

Islāmic Finance Benchmark: A Possible Solution Revisited

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Abstract

Financial Assets' pricing benchmarks serve multiple purposes in financial markets and hence play a critical role. First, they serve as a reference point for pricing instruments; second, they reflect the opportunity cost and third, they serve as a reference rate for the relative performance of investment portfolios. Hence, a benchmark that is transparent, liquid, easy to calculate and non-manipulative is considered critical for the efficiency of financial markets. Recent scandal of LIBOR's manipulation by Barclays bank emphasizes the importance of a non-manipulative benchmark. In this paper, we propose an alternative pricing model and show how it could work to serve the purpose of a potential benchmark for pricing. This model was proposed by Abbas Mirakhor (1996) by utilizing the concept of Tobin's Q^2 to arrive at the cost of capital (CoC) without resorting to fixed interest rate. We have empirically tested the model on Malaysian firms. To arrive at the CoC, we derived Q-ratios at firm level and aggregated the same at the industry level. Our findings suggest that the model proposed by Mirakhor (1996) can be used to estimate CoC in an interest free economy.

Keywords: Cost of Capital (Coc), IF benchmark, Islāmic finance, Tobin's Q.

KAUJIE Classification: L3, L4, Q21, Q23

JEL Classification: E6, G1, G12, G2, P34:

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² Tobin's Q, is the ratio between the market value and replacement value of a physical asset. It was introduced by James Tobin and William Brainard in 1968. Tobin writes: One, the numerator, is the market valuation: the going price in the market for exchanging existing assets. The other, the denominator, is the replacement or reproduction cost: the price in the market for the newly produced commodities. We believe that this ratio has considerable macroeconomic significance and usefulness, as the nexus between financial markets and markets for goods and services (1969).

1. Introduction and Issue Motivating the Paper

Benchmarks serve multiple purposes in financial markets and hence play a critical role. They serve as a reference point for pricing instruments, reflect the opportunity cost and also serve as a reference rate for the relative performance of a portfolio. Hence, a benchmark that is transparent, liquid, easy to calculate and non-manipulative is considered critical for the efficiency of financial markets. Recent scandal of "The London Interbank Offered Rate-LIBOR" manipulation by Barclays bank enhances the importance of a non-manipulative benchmark. LIBOR has been the subject of considerable media attention for the last four years, particularly since the announcement on June 27, 2012 that Barclays PLC had reached a \$453 million settlement with the U.K.'s Financial Services Authority, the U.S. Commodity Futures Trading Commission, and the U.S. Department of Justice regarding accusations that Barclays had tried to manipulate LIBOR³. It all started back in 2008, when Wall Street Journal came up with a controversial report suggesting that banks might have understated borrowing costs they reported for LIBOR during the 2008 credit crunch⁴. For example, the study found that rates at which one major bank (Citigroup) "could borrow dollars for three months were about 0.87 percentage point lower than the rate calculated using default-insurance data." In the same year, William Buiter⁵ gave a statement by describing LIBOR as "the rate at which banks don't lend to each other" and called for its immediate replacement. Ultimately, in June 2012, it came to light that Barclays bank manipulated the LIBOR⁶. This manipulation went on from 2005 to 2009. The first form of manipulation by Barclays involved submission of false borrowing rate at the request of its derivatives traders in New York, London and Tokyo in order to bolster the profitability of the bank's trading book. Second, Barclays submitted artificially low borrowing rates during the 2008-2009 credit crisis to counter market speculation about the bank's deteriorating financial health.

³ http://www.denverpost.com/business/ci_20956538/barclays-fined-453-2-million-false-libor-quotes?source=rss

⁴ Mollenkamp, Carrick; Whitehouse, Mark (29 May 2008). "Study Casts Doubt on Key Rate", The Wall Street Journal.

⁵ Former member of Bank of England's Monetary Policy Committee.

⁶ Our first objective is to move away from fixed rate of return. However, we cannot ignore the fact that it has to be non-manipulative. Issue of non-manipulation is important as we have seen from the recent LIBOR scandal and we believe, even the recently launched IIBR (Islāmic interbank rate) is subject to manipulation as it relies on the same methodology as that of LIBOR.

There were at least 14 derivative traders who made requests for false submission including senior derivative traders.

In this paper, we suggest a model proposed, by Mirakhor (1996) which can well serve the purpose of a potential benchmark for pricing. We also show the feasibility of the model in contemporary financial system. The main motivations behind the paper are, a) to move away from any fixed rate of return, b) to present a benchmark that reflects the return based on real sector of an economy as far as possible and, c) to present a non-manipulative benchmark.

To achieve our objective, we empirically test the Mirakhor model of CoC and show possibility to determine CoC without using any fixed rate. This model utilizes the concept of *Tobin's Q* to arrive at the CoC without resorting to fixed interest rate. Following Mirakhor (1996), we extend the literature by empirically testing the model on Malaysian data, from the period through 2001 to 2010. To arrive at the CoC, we derive Q-ratios at firm level for total of five sectors and then use it to calculate the cost of capital at firm level. We then aggregated the cost of capital at the industry level by using the weighted average of market capitalization of each firm. We only included the Shari'ah-compliant⁷ listed firms (based on the list published by SAC (Shari'ah Advisory Council) of Malaysia. We also aggregated Q-ratios at industry level.

In Section 2, we provide a brief literature review followed by the introduction to Mirakhor model and measurement of Q ratio in Section 3 and Section 4 respectively. In the fifth and sixth sections, we present our methodology, analyses of the results and relating discussion. Finally, we conclude with Section 7. Graphs are shown in the Appendices.

2. Literature Review

In *Tobin's Q* theory, investment behavior is arrived at by comparing the market value of assets with the market cost of those assets. When Tobin (1969) first formulated the concept of Q, as measured by the ratio of market value of firm to replacement cost of firm, his idea was to capture the incentive behind the firm's decision to invest. But since then, Q ratio has evolved and is used in the literature extensively to reflect firm's variety of unobservable characteristics. For example, Lang *et al.* (1995) used it to reflect the firm's opportunity to invest. Others such as Opler and Tintman (1993) used it to capture the intensity of agency problem in the

⁷ The firms are classified as Shari'ah-compliant based on the list published by SAC (Shari'ah Advisory Council) of Malaysia.

firm whereas Lang *et al.* (1989) used it as a measure of management's team efficiency.

In the *Tobin's Q* ratio, the denominator part represents the replacement cost of assets whereas the numerator part represents the market value of the firm. In the finance and the macro literature, two types of *Q* ratios are defined and there exists a clear distinction between the two. First is average *Q* and the other is marginal *Q*. When we utilize all of the firm's assets to arrive at *Q* ratio it is called "Average *Q*" and when it is used for new investment decision purposes it is called "Marginal *Q*".

There are two approaches taken by researchers regarding utilization of the concept of *Q* ratio. On one hand, Tobin (1969), Smith (1981), Hayashi (1982) and others have utilized the concept of marginal *Q* in explaining capital investment. The intuition behind utilizing marginal *Q* is very simple. As long as marginal *Q* of firms are more than one, that is firms market value is greater than its replacement cost, firms have the incentive to invest in new projects. This investment will go on until it utilizes all the projects whose marginal *Q* is more than one. Similarly, when marginal *Q* is less than one, the firms should start selling their assets. Thus, this process of investing and disinvesting will go on as long as marginal *Q* is anything other than one. Similarly, many authors have utilized this ratio to explore the link between financial markets and real markets. Furthermore, it is also being used extensively, at both micro and macro level, in modeling real asset investment (Herendeen *et al.*, 1988). Not surprisingly, it is also being used to address certain issues in the branch of financial economics. For instance, Lang and Litzenberger (1989) used the average *Q* as a proxy to identify the firms that are making over investments. Lindenberg and Ross (1981) used average *Q* to quantify the extent of monopolistic power across industries. It has also been used as a proxy to determine the effect of tax structures on investment decisions (Salinger and Summers, 1983). Fazzari *et al.* (1988) used it as a measure to explore the impact of financing constraints on investments. Recently, Rajan *et al.* (2000) used it to identify the benefits of corporate diversification. Bai *et al.* (2004) used *Q* ratio to explore the relationship between corporate governance and market valuation while Jayaratne and Morgan (2000) used it to measure the impact of deposit constraints on bank lending. More recently, Liang *et al.* (2013) utilized it as a measure of bank performance in their study of role of branches and representative offices in enhancing bank performance. Choi and Han (2013) utilize *Q* as a proxy for investment opportunities in explaining the impact of restructuring on the value of firm. Others such as Gellati and Ramsey (2013), using structural

change model and wavelet analysis, try to re-examine the Tobin's theory and explore the determinants of investment. Their findings suggest that Q ratio is an important determinant of aggregate investment. On the contrary, Dybvig and Warachka (2012) suggest that Tobin Q does not reflect the firm performance.

3. Mirakhor (1996) Model

It has been argued in the literature that without resorting to any interest rate benchmarks, it is not possible to determine the CoC. It is also said that project evaluation will become difficult in the absence of any interest rate mechanism. To demonstrate that it is possible to estimate CoC without using any interest rate benchmark, Mirakhor (1996) presented a model by utilizing Q ratio as a main component to arrive at the CoC. His theoretical model explains the possibility to derive the CoC without resorting to any interest rate benchmark. The model is based on an assumption that there is no interest based benchmark and therefore the only source of financing available in the financial market is equity. Besides, he argues that in capital markets in such an economy where all the debt based instruments have been removed, there are two classes of investors. First, the portfolio investors who look for profitable avenues to place their surplus funds. Second, the entrepreneurs who look for the source of funding for their investment projects. In such an economy, physical capital is evaluated in an equity market and the link between the supply price of physical capital and the rate at which the shareholders discount their expected cash flows can be determined. The valuation of physical capital provides the essential platform for the interaction of portfolio investors and entrepreneurs and this interaction will establish the supply cost of physical capital. In derivation of the CoC, Mirakhor employed the Hayashi's (1982) basic version of Q model. He used this model of Q to make the model simple and easy to compute. In its simplest form, the model states that,

$$\rho = \frac{Y}{V}(1 - d + dq)$$

Where,

= Firm's CoC or shareholder's required rate of return.

Y = Value of expected earnings for the next year⁸.

V = Present value of the firm's stock of capital⁹.

⁸ Our estimation of expected earnings is based on the growth of earnings in previous years.

d = Sum of fraction of expected earnings retained by the firm and the expected rate of stock financing expressed as ratio of firm's expected earnings.

q = Firm's Q ratio.

Choudhary and Mirakhor (1996) have also emphasized that the concept of Q ratio can be utilized by the governments to finance their projects. Iqbal (2002) also supports the Mirakhor's model and argues that it can solve the major lacuna in Islāmic financial system. Moreover, he argues that existing alternatives are limited to macro level only whereas benchmark based on Q ratio can also serve the purpose at micro level such as firms and banks.

4. Measurement of Q Ratio

The theoretical model of Q ratio developed by Tobin (1969) is simple and appealing and is defined as the ratio of market value of additional one unit of capital (also referred to as shadow price of capital) to its replacement cost, known as "Marginal Q". But the shadow price of capital is forward-looking and hence Marginal Q is not observable. The observable Q is "Average Q", which is the ratio of market value of a firm's assets to the replacement cost of its assets. Hayashi (1982) described certain set of assumptions where the Marginal Q will be equal to Average Q. These assumptions are competitive markets, linear homogeneity of technological productions and adjustment costs.

In literature, there are so many different estimators of Q. Perfect and Wiles (1994) provide excellent comparison of some of the estimators of Q. In their paper each model follows different procedure and methodology and includes simple as well as complex models of Q estimators. For instance, first model uses market value and reported data, second uses book value data, third follows model developed by Lindenberg and Ross (1981), fourth model is developed by Perfect and Wiles themselves, which is also based on Lindenberg and Ross (1981) estimator and the fifth model is based on the procedure developed by Hall (1993). Their main aim is not to determine the model which may closely approximate the true value of Q but to determine the sensitivity of the results to the different models used to approximate Q. Their findings suggest that conclusions drawn from the

⁹ Since the basic assumption of the model is that the markets are debt-free, so to make our results comparable to that of actual returns of respective industry, we considered total capital (equity + debt) as equal to total equity and hence assumed that the firms are completely financed by equity, while calculating the present value of the firm. We took the present value of equity and debt from the annual reports.

results are indeed sensitive to the different estimators of Q. The simple model to estimate Q (Tobin, 1969) is significantly different from other models and furthermore, the procedure developed by Hall (1993) generates means and the variances that are higher than the other estimators.

5. Data and Methodology

All the data is collected from DataStream. It consists of all the publicly traded Sharī'ah-Compliant firms spread across the six sectors in Malaysian economy. The data set covers the period from 2000 to 2010. Main variables include equity value of firm, total assets and intangible assets.

In our case, we follow Chung and Pruitt (1994) to construct our Q. In this model approximate Q is defined as,

$$\text{Approximate } q = \frac{MVE + PS + DEBT}{TA}$$

Where, MVE is market value of equity, PS is the market value of Preferred stock, DEBT is the value of firm's short term liabilities net of its short term assets, plus the book value of long term debt and the TA is the book value of total assets. Chung and Pruitt model is appealing as all the necessary data can be obtained from the firm's financial report. Moreover, they maintain, *"the simplified procedure involved in the calculation of approximate Q represents a compromise between analytical precision and computational effort. Of course, the true measure of any such "short-cut" technique is its degree of accuracy when compared with values obtained from following "theoretically correct" procedures"* (P: 2).

Chung and Pruitt (1994) compared their model to that of procedure developed by Lindenberg and Ross (1981) and observed high correlation between them and hence their findings suggest that the procedure can be safely employed whenever the data is unavailable to employ more theoretically correct Lindenberg and Ross (1981) estimator. Their findings are also in line with that of Perfect and Wiles (1994)¹⁰ who suggest that correlation coefficient of simple Q ratio (their Q is similar but not identical to Chung and Pruitt approximate Q) and that of Lindenberg and Ross (1981) Q is 0.9315.

¹⁰ Perfect and Wiles (1994) also reported high correlation of 0.9856 between exact Q and Lindenberg and Ross (1981) Q. Thus implying that there would be high correlation between exact Q and approximate Q of Chung and Pruitt (1994).

Once we get the Q ratio at firm level we arrive at the cost of the capital using the estimated Q ratio. To aggregate the CoC at industry level, we use the weighted average of market capitalization of each firm. In next section, we discuss our results and implications.

6. Discussion of Results and Implications

Table 1 and the Table 2 below present the actual returns and the estimated CoC of respective industry. We can see that estimated CoC and actual returns are quite different from each other. Overall, in our estimation, Mirakhor's model suggests lower CoC as compared to the actual returns of the respective industry. Except for the Industrial production and the Properties sector, other estimated CoC are much lower as compared to the actual returns. It implies that the returns yielded by stocks of the sectors are lower as compared to the CoC calculated using Mirakhor's model. (Please refer to appendixes for graphical presentation).

Further, we conducted t-tests to ascertain whether the actual and the estimated returns are statistically significantly different from each other or not. Our findings based on reported p-values suggest that the actual returns and the estimated ones are not significantly different from each other and hence the proposed model can be utilized to estimate the CoC in an interest-free economy.

	PLANTATION	CONSTRUCTION	INDUSTRIAL PRODUCTION	PROPERTIES	CONSUMER
MEAN	22.94%	9.92%	6.65%	8.98%	12.61%
MEDIAN	22.50%	10.22%	9.78%	6.79%	12.96%
MAX	86.84%	84.62%	36.14%	76.00%	35.58%
MIN	-47.65%	-49.75%	-38.79%	-50.50%	-18.39%
STDEV.	35.70%	38.65%	24.65%	38.48%	17.98%

TABLE 1: ACTUAL RETURNS OF RESPECTIVE SECTORS

The results provide us an alternate benchmark for an efficient non interest

	PLANTATION	CONSTRUCTION	INDUSTRIAL PRODUCTION	PROPERTIES	CONSUMER
MEAN	10.34%	13.94%	5.20%	7.18%	6.02%
MEDIAN	8.58%	3.46%	5.00%	1.28%	6.48%
MAX	23.51%	114.11%	9.72%	68.50%	7.39%
MIN	6.68%	-0.23%	2.13%	-7.60%	1.24%
STDEV	5.06%	35.23%	2.16%	21.85%	1.79%
- p value	0.2837	0.8107	0.8551	0.8991	0.2639

TABLE 2: ESTIMATED RETURNS OF RESPECTIVE SECTORS

based financial market which is expected to be more transparent, liquid, easy to calculate and non-manipulative. This also means that we can not only arrive at a non-fixed rate of return in contemporary financial system but can also put forward a non-manipulative benchmark that reflects the return based on real sector of an economy.

This provides a solution to a long term benchmark issue in Islāmic finance world. It is further emphasized by Choudhary and Mirakhor (1996) that the 'Q ratio' concept can be utilized by the governments as well to finance their projects. Iqbal (2002) argues that existing alternatives are limited to macro level only, whereas benchmarking based on the 'Q ratio' can serve the purpose at micro level as well, such as firms and banks.

7. Conclusion

In this paper, we empirically tested the Mirakhor (1996) model for the Malaysian economy to arrive at the CoC. The purpose was to test the application of the model for further utilization in Islāmic Finance industry. Our findings suggest that the estimated CoC is not significantly different from the actual returns of the respective industry. It implies that the returns yielded by the stocks of sectors are statistically similar to the CoC calculated using Mirakhor's model. The model seems to be more practical in an interest-free economy where firms are required to disclose the market value of their assets as well. Further, we recommend study at economy level, testing whether there is any significant difference between the results from Mirakhor model and that of the benchmark already in use.

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Appendices

