross loans			

The table was created based on my own elaboration. The content is derived from the particular scientific journal articles mentioned. CBs denote conventional banks, IBs denote Islamic banks.

Appendix C: Logistic regression with absolute numbers

	Expectation	Model 1	Model 2
ROA	+	20.799	
		[17.487]	
ROE	+		3.431
			[2.229]
OEA	+	-3573.130***	-3530.573***
		[568.853]	[564.955]
OER	+	7.888***	7.996***
		[1.376]	[1.282]
CTA	+	33.517***	
		[7.579]	
CTD	+		11.545***
			[3.511]
DTA	-	-2.492	
		[1.527]	
DTE	-		-0.002
			[0.002]
LTA	-	10.123***	7.816***
		[1.657]	[1.515]
LTD	-	-2.328**	-1.498*
		[1.036]	[0.910]
Constant		-3.467**	-4.815***
		[1.511]	[0.837]
N		554	554
Pseudo R^2		0.359	0.342
HL Test		9.006	13.682
P-value		0.342	0.090
Hit rate (%)			
Conventional bank		67.90	67.90
Islamic bank		73.10	69.30
Overall		70.60	68.60

See Table 5 for the definition of the variables and Table 6 for the data sources. ***, **, * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. The standard errors for each variable are shown in brackets. + indicates a positive expected relationship with Islamic banks, whereas – represents a negative expected relationship. They were defined based on the results of previous studies. 0 = conventional bank; 1 = Islamic bank

Appendix D: Two sample t-test with a split sample

Panel A: 2008-2011

Variable	Mean CB	N	Mean IB	N	T-value
ROA_{t-1}	0.016	128	0.011	127	3.418***
ROE_{t-1}	0.134	128	0.105	127	2.878***
OEA_{t-1}	0.019	127	0.016	127	3.074***
OER_{t-1}	0. 401	127	0.461	127	-2.866***
CTA_{t-1}	0.096	127	0.118	132	-2.500**
CTD_{t-1}	0.144	127	0.163	132	-1.544
DTA_{t-1}	0.874	127	0.860	132	-1.597
DTE_{t-1}	7.849	127	8.965	132	-2.219**
LTA_{t-1}	0.609	128	0.617	132	-0.501
LTD_{t-1}	0.879	128	0.862	132	-0.755

Panel B: 2012-2014

Variable	Mean CB	N	Mean IB	N	T-value
ROA_{t-1}	0.013	109	0.010	114	2.477**
ROE_{t-1}	0.102	109	0.099	114	0.396
OEA_{t-1}	0.018	109	0.016	114	1.828*
OER_{t-1}	0.434	109	0.487	114	-2.472**
CTA_{t-1}	0.081	109	0.107	115	-3.556***
CTD_{t-1}	0.120	109	0.146	115	-2.503**
DTA_{t-1}	0.869	109	0.877	115	-1.185
DTE_{t-1}	7.460	109	9.137	115	-3.356***
LTA_{t-1}	0.569	109	0.633	115	-4.143***
LTD_{t-1}	0.827	109	0.858	115	-1.433

See Table 5 for the definition of the variables and Table 6 for the data sources. The two sample t-test was calculated based on the mean. Panel A shows the results for the years 2008-2011; Panel B displays the results for 2012-2014. Since the t-test results are based on lagged data, the year 2015 drops out. ***, ** and * signify a relationship between independent and dependent variable that is statistically significant at the 1%, 5% and 10% level respectively. CBs denote conventional banks, IBs denote Islamic banks.

The two sample t-test was repeated with a split sample to test whether e.g. effect of the crisis on the profitability levels of both bank types reverses again. However, the results have to be interpreted with caution since not all banking sectors were (a) hit by the crisis in general, (b) hit at the same time and (c) in some countries governments intervened with capital injections (Al-Hassan et al., 2010). Nevertheless, the above results show that during the first period, the means of the bank examined in this thesis differed especially in profitability and efficiency and approach in the second sample. Most of the ratios that measure the mean liquidity, solvency and credit risk are not significantly different during the first years of crisis but diverge in the following years.