

# **EVALUATION ON MARKET RISK MANAGEMENT**

## **IN INDONESIA**

**(Case Study on: Sukuk and Conventional Bonds)**

### **SKRIPSI**

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**for**

**Bachelor Degree in Economics, Major in Accounting**



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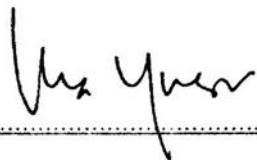
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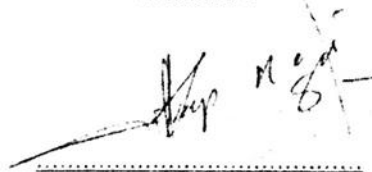
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## **ABSTRACT**

This research is about comparative risk analysis of sukuk and conventional bonds in Indonesia. The main objective is to know deeply market risk between conventional bond and Islamic bond. This research used descriptive and explorative. To collect the data, the author used secondary data i.e collecting data in the form of historical datas or other written data which related to the research. The historical data taken from Indonesia Stock Exchange. This analysis indicate that the comparison between Islamic bond and Conventional Bond In Indonesia by using duration and convexity analysis.

**Keywords:** *Sukuk, Conventional Bond, Duration, Convexity*

## INTISARI

Penelitian ini tentang analisis risiko komparatif sukuk dan obligasi konvensional di Indonesia. Tujuan utama penelitian ini adalah untuk mengetahui risiko pasar antara obligasi konvensional dan obligasi syariah. Penelitian ini menggunakan metode deskriptif dan eksploratif. Dalam pengumpulan data, penulis menggunakan data sekunder yaitu mengumpulkan data dalam bentuk data historis atau data tertulis lainnya yang terkait dengan penelitian yang diambil dari Bursa Efek Indonesia. Analisis ini menunjukkan perbandingan antara obligasi syariah dan Obligasi Konvensional Di Indonesia dengan menggunakan analisis durasi dan konveksitas.

**Kata Kunci:** *Sukuk, Obligasi Konvensional, Durasi, Konveksitas*

# CHAPTER I

## INTRODUCTION

### **I.1 Research Background**

Bond is seen as a form of investment that obliges its publishers (borrower) to pay the debt to the investor (lender) of amount lent and interest for a certain period. According to Brigham & Houston (2006), bonds are defined as money instrument long-term or also called long-term contract where the borrower funds agreed to pay interest and principal on a specific date to bondholders. Bonds are divided into two types, there are conventional bonds and Islamic bonds.

As we have known, Islamic investment nowadays are widely broad, Islamic bonds (sukuk) can be considered as substitute of conventional bonds especially from the most recent decade. One of the main characteristic that conventional bonds have is the element of interest or riba. Sukuk neglect the riba, gharar and other attributes which accomplish the rights of any party involved. AAOIFI (2008) determines sukuk as, “the investment authorize of the same value, which is represented as the undivided amount of share in the ownership of tangible assets should be elaborated in the specific projects or for investment purposes”. The development of sukuk in financial markets is seen as circumstance to afford new financing and investing aspect for corporates and investors appropriately.

In other words, sukuk can be considered as a substitute to other long-term financing and investing options. Sukuk improved significantly in the world such as Saudi Arabia, Qatar, Iran, Turkey, UK, France, Germany, Jordan, Bahrain,

Hongkong, Japan, Singapore, South Korea, Malaysia, and Indonesia. The development of sukuk is not apart from obstacles, one of the obstacles is the risk that can't be controlled. If the risk can't be controlled, then the results will not turn out like the expectations. There are some risks associated with activities of financial institutions that issue conventional and Islamic bonds including market risk, financing risk, operational risk and reputation risk.

To manage the risks, there is a way to manage the risks, investor can use the tool risk management of a bond in considering sales and purchase of bonds. Duration measures the magnitude of the percentage change in bond prices as a result of the change interest rates. While convexity helps in predicting price changes which is more accurate to changes in interest rates.

The purpose of this research is to evaluate the difference between Islamic and conventional bonds in Indonesia especially reflected to risk based on their own characteristics.

## **I.2 Research Questions**

From the result of the research background above, so the research questions will be:

1. Is there any possibility that islamic bonds risk can be calculated?
2. Is conventional bond has the same risk or higher risk than sukuk?



### **1.3 Research Scope and Limitation**

This study will be focusing on comparing risk perspective between Islamic bonds and conventional bonds using duration and convexity analysis. The limitation of this research are

- The researcher only used one type of sample for each bond.
- The researcher did not use all types of bonds for this research. The researcher only chose corporate bond for conventional bond and government bond for Islamic bond.
- The sample selected limited to bonds data in Indonesia

### **1.3 Research Objective**

This research is about the comparative risk analysis of Islamic bonds and conventional bonds in Indonesia. The main objective is to analyze whether sukuk has lower or higher risk compared to conventional bonds or not and what are causes of risk of conventional bonds and Islamic bonds.

### **1.4 Research Benefits**

#### **a. Practical Benefit**

For practical benefit, the result of research can be used as an input for investor decision making on choosing between sukuk or conventional bonds

#### **b. Academic Benefit**

For academic, it can give more understanding about conventional bonds and sukuk as well as useful as consideration and give more information for other researcher.

**c. Management of The Company**

For the management of the company after seeing the results of the research can use to develop the company's investment and funding plan optimal.

**d. Individual**

For those parties or individuals who read about this research is expected can add their knowledge of sukuk and conventional bond risk especially regarding what factors affect the market risk in the capital market. The reader can be taken into consideration for the reader if interested in investing on the Sukuk instrument.

**I.5 The Organization of Thesis**

To give a fairly clear picture of this research, the author compiled a systematic writing that contains the material information as well as other matters relating to this research. As for systematics such research is as follows:

**Chapter I: Introduction**

The first chapter is a preliminary chapter that presents the setting behind research issues, problem formulation, research objectives and benefits, and systematics of writing.

**Chapter II: Literature Review**

The second chapter discusses the theoretical foundations underlying research, overview of variables in research, framework development theoretical thinking, and research hypotheses.

**Chapter III: Research Method**

The third chapter contains an explanation of the variables used in research with its operational definition, population and sample used, whether the type and source of data used, then the method of collection data and data analysis methods which will be used.

#### **Chapter IV: Data Analysis and Result**

This chapter contains the risk analysis for both sukuk and conventional bonds and the result of analysis it self.

#### **Chapter V: Conclusion and Recommendation**

This chapter provide the conclusion of the research, recommendation and works to improve for future research.

### **1.6 Research Method**

From the previous research questions and the main objective of the research, it has been clear that this research methodology is qualitative. The methodology which author present is to investigate the market risk between conventional bonds and sukuk issues.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **II.1 Sukuk and Conventional Bonds Definition**

In Islam, obligation is called sukuk, Sukuk is derived from the Arabic word "sak" (singular) and "sukuk" (plural) which has a similar meaning to the certificate (note). According Udovitch Adam (2006, p. 57), the use of the word can be traced to the Islamic literature classics, especially on international trade activity in Muslim territory in the Middle Ages along with the word hawalah (transfer / remittances) and Mudharabah (business activity communion), some chroniclers of Islamic trade from the west conclude that words are words from the sound Sakk latin "Checks" or "Check" are commonly known in modern banking. In practical terms, sukuk is the evidence (claim) of ownership.

A sukuk represent the interests either the full or proportionate in one or a set of assets (Hakim, 2005). Sukuk as Islamic financial products are often equated with bonds (bond) despite having somewhat different characteristics. According to Adam (2006, p. 63), sukuk have common properties that have the same quality as other conventional financial products. Sukuk offered on condition which requires issuers to pay to sharia bondholders a number of revenue-sharing and repay the sharia bond funds at the date of repayment of Islamic bond funds. Revenue-sharing paid every certain period (3 months, 6 months or every year). The magnitude revenue share is calculated based on the multiplication of the

holder ratio sharia bonds with revenue generated in the latest quarterly consolidated financial statements of the issuers that issued before the date of payment of revenue sharing concerned. Payment of revenue-sharing revenue to each sukuk holder will be made proportionally according to the portion ownership of unpaid sukuk.

Sukuk investments represent apparent class of securities issued by sovereign and corporate entities. There are investment authentication with both bond and stock-like features issued to finance trade or the production of tangible assets. Same as bonds, sukuk have a maturity date and holders are designated to a regular flow of income over the life of the sukuk.

There are three parts of types of sukuk, first, in terms of issuers which are corporate bonds and state bonds. Secondly, there are four kinds of state bonds, namely recap bonds, retail bonds, sukuk bonds, and government bonds. Third, in terms of the agreement there are six parts, mudharabah bonds, shariah bonds musyarakah, murabahah bonds, salam bonds, istishna bonds, and ijarah sharia bonds.

Bond is a contract that requires the borrower to repay the loan principal plus the interest on the loan within a certain time agreed by the parties concerned (Jogiyanto, 2003: 11). According to Moechdie, et al. (2012: 299) Bonds are one of a kind debt. In general, bonds are long-term letters of payable. According to convention in force in Indonesia, debt with tenor above 5 (five) years term is called a bond, even though some of the bonds have a tenor of 3 (three) years

issued by a finance company marketed and recorded as bonds. Most bonds in Indonesia have a tenor of 5 (five) years and most length is 30 (thirty) years.

According to Tandelilin (2010) in Pandutama (2012), from the point of view the company, the company declares the company's debt to its holders, while from the point of view of investors, corporate bonds is an investment that is different from ordinary shares. Common stock states ownership claims on a company, while bonds declare a creditor's claim to a company. Coupon of bonds received the investor periodically and the principal of the bonds at maturity, It said that bonds are a fixed income. Investment on bonds are relatively safer compared to stock investments, due to holders the bond has the first right of the company's assets if the company experienced liquidation. This happens because the company already has a contract agreement to settle bonds that have been purchased by bondholders.

Fabozzi (2000) explains that, "A bond is an instrument of indebtedness that obliges the bond issuer (borrower) to repay the lender (creditor) the borrowed assets plus the interest within a certain period of time." (p.1)

Conventional bonds are letter of recognition of debt from a company or institution which is often referred to as the term bonds issue. Conventional bonds are also interpreted as securities or certificates containing contracts between the lender (financier) and the lender (issuer) and comply with the stipulated provisions, including on maturity, debt repayment, interest paid, the amount of redemption and other provisions.

### **II.1.1 Types of Sukuk**

Various types of sukuk structures are known internationally and have been get endorsement from accounting and auditing organization for Islamic Financial institutions (AAOIFI, 2008) in the research of Rusydiana (2012) between other:

a. Sukuk Ijarah

The sukuk issued under the agreement or Ijarah contract in which one party acts alone or through its representative sell or lease a beneficial interest on an asset to another party based on the agreed rental and rental period, without being followed with the transfer of ownership of the asset itself.

b. Sukuk mudharabah

The sukuk issued under the agreement or mudharabah contract in which one party provides capital and other parties provide manpower and expertise, the advantages of cooperation will be divided on the basis of an agreed comparison previous. The losses incurred will be fully borne by the party who becomes the provider of capital.

c. Musyarakah Sukuk

sukuk issued under the agreement or a musyarakah contract in which two or more parties cooperate combine capital used to build new projects, develop existing projects, or finance business activities. Profits and losses incurred will be shared in accordance with the amount of capital participation of each party.

### II.1.2 Bonds Comparison

	<b>Conventional Bond</b>	<b>Islamic Bond</b>
Form	Indicate a debt obligation	Indicate an ownership
Asset	The product may include product against Islam	Asset are compliant with shariah
Price	Based on credit rating	Based on value of asset
Profit	Fixed Interest (riba)	Asset increase in value
Sale	Ownership	Debt

**Table 2.1 Conventional Bond vs Sukuk**

### II.1.3 Bonds Performance

Bonds performance is really important that should be reached for any investor. Bonds performance can be seen from any point of view based on the need of analysis. Some of tools analysis are, coupon yield; bond interest which has the same amount as coupon rate multiple with the nominal value, current yield; proportion of bonds income which comes from relative coupon payout against the interest. Yield to maturity; the rate of return that gained by investor.

### II.1.4 Yield Definition

Yuliati and Handoyo (1996) explain that, yield of bonds are interest rate which equates the present value from all interest and nominal bonds value. Yield also can be defined as the rate of return on investment as a percentage of the initial investment amount. Yield measures the rate of return of a financial instrument such as stocks and bonds. It measures based on the basis of dividend and interest rates. Meanwhile, for bond investment, yield can be calculated in three ways:



#### II.1.4.1 Nominal Yield

Nominal yield refers to the interest rate offered by bonds. Nominal yield also can be defined as the annual coupon interest that is paid to bondholders. The coupon rate is expressed as a nominal value percentage.

#### II.1.4.2 Current Yield

*Current yield (CY)* is the ratio between interest coupon and current bond price.

The calculation of current yield is by comparing coupon (bonds conventional) and ijarah fee by the price of bonds in the market.

$$\text{Current yield} = \frac{\text{annual dollar coupon interest}}{\text{price}}$$

#### II.1.4.3 Yield to maturity

The rate of return that bond investor will get if investor holds the bond until maturity date. Yield to maturity also means as a single discount rate that equates the present value of a bond's cash flows to its market price.

$$\text{YTM} = \frac{C + \frac{F - p}{n}}{\frac{F + p}{2}} \times 100\%$$

$C$  = coupon

$F$  = Face Value

$P$  = Price of bonds (market)

$m$  = maturity date (1 year, 360 days)

## **II.1.5 Risk Definition**

Risk is mostly connected with the variance of outcome that we received. *Van Horne and Wachowics* defined risk as the variability of return to expected return. In bonds market, there are some types of risk such as *specific risk, common risk and market risk*. There are two types of risk that faced by investors:

### **1. Internal Risk/Default Risk**

Risk which comes from within the company which is caused by the inability of issuer to pay coupon and pay off the loan. Default risk usually measured by bond rating. Default risk is influenced by issuer condition.

### **2. External Risk**

Risk which comes from outside the company, some risk could be influence internal risk.

#### **a. Interest rate risk**

Risk where it could be decreasing the value of bond which caused by interest rate increase. Interest rate risk is affected by maturity and interest coupon rate. Bond that has long-term maturity will have the bigger interest rate risk. The lower interest coupon rate, the price bond will be more sensitive to changes or interest rate.

#### **b. Reinvestment Risk**

Risk that decreasing income of bond portfolio which is caused by lower interest rate.

**c. Inflation Risk**

The risk of real value cash flow caused by the increase rate of inflation.

**d. Liquidity/Marketability Risk**

Risk which caused by convenience of bond that traded in market

**e. Country Risk**

Risk caused by the uncertainty over the political and economy environment in a country.

**f. Foreign Exchange Risk**

Risk that caused by the depreciation exchange rate of bond currency

**g. Call Risk**

Risk that caused by withdrawal of bond

**II.1.6 Duration Definition**

Duration is a measurement of interest rate risk of bonds. It measures price sensitivity of bonds or bond portfolios to the changes in interest rates (Choudhry, 2005, p. 32). Bonds which have longer duration will be have higher in price changes than bonds which have shorter duration. Hageun (2001) define that duration is one of the most popular bond risk measurement tools (p.385). Andrew Jeffrey (2000) found that duration is the time to maturity formed from a combination of cashflow to maturity.

### **II.1.6.1 Macaulay Duration**

Bierwag (1987) explains, the word duration was first used by Frederick Macaulay in 1938 to refer the formula that used to calculate average time maturity of securities.

### **II.1.6.2 Modified duration**

Choudhry, 2005 defined “Modified duration shows approximate percentage price change of a bond for the change in yield of 100 basis points” (p.37)

### **II.1.7 Convexity Definition**

Andrew Jeffrey (2000) states, convexity is a measurable measure is used to maintain duration as a basis for minimizing risk (hedge) for the period long maturity. Hull (2009) explain that, “Convexity is a measure of the curvature of the price-ield curve” (p.90).

Reilly and Brown (2003) stating how to calculate convexity (p. 777):

$$\frac{P(i \text{ decrease}) + P(i \text{ increase}) - 2 \times FV}{2 \times FV \times dY^2}$$

*P(i decrease) = price of the bond when interest rates decrease*

*P(i increase) = price of the bond when interest rates increase*

*FV = face value of the bonds*

*dY = change in interest rate in decimal form*

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **III.1 Data Collection**

This study used descriptive and explorative, but in analysis study used qualitative analysis. Saunders (2007) stated that, qualitative analysis refers to non-numerical data as product of different reserach strategies that allow the researcher to develop theory from them.

To collect the data, the author used secondary data i.e collecting data in the form of historical datas or other written data which related to the research. The historical data taken from Indonesia Stock Exchange from year 2015-2017. Besides, the author also used literary method in collecting the data by reading journals, article and book which are related to the research.

#### **III.2 Sampling**

Population for this research is bond traded in Indonesia Stock Exchange (IDX). Researcher has taken two types of bonds The type of sukuk selected for this research is government sukuk (the type of Islamic bond). A government sukuk that has fixed yield. Meanwhile, conventional bond sample is bond that listed in IDX from year 2015-2017.

The type of conventional bond is a corporate bond. The sampling for this reasearch are using non-probability sampling with some criteria such as

1. Bonds that are published between 2015-2017.
2. Bonds that have fixed yield.

### **III.3 Technical Data**

The technical data that used for this research is qualitative data. Saunders, Lewis and Thornhill (2012) define that this approach has two types of structure that using event sequence and using logical sequence (p.575). This type of research is comparative analysis which comparing sukuk and conventional bonds risks (convexity, sensitivity and duration) based on their character.

Researcher used the theory prepared in chapter 2 to judge the result in chapter 4. The function of theory used is to make sure whether the result of the research is in line with duration and convexity theories.

## CHAPTER IV

### DATA ANALYSIS AND EVALUATION

#### IV.1 Duration Analysis

Duration is a concept developed by Frederick R. Macaulay in (1930), it is the tools of investors to estimate the price sensitivity of bond on the changes of interest rate in the market. Below is the calculation of finding a duration of Angkasa Pura obligation I year 2016, A series with coupon rate 8,60% and maturity for 5 years which has 7,95% yield. In the calculation, it obtained macaulay duration *3,74 years* and modification duration is *3,47 years* compare to time to maturity of 4 years. For Islamic bond, the author used Islamic bonds from Sukuk Negara Ritel Seri SR-006 year 2015, with coupon rate 8,30% and maturity for 2 years which has 5,76%. In the calculation, it obtained macaulay duration *1,80 years* and modification duration is *1,70 year* compare time to time maturity of 1 year.

Islamic Bond		Conventional Bond	
Bond Price	\$103,30	Bond Price	102,7
Face value	100	Face Value	100
coupon rate	8,30%	Coupon Rate	8,60%
Life in years	2	Life in Years	5
Yield	5,76%	Yield	7,95%
Frequency	2	Frequency	2

Period	Cash Flow	PV Cash Flow	PV at 4,5%	PV of the flow	PV as % of the price	1*5
0						
1	86	82,71	0,96	82,30	0,062138	0,062138
2	86	79,55	0,92	78,75	0,059462	0,118924
3	86	76,51	0,88	75,36	0,054451	0,163353
4	86	73,58	0,84	72,12	0,054451	0,217805
5	86	70,77	0,80	69,01	0,052106	0,260532
6	86	68,07	0,77	66,04	0,049863	0,299175
7	86	65,46	0,73	63,20	0,047715	0,334008
8	86	62,96	0,70	60,47	0,045661	0,365285
9	86	60,55	0,67	57,87	0,043694	0,393249
10	1086	735,43	0,64	699,31	0,528008	5,280083
<b>Total</b>				1324,42	0,997550	7,494552
<b>Macaulay Duration</b>				<b>3,7</b>		<b>3,747276</b>
<b>Modified Duration</b>						
				<b>3,5</b>		
				<b>3,471307</b>		<b>years</b>

**Table 4.1.1 Calculation of Conventional Bond Duration**

Types of the data needed to calculate duration such as bond market price, nominal value of bond, number of maturity, periodic or annual coupon payments, and rate.

This rate of reward is also called bond yield or discount factor at maturity.



Calculation of bond duration requires information on the nominal price, bond coupon, maturity, bond yield, and the frequency of coupon payment. Bond selling price taken from Microsoft Excel calculation. Bond duration issues include sales price issues, macaulay duration, modified duration, and convexity. Several formulas were developed to calculate the overall information required in the determination of bond duration.

Period	Cash Flow	PV at 4,5%	PV of the flow	PV as % of the price	1*5
0					
1	83	0,98	81,17	0,066049738	0,066049738
2	83	0,96	79,39	0,06459632	0,129192641
3	83	0,94	77,64	0,063174886	0,189524657
4	1083	0,91	990,78	0,806179056	3,224716225
			1228,98	1,00	3,60948326
					1,80474163
<b>Macaulay Duration</b>					<b>1,8</b>

<b>Modified Duration</b>	
1,706450104	<b>1,7</b>

**Table 4.1.2 Calculation of Islamic Bond Duration**

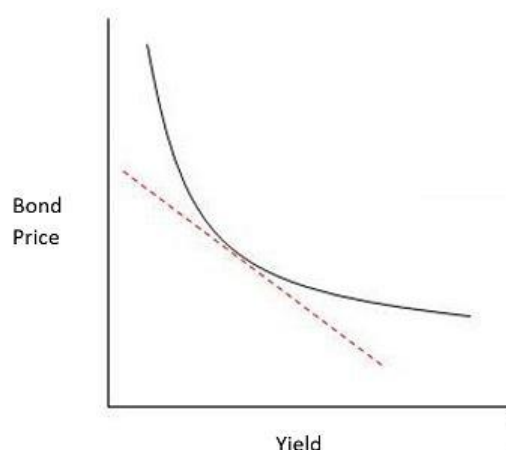
The results of duration calculation shown that all samples of bond have the shorter duration compare to maturity date. In the same way, each sample taken from calculation for its duration value, either Macaulay or Modified. The results of both Macaulay and Modified duration calculations indicate that the small value duration can be seen in short-term bonds like Islamic Bond. The value of macaulay and modified duration showed that bonds which have long-term maturity date will have high duration.

The duration of the bonds summarizes the effects of the maturity and cashflow patterns of a bond. This means that the duration of the bond can be viewed as a weighted average until time of maturity date. Other things assumed to be unchanged, the lower coupon rate will result the longer the bond duration. The further effect is that bond price volatility get bigger. If the bond coupon is lower and bond price volatility lower means that duration is lower. The longer maturity of the bonds tends to reflect the volatility of bond prices that are longer than the maturity of the bonds is shorter.

#### IV.2 Convexity Analysis

Convexity is considered as a complementary tool of duration, it measures interest rate risk. It has relation with duration since duration has a concept where interest rate and bond price have linear relationship.

**Graphic 4.1**



Graphic 4.1 shows the relation between bonds price and bonds yield.

Convexity is the size of a convex curves that show relationships between the bond price and Yield to Maturity (YTM). Bond price might be affected because of

immediate fluctuations of interest rates. Convexity can be calculated which shown by table below, there are two calculation of convexity from different sample (conventional bond and islamic bond), Islamic bond with a 8,3% coupon rate and maturity for 2 years that has 5,76% yield resulted 7,2 convexity. Meanwhile, conventional bond with 8,60% coupon rate and maturity for 5 years that has 7,95% yield resulted 10,5 convexity.

Year	Cash Flow	PV at 4,5%	PV CF	$t^2+t$	4*5
1	83	0,98	0,98	2	1,95599022
2	83	0,96	0,96	6	5,738846611
2	1083		0,94	6	5,612563923
			2,87		13,30740075
<hr/>					
1,5625					
<hr/>					
20,79281368					
<hr/>					
7,245143171 <b>7,2</b>					

**Table 4.1.3 Convexity of Islamic Bond**

Year	Cash Flow	PV at 4,5%	PV CF	$t^2+t$	4*5
1	86	0,96		82,71	2 165,42
2	86	0,92		79,55	6 477,30
3	86	0,88		76,51	12 918,11
4	86	0,84		73,58	20 1471,68
5	1086	0,80		70,77	30 2123,12
Total				383,13	5155,63

	1,5625
	<hr/>
	8055,67394
	<hr/>
	21,02618752
<b>Convexity</b>	<b>10,51309376</b>

**Table 4.1.4 Convexity of Conventional Bond**

The table above shown that Islamic bond convexity result is 7,2 meanwhile conventional bond is 10,5. In other meaning, Islamic bond's convexity is lower than conventional bond. It can be concluded that if the convexity increases, the systematic risk might be increase too. If the convexity decreases, the market interest rates will also decrease.

Commonly, the higher coupon rate, the lower convexity (market risk) of bond since the market risk will increase to exceed the coupon bond. Therefore, the relation between yield and bond price might be down and raised. In conclusion, convexity can be a better tool on analysing the impact of bond price whenever high fluctuation of interest rate occur.

Bonds that taken as sample research have difference coupon rate and maturity date. The calculation result of duration for both conventional bond and islamic bond have shorter duration. The calculation result of convexity shown that coupon rate with same maturity, the convexity will get lower but the interest will get higher. As well as fixed period and fixed interest rates, the convexity will get lower.

### **IV.3 Sensitivity Analysis**

Convexity, a measurement in changes of bond price and yield, it also measure the changes duration as interest rate changes. Commonly, if the coupon is higher, the convexity will result lower. Just like example, a 10% bond would likely less risky than a 5% bond, the sample were used for this research are more than 5% bond, it means the bonds are less risky. In opposite, the high convexity is more sensitive to changes of interest rates.

Based on duration and convexity analysis on the previous pages, the sensitivity can be calculated by the formula below:

$$\Delta P = [-1/2 \text{ convexity} \times \Delta i + \text{Modified Duration} \times (\Delta i)^2] Y$$

<b>Islamic Bond</b>	-0,00245
<b>Conventional Bond</b>	-0,00338

The calculation result above shown that the sensitivity of islamic bond is - 0,00245 while conventional bond is -0,00338. This mean that every 1% changes of interest, the price will be change to 0,000245. If the interest rate rises, the price would decrease 0,00245. If the interest rates decrease, the result would be positive. Since For conventional bond, it shown that it has -0,00338 sensitivity. It means that every 1% changes of interest, the conventional bond price would be change to 0,00338. If the yield rises, the price would decrease 0,00038.

In conclusion from above, Islamic bond is less sensitive than conventional bond since islamic bond has no interest risk (the yield of islamic bond is a coupon) compare to conventional bond. Meanwhile conventional bond has interest risk and the yield is fixed income.

#### IV.4 Risk Analysis

**Table 4.2 Risk Comparison**

	<b>Con. Bond</b>	<b>Sukuk</b>
Macaulay Duration	3,791348915	1,80474163
Modified Duration	3,512134243	1,706450104
Convexity	10,51309376	7,245143171
STDEV.P	3,236480407	2,588108512
STDEV.S	3,96386278	3,169772627

The table above shown that Macaulay Duration of Conventional Bond is 3,79 years while sukuk is 1,80 years. The table shown that the modified duration of conventional bond is higher compare to Islamic bond. For modified duration, it has 3,51 years for conventional bond while Islamic bond has 1,70 years. If duration is higher, the risk is high. It means conventional bond has higher risk compare to Islamic bond. Meanwhile Islamic bond has lower risk compare to conventional bond. The reason why islamic bond has lower risk because islamic bond has no interest rate unlike conventional bond.

For standard deviation population, the conventional bond has 3,23 when sukuk standard deviation resulted 2,58. For standard deviation of sample, it resulted 3,96 meanwhile islamic bond is 3,16. For both standard deviation result, it can be concluded that conventional bond has higher risk than islamic bond. Because, based on theory, if standard deviation is high, the risk would be high also.

The past research, Martin (1996) conducted a test to calculate the risk of bonds, by looking at relationship changes in interest rates with bond prices. The results of his study indicate that the changes interest rates are related to bond prices. Investors will purchase long-term bonds when interest rates are high and buying short-term bonds when interest rates are low.

The risk where bond price will fall when interest rates increasing. Interest rate risk indicate the relationship between bond price and market interest rates. Further explanation, if conventional bond has a 8,60% coupon rate, 5-year period, the investor expect to have \$43 per year, if the market interest increase one percent, a newly issued bond have to be paid higher than 8,60% coupon rate.

However, if the interest rate is higher, the issuer of bond will have difficulty to pay par value of the bond since the buyer need to pay higher coupon amount. Talking about relationship between bond price and interest rates, both of them control interest rate environment as well. Now, the bond that has issued will be sold at above par value price since the coupon payment of bond is greater. In conclusion, the relation between both bond price and interest rates for a bond is simply changing in the environment.

## **CHAPTER V**

### **CONCLUSION AND RECOMMENDATION**

#### **V.1 Conclusion**

Based on the discussion on the previous chapters, the researcher aims to evaluate the market risk management between islamic bond and conventional bond. The researcher has summarized the discussion as follows:

1. Islamic bond risk can be calculated same as conventional bond using duration and convexity analysis.
2. Based on duration and convexity analysis on chapter 4, conventional bonds tend to have higher risk than Islamic bonds and more sensitive than Islamic bonds.

#### **V.2 Recommendation**

##### **V.2.1 Academics**

For Academics, the results of research can be use as a reference to research more about duration and convexity or compare it with foreign capital market.

##### **V.2.2 Company**

For company, the research result that showing the use of duration and convexity can be use to measure the sensitivity of bond to changes in interest rates. The company could be more considerate in obtaining funding sources.

##### **V.2.3 Investor**

For investor, duration and convexity analysis in this research could be as a measurement in choosing bonds. Investor should choose bond that has short-term



maturity because bond that has short-term maturity tend to have bigger yield that will produce lower duration (it is not too sensitive to changes of interest rate)

#### **V.2.4 Future Researcher**

For further research, the future researcher should analyze about convexity and duration using other sample of islamic bonds (corporate bond) with different rating, coupon rate, yield and bond price.

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