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The Accuracy of the Multiples Valuation Method: Islamic vs.
Conventional Banks

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Abstract

The focus of this thesis is on the accuracy of the multiples valuation method for Islamic and conventional banks. Therefore, conclusions can be drawn about firm characteristics that influence the accuracy of this valuation method. Moreover, this research also examines the way the multiples needs to be computed and the best method to select comparable firms. With several measures, such as valuation errors, a distribution measure, MSE and the Q-like score, the accuracy of the multiples valuation method is determined. Selecting comparable firms on the basis of same industry and size results in the most accurate multiples. Because of the right-skewed distribution, the use of median multiples is preferred. The valuation of conventional banks is more accurate than for Islamic banks which is the opposite of the hypothesis. Therefore, this finding could imply several things about the accuracy of the multiples valuation method and the characteristics, such as riskiness, of Islamic banks.

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1. Introduction

The ability to make a firm valuation is one of the pillars of corporate finance. The multiples valuation method is relatively easy to carry out and is often used as a complement to, or even as a substitute for, the Discounted Cash Flow method (DCF-method). Therefore, it is important to know how accurate the multiples method is. The main drawback of the DCF-method is the amount of assumptions you have to make, but what influences the accuracy of the multiples valuation method? More specifically, for what type of firms is this method more accurate? This question is partially answered by several papers including Lie & Lie (2002), Gilson, Hotchkiss & Ruback (2000), Kim & Ritter (1999) and Kaplan & Ruback (1995).

This thesis builds on the papers mentioned above by investigating the accuracy of the multiples valuation method for Islamic banks. The accuracy will be benchmarked against the valuation accuracy of conventional banks. Because of this, it is possible to conclude something about the characteristics that influence the accuracy of the multiples valuation method. Lie & Lie (2002) showed that firms with high intangible value, uncertain growth opportunities and more risk/uncertainty are very hard to value with the multiples method. For example, high-tech companies are often worth two to four times more than the multiples valuation estimate predicts whereas it gets considerably close to the true value for financial companies.

Because of the differences between Islamic banks and their conventional counterpart, which will be discussed in the theoretical framework, I will expect differences in the accuracy of the multiples valuation method. Based on the previous, the research question of this thesis is the following:

To what extent does the accuracy of the multiples valuation method differ between Islamic and conventional banks?

It is scientifically relevant to answer this question because of three main reasons. Firstly, the findings provide a foundation for the use of this method in further research and in practice. Secondly, it confirms or rejects conclusions of earlier researches about the firm characteristics that influence the accuracy of the multiples valuation method. Thirdly, this thesis examines indirectly whether the theoretically based characteristics of Islamic banks are present in practice because this influences the valuation accuracy. For example, there is some discussion about whether Islamic banks are less risky. Theoretically, the Islamic banks should be less risky, but some empirical studies did not find a significant difference or found some features for which needs to be controlled for.

Moreover, it is also socially relevant to know something about the accuracy of valuation techniques in general. The reason for this originates from the fact that financial institutions are an important part of our economy and society. The functioning of the financial world has a big impact on our daily life. So, the more efficient the functioning of the financial world is, the more beneficial it is for the society. Getting closer to accurate firm valuation will be beneficial in a way that the financial resources will be used more efficiently and therefore benefit the providers and users of finance.

The remainder of the thesis is structured as follows: section two describes the theoretical framework of this paper which contains background information about Islamic banking and the multiples valuation technique. The third section describes the data section four entails the methodology of this thesis and the results will be shown in section five. Finally, the conclusion and discussion will be presented in section six.

2. Theoretical framework

2.1 Islamic banking

The literature about Islamic banking is extensive. The riskiness of Islamic banks, compared to their conventional counterpart, is the main characteristic which will theoretically lead to different valuation accuracies. Therefore, the focus in the theoretical framework will be on the risk features. For more information about Islamic financing, the “Handbook of Islamic Banking” (Hassan & Lewis, 2007) and the book “Islamic banking” (Lewis & Algaoud, 2001) are recommended.

In this thesis, risk is defined as the extent to which a bank is exposed to financial instability or decline due to the way it conducts their operating activities. The principles of Islamic banking are much more broader than only managing the risk of their operating activities. It advocates property rights, the rights and duties of individuals, social justice, risk sharing and the sanctity of contracts (Van Greuning & Iqbal, 2008). Nevertheless, the application of these principles leads theoretically to less risk for the Islamic finance institutions.

First, “Gharr” (the Arabic equivalent of uncertainty or speculation) is not allowed in financial transactions (Alkassim, 2005). If necessary, minor uncertainties can be permitted but entering a transaction without enough knowledge or with a lot of risk is prohibited. This implies that options, futures, derivatives and short-selling is not allowed. Besides, financial instruments and transactions which are not backed by assets are also prohibited, because money must be treated as a medium of exchange and not as capital itself (Arif, 1988). This is the second factor that reduces the risk of Islamic banks. It means that transactions must be backed by tangible physical assets. This reduces the risk of losing money because if the borrower cannot refund the money, the bank can sell the physical assets because it is the owner of the asset up until the borrower meets the refund. This is called “Bai’ al ‘inah” which is essentially a sale and buy-back agreement (Ahmad, 2015). Moreover, inflation risk does not exist because there is no expansion of money due to the existence of goods backing up the transaction. Lewis & Algaoud (2001) mention that you cannot buy something which is not there yet, even if it is almost certain it will be there. They state for example, that you cannot buy fish which is not yet caught.

Furthermore, just as with the conventional banks, there must be transparency in all transactions. However, the Quran emphasizes this feature strongly which results in a better compliance of this rule. A transaction is not valid if the buyer is not completely aware of the products’ quality and quantity, any ambiguity must be eliminated. Therefore, a board of Shariah experts is

installed to verify whether each Islamic bank acts according to the Islamic principles (Nathan & Ribiere, 2007).

Finally, Islamic finance is characterized by loss- and profit sharing. This means that banks are investors and not lenders (Arif, 1988). They act in a so called “Musharaka” (partnership), which can have different forms. At first sight, it sounds risky because there is a possibility that the bank can make a loss, which makes the funding more risky. However, because of the partnership and obligation to be as transparent as possible, Islamic banks are completely involved in the way the money will be used. Therefore, they will know, and have to know because of the prohibition of “Ghrrar” (uncertainty), the extent to which the project or business is exposed to a potential loss. Because of this, they are able to minimize the loss potential. Besides, if a company incurs a loss, which an Islamic banks will share, conventional banks also may experience some losses because the borrower cannot (partially) pay back the money. So for both type of banks, there is a downside if the borrower loses money, but the risk for Islamic banks is relatively low because of their involvement, and therefore their knowledge about the way the money will be used. For this reason, among others, “Muslim scholars have emphasized that profit-and-loss sharing contracts promote greater stability in financial markets” (Hassan & Lewis, 2007). Moreover, Abedifar, Ebrahim, Molyneux & Tarazi (2015) state that risk could be reduced because “the religious beliefs of clients may induce greater loyalty and discourage default (it may also reduce deposit withdrawal risk)”.

In sum, Islamic banks are less risky and have less uncertainty about their payoff compared to conventional banks. This is mainly because uncertainty and speculation is forbidden and the transparency and knowledge they must have about the transactions they are involved in.

2.2 Multiples valuation method

The multiples valuation technique is used by a lot of companies. For example, 38.92% of the CFOs of big companies in the US use always or almost always the multiples method (Graham & Harvey, 2001). Therefore, it is important to measure how accurate this method is. As mentioned in the introduction, several papers investigated the accuracy. Kaplan and Ruback (1995) found similar levels of precision for the DCF and multiples method in their sample of companies which were involved in highly leveraged transactions. Kim and Ritter (1999) showed that for IPOs, the use of forecasted earnings is more accurate than using historical earnings. However, this does not mean that for other companies the multiples valuation is

equally accurate. Choosing comparable firms is an important step in using the multiples method which will influence the accuracy of this method.

Alford (1992) showed that comparable firms chosen on the basis of same industry code (SIC) leads to the most accurate valuation for the price/earnings multiple. In some cases, a combination of same industry code and same size based on total assets or return on equity improves the accuracy. This conclusion is not surprising because companies within the same industry are expected to have similar earnings growth and risk profiles (Lokey, Braun, & Cefall, 1990). Thus, for this research the comparable firms for the Islamic and conventional banks will be banks within the same specialisation. Moreover, the combination of same industry and size will also be examined in this thesis. Whether a firm has the same size depends on the value of total assets and the amount of comparable firms. The size of a comparable firms needs to be as close as possible. However, for the smallest and largest firms, this could lead to multiples which are based on only a few observations. Therefore, also other firms which are a bit less close to the asset value of the bank for which the multiple needs to be computed, will be added. The benchmark of at least six comparable firms will be maintained.

Based on earlier research, the hypothesis is that the valuation of Islamic banks will be more accurate than for the conventional banks. This is because of the lower risk and less uncertainty concerning the operating activities of Islamic banks, which is explained in section 2a. The hypothesis is based on the conclusions of Lie & Lie (2002). They found that the accuracy of tech-companies, pharmaceutical companies and firms with high R&D expenses is extremely low. This is because “the estimates do not fully capture the growth opportunities and other intangibles associated with these companies”. The reason for this is that the growth opportunities are uncertain and risky and the exact value of intangible assets is also uncertain. For example, the investment in a new medicine is very risky and involves a lot of uncertainty about the benefits it will have. Sometimes, it is even questionable whether such an investment will generate positive cash flows at all. Also, the intangible value of the research in progress and eventually the patent can be difficult to estimate precisely. Therefore, as stated above, the hypothesis which will be tested is:

The valuation accuracy of Islamic banks is higher than for conventional banks.

The multiples can be calculated in different ways. First, as stated earlier, the comparable firms can be chosen on the basis of same industry, size or a combination of these. Even a mechanical algorithm can be used to select comparable firms (Kim & Ritter, 1999). Second, If the

comparable firms are selected, the mean and median multiples over the industry can be computed. It is also possible to choose for a value range by using the minimum and maximum value instead of the point estimates. The mean multiple could be influenced by outliers, especially if the number of observations is relative low. This is the case for the Islamic banks sample because of the niche-market in which they operate. The use of median multiples in earlier research is also preferred because it is more accurate (Kaplan & Ruback, 1995) (Lie & Lie, 2002). Therefore, the second hypothesis of this thesis is:

The median multiples generate more accurate valuations than the mean multiples for Islamic and conventional banks.

Besides the expected accuracy difference between the Islamic and conventional banks, the direction of the valuation errors can be hypothesized. Lie & Lie (2002) found out that large firms are more undervalued and small firms are often overvalued. Because of the niche market in which Islamic banks operate, the size of these banks will be relatively small. Therefore, the valuation of these banks will be positively biased. The conventional banks sample will contain more undervalued firms because of their large size. Of course, before testing this hypothesis, the size of both types of banks will be examined in the data section. Nevertheless, based on the literature, the following hypothesis is formulated:

Conventional banks are more undervalued than Islamic banks

3. Data

The data used in this thesis is obtained from the Orbis Bank Focus database. The databank contains annual and quarterly report data for both banks and insurers all over the world. The Islamic banks sample is extracted by requesting banks from the specialisation “Islamic banks” which are listed on an exchange market. This is because the market value on the exchange is needed to measure the accuracy of the estimated valuation, which will be discussed in the methodology section. Subsequently, the banks for which not all required variables were available for the multiples calculation were deleted. In the end, 36 Islamic banks were used in this thesis.

The conventional banks in the Orbis Bank Focus database are extracted by selecting the commercial non-Islamic banks. Subsequently, only the commercial banks from the Middle-East are used to avoid differences between samples. The Islamic banks sample contains mainly banks from the Middle-East (and three from London, Kuala Lumpur and Istanbul). Although Saudi-Arabia and Iran are located in the Middle-East, the banks from these countries are deleted because of the Shariah legislation (Grassa & Gazdar, 2014). This implies that also the conventional banks are bounded to some degree of Shariah compliant business management. This is not desirable because this research focusses on the difference between the valuation accuracy of Islamic and conventional banks. So, it is important to have conventional banks which are not subjected to some degree of Islamic based legislation. At the end, the banks for which not all necessary data was available were deleted. The conventional bank sample contains 64 observations.

The removal of observations that did not contain all required variables has been carried out because this ensures that the accuracy of different multiples can be examined. If some multiples are calculated with more and different observations, the accuracy could be influenced because of those additional observations. So, the comparison between multiples can be made because of the removals. However, the comparisons between sample is a bit problematic because the samples differ (Table 1 & 2).

Table 1
Descriptive Statistics about the Islamic Banks Sample (N=36)

	Market capitalisation m USD 2017	Net income m USD 2017	Profit before tax m USD 2017	Total assets m USD 2017	Equity m USD 2017	Operating profit m USD 2017	Operating revenues m USD 2017
Mean*	3052.8	250.8	259.6	15160.5	2034.0	257.6	607.9
Median	677.1	73.3	92.9	6139.2	754.4	92.6	260.6

Lowest	21.0	2.2	2.2	79.8	23.2	2.2	5.8
Highest	28002.0	2432.2	2432.2	91497.7	14866.9	2422.7	4231.8
Std. deviation	5500.1	459.9	461.1	19895.8	3003.9	456.9	854.0
25th Percentile	290.1	17.1	22.2	2654.9	320.8	22.9	109.6
75th Percentile	3264.7	228.6	229.9	17194.0	2106.3	229.8	713.3

*The differences between the means of the Islamic banks sample and conventional banks are not significant at a 5%-level

Table 2
Descriptive Statistics about the Conventional Banks Sample (N=64)

	Market capitalisation m USD 2017	Net income m USD 2017	Profit before tax m USD 2017	Total assets m USD 2017	Equity m USD 2017	Operating profit m USD 2017	Operating revenues m USD 2017
Mean*	3102.3	342.5	392.9	27982.9	3301.9	383.8	895.0
Median	1214.7	139.9	150.0	11000.9	1490.5	139.2	354.5
Lowest	9.9	2.5	4.7	97.1	19.6	5.0	7.8
Highest	31974.8	3610.2	3861.2	222823.6	27831.0	3827.9	6265.5
Std. deviation	5873.1	651.5	700.4	44130.7	5060.1	692.6	1315.3
25th Percentile	368.6	38.3	46.7	3785.9	479.1	49.3	161.7
75th Percentile	2794.0	323.8	349.1	30260.3	4146.3	341.1	1028.1

*The differences between the means of the Islamic banks sample and conventional banks are not significant at a 5%-level

The banks in the conventional sample are on average larger than the Islamic banks and they tend to generate more profit and revenues. These findings are the same for other measures such as the median, lowest, highest, 25th percentile and the 75th percentile. However, the differences between the means are not significant. Nevertheless, it could be helpful to control for these differences due to outliers, the high standard deviations and the low number of observations. This influences the two sample t-statistic. The differences will influence the results because the multiples valuation method is more precise for large financial companies than for small ones (Lie & Lie, 2002). The difference in profit and revenues will also bias the results because the earnings and sales multiples are more accurate for companies with high profits and revenues. The adjustments to correct for the differences between sample will be explained in the methodology section.

The removals could lead to samples which are not representative for their population. Therefore, the descriptive statistics of the subsample and population need to be discussed. The Islamic banks sample differs from its population because the sample contains larger, more revenue and profit generating banks (Table 1 & 3). The same differences apply to the conventional banks sample (Table 2 and 4). This means that the valuation accuracy of the samples used in this research will be higher than what it would be for the entire population. Therefore, the conclusion of this thesis about the accuracy difference between Islamic and conventional banks is based on relatively large banks. Nevertheless, the comparison between

those banks can be made because the samples differ only in specialisation (Islamic versus conventional) and not in size. Especially after the adjustments for differences in size and profit which will be discussed in the methodology section.

Table 3
Descriptive Statistics about the Islamic Banks Population

	Market capitalisation m USD 2017	Net income m USD 2017	Profit before tax m USD 2017	Total assets m USD 2017	Equity m USD 2017	Operating profit m USD 2017	Operating revenues m USD 2017
Mean	1961.3	88.8	6.9*	6669.7*	851.6*	98.0	256.1*
Median	358.8	12.9	12.5	1942.8	274.9	12.4	78.2
Lowest	0.7	-107.0	-107.0	1.5	-126.4	-107.0	-35.8
Highest	28002.0	2432.2	2432.2	91497.7	14866.9	2422.7	4231.8
Std. deviation	4493.2	270.3	273.9	13013.2	1814.2	272.1	523.5
25th Percentile	5.4	0.0	0.1	51.2	11.5	0.1	1.9
75th Percentile	1349.8	59.1	77.5	6035.5	700.2	81.4	238.9

*Significantly different from the Islam banks sample used in this thesis ($\alpha=0.05$)

Table 4
Descriptive Statistics about the Conventional Banks Population

	Market capitalisation m USD 2017	Net income m USD 2017	Profit before tax m USD 2017	Total assets m USD 2017	Equity m USD 2017	Operating profit m USD 2017	Operating revenues m USD 2017
Mean*	2451.8	220.6	253.9	18670.9	2193.1	248.2	594.4
Median	755.2	49.4	59.4	4958.1	665.8	59.3	198.5
Lowest	7.6	-75.6	-75.6	13.3	12.1	-75.6	-6.6
Highest	31974.8	3610.2	3861.2	222823.6	27831.0	3827.9	6265.5
Std. deviation	5326.3	530.2	573.6	36517.9	4186.1	566.5	1102.1
25th Percentile	137.4	4.3	5.0	493.0	213.5	5.9	19.0
75th Percentile	2267.5	176.2	201.8	18710.7	2209.0	200.9	509.6

*The differences between the means of the conventional banks sample and their population are not significant ($\alpha=0.05$)

For both samples, two multiples, the price/earnings and price/book value, are extracted from the database. Three other multiples are not directly extracted from the Orbis Bank Focus database, but the variables needed to compute these ratios can be obtained. This applies to the market capitalisation/total assets multiple, market capitalisation/EBIT and the market capitalisation/ operating revenues multiple. Earnings Before Interest & Taxes (EBIT) is calculated by adding interest expenses and profit before tax together. The values of all variables are the closing values of 2017.

Table 5
Descriptive Statistics about the Multiples of the Islamic Banks Sample

	Price/earnings	Price/book value	Market cap/assets	Market cap/EBIT	Market cap/operating revenues
Mean*	18.1635	1.2576	0.1686	6.4069	4.2715
Median	12.2370	1.0465	0.1500	4.8333	3.7752
Lowest	1.1700	0.1800	0.0180	0.3462	0.3582

Highest	151.4670	7.2810	0.8600	44.5621	22.1344
Std. deviation	25.9825	1.1349	0.1429	7.1966	3.7064
25th Percentile	7.5405	0.7603	0.0945	2.9448	1.7646
75th Percentile	14.9880	1.4688	0.1940	8.7338	5.8530

*The differences between the multiples of the Islamic and conventional banks are not significant ($\alpha=0.05$)

Table 6

Descriptive Statistics about the Multiples of the Conventional Banks Sample

	Price/earnings	Price/book value	Market cap/assets	Market cap/EBIT	Market cap/operating revenues
Mean*	13.3437	0.9142	0.1378	4.7692	3.6259
Median	9.8755	0.8165	0.1040	3.5577	2.9878
Lowest	1.7730	0.0410	0.0190	0.5020	0.3155
Highest	170.4620	2.5750	0.9500	38.1878	20.8490
Std. deviation	20.7678	0.4510	0.1297	4.8209	2.9238
25th Percentile	7.4218	0.5903	0.0755	2.9043	2.0183
75th Percentile	12.9815	1.1670	0.1565	5.5295	4.3313

*The differences between the multiples of the Islamic and conventional banks are not significant ($\alpha=0.05$)

For both the Islamic and conventional banks (Table 5 & 6) the mean differs from the median multiple. For all five multiples, the mean is higher than the median which implies that the distribution is right-skewed. Therefore, it could be better to use the median instead of the mean. The means of the Islamic and conventional banks sample do not differ significantly, mainly because of the high standard deviations.

4. Methodology

As stated in the data section, the comparable firms will be selected on the basis of same industry and the combination of same industry & size. Thus, the five industry multiples for each bank in the Islamic banks sample will be based on the values of other Islamic banks. For the conventional banks multiples, the industry is defined as all other conventional banks from the Middle-East. This has been done to avoid differences between sample. For all multiples, both the median and mean will be calculated. To avoid the effect of outliers, it could be better to use the median multiple. In the end, for each company there will be ten different multiples, five mean multiples and five median multiples.

Thereafter, the accuracy of the multiples will be calculated by taking the natural logarithm of the ratio of the estimated value to the market value. This is the valuation error of the industry multiple.

$$\text{valuation error} = \ln\left(\frac{\text{estimated value}}{\text{market value}}\right) \quad (1)$$

The market value is used as a proxy for the true value of the companies. Of course, it is questionable whether the market is able to value the companies accurately because of all kinds of anomalies. So, it is important to keep in mind whether the market value could be biased or not. However, if the market is bounded to some irrationality leading to inaccurate market values, it is likely that both the Islamic and conventional banks are biased in the same way. So, it does not influence the relative differences between these banks, which this thesis is focussed on. Nevertheless, there are also anomalies which do not affect all banks simultaneously, but making adjustments for this is subjective and depends on various assumptions. In sum, despite of some drawbacks of using the market value of companies, it is the best proxy for the true value. Moreover, to compare the results of this thesis with other findings such as the research of Lie & Lie (2002), it is convenient to use the same methodology. Otherwise, differences in conclusion could occur because of different methodologies instead of differences in firm characteristics.

To be able to draw conclusions from the valuation errors of all banks for ten different multiples, the mean and median valuation error of each multiples will be calculated. Positive values for those means and medians imply an upward bias, over-estimation of the true value, and negative values imply an underestimation. The closer the mean or median is to zero, the more accurate the estimated value is. Moreover, the fraction within 15% will also be computed. This is the

fraction of banks for which the estimate differs 15% or less from their true value. This fraction gives a better indication about the distribution of valuation errors. 15% is used as a benchmark to be able to compare the results of this thesis with other papers such as Gilson, Hotchkiss & Ruback (2000), Kaplan & Ruback, (1995), Kim & Ritter (1999) and Lie & Lie (2002) who also used the 15% benchmark.

If the three commonly used accuracy measures (fraction within 15%, mean & median valuation error), which are also used in the papers mentioned above, do not generate convincing results, the Mean Squared Error (MSE) will be calculated for each multiple. The MSE measures the averaged squared distance between the true and estimated value.

$$MSE = \frac{1}{N} \sum_{n=1}^N (\text{estimated value} - \text{market value})^2 \quad (2)$$

Because of differences between sample, the accuracy measures will also be calculated within six subdivisions. These subdivisions are small, medium & large companies and companies with low, medium & high earnings. The first three subdivisions are based on total assets. For this, both Islamic banks and conventional banks will be merged in one dataset. Small companies are all banks which belongs to the lowest 33.33% based on assets, large companies are the biggest 33.33% of all banks and medium companies are the banks in between. The same methodology will be applied to low, medium and high earnings, but then based on EBIT. Comparing these subdivisions will result in conclusions which are not biased because of differences in size and profit. Therefore, accuracy differences between the Islamic subdivisions and the conventional ones could only occur because of differences between bank characteristics, being Shariah compliant business management versus conventional business management.

Finally, all calculations will also be executed for multiples based on same industry and same size. Alford (1992) concluded that choosing firms on the basis of same industry is the most accurate way to select, but in some cases the precision improves when using firms within the same industry and same size based on assets.

When the best selection method has been chosen, the Q-like score for each multiple in both the Islamic and conventional banks sample will be calculated. This will be done because the Q-like penalizes underestimation relatively more than overestimation. Therefore, conclusions can be drawn concerning the magnitude of underestimation. This is relevant because not only the sample with the highest accuracy will be found with the methodology stated in previous paragraphs, but also the magnitude of under- and overestimation can be added to the conclusion

concerning the accuracy. The MSE and valuation errors are not suitable for this because the MSE does not make a difference between over- and underestimated values because of the feature of squaring the difference between estimated and true value (Figure 1). The amount of negative signs before the valuation errors can give an indication about how many times a value is underestimated but does not quantify the magnitude of the underestimations.

$$Qlike = \sum_{n=1}^N \frac{true\ value}{estimate} - \ln\left(\frac{true\ value}{estimate}\right) - 1 \quad (3)$$

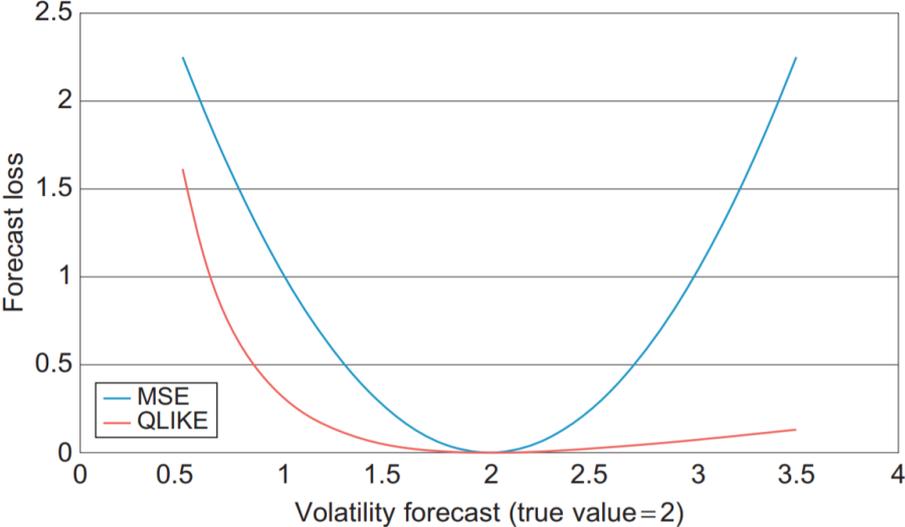


Figure 1. The difference between Q-like and MSE

Because the conventional and Islamic banks sample differ in the number of observation, the Q-like score will be higher for the conventional banks even if the magnitude of undervaluation is the same as in the Islamic banks sample. Therefore, the Q-like score will be divided by the number of observations. If the average Q-like score is higher for the conventional banks sample, the banks are more undervalued than firms in the Islamic banks sample.

5. Results

First, the results concerning the use of median and mean multiples will be discussed. Hereafter, the results of the selection of comparable firms will be presented. As mentioned in the methodology, the comparable firms are chosen on the basis of same industry and same industry & size. The differences between the accuracy of Islamic versus conventional banks will be based on the best selection method.

5.1 Mean and median multiples

There are 35 fraction within 15%-values divided across five different multiples and seven subdivisions. The median multiples outperform the mean in 22* out of 35 cases in the conventional banks multiples based on only industry (Table 14). In 6 cases the accuracy is the same and in only 7 cases the mean multiple is more accurate (based on the fraction within 15%-values). For the Islamic banks multiples based on industry and based on both industry and size (Table 12 & 13), the findings are less convincing. The median multiples are in 13 cases more accurate, 5 times equally accurate and in 17 cases the mean even outperforms the median, but not significantly. The median Islamic banks multiples based on both industry and assets outperforms the mean in 12 cases, 11 times they are equal and in 12 cases the mean outperforms the median. Moreover, the fractions within 15%-values for the conventional banks sample based on both industry and assets are also not convincingly in favour of the median multiples.

In sum, looking at the fraction within 15%-values, only the conventional banks multiples based on industry are in favour of the use of median multiples. However, in contrast to the findings based on the fraction within 15% measure, the results of the median and mean valuation errors are convincingly in favour of the median multiples. For example, the median and mean valuation errors of the median Islamic banks multiples sorted on only industry (Table 12) are in 27* and 32* cases, respectively, closer to zero than the mean Islamic banks multiples. Islamic banks multiples based on both industry and assets are also in favour of the median multiples. The median and mean valuation error is in 24* and 30* cases, respectively, more close to zero. For the conventional banks multiples based on industry and based on both industry and size, the results are also in favour of the median multiple. For example, the median valuation error of the median multiples for the conventional banks filtered on both industry and assets, are in all cases closer to zero than for the mean multiples.

* Significant based on a two tailed sign test with $\alpha=0.05$

In conclusion, the use of the median multiples is more accurate, which is in line with the findings of Lie & Lie (2002),. This is due to the influence of outliers on the mean multiples. Therefore, the mean multiple is less accurate and will not be used to value the Islamic and conventional banks. For the findings concerning the selection methods, only the median multiples will be examined.

5.2 Best selection method

First, the best selection method for the Islamic banks multiples will be discussed (Table 7 & 8). In total, there are 35 fraction within 15%-values, mean & median valuation errors divided across five different multiples and seven subdivisions. The three measures all point in the same direction. Choosing the comparable firms on both industry and size results in better estimates than selecting on only industry. The fraction within 15%-values for the industry & size selection method (Table 8) are in 25* out of 35 cases higher than the values for the selection method based on only industry (Table 7). The median and mean valuation errors are 20 and 28* times, respectively, more close to zero for the industry & size selection method. Therefore, choosing comparable banks for Islamic banks on the basis of both industry and size results in better estimates than only filtering on industry.

Table 7
Valuation Errors for the Islamic Banks Median Multiples based on Industry

Valuation accuracy	Price/ earnings	Price/Book value	Market cap/assets	Market cap/EBIT	Market cap/ rev.
All banks					
Within 15%	0.2778	0.1667	0.1944	0.1389	0.1111
Median	0.0000	0.0000	0.0000	-0.0001	0.0000
Mean	-0.0616	-0.0511	-0.1607	-0.1560	-0.1860
Small banks					
Within 15%	0.1667	0.3333	0.1667	0.1667	0.0833
Median	0.1256	-0.1426	0.0022	-0.1154	-0.4108
Mean	0.1206	-0.2871	-0.1016	-0.2077	-0.2817
Medium banks					
Within 15%	0.3750	0.0000	0.1875	0.1250	0.1250
Median	0.0000	0.1771	-0.2353	-0.0001	-0.1854
Mean	-0.0464	0.1034	-0.2560	-0.1917	-0.1901
Large banks					
Within 15%	0.2500	0.2500	0.2500	0.1250	0.1250
Median	-0.1306	0.1790	0.1356	0.2037	0.2648

* Significant based on a two tailed sign test with $\alpha=0.05$

Mean	-0.3652	-0.0063	-0.0585	-0.0073	-0.0344
Banks with low earnings					
Within 15%	0.2500	0.2500	0.2500	0.1667	0.0833
Median	0.1596	-0.1426	-0.0106	0.0671	-0.1846
Mean	0.3143	-0.2692	-0.0857	-0.0224	-0.2062
Banks with medium earnings					
Within 15%	0.3846	0.0769	0.1538	0.1538	0.1538
Median	0.0167	0.1588	0.0526	0.0124	0.0956
Mean	-0.1194	0.1646	-0.1629	-0.2251	-0.1227
Banks with high Earnings					
Within 15%	0.1818	0.1818	0.1818	0.0909	0.0909
Median	-0.1918	0.0601	-0.0267	-0.0938	0.1176
Mean	-0.4033	-0.0682	-0.2397	-0.2201	-0.2388

*The ranges for small, medium and large banks are [<4,110], [4,110;18,210] and [>18,210] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [118.224;435.684] and [>435.684] millions US dollars, respectively.

Table 8
Valuation Errors for the Islamic Banks Median Multiples based on Industry and Size

Valuation accuracy	Price/ earnings	Price/Book value	Market cap/assets	Market cap/EBIT	Market cap/ rev.
All banks					
Within 15%	0.4722	0.4722	0.3056	0.2500	0.4167
Median	-0.0154	0.0183	0.0311	0.0123	-0.0238
Mean	-0.0148	-0.0379	-0.0518	-0.0815	-0.0077
Small banks					
Within 15%	0.3333	0.5000	0.3333	0.2500	0.4167
Median	0.0925	0.0821	0.1048	0.1196	0.1398
Mean	0.0644	-0.0076	-0.0079	0.0120	0.1614
Medium banks					
Within 15%	0.5625	0.4375	0.3750	0.2500	0.3125
Median	-0.0171	-0.0012	0.0311	0.0123	-0.0238
Mean	-0.0112	-0.0180	-0.0422	-0.1132	-0.0564
Large banks					
Within 15%	0.5000	0.5000	0.1250	0.2500	0.6250
Median	-0.0573	-0.0529	-0.0932	-0.1011	-0.0794
Mean	-0.1406	-0.1232	-0.1372	-0.1584	-0.1641
Banks with low earnings					
Within 15%	0.1667	0.1667	0.1667	0.2500	0.1667
Median	0.0013	0.0000	0.0649	0.0483	-0.0252
Mean	0.0649	-0.1295	-0.1002	-0.0059	-0.0495

Banks with medium earnings					
Within 15%	0.4615	0.2308	0.0769	0.0769	0.2308
Median	-0.0043	0.1180	0.2176	0.0111	0.1136
Mean	-0.1034	-0.0575	-0.0118	-0.2144	-0.0260
Banks with high Earnings					
Within 15%	0.0909	0.0000	0.1818	0.0909	0.2727
Median	0.1068	-0.1731	-0.1415	-0.2970	-0.1477
Mean	-0.1455	-0.1919	-0.2333	-0.2738	-0.2928

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.

Choosing comparable firms filtered on both industry & assets is also the best selection method for the conventional banks sample. 21 fraction within 15%-values improved by filtering on both industry and assets instead of only industry (Table 9 & 10). 13 values decreased and 1 remained unchanged. The results of the median and mean valuation errors are even more convincing. 24* median valuation errors are more close to zero and 26* mean valuation errors are closer to zero for the industry and assets method in comparison with the only industry method.

In sum, filtering on both industry and assets generates the most accurate valuations. Therefore, the findings with respect to the accuracy of Islamic and conventional banks will be based on the median multiples filtered on industry and size.

Table 9
Valuation Errors for the Conventional Banks Median Multiples based on Industry

Valuation accuracy	Price/ earnings	Price/Book value	Market cap/assets	Market cap/EBIT	Market cap/ rev.
All banks					
Within 15%	0.2969	0.2344	0.2188	0.2813	0.2188
Median	0.0000	0.0000	0.0000	0.0000	0.0000
Mean	0.0020	-0.0355	0.0264	0.0399	-0.0227
Small banks					
Within 15%	0.1905	0.3333	0.1429	0.1905	0.2381
Median	0.2516	0.0086	0.1856	-0.1266	-0.0142
Mean	0.0870	-0.1130	0.2296	0.0547	-0.0424
Medium banks					
Within 15%	0.3889	0.2222	0.2778	0.2778	0.1667
Median	0.0597	0.0678	0.0566	0.2506	0.1615
Mean	0.2417	0.1502	0.1460	0.3087	0.1359
Large banks					

* Significant based on a two tailed sign test with $\alpha=0.05$

Within 15%	0.3200	0.1600	0.2400	0.3600	0.2400
Median	-0.1141	-0.0773	-0.1001	-0.0003	-0.0870
Mean	-0.2419	-0.1042	-0.2303	-0.1660	-0.1204
Banks with low earnings					
Within 15%	0.1905	0.2857	0.1905	0.1429	0.2381
Median	0.2516	0.0515	0.1015	-0.0447	0.0721
Mean	0.2145	-0.0900	0.2065	0.1229	-0.0214
Banks with medium earnings					
Within 15%	0.3810	0.2857	0.1905	0.2857	0.1429
Median	0.0863	0.0994	0.1693	0.2197	0.1811
Mean	0.1063	0.1482	0.1456	0.2672	0.1051
Banks with high Earnings					
Within 15%	0.3182	0.1364	0.2727	0.4091	0.2727
Median	-0.2021	-0.1585	-0.1327	-0.0264	-0.1385
Mean	-0.3004	-0.1589	-0.2592	-0.2563	-0.1460

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.

Table 10
Valuation Errors for the Conventional Banks Median Multiples based on Industry and Size

Valuation accuracy	Price/ earnings	Price/Book value	Market cap/assets	Market cap/EBIT	Market cap/ rev.
All banks	0.3818	0.2727	0.2182	0.2545	0.2727
Within 15%	-0.0076	-0.0268	0.0235	-0.0140	-0.0296
Median	0.0200	-0.0286	0.0216	0.0240	-0.0394
Mean					
Small banks	0.2857	0.2381	0.1429	0.0476	0.1429
Within 15%	0.0007	-0.0430	-0.0576	-0.1063	-0.0554
Median	-0.0272	-0.1434	0.0759	0.1512	-0.0741
Mean					
Medium banks	0.2778	0.1111	0.1667	0.1111	0.2222
Within 15%	0.0000	0.0000	0.0663	0.0000	0.0805
Median	0.1747	0.0929	0.0897	0.0502	0.0258
Mean					
Large banks	0.6250	0.5000	0.3750	0.6875	0.5000
Within 15%	-0.0085	-0.0247	-0.0161	-0.0036	-0.0347
Median	-0.0919	-0.0147	-0.1262	-0.1726	-0.0672
Mean					
Banks with low earnings	0.3333	0.1429	0.2381	0.0476	0.1429
Within 15%	-0.0077	-0.0791	0.0140	-0.0172	0.0810
Median	-0.0004	-0.1977	0.0505	0.1677	-0.0549

Mean					
Banks with medium earnings	0.0526	0.3684	0.1579	0.3158	0.2105
Within 15%	-0.0213	-0.0112	-0.0146	-0.0151	-0.0089
Median	0.0025	0.1057	0.0545	0.0495	0.0224
Mean					
Banks with high Earnings	0.4667	0.5333	0.4667	0.6000	0.6000
Within 15%	-0.0084	-0.0407	-0.0049	0.0078	-0.0196
Median	-0.0458	0.0087	-0.0653	-0.0982	-0.0215
Mean	0.3818	0.2727	0.2182	0.2545	0.2727

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.

5.3 Precision of the five different multiples

In the Islamic banks sample, the price/earnings multiple has the most accurate estimations because the fraction within 15% for this multiple is the highest in 3 out of 7 subdivision (Table 8). The average fraction within 15% over the 7 subdivisions for the price/earnings multiple is 0.3234. This is larger than means for the other multiples. The average fraction within 15% for the price/book value, market cap/assets, market cap/EBIT and market cap/operating revenue multiples are 0.2884, 0.1955, 0.1772 & 0.3051, respectively. Moreover, the mean valuation errors are also in favour of the price/earnings multiple. The mean valuation error of the P/E-multiple is in 2 out of 7 subdivision the lowest. This is also the case for the price/book value multiple, but the average of the seven mean valuation error is the lowest for the price/earnings multiple. Therefore, this multiple performs the best.

The market cap/EBIT multiple is the worst performing multiple. It has the lowest fraction within 15% value in 4 out of 7 subdivisions. The fraction within 15% values are on average 0.1772 which is the lowest average of all five multiples. The mean valuation error of the market cap/EBIT multiple is in 3 out of 7 subdivision the worst. Based on the median valuation errors the market cap/assets multiple is the worst performing multiple. It has the highest value in 5 out of 7 subdivisions. Therefore, the market cap/EBIT and the market cap/assets generates the worst valuations in the Islamic banks sample.

The price/earnings multiple is also the best performing multiple in the conventional banks sample (Table 10). It has the highest fraction within 15%-value in 4 out of 7 subdivisions. The median and mean valuation errors are the lowest in 4 out of 7 subdivisions. The market cap/EBIT is the worst performing multiple but it is not overwhelming. It has the lowest fraction

within 15%-value in 3 subdivisions, but it is not the worst performing multiple based on the mean and median valuation error. The mean and median valuation errors point more to the market cap/revenues multiple. It has the highest median valuation error in 4 subdivisions and the average mean valuation errors over the seven subdivisions is the highest for this multiple. Thus, in the conventional banks sample the market cap/EBIT and market cap/revenues are the worst performing multiple.

Overall, the price/earnings multiples generate the most accurate estimations. The three market cap multiples perform very badly. Especially, the market cap/EBIT multiple generates very inaccurate estimations. The price/book value multiple is the second best option. These findings cannot completely be compared with earlier research. All papers use different multiples and even if the multiples are the same, the definition of some variables differ. For example, Kim & Ritter (1999) used forward-looking price/earnings multiples and Kaplan & Ruback (1995) examine multiples based on EBITDA. Moreover, the findings of this thesis are based on Islamic and conventional banks. Therefore, the findings can only be compared with conclusion concerning other industries. It is not possible to conclude something about which multiple is always the best regardless of the industry a firm belongs to. Computing the exact same multiples was not possible because of a lack of data.

Just as the different industries Lie & Lie (2002) investigated, the multiples using earnings, or some derivation of that such as EBIT, perform very badly for conventional and Islamic banks that generate low earnings. However, the findings concerning the asset-based multiple is the opposite of their findings. It is the best performing multiple for financial companies in general, but one of the worst performing multiples in this thesis. Though, the comparison is not fully justified because they compare the accuracy of this multiple with other multiples.

5.4 Differences in accuracy across the subdivisions

The accuracy in the high earnings subdivision in the Islamic banks sample is by far the lowest (Table 8). The fraction within 15% is for 2 out of 5 multiples the lowest and the median valuation error has in 3 cases the highest value. The mean valuation error is more overwhelming, for all 5 different multiples the highest mean valuation error is in the high earnings subdivision. This result is striking because the high earnings subdivision performs the best in the conventional banks sample (Table 10). It has in 3 out of 5 multiples the highest fraction within 15%-value and in 2 out of 5 cases the mean and median valuation error is the lowest. The average fraction within 15% across the five multiples for the Islamic high earnings

subdivision is 0.1273, which is the lowest average, whereas for the conventional banks it has a value of 0.5333 on average. The best valuations in the high earnings subdivision of the conventional banks sample is in line with earlier findings. The multiples valuation method performs the best for large firms and firms with high earnings, which holds for all industries (Lie & Lie, 2002).

In contrast to the finding of the worst performing subdivision in the Islamic banks sample, the finding concerning the best performing subdivision is in line with earlier research. The large banks subdivision performs the best based on the fraction within 15% (Table 8). On average, it has the highest fraction within 15% for all multiples. Medium sized Islamic banks also perform well based on the mean and median valuation error. This subdivision contains on average, the lowest median valuation error and the second lowest mean valuation error. Therefore, the valuation accuracy of medium and large Islamic banks is the highest. As stated above, the high earnings subdivision contains the most accurate estimations in the conventional banks sample (Table 8). Thus, the findings concerning the highest accuracy across subdivision in the Islamic and conventional banks sample are in line with the conclusion of Lie & Lie (2002).

Only the finding concerning the lowest accuracy for the high earnings subdivision of the Islamic banks sample is in contrast with earlier research. A possible explanation could be the fact that this subdivision contains only a few firms because the amount of high earnings generating Islamic banks is quite low. Besides, because of a low amount of large Islamic banks, there is not a huge amount of comparable banks to use for the multiple calculation. Therefore, the multiple itself is computed with at most six comparable firms and the amount of firms within this subdivision is quite low. Moreover, this thesis uses a relative benchmark to subdivide the banks into three different earnings categories. Banks with the lowest 33.33% EBIT-values are low profit banks, banks with the highest 33.33% EBIT are defined as “high-earning” banks. However, Lie & Lie (2002) used an absolute benchmark. Therefore, their minimum value for which a banks belongs to “high-earnings banks” is different than the minimum value (>\$435.684 million) used in this thesis.

5.5 Accuracy difference between Islamic and conventional banks

Comparing the 35 fraction within 15%-values, the median & mean valuation errors between the Islamic and conventional banks, the results do not convincingly prove differences in accuracy. The fraction within 15% is in 20 cases higher in the Islamic banks sample, 14 times it is lower and 1 time it is equal. Therefore, the valuations for the Islamic banks are more

accurate, but the numbers mentioned above are not significant (based on a two-sided sign test). The findings based on the mean and median valuation error are the opposite. The mean valuation error is in 20 cases higher and in 15 cases lower for the Islamic banks sample, which indicates a higher accuracy for the conventional banks sample. However, again not significant. The median valuation error is significantly in favour of the conventional banks. The median valuation error is in 27 cases lower for the conventional banks, which indicates a higher accuracy for the conventional banks sample. However, because of the ambiguous findings and the insignificance of some findings, the results are not convincing.

Therefore, as mentioned in the methodology, the Mean Squared Error will be calculated (Table 11). For all multiples the MSE is higher in the Islamic banks sample which means that the valuation accuracy is lower. This is in accordance with the only significant finding in the previous part of this section. Thus, the valuation accuracy in the Islamic banks sample is lower than the precision in the conventional banks sample.

To emphasize the accuracy difference, the fraction within 15%-range (minimum – maximum) for all five multiples in the conventional banks sample is higher than the range for the Islamic banks. The minimum and maximum values for all five multiples in the Islamic banks sample are lower, except for the market cap/operating revenues multiple. In sum, the accuracy of the valuation for the Islamic banks is lower than the accuracy for the conventional banks. This is the opposite of the hypothesis stated in the theoretical framework. This result will be discussed in section 6.

Table 11
MSE and Q-Like Score for the Islamic and Conventional Banks Sample

		Price/book value	Market cap/assets	Market cap/EBIT	Market cap/ revenues
	Islamic banks				
MSE	738.3082	1.2635	0.0233	58.8959	15.6886
Qlike	19.9193	52.2389	10.5104	-17.3644	12.5836
Qlike average	0.5533	1.4511	0.2920	0.4823	0.3495
	Conventional banks				
MSE	479.7356	0.3031	0.0200	29.0651	10.3974
Qlike	22.5634	10.0430	19.4905	19.2467	15.3555
Average Qlike	0.3526	0.1569	0.3045	0.3007	0.2399

5.6 Level of undervaluation

As mentioned in the theoretical framework section, the expectation is that conventional banks will be more undervalued than Islamic banks. Four multiples contained a lower average Q-like

score for the conventional banks valuations, in comparison with the Islamic banks sample (Table 11). Therefore, the conventional banks are less undervalued than the Islamic banks. This is in contrast to the hypothesis. However, it explains the origin of the valuation difference found in the previous section. Islamic banks are more undervalued than conventional banks, which eventually result in the less accurate valuation. Only if the conventional banks are extremely overvalued, the accuracy for Islamic banks can be higher. However, the findings in the previous section implies a lower accuracy for Islamic banks. Therefore, the valuation accuracy for Islamic banks is lower because these banks are more undervalued.

Moreover, using a two tailed sign test, the amount of negative signs in the Islamic banks sample is significant at a 5%-level. It contains 47 negative valuation errors out of 70 values (median + mean). The 43 negative signs in the conventional banks sample are not significant. The findings mentioned above indicates that not only the magnitude of undervaluation is higher for Islamic banks, but also the amount of undervaluations. This is in contrast to the hypothesis which states that conventional banks are more undervalued because they are, on average, larger than Islamic banks. However, the large conventional banks could be less undervalued because of the definition of “large”. In the paper of Lie & Lie (2002) large firms are defined as firms with a book value of \$1 billion or more. This paper does not use an absolute benchmark but a relative benchmark based on the distribution of the sample. Therefore, the “large banks” are firms which fall under the largest 33.33% based on total assets. The absolute benchmark of \$1 billion is not usable in this thesis because it will result in too low observations in the small and medium sized companies subdivision.

6. Conclusion & Discussion

As stated in the introduction, it is important to achieve accurate firm valuation. Therefore, this thesis provides an answer to the following research question:

To what extent does the accuracy of the multiples valuation method differ between Islamic and conventional banks?

Firstly, the use of median multiples instead of mean multiples is preferred in both the Islamic and conventional banks which is in line with the second hypothesis. Therefore, this finding is in line with earlier researches such as Kim & Ritter (1999), Kaplan & Ruback (1995) and Lie & Lie (2002). The reason for this is the effect of outliers on the mean multiples. This results in less representative industry multiples to value a single firm within the specific industry. Because of this and the findings in earlier papers, the use of the median value is recommended in practice and in further researches. Thus, with respect to the statistical value to use, the research question can be answered. The use of the median multiples results in better valuation for the Islamic and conventional banks. Therefore, they do not differ in the way the multiples needs to be computed.

Secondly, the comparable firms which are used to compute the median multiples needs to be filtered on industry and assets. The valuation accuracy for the Islamic and conventional banks improves if the firms are also filtered on size. This strengthens the suggestion of Alford (1992), in which states that in some cases, the valuation accuracy improves by selecting not only on industry, but also on size. Thus, the way the comparable firms needs to be chosen is not different for the Islamic banks in comparison with conventional banks.

Thirdly, the accuracy of the multiples valuation method is higher for conventional banks than for Islamic banks. This is in contrast to the first hypothesis. The expectation was that the multiples method is more accurate for Islamic banks because the way these banks manage their operating activity involves less risk and uncertainty. The opposite finding could imply several things: the multiples method is not more accurate for firms with low risk, the Islamic banks are not less risky or a combination of these suggestions.

6.1 Effect of risk on the accuracy of the multiples valuation method

The first suggestion could be true because the findings of Lie & Lie (2002) are dated. The economic environment and the world of finance changed dramatically since 1998 which is the fiscal year of the data used in their research. Therefore, the relation between riskiness and valuation accuracy could be different. To verify this, further research could focus on valuation

accuracy over time and control for cyclical fluctuations. This will result in findings that hold over time.

Moreover, their conclusion is based on differences across industries. They investigated the accuracy in different industries, whereas this thesis is focussed on different specialisations within one industry. Therefore, the differences in risk between industries could still have an effect on the valuation accuracy, but the differences in risk profiles within an industry has not. Finally, the geographical location of firms can have an impact which results in the difference in conclusion between this thesis and other papers. For example, Lie & Lie (2002) used all firms which were available in the Compustat database at that time whereas this thesis only uses firms from the Middle-East because almost all Islamic banks are located in this region. Therefore, further research could focus on differences across countries. The accuracy of firms which are within the same industry, same size and for which the same methodology will be used, but only making a difference between firms because of their geographical location, can be examined.

Finally, the extent to which banks are followed by analysts and investors could have an impact on the value on the stock exchange. The pricing is less efficient if the attention of analysts is limited or absent (Brennan & Copeland, 1988). The Islamic banks operate in a niche market which could lead to less attention of analysts and investors. Therefore, their valuation in the stock exchange is less efficient which results in an inaccurate estimated value using the multiples valuation method.

6.2 The riskiness of Islamic banks

The second implication about whether Islamic banks are not less risky could be true as well. As stated in section 2, the way the Islamic banks manage their operating activity should theoretically lead to less risk in comparison with the operating activities of conventional banks. However, perhaps it is not reflected in practice. For example, theoretically the sharing loss and profit contracts and the board of Shariah experts should lead to less risk, but the banks and the board are not able to bring this into practice because of a lack of knowledge/skills or economic factors such as (dis)economies of scale or agency problems. Further research could focus on the financial knowledge and skills of Islamic bankers and the way the Shariah board functions.

There are some papers in which the riskiness of Islamic banks is investigated. For example, Iqbal, Habeeb, Rajeshe and Naveen (2017) investigated differences between Islamic and conventional banks in Bahrain and state that “There is clear evidence of the strength of Islamic banks in recent financial downturn”. Siraj and Pillai (2012) concluded the same and mentioned

the fact that Islamic banks are heavily equity financed could be a reason for this. Yiniarty (2017) concludes the industry was resilient enough to survive the Asian financial crisis in 1998 and the financial crisis of 2008. Hassan Dridi (2010) stated that a stronger reputation, better diversification and more benefits from economies of scale are the reason for the better performance during the world financial crisis. Samad (2004) found that the Islamic bank perform better in terms of credit risk. Moreover, the liquidity position of Islamic banks is better (Samad & Hassan, 1999) (Masruki, Ibrahim, Osman, & Abdul, 2010) (Ansari & Rehman, 2011) (Jaffar & Manarvi, 2011) (Iqbal, 2012).

However, these findings are not robust. Other studies showed lower risk profiles for Islamic banks but only in certain circumstances. For example, small Islamic banks are indeed less risky but large Islamic banks are more risky compared to their conventional counterpart (Cihak & Hesse, 2010). It also depends on the leverage position of the Islamic bank, the Muslim population in the country (Abedifar, Molyneux, & Tarazi, 2013) and the profit efficiency (Saeed & Izzeldin, 2014). Mollah, Hassan, Al Farooque (2014) found that financial disclosure issues have an impact but the nature of Shariah boards does not limit risk-taking by Islamic banks.

In sum, the empirical researches concerning the riskiness of Islamic banks versus conventional banks is not conclusive. To evaluate the effect of risk on the accuracy of the multiples valuation method, further research should focus on the exact risk profiles of the companies in their research. Therefore, it is better to match risk measures, such as liquidity and solvency ratios, with valuation accuracy controlled for other factors such as size and profitability.

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Appendix

Table 12

Valuation Errors for the Islamic Banks Multiples based on Industry

Accuracy measures	Mean P/E	Median P/E	Mean P/B	Median P/B	Mean market cap/assets	Median market cap/assets	Mean market cap/EBIT	Median market cap/EBIT	Mean market cap/ rev.	Median market cap/rev.
All banks										
Within 15%	0.0278	0.2778	0.1667	0.1667	0.1571	0.1944	0.1667	0.1389	0.1667	0.1111
Median	-0.4043	0.0000	-0.1886	0.0000	-0.1199	0.0000	-0.2889	-0.0001	-0.1280	0.0000
Mean	-0.4556	-0.0616	-0.2346	-0.0511	-0.2771	-0.1607	-0.4373	-0.1560	-0.3104	-0.1860
Small banks										
Within 15%	0.0000	0.1667	0.0833	0.3333	0.2500	0.1667	0.0833	0.1667	0.0000	0.0833
Median	-0.2845	0.1256	-0.3221	-0.1426	-0.1176	0.0022	-0.4003	-0.1154	-0.4978	-0.4108
Mean	-0.2612	0.1206	-0.4737	-0.2871	-0.2192	-0.1016	-0.4925	-0.2077	-0.4036	-0.2817
Medium banks										
Within 15%	0.0625	0.3750	0.1875	0.0000	0.3125	0.1875	0.1875	0.1250	0.1875	0.1250
Median	-0.4043	0.0000	-0.0192	0.1771	-0.3468	-0.2353	-0.2889	-0.0001	-0.2688	-0.1854
Mean	-0.4437	-0.0464	-0.0745	0.1034	-0.3708	-0.2560	-0.4684	-0.1917	-0.3057	-0.1901
Large banks										
Within 15%	0.0000	0.2500	0.2500	0.2500	0.3750	0.2500	0.2500	0.1250	0.3750	0.1250
Median	-0.5287	-0.1306	-0.0170	0.1790	0.0059	0.1356	-0.0867	0.2037	0.0951	0.2648
Mean	-0.7709	-0.3652	-0.1962	-0.0063	-0.1766	-0.0585	-0.2924	-0.0073	-0.1797	-0.0344
Low earnings										
Within 15%	0.0000	0.2500	0.1667	0.2500	0.3333	0.2500	0.1667	0.1667	0.0000	0.0833
Median	-0.2499	0.1596	-0.3221	-0.1426	-0.1308	-0.0106	-0.2157	0.0671	-0.2680	-0.1846
Mean	-0.0651	0.3143	-0.4573	-0.2692	-0.2053	-0.0857	-0.3064	-0.0224	-0.3272	-0.2062
Medium earnings										
Within 15%	0.0769	0.3846	0.1538	0.0769	0.3077	0.1538	0.1538	0.1538	0.2308	0.1538
Median	-0.3958	0.0167	-0.0380	0.1588	-0.0795	0.0526	-0.2761	0.0124	-0.0790	0.0956
Mean	-0.5177	-0.1194	-0.0097	0.1646	-0.2751	-0.1629	-0.4976	-0.2251	-0.2448	-0.1227
High earnings										
Within 15%	0.0000	0.1818	0.1818	0.1818	0.2727	0.1818	0.1818	0.0909	0.2727	0.0909
Median	-0.5910	-0.1918	-0.1393	0.0601	-0.1335	-0.0267	-0.3973	-0.0938	-0.0564	0.1176
Mean	-0.8083	-0.4033	-0.2575	-0.0682	-0.3578	-0.2397	-0.5089	-0.2201	-0.3695	-0.2388

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.

Table 13

Valuation Errors for the Islamic Banks Multiples based on Industry and Assets

Accuracy measures	Mean P/E	Median P/E	Mean P/B	Median P/B	Mean market cap/assets	Median market cap/assets	Mean market cap/EBIT	Median market cap/EBIT	Mean market cap/ rev.	Median market cap/rev.
All banks										
Within 15%	0.3056	0.4722	0.5278	0.4722	0.2286	0.3056	0.3611	0.2500	0.3611	0.4167
Median	-0.1321	-0.0154	-0.0110	0.0183	-0.0399	0.0311	-0.0761	0.0123	-0.0537	-0.0238
Mean	-0.1650	-0.0148	-0.0715	-0.0379	-0.1001	-0.0518	-0.1564	-0.0815	-0.1105	-0.0077
Small banks										
Within 15%	0.0833	0.3333	0.6667	0.5000	0.5000	0.3333	0.3333	0.2500	0.0833	0.4167
Median	-0.2412	0.0925	0.0744	0.0821	0.0289	0.1048	-0.0162	0.1196	-0.0728	0.1398
Mean	-0.1182	0.0644	-0.0055	-0.0076	-0.0252	-0.0079	-0.0580	0.0120	-0.0231	0.1614
Medium banks										
Within 15%	0.3750	0.5625	0.4375	0.4375	0.4375	0.3750	0.3750	0.2500	0.4375	0.3125
Median	-0.1549	-0.0171	-0.0852	-0.0012	-0.0930	0.0311	-0.0819	0.0123	-0.0466	-0.0238
Mean	-0.2068	-0.0112	-0.0757	-0.0180	-0.1191	-0.0422	-0.2040	-0.1132	-0.1336	-0.0564
Large banks										
Within 15%	0.5000	0.5000	0.5000	0.5000	0.3750	0.1250	0.3750	0.2500	0.6250	0.6250
Median	-0.0089	-0.0573	-0.0629	-0.0529	-0.0883	-0.0932	-0.1004	-0.1011	-0.0669	-0.0794
Mean	-0.1516	-0.1406	-0.1618	-0.1232	-0.1742	-0.1372	-0.2091	-0.1584	-0.1954	-0.1641
Low earnings										
Within 15%	0.1667	0.1667	0.0833	0.1667	0.4167	0.1667	0.1667	0.2500	0.0833	0.1667
Median	-0.3467	0.0013	0.1120	0.0000	-0.1180	0.0649	-0.1075	0.0483	-0.1760	-0.0252
Mean	-0.4278	0.0649	-0.0819	-0.1295	-0.1796	-0.1002	-0.1717	-0.0059	-0.1858	-0.0495
Medium										
Within 15%	0.3077	0.4615	0.2308	0.2308	0.0769	0.0769	0.0769	0.0769	0.0000	0.2308
Median	-0.3032	-0.0043	-0.2045	0.1180	-0.3999	0.2176	-0.4728	0.0111	-0.1914	0.1136
Mean	-0.3785	-0.1034	-0.2295	-0.0575	-0.3139	-0.0118	-0.6385	-0.2144	-0.3457	-0.0260
High earnings										
Within 15%	0.0909	0.0909	0.0909	0.0000	0.1818	0.1818	0.1818	0.0909	0.2727	0.2727
Median	0.1070	0.1068	-0.1313	-0.1731	-0.1551	-0.1415	-0.3271	-0.2970	-0.1156	-0.1477
Mean	-0.0988	-0.1455	-0.1631	-0.1919	-0.2526	-0.2333	-0.3416	-0.2738	-0.2988	-0.2928

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.

Table 14

Valuation Errors for the Conventional Banks Multiples based on Industry

Accuracy measures	Mean P/E	Median P/E	Mean P/B	Median P/B	Mean market cap/assets	Median market cap/assets	Mean market cap/EBIT	Median market cap/EBIT	Mean market cap/ rev.	Median market cap/rev.
All banks										
Within 15%	0.2500	0.2969	0.2188	0.2344	0.1719	0.2188	0.1563	0.2813	0.1875	0.2188
Median	-0.3051	0.0000	-0.1147	0.0000	-0.2853	0.0000	-0.2971	0.0000	-0.1964	0.0000
Mean	-0.2986	0.0020	-0.1485	-0.0355	-0.2546	0.0264	-0.2530	0.0399	-0.2161	-0.0227
Small banks										
Within 15%	0.3333	0.1905	0.2381	0.3333	0.1905	0.1429	0.1429	0.1905	0.1905	0.2381
Median	-0.0555	0.2516	-0.1103	0.0086	-0.1071	0.1856	-0.4249	-0.1266	-0.2036	-0.0142
Mean	-0.2153	0.0870	-0.2261	-0.1130	-0.0465	0.2296	-0.2352	0.0547	-0.2330	-0.0424
Medium banks										
Within 15%	0.3333	0.3889	0.2778	0.2222	0.1667	0.2778	0.1111	0.2778	0.2778	0.1667
Median	-0.2499	0.0597	-0.0459	0.0678	-0.2378	0.0566	-0.0433	0.2506	-0.0399	0.1615
Mean	-0.0508	0.2417	0.0394	0.1502	-0.1389	0.1460	0.0175	0.3087	-0.0588	0.1359
Large banks										
Within 15%	0.1200	0.3200	0.1600	0.1600	0.1600	0.2400	0.2000	0.3600	0.1200	0.2400
Median	-0.4152	-0.1141	-0.1887	-0.0773	-0.3768	-0.1001	-0.2973	-0.0003	-0.2773	-0.0870
Mean	-0.5470	-0.2419	-0.2186	-0.1042	-0.5127	-0.2303	-0.4628	-0.1660	-0.3152	-0.1204
Low earnings										
Within 15%	0.2857	0.1905	0.2857	0.2857	0.1905	0.1905	0.1905	0.1429	0.1905	0.2381
Median	-0.0555	0.2516	-0.0668	0.0515	-0.1923	0.1015	-0.3421	-0.0447	-0.1305	0.0721
Mean	-0.0779	0.2145	-0.2032	-0.0900	-0.0711	0.2065	-0.1657	0.1229	-0.2123	-0.0214
Medium										
Within 15%	0.3810	0.3810	0.2381	0.2857	0.1905	0.1905	0.0952	0.2857	0.2857	0.1429
Median	-0.2231	0.0863	-0.0181	0.0994	-0.1236	0.1693	-0.0747	0.2197	-0.0199	0.1811
Mean	-0.1983	0.1063	0.0369	0.1482	-0.1382	0.1456	-0.0249	0.2672	-0.0895	0.1051
High earnings										
Within 15%	0.0909	0.3182	0.1364	0.1364	0.1364	0.2727	0.1818	0.4091	0.0909	0.2727
Median	-0.5041	-0.2021	-0.2709	-0.1585	-0.4098	-0.1327	-0.3236	-0.0264	-0.3293	-0.1385
Mean	-0.6051	-0.3004	-0.2733	-0.1589	-0.5408	-0.2592	-0.5541	-0.2563	-0.3405	-0.1460

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.

Table 15

Valuation Errors for the Conventional Banks Multiples based on Industry and Assets

Accuracy measures	Mean P/E	Median P/E	Mean P/B	Median P/B	Mean market cap/assets	Median market cap/assets	Mean market cap/EBIT	Median market cap/EBIT	Mean market cap/ rev.	Median market cap/rev.
All banks										
Within 15%	0.3273	0.3818	0.2727	0.2727	0.1818	0.2182	0.2182	0.2545	0.3091	0.2727
Median	-0.1475	-0.0076	-0.0884	-0.0268	-0.2108	0.0235	-0.0880	-0.0140	-0.1328	-0.0296
Mean	-0.1902	0.0200	-0.1385	-0.0286	-0.2041	0.0216	-0.1932	0.0240	-0.1935	-0.0394
Small banks										
Within 15%	0.1905	0.2857	0.1429	0.2381	0.0476	0.1429	0.0952	0.0476	0.1905	0.1429
Median	-0.1777	0.0007	-0.1380	-0.0430	-0.4555	-0.0576	-0.4618	-0.1063	-0.2971	-0.0554
Mean	-0.1462	-0.0272	-0.2503	-0.1434	-0.3784	0.0759	-0.3368	0.1512	-0.3523	-0.0741
Medium banks										
Within 15%	0.2222	0.2778	0.1667	0.1111	0.1667	0.1667	0.0556	0.1111	0.2778	0.2222
Median	-0.2669	0.0000	-0.1704	0.0000	-0.1733	0.0663	-0.1269	0.0000	-0.0950	0.0805
Mean	-0.3147	0.1747	-0.0603	0.0929	-0.0825	0.0897	-0.0499	0.0502	-0.1002	0.0258
Large banks										
Within 15%	0.6250	0.6250	0.5625	0.5000	0.3750	0.3750	0.5625	0.6875	0.5000	0.5000
Median	-0.0140	-0.0085	-0.0791	-0.0247	0.0110	-0.0161	0.0149	-0.0036	-0.0362	-0.0347
Mean	-0.1080	-0.0919	-0.0798	-0.0147	-0.1120	-0.1262	-0.1661	-0.1726	-0.0900	-0.0672
Low earnings										
Within 15%	0.0952	0.3333	0.1905	0.1429	0.0952	0.2381	0.0952	0.0476	0.1429	0.1429
Median	-0.5943	-0.0077	-0.1217	-0.0791	-0.3652	0.0140	-0.4561	-0.0172	-0.3705	0.0810
Mean	-0.4442	-0.0004	-0.2497	-0.1977	-0.3534	0.0505	-0.3658	0.1677	-0.3544	-0.0549
Medium										
Within 15%	0.2632	0.0526	0.1579	0.3684	0.1579	0.1579	0.1579	0.3158	0.2105	0.2105
Median	-0.0264	-0.0213	-0.0983	-0.0112	-0.0692	-0.0146	-0.0178	-0.0151	-0.0633	-0.0089
Mean	-0.0343	0.0025	-0.0808	0.1057	-0.1360	0.0545	-0.0786	0.0495	-0.1323	0.0224
High earnings										
Within 15%	0.4667	0.4667	0.5333	0.5333	0.4667	0.4667	0.6000	0.6000	0.6000	0.6000
Median	-0.0171	-0.0084	-0.0787	-0.0407	0.0081	-0.0049	0.0160	0.0078	-0.0394	-0.0196
Mean	-0.0572	-0.0458	-0.0435	0.0087	-0.0551	-0.0653	-0.0873	-0.0982	-0.0478	-0.0215

*The ranges for small, medium and large banks are [$<4,110$], [$4,110;18,210$] and [$>18,210$] million US dollars, respectively. The ranges for low, medium and high earnings are [<118.224], [$118.224;435.684$] and [>435.684] millions US dollars, respectively.