

Liquidity Premium Theory: an Empirical Support From *Sukuk* (Islamic Bonds) Yields and Profits Curves

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The need to account for all one-period returns on bonds which are reinvested at the coupon rate and which in turn would lead to percentage increase in the investors' wealth over a particular investment horizon led to Liquidity Premium Theory. Sukuk (Islamic bonds with profit rates instead of coupon rates) has been found to be similar to conventional bonds and has been used to achieve same objectives, especially in meeting long term needs of lenders and borrowers in the capital market. Therefore, this study examines the relationship between the yields and maturities of Sukuk to see if long term investors who currently dominate Sukuk market are obtaining term premium to compensate them for the risk involved in long term lending. Using extended Heath, Jarrow and Morton (1992) model, empirical result obtained using 2001-2009 data on Sukuk and employing MATLAB statistical tool on spot and forward profit rates indicate that there is biased expectation by the Sukuk investors. The biased expectation was evidenced from the shape of the Sukuk yields and credit curves plotted. This is a plausible confirmation that there is a positive spread between yields on Sukuk. A broad battery of statistical evidences from the term structure of profit rate suggests that there is support, through Sukuk holders' expectation, for Liquidity Preference Theory.

Key words: *Sukuk* (Islamic bonds), Liquidity or term premium, *Sukuk* yield curve, *Sukuk* credit curves JEL:

Introduction

Reward for risk or term premium that is the returns on bonds are multi-period. Van Horne (1990) suggested that in measuring the multi-period Holding Period Returns (HPR), there is the need to account for all one-period returns which are reinvested at the coupon rate and which in turn would lead to percentage

increase in the investors' wealth over a particular investment horizon using a geometric average. It means that risk-averse investors who usually dominate the capital market will prefer to obtain term premium to compensate for the risk involved in lending long or else lend short. With this occurrence, forward interest rate

will exceed the forecasted spot rate by the liquidity or premium that is embedded in the forwards rate. Thus, the forward rate will become a biased predictor of forecasted future spot rate which will definitely affect the term structure (yield curve) Shiller (1980). This led to Biased Expectation Theory, for example, the Liquidity Preference Theory. Therefore, the yield curve is a line graph that illustrates the relationship between the yields and maturity of fixed income securities. In creating the yield curves, yields on bonds of the same type and their different maturity periods are plotted against one another with the yield on the y or vertical axis while the time to maturity is plotted on the x or horizontal axis. The shape of the yield curve fitted to the observations is, therefore, determined by the spread between these yields which may be positive, negative or without spread. *Sukuk* is a multi-period bond with a multi-period Holding Period Returns (HPR). Therefore, this study examined the relationship between the yields and maturities of *Sukuk* to see if long term investors who currently dominate its market are obtaining term premium to compensate them for the risk involved in lending long. Empirical result on spot and forward profit rates indicates that there is biased expectation by the *Sukuk* investors. The shape of the yield curves plotted shows that this biased expectation has affected the *Sukuk* yields and credit curves. This is a plausible confirmation that there is a positive spread between the yields. It implies that liquidity premium is inbuilt by *Sukuk* investors into returns on long term *Sukuk*. The paper is divided into: Introduction, Liquidity Preference Theory: a Re-examination, Method, Discussion and Conclusions.

LITERATURE REVIEW

Liquidity Preference Theory: a Re-examination

The Pure Expectation Theory proposed that the long term rate of interest is an unbiased average of the current short term rate and future short term rates

expected to prevail during the long term obligation. In other words, the current forward rates are unbiased predictor of future spot rate with the term premium being zero for all maturity. This is writing mathematically as follows:

$$1 + R_{n,t} = \{ (1+r_t) (1+r_{t+1}) (1+r_{t+2}) \dots (1+r_{t+n}) \} \dots \dots \dots (1.1)$$

Where:

$R_{n,t}$ the actual rate of interest at time t of a bond with n time to maturity,

r_t the safe return on expected spot rate on one-period investment,

r_{t+1} , r_{t+2} and r_{t+n} series of expected returns on a bond at varying future (1, 2...n), one-period rate of return (future short term rates) at time t , and n is the number of years to maturity of the bond.

The theory has, however, became the basis for further hypothesis on the term structure of interest rate. This hypothesis is shared with the other two forms of expectation theories, that is the Biased Expectation Hypothesis (Liquidity Preference Theory and Preferred Habitat Theory) and Market Segmentation Hypothesis. That is, they all assume that the forward rate of current long term bonds are closely related to market expectation about future short term rate; that the forward rate exclusively represents the expected future rates. It implies that there is an assumption that the term premium is constant over time and it is also independent of bond's term to maturity as well as information at time t . However, the three hypotheses differ on whether other systematic factors can affect the forward rates and how it will, even if it can affect it (Fabozzi, 2000). Pure expectation theory does not

consider the risk associated with investment in long term bonds to the investors which increased with maturity, meanwhile the Liquidity Preference Theory (LPT) does.

LPT proposed by J. R. Hick in the first edition of his book, *Value and Capital* in 1939 is one form of Biased Expectation Theory. He argued in his book that Pure Expectation Theory must be modified because the longer the maturity of a bond the greater the risk of fluctuations of its value to the investors (Van Hornes 1970, 2001), (Fabozzi, 2000), (Cuthbertson and Nitzsche, 2004), (Michaelson, 1973). Investors in bonds are usually risk-averse in nature and preferred to lend short, on the other hand, borrowers preferred to borrow long to avoid uncertainty in future capital supply and to reduce risk of default at the redemption period. Investors prefer to stay in their habitat where they are most liquid and safe; that is, they are better-off investing on short term and reinvesting at each maturity (Van Horn, 2002) because maturity and bond price volatility are directly related. The longer the term to maturity, the higher the risk of fluctuations in the redemption value M , but some investors who are speculators are willing to borrow short and lend long only if there is a compensation for such risk in terms of liquidity premium on reinvestment of future coupon yield on the bond, thereby bridging the gap created between the two parties i.e. the borrower and the lender (Sundaresan, 2002). Therefore, investing in long term bond will provide higher expected returns to the investor than when he invests on short term basis and reinvest at maturity. Bonds of different maturity will not be perfect substitute for each other. Hence, according to (Michaelson 1973), the theory says that: "The forward rate will be a biased estimate of the expected interest rate"

This is because there is liquidity premium embedded in it. Thus, rewriting equation 1 but with the liquidity premium addition to the right side of the equation, we have:

$$1+R_{n,t} = \{ (1+r_t) + (1+r_{t+1} + L_{t+1}) (1+r_{t+2} + L_{t+2}) \dots (1+r_{t+n} + L_{t+n}) \} \dots \dots \dots (1.2)$$

Where:

$R_{n,t}$ is the forward rate beginning at time t to n implied in the term structure

L_{t+1} , L_{t+2} and L_{t+n} are the Hicksian term or the liquidity premium embedded in the forward rate.

Term or liquidity premium increases with an increase in risk and term to maturity, hence:

$$0 < L_{t+1} < L_{t+2} < L_{t+3} < \dots \dots \dots L_{t+n} \dots \dots \dots (1.3)$$

Under this theory, the forward rate is a reflection of the expected interest rate plus the risk premium or liquidity premium which increases as the term to maturity increases. The liquidity premium follows a Brownian motion as a continuous stochastic process. Risk of fluctuations in value of the principal increases as term to maturity increases; thus, liquidity premium is the amount with which the one-period rate of return must increase to compensate the investors for holding a less liquid bond. It follows that issuers of long term bonds must be prepared to offer a rate that is higher than the rate available on short term bonds to overcome the preference of the investors for short term bonds. According to Michaelson (1973), the central question about measuring liquidity premium has to do with nonstationary of the system which usually led to interest rate risk as well as frequent changes of the term premium as a result of disequilibrium disturbances. This conventional theory is hereby applied to *Sukuk* bonds because *Sukukholders'* expectation is similarity to conventional bondholders' expectation on different



returns on different investment horizons as a result of different maturity periods.

Sequence of investments on short term bonds therefore, are not perfect substitutes for an investment in a long term bond; unlike in the Pure Expectation Theory where (PET) the investment horizon does not matter. The usual uncertainty in the market is hereby put into consideration; hence arbitrage does not make all maturities consistence with the expectation. This is so because investors in shorter term bond and longer term bonds with comparable default risk but different investment maturities receive different returns due to differences in their bonds' liquidity. For instance, the risk premium for uncertainty given to holders of longer term bonds. Thus, due to the liquidity premium embodied in the forward rate, it tends to have biased for upward sloping or normal yield curve.

Term structure of interest rate is the relationship between the yield and term to maturity of securities that defers only in length of time to maturity with other factors other than maturity held constant. Shapiro² defined Yield to Maturity (YTM) as the constant interest rate (discount rate) that makes the present value of the bond's cash flows equal to its price.

One needs to make use of securities that defer only in term to maturity in order to have a meaningful result from a study of such relationship. Policies of monetary authorities that attempt to influence the short-

term interest rate in an attempt to influence the rate of inflation in an economy sometimes have effects on interest rate of long term government bonds directly or indirectly. This is referred to as yield curve: Cuthbertson and Nitzsche (2001a). The conventional formula for calculating yield to maturity YTM at a point in time t (Y_t) for a government bond with time to maturity n is presented below:

$$P = \frac{C}{(1+Y_t)} + \frac{C}{(1+Y_t)^2} + \frac{C}{(1+Y_t)^3} + \dots + \frac{C+M}{(1+Y_t)^n} \dots \dots \dots (1)$$

Where:

P the purchase price of the bond,
 C the fixed coupon payment on the bond per annual,
 Y_t the yield on the bond at time t , M the redemption payment at maturity, and n the number of year to maturity.

If there is another bond whose time to maturity is m , with a difference in coupon payment C , then its YTM will be different due to differences in term to maturity and the coupon payment. Therefore, YTM is the rate that equalizes the present value of a bond to its discounted values. Hence, it is an internal rate of return (IRR) to the investors (Dodds and Ford, 1992; James, 2000; Cuthbertson and Nitzsche, 2004).

Method

Security Industry Association has standard requirement on inputs in term structure analysis of fixed income securities. Therefore, this research employs only active fixed income *Sukuks* such as: *Mudarabah*; *Ijarah* and *musharakah* that have similar characteristics to conventional bond with little or no dichotomy. Nine years data spanning from 2001 to 2009 was employed using MATLAB statistical tool for analysis. Malaysian Government and corporate *Sukuk* were examined. Spot and forward rates were generated and regressed to see if forwards rates account for term or liquidity premium. Yield and credit curves were plotted to see if there is positive spread between the yields.

²This is another form of expectation theory referred to as Constant Term Premium theory where the expected excess return is equal to a constant that is the same for all maturities. There is also local expectation theory, all these theories suggest that the investors' expectation about the returns for all investment horizon is the same irrespective of the maturity strategy employed.

³Foundation of Economics: Bonds and Term Structure of Interest Rates accessed from <http://people.stern.nyu.edu/ashapiro/courses/B01.231103/FFL12w.pdf> on 5th March 2013

Numerical values were obtained using extended HJM (1992) model with no-arbitrage restriction on the model. HJM employed forward rates to generate a complete term structure with assumption of continuous time economy on the interval of $(0, T)$, this was also modeled after. It required that initial term structure of forward rate must be specified and should be an input in pricing of the bond. With this market model; a bridge between risk-neutral probability and the real world probability is constructed. Then MATLAB program were written for the spot curve to forward curve¹. Forward rates calculated at the beginning of all periods implied in the data with the addition of the compounding. From the above step, forward rate based on initial zero-coupon rates evolved and only fixed rate *Sukuk* were employed.

Theoretical Framework

One factor model specified the stochastic process that describes the spot rates (zero coupon rates) movement. Spot rates dynamics is the only factor that drives the dynamics of interest rate behaviors. Spot rate is assumed to be a random variable; hence, it follows a geometric Brownian motion (Weiner process):

$$dr = \mu dt + \sigma dz \dots \dots \dots (1.4)$$

It follows that the shock (noise) that causes the change in the value of spot rate also follows a Weiner process with a mean of 0, and standard deviation of 1.

$$dr = \sigma dz \dots \dots \dots (1.5)$$

To capture *Sukuk* profit rate movement the study specified the expected direction of change in the spot rate (μ) to be more realistic. Therefore, the stochastic process of *Sukuk* spot rate is defined as:

$$dr = \mu dt + \sigma dz \dots \dots \dots (1.6)^2$$

Where:

- dr is the change in the spot rate
- μ is the drift or the expected direction of change in the spot rates

- dt is the change over time
- σ is the volatility of price movement
- dz is the Weiner process

This was done to capture the tendency of the *Sukuk* profit rate to drift back to its long run average. Therefore, with the addition of the mean-reverting parameter, then we have:

$$dr = \mu(b-r)dt + \sigma dz \dots \dots \dots (1.7)$$

where:

- μ now becomes the speed of mean-reversion
- b is the long run average (mean) of profit rate.

The yield curve is a function of current spot rates and it is determined by the above mentioned parameters in the model that is the drift, the mean-reverting as well as volatilities parameters. The study proposed a No-arbitrage, two-factor market model as in HJM (1992) where forward price of a bond is equal to the expected value of spot bond price one period ahead with assumption that the profit rate is mean-reverting and the market price of profit rate risk is a function of time. Volatility can be user-specific; hence, it is constant over time and assumes to be non- stochastic. Therefore, to obtain the zero-coupon bond price for a *Sukuk* maturing in 3 years time, then $t=3$ in the price equation. The spot rate $r(t)$ is assumed to be equal to the instantaneous forward rate $f(t, T)$, then we have $f(t, T)$ in equation (1.8):

$$f(t, T) = \frac{\partial \ln[P(t, T)]}{\partial T} \dots \dots \dots (1.8)$$

Intuitively, if the forward rate follow this process

⁴For programs written to perform the MATLAB function of obtaining the price, price tree and yield, refer to the appendix.

⁵Equation (1.6) is the simplest term structure model in term of one-factor model.



$$f(t, T) = f(0, T) + \int_0^t \alpha(s, T) ds + \sum_{i=1}^n \int_0^t \sigma_i(s, T) dW_i(s) \dots (1.9)$$

Where $\{W_i\}_{i=1, \dots, n}$ are independent Brownian motions, then the spot rate process is

$$r(t) = f(t, T) = f(0, T) + \int_0^t \alpha(s, T) ds + \sum_{i=1}^n \int_0^t \sigma_i(s, T) dW_i(s) \dots (2.0)$$

The bond price fluctuates as a result of the profit rates (interest rate), with variation in spot rate; Let $P(t, T)$ denote the price of a *Sukuk* bond at time t maturing at time T where $t \leq T$. with the boundary $P(t, T) = 1$, we have

$$[P(t, T)] = \dots (2.1)$$

Then to determine the movement on the price P of a bond at time t , maturing at time T

$$P[t, T] = \exp\left(-\int_t^T f(t, s) ds\right) \dots (2.2)$$

And logarithm of P is:

$$\ln P[t, T] = \exp\left(-\int_t^T f(t, s) ds\right) \dots (2.3)$$

With mathematical derivations as detailed in HJM appendix; combined with equations 2.0 and 2.2, we have the following equation.....(2.4)

Wherein:

$$a_i(t, T) = -\int_t^T \sigma_{i(t, T)} dt \dots (2.5)$$

also

$$b(t, T) = -\int_0^t \alpha(t, T) dt + \frac{1}{2} \sum_{i=1}^n a_i(t, T)^2 \dots (2.6)$$

Ito lemma differential equation was used to transform the dynamics of bond price into a stochastic process:

$$dP(t, T) = [r(t) + b(t, T)]P(t, T) dt + \sum_{i=1}^n a_i(t, T)P(t, T) dW_i(t) \dots (2.7)$$

HJM proposed that if Q - the risk neutral probability is an equivalent martingale, and $B(t)$ is a discount factor; it follows that a zero-coupon bond with maturity time T will have this price:

$$\frac{P(t, T)}{B(t)} \dots (2.8)$$

When Ito lemma is applied to the logarithm of equation 15

$$\ln \frac{P(t, T)}{B(t)} = \ln \frac{P(0, T)}{B(t)} + \int_0^t b(t, T) dt - \frac{1}{2} \sum_{i=1}^n \int_0^t a_i(t, T)^2 dt + \sum_{i=1}^n \int_0^t a_i(t, T) dW_i(t) \dots (2.9)$$

In the context of two-factor model, if the above condition holds and further proposition of No-arbitrage condition and restriction on the forward rate process drifts, it is given in equation (3.0):

$$\alpha(t, T) = -\sigma_1 q_1(t) - \sigma_2 e^{-\frac{\lambda}{2}(T-t)} q_2(t) + \sigma_1^2(T-t) - 2 \frac{\sigma_2^2}{\lambda} e^{-\frac{\lambda}{2}(T-t)} \left(e^{-\frac{\lambda}{2}(T-t)} - 1\right) \dots (3.0)^3$$

Discussions

This section presents the result from the study analysis. The spot and forward profit rates (which are too long to be display in this paper) indicate that the long term profit rate is a biased average of the current short term profit rate and future short term rates expected to prevail during the long term obligation. The regression

³For further equations and description of the two-factor model, please refer to the appendix

result supported this with weak forward profit rate’s predictive power. The yields were presented in Tables while the yields and credit curves of *Sukuk* of same securities but with different maturities were plotted. It is glaring that there is a positive spread between the yields on short term *Sukuk* and the yields on long term *Sukuk*. The Mean yield-to-maturity (YTM) was calculated and plotted to see how the spread will affect the shape of the yield and credit curves.

To examine the ‘predictability smile’ in this research, single regression Ordinary Least Square as used by Fama-Bliss (1987) was employed. He used this method to predict the ability of the forward rates to forecast the spot rates employing simple linear regression. Therefore this study regress the forward rate on the actual spot profit rates at time t with n years to maturity using equation 3.1 below:

$${}_t sr_n = \hat{a} + \hat{a} fr + \hat{a}_t \dots \dots \dots (3.1)$$

Where ${}_t sr_n$ is the actual spot profit rate of an n year bond at time t , \hat{a}_t is the slope coefficient of the forward rate; fr is the implied forward rate of 1 year bond at time t ; while \hat{a}_t is the disturbance error term.

The research tested the validity of expectation theory in segmented *Sukuk* market. If the \hat{a} which is the intercept have a zero value or very close to zero and the co-efficient of the forward rate as a value of 1 or a value close to 1; then the forward rate has a strong predictive power to forecast the future spot profit rate. The closer these values are to zero and 1 respectively, the stronger the predictive power. And if otherwise, that is, if the intercept presented a value not equal to zero and the co-efficient value is zero; then there is likelihood of weak predictability power of forward rate to predictive future spot profit rate of *Sukuk* (Islamic bonds) that is:

$$H_0: \hat{a} = 0, \hat{a} = 1$$

$$H_1: \hat{a} \neq 0, \hat{a} = 0$$

OLS results is presented in Table 1.0 below.

Table 1.0 Spot and Forward Rates Regression Output Result

Variable	\hat{a}	$\hat{a} fr$	Standard Error	t-statistic	P-value	decision
Spot rates	0.034		0.001	66.974	0.000	Reject Null
Forward rates	0.018		0.007	2.610	0.000	Reject Null

R-square= 89%

Adjusted R-square=76%

$$sr_n = 0.03411 + 0.018021fr + 0.0098 \dots \dots \dots (3.2)$$

$$se = (0.001) \quad (0.0069)$$

$$t = (66.974) \quad (2.610)$$

In equation 3.1 above, 0.03411 is the \hat{a} , it is statistically different from zero and significant at 5% significant level. 0.018021 is the co-efficient of the forward rates. It is statistically different from 1, while 0.0098 is the error term \hat{a} . Standard deviation of \hat{a} is 0.001 and 0.0069 standard deviation for the co-efficient of forward rates. The *t-statistic* for \hat{a} and $\hat{a}fr$ is 66.974 and 2.610 significant at 5%. Given the 56% correlation coefficient, there was an indication of high degree of linear relationship between the two variable i.e. spot and forward rates. Based on the assumptions of classical linear regression model estimation that Ordinary Least Square (OLS) estimators are BLUE- Best Linear Unbiased Estimator and based on asymptotic consideration of the samples; the spot rate is a linear function of a random variable and has minimum variance in the class of such unbiased estimators. The Durbin Watson statistics of 0.441 showed that there is no likelihood that the model neither suffered from pure autocorrelation nor specification error. Based on these result, there is the likelihood to conclude that forward profit rates has weak predictability power to forecast future spot rate. Hence, Pure form of expectation hypothesis may not be supported. Consequently this research concludes based on the regression that the biased form of Expectation hypothesis is supported however with weak predictive power.

Government and Corporate Sukuk Yield and Yield Curve Comparison

Sovereign Sukuk known as Government Islamic Investments (GII) have no credit risk. There are eight

risk classes (as defined by Rating Agency Malaysia) namely: AAA, guaranteed A1; AA1, AA2; AA3; A1; A2; and A3. Rating Agency of Malaysia is charged with the responsibility of rating Malaysian Government Security (including sovereign and corporate *Sukuk*). The rating reveals the ability and willingness of the issuer to pay on time the profit and the principal as well as probability of default. Best quality *Sukuk* with highest, high and adequate safety of timely payment of profit and principal are rated AAA; AA and A respectively. Moderate; inadequate and high risk of safety of timely payment of profit and principal are rated BBB; BB and B (Noor 2009). Change in circumstances or adverse economic condition may likely lead to weaken capacity of the issuer to meet payment of profit and principal when compare with debt in higher rated categories. The same RAM ratings are applicable to conventional and *Sukuk* (Islamic) bond rating in Malaysia. Having said that, Table 1.1 below presented the fair yields and mean YTM for Government Islamic Investment (GII also known as sovereign *Sukuk*).

Table 1.1 Fair Yield for Malaysian Government Sukuk-Different maturity Comparison

Bonds	Profit rate	Fair YTM (2factor HJM)	Mean YTM
3Y	3.57	3.58	
3Y	4.363	4.41	
3Y	3.077	3.15	
3Y	3.288	3.4	
10Y	4.419	4.48	
10Y	3.82		
10Y	3.941		
10Y	4.295		
10Y	3.91		
11y	4.492	3.884.03	3.625
			4.325
		4.474.165.43	5.43

First, comparison of 3 years *Sukuk* with 10 and 11 years government *Sukuk* was done. Comparison of this nature is usually done to examine the relationship between yields on the same type of securities. Mean YTM on 3 years Malaysian Government *Sukuk* was 3.625 percent while 10 and 11 years *Sukuk* has 4.325 percent and 5.43 percent respectively (refer to Table 1.1). It implies that 10 years government *Sukuk* offer compensation for extra risk taken for investing for additional 7 years with 0.7 percent extra returns. Meanwhile, additional return on 11 years *Sukuk* for investing on long term basis was 1.805 percent. One can infer that there is probability of increasing extra returns (liquidity premium) towards the longer maturity spectrum as depicted in the Figure 1.1. This is an indication of support for liquidity preference theory, though a weak one.

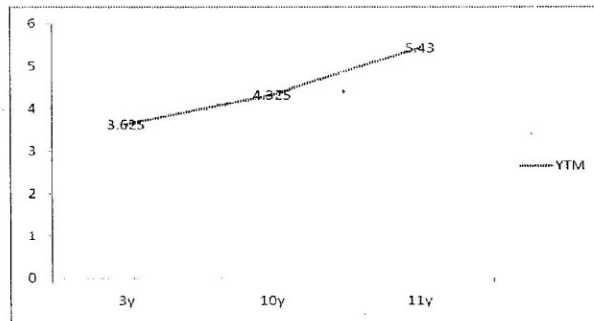


Figure 1.1 YTM Comparison within Malaysian Government *Sukuk*

Second, comparison between 5, 10 and 12 years AAA corporate active *Sukuk* was done (in Table 1.2 and Figure 1.2). It shows an upward sloping curve. This curvature is an indication of inbuilt liquidity premium to compensate investors on long term basis for taking extra risk. Investors built in a kind of what can be describe as moderate risk premium on 10 and 12 years *Sukuk*. 10 year *Sukuk* holder earns 0.922 percent risk premium on is investment while 0.084 percent compensation to 12 year *Sukuk* holder for extra 2 years

investment and 1.006 percent extra return was earned on extra 7 years of investing into the future with it uncertainty.

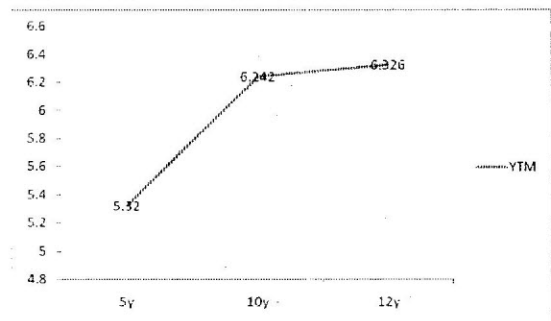


Figure 1.2 YTM Comparison within AAA *Sukuk*

Third, the shape of the yield curve obtained under AA1 rated *Sukuk* was the similar to the curve under the Malaysia Government *Sukuk*, as could be seen in Table 1.3 and Figure 1.3. There are also extra returns to investors on long term basis. In fact, there is a glaring 1.39 percent risk premium to 12 year's investor for investing for another 6 years over the 6 years investors. While 1.41 percent extra returns was earned for investing on another 7 years when 6 years *Sukuk* return was compared with 13 years AA1 *Sukuk*. As far as extra returns to an investor on 13 years spectrum is concerned when compare with 12 years investment horizon, 13 years investor earn just 0.02 percent extra return for extra 1 year risk taken.

Table 1.3 Fair Yield for Corporate AA1 Rated Active *Sukuk*-Different Maturity Comparison

Bonds	Profit rate	Fair YTM (2factor HJM)	YTM
6y	5.85	5.87	
6y	7.45	7.51	6.69
12Y	8	8.08	8.08
13Y	8	8.1	8.1

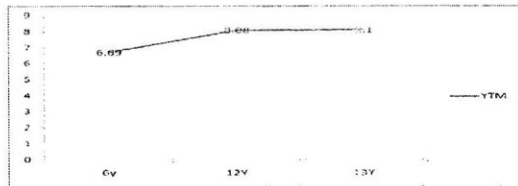


Figure 1.3 YTM Comparison within AA1 *Sukuk*

Lastly, the curvature for AA3 corporate *Sukuk* is akin to the GII and AA1. As the security moves toward maturity, liquidity premium is built into the return to *Sukuk*holders to compensate them for holding longer term bonds and for the additional risk of credit default as applied to rated corporate bonds. A relatively big extra return to investors on 16 and 17 years *Sukuk* was observed. 3.28 percent and 3.76 percent risk premium were earned for investing for 16 and 17 years respectively when compared with the return on 8 years investment horizon. This credit class showed a better liquidity premium than the Malaysia Government *Sukuk* and other credit classes examined. Though, despite this fact, its yield curve is similar to GII. By implication, corporate AA3 *Sukuk*'s behavior conforms to the bond market convention. There is the likelihood of higher extra returns aside the risk-free rates on these *Sukuk*.

Table 1.4 Fair Yield for Corporate AA3 Rated Active *Sukuk*-Different Maturity Comparison

Bonds	Profit rate	Fair YTM (2factor HJM)
8Y	5.2	5.32
16Y	7.95	8.6
17Y	8.35	9.08

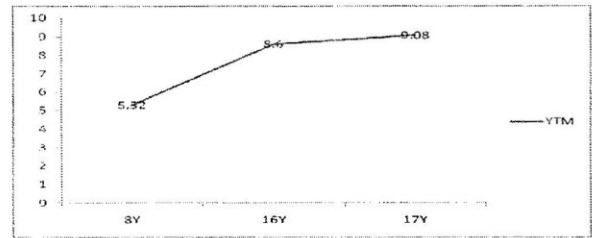


Figure 1.4 YTM Comparison within AA3 *Sukuk*

In summary, the study extracted bonds from the government and corporate *Sukuk* that have similar maturities. Government Islamic Investment (GII) and three different credit classes were compared. The spread between the GII and the risk classes were obtained by deducting the basic profit yields offered on GII from the profit yields on corporate. The profit yield offered on government bond is the basic yield while the profit rate offered on a non-government *Sukuk* is:

$$\text{Base profit yield} + \text{spread}$$

Since the spread constitute the risk premium then it can be re-written as:

$$\text{Basic profit yield} + \text{risk premium.}$$

It was found that 4 years lower quality *Sukuk* A2 proof to be a high yield bond with 5.97 percent spread over the basic yield offer by GII (refer Table 1.5). This performance may be as a result of the credit worthiness of the issuer and it's rating by a recognized rating agency. 5 years corporate A2 also outperformed 5 years

AAA by offering extra 2.867 percent extra yield over extra yield AAA investor earn as additional yields for taken additional risk. For 6 years maturity class, AA1 risk class outperformed AAA risk class why A2 investors are worse-off with a negative spread of 1.86. Lastly, in the 10 and 11 years maturity class, AA1 outperformed AAA *Sukuk*. The performance seems to improve as A2 *Sukuk* moves towards longer spectrum.

Furthermore, with the 92.3 percent positive spread observed between GII and three credit classes, it can be inferred that there is liquidity premium inbuilt in the yield curves to compensate investors who invest on risky *Sukuk*. This is in conformity with theory as investors are usually ready to invest on bonds that can return the risk-free rates and some risk premium to compensate them for investing on risky bonds and on long term bases. With these positive spreads, *Sukuk* shows a kind of support for Liquidity Preference Theory.

confirm the empirical support of *Sukuk* for Liquidity Preference theory and shows that *Sukuk* holders' expectation on long term bonds is consistence with Liquidity Preference Theory; a form of Expectation Hypothesis. Evidence in the regressions analysis finds that market may not be building-in much of investors' expectations into the profit rates on *Sukuk*. The predictive power of forward profit rates to forecast future spot profit rates is weak. The likelihood of non-existence of good market valuation, few experts on Islamic financial instruments in the market and few trading on *Sukuk* may be attributed to the HJM result. It also implies that liquidity premium is inbuilt by *Sukuk* investors into returns on long term *Sukuk*. By implication what shapes *Sukuk* yield and credit curves were the expected basic yields on GII and liquidity premium on long term *Sukuk* holders which is expected to rise steadily with maturity. This accounted for why Liquidity Preference Theory has a bias for upward sloping yield curve. According to Fisher and

Table 1.5 Malaysian Government Sukuk (GII) versus Corporate AAA, AA1 and A2

Maturity	GII (%)	Corporate			Corporate Spread			
		AAA(%)	AA1(%)	A2(%)	AAA(%)	AA1(%)	A2(%)	
4y	3.33	-	-	-	9.29	-	-	5.97
5Y	3.33	5.41	-	-	8.29	2.09	-	4.96
6y	4.39	5.73	6.84	-	2.54	1.34	2.44	-1.85
10Y	4.33	6.69	7.63	-	-	2.37	3.31	-
11Y	4.57	5.39	7.81	-	-	0.83	3.24	-

Conclusion

The study was conducted using the profit rates on *Sukuk* and other SIA requirement for estimating fixed income securities. It was found that biased expectation was evidenced from the shape of the *Sukuk* yields and credit curves plotted. This is a plausible confirmation that there is in-build Liquidity premium (risk premium) in the yields on non-government *Sukuk*. In the fair yields on government and corporate *Sukuk*

Gills (1996) who constructed a strong version of an arbitrage-free model, all forms of expectation hypothesis can hold. Contrary to Attfield and Duck's (1982) work on U.K that applied (Sargent, 1979) method on the U.S to test the rational expectation model of interest rate in the U.K, which posited that the rational expectation hypothesis is decisively rejected when

short, medium and long term interest rates were pool in a model. Though, their model could not reject the hypothesis when the short and medium term interest rates were tested. This study pooled short, medium and long term profit rates but found not only support for Liquidity Preference hypothesis but increasing term premium at the long term spectrum.

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Biographical Note

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