

# The Role of Enterprise Risk Management Practices in Elevating Financial Sector Performance: Evidence from Jordan

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## Abstract

As financial industry faces the most diversified risks in comparison to other industries, financial managers should adopt proper holistic risk management system that is enterprise risk management (ERM) in order to reduce risks. In today's volatile and complex market, companies in general and financial organisations in particular have conducted remarkable changes to overcome disadvantages points of conventional silo risk management and performed the necessary progress which is required guarantee an efficient operation of risk management system. The aim of this study to investigate the determinants of effective Enterprise Risk Management (ERM) application, and the potential impact of (ERM) on the performance of Jordanian financial sector companies (94 companies). The study adopted quantitative methodology supported by pragmatism research philosophy. Using Logit Model, the analysis results indicated that firm size, leverage and BOD do reflect a significant impact positive on effective implementation of ERM. Also Chi-Square analysis results, portrayed that ERM implementation possess no effect on the financial indicators (SR, DG, CG and EPS) of the study sample. The results also showed that ERM adoption in Jordan is still in its immature stage, and all respondents agreed on the crucial benefits derived from ERM implementation. Moreover, the study recommended that involvement of top management, proper corporate governance system and employees risk culture awareness would significantly help in reaping the benefits of ERM implementation. The study also recommends that Central Bank of Jordan should enforce the adoption of ERM as mandatory for all financial organization. Finally, companies should take into consideration its capabilities in sustaining unexpected events and build their investment portfolio accordingly and this differ according to business sector involved.

**Keywords:** Risk Management, Financial Sector, Enterprise Risk Management, Volatility.

## 1. Introduction

In today's business environment, risk management is an indispensable tool of

efficient management practice. In broadest context, it implies a methodical enforcement of related policies, procedures and practices to the tasks of identifying, assessing, analysing,

dealing and monitoring different types of risk. Managing risk is a basic concern in today's volatile business environment. However, recently a model shift occurred regarding how to view risk management concept. Instead of viewing risk management as a silo-based approach, the tendency now is to adopt a holistic risk management approach, which is commonly referred to as enterprise risk management (ERM). The eruption of the Financial Crisis 2007 -2008, volatile economic conditions, geopolitical threats, technological advances, and changed regulatory environments have forced business enterprises in different economic sectors to embrace enterprise risk management (ERM). Highly fluctuation of post-crisis consequences forced financial institutions to launch re-evaluation process to their present risk management policies, pursuits and concentrate on adopting an effective method for risk management (Aven 2010; Ray & McAuliffe 2010). Hence, the idea of risk management became essential and integral part in the company business operations (Mikes, 2005, Power, 2003).

Risk definition varies, based on two major dimensions or components: Consequences and uncertainty. Lhabitant & Tinguely (2001) defined risks as the exposure to unknown or uncertainty, Kaplan & Garrick (1981), argued that risk does not refer only to uncertainty, but also the sequels this uncertainty could contemplate. Kaplan (1997) defines risk as "the process by which a business systematically and continuously identifies property, liability and personnel exposures as soon as or before they emerge". Regarding ERM, Soltanizadeh et. al., (2014) defined enterprise risk management as "a fully integrated system in which managers can employ, to recognize risks and select the proper response based on the enterprise's risk appetite". CAS (2003) defines ERM as an "approach by which an enterprise assesses, controls, exploits, finances, and monitors risks from all sources for the purposes of increasing enterprise's short- and long-term value of its stakeholders". Similarly, ISO 31000 (2009) stated that, ERM is "a coordinated activity meant to direct and control an enterprise related risk".

Financial institutions are vulnerable to different types of risks in pursuance of their business nature and complexity which has changed

dramatically over time. The failure to efficiently manage these risks will restrain the financial institutions profitability, as their earnings will be converted to bad debts. Therefore, financial institutions have to detect, manage and control the potential risks that they face, as well as predicting the consequences that could occur from such risks.

ERM is a new concept that business organizations start to practice for managing risk. Therefore, researches are still in its early stages in investigating the determinants and the added values of ERM. This research will provide an explanation of ERM impact on stock return, dividend gain, capital gain and EPS, also further emphasis will be shed on factors determining the effectiveness of ERM implementation, with a focus on the Jordanian financial sector. (Khan et al., 2016; Ahmad and McManus, 2014) studied the determinants that may affect organization to adopt ERM in the US, Malaysia, France and Australia. Additionally, (Florio and Leoni 2017; and Grace et al. 2013) studied the impact of ERM on organization performance.

Since 1990s a keen Interest in Enterprise Risk Management (ERM) concept has been mounting as enterprises confront several impacts under competitive environment (Arena et al. 2010). In response to unforeseen events, one school believed that ERM imposes a direct influence on enterprises financial performance (Zou & Hassan 2017; Florio & Leoni 2017) while the other school postulate that the relationship between ERM and enterprise financial performance could be influenced by some internal factors (Khan and Ali 2017). There are numerous scholars who examined the relationship between ERM adoption and enterprise's performance, but the majority of those scholars used different proxies to determine whether a company adopting ERM or not. For example, Ahmad and McManus, (2014) and Khan et al., (2016) used Chief Risk Officer (CRO) appointment as an indicator of ERM, while Hoyt and Liebenberg (2011) and Pagach and Warr (2011) used key words ERM to indicate the existence of ERM in the company.

Briefly speaking, proper risk management strategies should take into consideration all

different risk related concept to manage risk more efficiently. Volatility, exposure, capital, correlation, time horizon and probability are different terms that are directly related to the volume and magnitude of risk that any business organisation may experience during its business course. ERM can be the effective approach that enterprises apply to in order to deal with different types of risks so they can achieve their goals. Managers, regulators and financial advisors support the adoption of ERM, because they believe that ERM adoption improve firm financial performance by providing an effective method in managing and controlling the related risks. This study aims to investigate some of the effectiveness of Enterprise Risk Management (ERM) determinants (firm size, board of directors monitoring, and financial leverage) in the Jordanian financial sector companies, then further investigation for the potential impact of (ERM) on firm financial performance.

## 2. Literature Review:

ERM has acquired a large momentum in many literatures and researchers that have introduced more insights to factors impacting effective ERM implementation (Beasley, et al., 2005; Gordon et al., 2009) as an assistance tool to confront the dynamic environment that business organisations are experience in their course of operations. Hoyt and Liebenberg, (2011) clarify that ERM creates a convergences and interaction between different risk categories, therefore, enabling risk management to easily determine the possible linkages between these risk categories that was neglected by other TRM approach. Buehler (2008) argued that ERM will help in a better risk-awareness that provides high-quality of decision-making, resulting in appropriate resources allocation, eventually leading to increase in equity return. (Culp and O'Donnell, 2009) suggest that ERM could introduce a safety measure that eliminate these types of unexpected events. The concept of risk management emerged after the "II World War" in 1950s (Crockford, 1982). It was initially designated to insurance market to protect enterprises and individuals from different repulsive events and accidents and its associated losses (Dionne, 2013).

Modern forms of risk management systems appeared during mid1950s as an alternative to insurance market when different kinds of insurance compensation became costly or not possible of being insured. Therefore, traditional risk management process which originated earlier was employed by insurance sector. Initially, enterprises` management did focus on avoiding various risks that affect enterprise assets rather than transferring those risks to opportunities in order to create added value (Mills, 1998). Accordingly, risk management has started to transfer to the concept of value creation model, instead of merely a required traditional risk management model (Dickinson, 2001). (Nocco and Stulz 2006; IMA, 2011) stated its during 1990s is when risk management approach was developed, the development involves risk management of different risks` types and not only against financial risks or assets` protection, it also covers the whole enterprise, this approach called holistic risk management which is known as ERM. This approach tackled all kinds of risks such as but not limited: hazard, financial, operation, strategic and business risks. ERM started to emerge as new risk management approach at the beginning of the 2000s, in order to handle the failure of the silo traditional risk management and its consequences (Beaumier & DeLoach, 2011).

There is a general consensus that (ERM) system has gained its popularity due to the pressure imposed on business enterprises to manage risk in a comprehensive way. Liebenberg and Hoyt (2003) are among the leading researchers to discuss the main determinants of ERM adoption, through the appointment of Chief Risk Officer - CRO as a proxy for ERM system. Thiessen, et al., (2001) have stated that Chief Risk Officers (CRO) were one of the major pillars of ERM adoption, they surveyed 21 CROs in order to explore their roles, duties and abilities. Saeidi et al. (2011) highlighted the dysfunctionalities of the enterprises' culture, the misunderstanding of risk concept may lead in applying inappropriate risk management approach, also the absences of a common language among enterprise`s employees may result in the same dilemma. Ellegaard (2008) proposed that, the best method to employ an effective ERM system, is through spreading culture and knowledge between enterprise`s management and

employees. ERM system effectiveness can only materialise if enterprise's management and employees are aware as how risk may affect their business operations (Andersen, 2009). Thus, to generate the expected benefits as a result of ERM adoption, the system must be addressed and practiced at the organisation level and not only at departments or administrative basis (Hillson, 2005).

Bromiley et al., (2014) proclaimed, "without appropriate risk governance system, you can waive an effective ERM system". Corporate governance principles do focus on integrate risk management framework with risk decision making (Cunningham et al., 1998). Segal (2011) pronounced that, ERM criterions furnishes an operational roadmap, which will set a fundamental infrastructure attributed to ERM processes. Moreover, an effective ERM-function should be equipped with professional qualified staff who can understand risks influencing the enterprise and acquire the knowledge and techniques needed to limit these risks effect and its consequences. Gatzert & Martin (2015) stated that ERM determinants may be associated with firms' features such as leadership, financial position and structural features. Generally, the determinants of ERM implementation in literatures include firm size, leverage, earnings volatility, stock price volatility, growth opportunities, diversification, institutional ownership, and employees' involvements.

Most literatures propose that ERM implementation should reflect a positive relationship with firm size. Beasley et al. (2005), Razali et al. (2011), Hoyt & Liebenberg (2008) and Beasley et al. (2008) complimented a positive relationship between firm size and ERM implementation. (Gatzert and Martin, 2015) also concluded that large sized firms are more likely to implement ERM, due to higher and more complexed risks they experience. Liebenberg & Hoyt (2003) study demonstrated a negative relationship between ERM implementation and firm size. On the other hand, higher debt ratio may boost the probability of financial instability and insolvency. Hoyt & Liebenberg (2011) could not explore any valid relationship between ERM implementation and leverage ratio, but they clearly opine that high leverage leads to high default risk. However, Golshan and Rasid

(2012) & Liebenberg and Hoyt (2003) debate that financial leverage positively related to ERM implementation. In contrast, Hoyt and Liebenberg (2008) concluded that ERM implementation and leverage are negatively related. Nevertheless, the positive aspect supports the arguments of Golshan and Rasid (2012) which proclaims that, adoption of an effective risk management approach by a firm with high leverage rate will minimise potential losses.

Hoyt & Liebenberg, (2015) stated that, earnings volatility is typically considered as one of the most important benefits derived from ERM implementation. Likewise, poor earnings by an enterprise, is also a major factor that motivate enterprises for the adoption of ERM. (Khan, et al., 2016; Pagach & Warr, 2011; Beasley et al., 2008). Pagach and Warr (2011) stated that, enterprises with more cash-flows volatility are expected to benefit from implementing ERM approach which help in reducing cash flow fluctuation. However, stock market price volatility considered as an essential variable that enterprises and investors are more anxious about. Pagach and Warr (2011) and Khan, et al., (2016) disclosed that implementing integrated risk management approach will reduce cash-flows as well as earnings volatilities, ultimately leading to a decline in stock market price volatility. Hoyt and Liebenberg (2011) said that, ERM implementation and stock market price volatility are positively related. In contrast, Golshan and Rasid (2012) did not support the expectation of Hoyt and Liebenberg which is, enterprises with high stock market price volatility tend to implement ERM approach.

(Erkens, 2016) argued that, enterprises with high growth opportunities are properly to implement ERM system. Theoretically, enterprises with more expected growth opportunities more likely to acquire external finance, to provide financial funding to its investments opportunities (Myers, 1977). Therefore, enterprises that have higher growth opportunities are subject to a high level of uncertainty regarding their future cash-flows and thus they tend to adopt an ERM system (Liebenberg & Hoyt, 2003; Khan, Hussain & Mehmood, 2016; Pagach & Warr, 2011). Beasley, et al., (2008) clarified that, firms with high potential growth opportunities, are usually

less than generating an added value, leading to additional cost of debt. Any ways, Managers do diversify investments to attain high expected returns with less expected risk. However, firms with vast diversification are likely to have a complexed risk. Consequently, this supported the hypothesis of Golshan and Rasid (2012) which argued that ERM approach and diversification level are positively correlated. Hoyt & Liebenberg (2008) and Hoyt & Liebenberg (2011), taken insurance industry sample, couldn't support a positive relationship between ERM and diversification. While a positive relationship between ERM and diversification was defended by (Tahir and Razali 2012). Liebenberg and Hoyt, (2003) and Hoyt and Liebenberg (2011) Empirical studies, suggest that large institutional ownership do exercise a pressure on enterprises management to perform a high level of control over the enterprise's affairs, operations and processes. Hence, they argue that such enterprises are more likely to implement an integrated enterprise risk management framework. Ownerships especially, institutional investors or big investors always seek safer investments within their business portfolio, and ERM theoretically enhance such thing which will foster enterprise value.

Finally, Towers, (2010); Cameron and Quinn (2011) suggest that for a successful implementation of ERM system, employee risk culture and their involvement is considered a corner stone. (Edwards and Bowen, 1998; Erlane, et. al., 2019) concluded that employees' competency has a positive relationship with ERM successful implementation. Fadun, (2013) also suggested that, for ensuring successful implementation of ERM, enterprises should focus on both financial and human resource capabilities.

### 3. Methodology:

#### 3.1 Logistic regression model

Logistic regression model is usually employed to predict the nature of relationship between binary or ordinal response probability and independent variables. The name logistic regression is employed when the dependent variable has only two probable values, such as 0 and 1 or Yes and No. The Model is suitable linear logistic regression models for binary or

ordinal response data based on maximum likelihood method (Hosmer & Lemeshow, 1989; Almahadin, 2022). But, the main reason behind applying logistic regression model is that, the data related to the study does include categorical variables thus (Berry et al., 2016; Field, 2013). Essentially, logit model is usually employed in identical studies (See example, Rodil et al., 2015; Seddighi, 2012; Almahadin and Tuna, 2022; Almahadin, et, al., 2020).

In this context, the main objective behind adopting logit regression model in this study is to obtain a proper knowledge related to the strength of the relationship between specific factors related to financial firms and the effectiveness of ERM implementation (Gujarati, 2009) using logit model we will calculate ' $\beta$ ' coefficient which predicts the impact of the predictor variables (Firm Size, BOD Monitoring and Financial Leverage) on the effectiveness of ERM implementation as dependent Variable. But, due to the use of extreme probability function in the model equation, the probability of spotted outcomes that relate to the dependent variable rise, giving the independent variable's suitable ' $\beta$ ' coefficient regression value (Field, 2016; Seddighi, 2012, p. 245).

In this context, the logit model can be given as follow (Bruins, 2006).: -

$$\text{Logit } p = \log\left(\frac{p}{p-1}\right) = \ln\left(\frac{p}{p-1}\right) = \text{logit}(p) = \alpha + b_1 x_1 + b_2 x_2 \dots \dots (1)$$

(Where,  $\alpha$  = equation constant,  $b$ = predictor independent variable coefficient,  $p$ = event Occurrence,  $1-p$ )

The aforementioned equation above, implies that logit ( $p$ ) is the probability for the occurrence of dependent variable event which will be equal to 1 (favorable outcome) (Burns, 2009; Baker et al., 2008). Therefore, when dependent variable value moves closer or approaching 0 it means that, an occurrence of certain event (favorable response) is little; while, when the value is getting closer to 1, it implies that possibility of an event occurrence is generally high (Filed, 2013, p. 678).

3.2 Probability of occurrence of a positive response: -

$$\text{Probability (Y = 1)} = \frac{1}{1 + e^{-(a+b_1x_1+b_2x_2+\dots)}} \dots \dots \dots (2)$$

(Where, a= predictor variable's constant, b = independent variable's coefficient of;  $x_1$  = predictor variable's value and e= exponent (Field, 2016; Seddighi, 2012)

Subject to that, the next adopted equation, that is employed in this study to predict provisional possibility of a dependent factor for certain independent factors (Bruins, 2006):

$$\begin{aligned} \text{Probability (Y = 1)} &= \frac{1}{1 + \exp^{\text{logit } p}} \\ &= \frac{\exp^{\text{logit}}}{1 + \exp^{\text{logit}}} = \\ &= \frac{\exp^{a+b_1x_1}}{1 + \exp^{a+b_1x_1}} \dots \dots \dots (3) \end{aligned}$$

(Where, a = equation constant; b = predictor variable's coefficient and  $x$  = predictor variable's value).

Probability of occurrence of an event, given multiple predictor variables=

$$\frac{\exp^{a+b_1x_1+b_2x_2+\dots}}{1 + \exp^{a+b_1x_1+b_2x_2+\dots}} \dots \dots \dots (4)$$

(Where, exp.= logarithm base exponents; a = equation's constant, b= predictor variable's coefficient, x= value given to predictor variables).

Thus, the non- happening of an event can be calculated as follow:

$$\frac{\exp^{-(a+b_1x_1)}}{1 + \exp^{-(a+b_1x_1)}} \dots \dots \dots (5)$$

(where, 1 - P = non-occurrence; P = event probability; (Y=0) = non-occurrence or negative impact)

Persistent with aforementioned logit function based on the following equation:

Table 1: Analysis Results related to Predictors of Significant Impact on ERMIE

Indicator	(β) Co- efficie nt	S.E	Wald	df	Sig.	χ <sup>2</sup>	df	Sig.	Exp. (β)	R <sup>2</sup> <sub>Cox &amp; Snell</sub>	R <sup>2</sup> Nagelkerke
Frim Size	0.787	0.298	6.960	1	0.008	8.706	1	0.003	2.198	0.088	0.121

$$\frac{\exp^{a+b_1x_1+b_2x_2+\dots}}{1 + \exp^{a+b_1x_1+b_2x_2+\dots}} \dots \dots \dots (6)$$

The possibility that company's ERM implementation effectiveness (ERMIE) for a given variable can be presented as follows:

ERMIE = 1, if a company is having implementation effectiveness.

ERMIE = Otherwise

On the basis of the above results, it is obvious that the three main indicators (X1 = Frim Size, X2 = Board of Directors monitoring and X3 = Financial Leverage) are reflecting a statistically significant impact on ERM implementation effectiveness.

Also, table 1 above furnishes prominent information that: Beta coefficient, independent variable statistical significance level and dependant variable odd ratio. Unlike the 't' statistic used in linear regression model, the logit model regression produces an analogous Wald statistic, which portray a chi-square distribution that predict the significance level of the predictor variable of (firm size, BOD monitoring and financial leverage) of Jordanian financial corporations in relation to ERM implementation effectiveness as a proxy of the dependant variable. Additionally, Exp (β), is the odd ratio, which distinct the variance in the odd of dependant variable generated as a result of one unit changes of independent variable.

$$\frac{\exp^{(a+b_1x_1+b_2x_2+b_3x_3)}}{1 + \exp^{(a+b_1x_1+b_2x_2+b_3x_3)}} \dots \dots \dots (7)$$

(Where, exp. is the equation's exponent; a is equation's constant and b is the coefficient of three factors or indicators produced by logit model analysis).

#### 4. Results:

##### 4.1 Probability:

<b>BOD Monitoring</b>	2.029	0.215	6.338	1	0.012	7.299	1	0.007	7.605	0.075	0.102
<b>Financial Leverage</b>	2.707	0.215	10.690	1	0.001	12.666	1	0.000	14.989	0.126	0.173

Based on the results displayed in (Table 1), the study tested the degree of significant contribution attributed to each variable on Jordanian financial corporations' ERM implementation effectiveness, and predict the change in the odd ratio in favour of occurrence related to ERM implementation effectiveness

based on the availability of a supplementary unit of an independent variable. Then, we will calculate the provisional probability of ERM implementation effectiveness subject to the existence of each indicator based on logit model equation see (Table 2).

Table 2: Conditional probability of factors impacting ERM adoption

Independent variables	Dependent Variable	Equation	Probability
<b>Firm size</b>	ERM implementation effectiveness (ERMIE) (ERMEI =1), if the ERM have implementation Effectiveness , (ERMEI=0), other wise	$\frac{\exp^{(5.359+0.787(1))}}{1 + \exp^{(5.359+0.787(1))}}$	0.9978
<b>BOD Monitoring</b>	ERM implementation effectiveness (ERMIE) (ERMEI =1), if the ERM have implementation Effectiveness , (ERMEI=0), other wise	$\frac{\exp^{(1.923+2.029(1))}}{1 + \exp^{(1.926+2.029(1))}}$	0.9812
<b>Financial leverage</b>	ERM implementation effectiveness (ERMIE) (ERMEI =1), if the ERM have implementation Effectiveness , (ERMEI=0), other wise	$\frac{\exp^{(0.373+2.707(1))}}{1 + \exp^{(0.373+2.707(1))}}$	0.956

#### 4.2 Provisional probability of ERM implementation effectiveness:

##### 4.2.1 Provisional probability of ERM implementation effectiveness and corporation's size perspective:

It is apparent from the model analysis results, the existence of a relationship between ERM implementation effectiveness and financial indicators. This is obvious from the Wald statistics value (df =1, Sig. value = 0.003, Wald = 6.960) which point out that, there is a statistical significant relationship between assets size and ERM implementation effectiveness. Moreover, the odd ratio, (Exp (β)) linked to value generation attributed to the financial institutions in Jordan (independent variable) which produces an outcome of 2.198. That is, If the Jordanian financial institutions have the competency to increase its assets size value by 1 unit, it would improve the odd ratio

positively in favour of attaining ERM implementation effectiveness by 2.198 times, this imply that, the Jordanian financial corporations are 2.198 times more probable to have ERM implementation effectiveness. Thus, the provisional probability of attaining an ERM implementation effectiveness by the Jordanian financial corporations is 99.78%.

##### 4.2.2 Provisional probability of ERM implementation effectiveness, and corporation's Board of Directors Monitoring perspective:

Table 3 below, demonstrates that BOD monitoring in the Jordanian financial corporations' is statistically significant (Wald statistic= 6.338; df = 1, Sig value=-0.012). Additionally, odd ratio (Exp (β)) value implies that, if the Jordanian financial institutions BOD ability to monitor has increased by one unit, this will lead to enhance the odd ratio in favour

of having ERM implementation effectiveness by 7.605 times. Based on the logit model results (Table 3), provisional probability of

corporation's ERM implementation effectiveness is estimated at 98.12%.

Table 3: Logit Model Results

Indicator	(B) Coefficient	S.E	Wald	df	Sig.	$\chi^2$	df	Sig.	Exp. (B)	Probability of ERM implementation effectiveness
<b>Firm Size (F.S)</b>	0.787	0.298	6.960	1	0.008	8.706	1	0.003	2.198	0.9978 ERMIE = {F.S.}
<b>BOD Monitoring (BOD M)</b>	2.029	0.215	6.338	1	0.012	7.299	1	0.007	7.605	0.9812 ERMIE = {BOD M}
<b>Financial Leverage (F.L.)</b>	2.707	0.215	10.690	1	0.001	12.666	1	0.000	14.989	0.9560 ERMIE = { F.L. }

4.2.3 Provisional probability of ERM implementation effectiveness, in connection to corporation's financial leverage perspective:

Table 3 results also reveals that the Wald statistic value (df =1) which produces a value of 10.690 with a significance degree level of 0.0001 ( $p < 0.05$ ), which implies that, financial leverage explore a positive statistical significance on enterprise ERM implementation effectiveness. Moreover, the odd ratio, (Exp ( $\beta$ )) related to enterprise financial leverage would produce a value of 14.989. This postulate that, if the Jordanian financial institutions' financial leverage value increased by 1 unit, it will enhance the odd ratio in favour of ERM implementation effectiveness by 14.989 times, henceforth an enterprise with this capacity of 14.989 times, is more probable to have a suitable ERM implementation effectiveness.

4.3: A Generic logistic model:

4.3.1 A Generic logistic regression model:

The motive behind conducting a multivariate logistic regression is to present a consistent and valid view of the major significant advantages that the corporation may obtain due to ERM implementation effectiveness. Table 4 below exhibit the predicted results of the provisional probability attributed to ERM implementation

effectiveness taking into account all the factors specified and discussed earlier.

Table 4: Logit Analysis Equation Variables for Estimating the Conditional Probability of Factors Impacting ERM Adoption Given All Indicators

Variable s	B	S.E	Wald	df	Sig.	Exp. (B)
<b>Firm Size</b>	0.126	0.393	0.102	1	0.749	1.134
<b>BOD Monitoring</b>	2.202	0.832	7.008	1	0.008	9.043
<b>Financial Leverage</b>	2.902	1.132	6.577	1	0.010	18.208
<b>Constant</b>	-4.076	2.778	2.153	1	0.142	0.017

Table 4 shows that the estimated coefficients ( $\beta$ ) of two factors (BOD monitoring and financial leverage) reflect that they are both statistically significant (Sig. – 0.008 and 0.01 respectively). Gathering all results, the odd ratio (Exp ( $\beta$ )) reveal that an additional 1 unit of these two independent variables will lead to the achievement of ERM implementation effectiveness. Based on the above results (Table 4) the following Model can be extracted:



## ERMIE

$$= \frac{\exp(-4.076+0.126x(1)+2.202x(1)+2.902x(1))}{1 + \exp(-4.076+2.253x(1)+3.112x(1)+2.902x(1))} \dots \dots (8)$$

(ERMIE = 1, X1 (Company Size) = 0.126, X2 (Board of Directors) = 2.202, X3 (financial Leverage = 2.902, Constant equation = - 4.076)

It is motivating to note that, between the two indicators, financial leverage is the most significant indicator, which marks the highest provisional probability of ERM implementation effectiveness given all the factors. That is, the odd ratio value (Exp (β)), is linked with corporation's financial leverage (df =1, Sig Value= 0.010) is 18.208. These findings indicate that, the higher is the financial leverage level of Jordanian financial corporations' the better is the ERM implementation effectiveness. This implies that financial corporations in Jordan particularly

banks depend on external source of finance in the form of deposit as it usually constitutes more than 90% of the total resources and thus banks and financial corporations in general should adopt and ERM system to protect depositors' money from any unexpected losses. This is also followed by value generation due to (BOD monitoring) indicator which have an odd ratio of 9.043 which means that ERM implementation effectiveness will increase by 9 times. In this context, financial institutions in Jordan are considered family business and thus they have full control of all decisions thus ERM implementation effectiveness can be actually realised for the said reason. After running the multivariate logit analysis, it appears that firm size has no effect, thus it should be excluded and the logit analysis to be run again to reach for more realistic equation for probability:

Table 5: Variables in the equation

Variables	B	S.E	Wald	df	Sig.	Exp (B)
<b>BOD Monitoring</b>	2.253	0.822	7.517	1	0.006	9.512
<b>Financial Leverage</b>	3.112	0.928	11.254	1	0.001	22.458
<b>Constant</b>	-3.268	1.113	8.622	1	0.003	0.038

Table 6: Conditional Probability of Company's ERM implementation Effectiveness given two Indicators: MOD Monitoring (MOD M); Financial Leverage (F.L.)

Independent variables	Dependent Variable	Function	Equation
MBD Monitoring and Leverage	ERM implementation effectiveness (ERMIE) (ERMEI =1), if the ERM have implementation Effectiveness , (ERMEI=0), other wise	ERMIE = F (MBD, leverage)	$\frac{\exp(-3.268+2.253x(1)+3.112x(1))}{1 + \exp(-3.268+2.253x(1)+3.112x(1))}$ <p>= 0.985</p> <p>(ERMIE = 1, X1 = 2.253, X2 = 3.112, Constant equation = -3.268)</p>

Replacing values shown in Table 6 to the previously written equation, the provisional probability of having ERM implementation effectiveness which depends on the corporation's ability to have more BOD monitoring and higher level of financial leverage is 98.5%. Table. 5.67 also discloses an indication of the most significant variable that

reflects the existence of ERM implementation effectiveness.

#### 4.3.2 Effectiveness of ERM Implementation on Financial Performance:

In order to test the impact of ERM implementation on company's financial performance peroxided four variables (SR, DG, CG and EPS), to achieve the said purpose, Chi-

Square model was adopted, and the results of the analysis is portrayed in table 7 below:

Table 7: Chi-Square Test's results

Effectiveness of implementation of ERM on financial performance	Value	df	Asymptotic Significance (2-sided)
1. Stock Return - SR	58.338	60	0.537
2. Dividend Gain - DG	26.211	27	0.507
3. Capital Gain - CG	62.546	59	0.352
4. EPS	46.061	37	0.146

Table 7 results show that (Stock Return Chi-Square = 58.338) with a value of (sig. = 0.537) which indicate the non-existence of significant impact of ERM Implementation on stock return as a proxy of financial performance indicators. Regarding the value of Chi-Square related to dividend gain (value = 26.211) with a sig. value = 0.507 which is more than 5% which indicate that there is no significant impact of the Effectiveness of ERM Implementation on the financial performance measured by dividend gain. Moreover, analyzing the results related to the effect of ERM Implementation on the financial performance measured by capital gain, the results indicate that the value of capital gain Chi-square was 62.546 at ( $\chi^2 \leq 0.05$ ) as sig. = 0.352 which imply, that there is no significant impact of ERM Implementation on financial companies capital gain. Finally, EPS Chi-Square value was (46.061) and its degree of significance was (0.146) which is higher than the study significance rate ( $\chi^2 \leq 0.05$ ), this will lead to conclude that the ERM implementation possess no significant impact on the financial performance represented by the financial performance indicator EPS.

## 5. Conclusion

Jordan is subject to many types of external risk factors as it is surrounded with countries that are facing political unrest in addition to the present COVID-19 pandemic which definitely exposed Jordanian financial institutions to volatile economical risk that should be handled to mitigate its consequences. The empirical analysis results applied on Jordanian financial institutions by employing logit model indicated that Firm Size imposed positive significant impact on the effectiveness of ERM implementation ( $p=6.960$ , Wald Test) at significance value of 0.008. Beasley et al.

(2005), Razali et al. (2011) and Hoyt & Liebenberg (2008) they concluded a positive relationship between firm size and ERM adoption (Liebenberg & Hoyt, 2003). Consequently, monitoring of the Board of Directors also reflected appositve impact with regression coefficient ( $B = 2.029$ ) and significance degree (Wald= 6.338) was (0.012) at statistical significance value less than (0.05). Dabari & Saidin (2016), state that higher Board of Director's involvement in the ERM process will positively affect an efficient ERM practices. Kleffner et al. (2003) suggest that, enterprise management that adopted ERM was boosted by the board of directors. While, Subramaniam et al. (2009) concluded that a larger board of directors are more likely to implement ERM. The third variable that posit a positive effect on effectiveness of ERM implementation was attributed to financial leverage as the value of (Wald= 10.690) at statistical significance value of (0.001), and a co-efficient of ( $B = 2.707$ ). Hoyt & Liebenberg (2011) could not expose any clear relationship between ERM implementation and leverage degree. However, Golshan and Rasid (2012) & Liebenberg and Hoyt (2003) debate that financial leverage positively related to ERM approach adoption. In contrast, Hoyt and Liebenberg (2008) found that ERM adoption and leverage are negatively related. Other variable; Environmental uncertainty, Growth opportunity, Cash Ratio, Institutional ownership and liquidity possess no significant effect on the effectiveness of ERM implementation. This implication will direct us to examine more as why there is no effect of such variable, especially liquidity which is considered as the backbone for the financial institution especially banking firms.

Concerning the impact of ERM implementation on financial performance, it was obvious that there is no significant impact of ERM implementation on the four proxies that represent financial performance indicators, which implies that "ERM implementation in the Jordanian financial firms has no significant impact on financial institutions' performance. The results came in consensus with many researches' results (e. g. Pagach and Warr et al, (2010); Zou and Hassan 2017; Florio and Leoni 2017), but the findings also contradict other literatures expectation regarding ERM practices that reflect a positive significant effect on

enterprises' results as confirmed by Hoyt et al. (2001), Beasley et al. (2008), Pagach and Warr (2011), Stanley (2011). Such implications may be attributed to the immaturity of ERM implementation within the majority of Jordanian financial institutions, also the lack of effective involvement by banks employees.

ERM is an efficacious system that provides protection against various risks that will probably erupt in future against invested resource. ERM boost creation mechanisms, by helping top management to consider future events, and take actions in a way that decreases the possibility of consequences related to performance reduction. To attain a full picture of all types of risks that enterprises may confront, and the way they should manage such expected risks within their tolerance level, there has been a keen interest in employing ERM models within the Jordanian financial sector that are vulnerable to various financial crisis. Notwithstanding, that ERM in Jordan is not mandatory, but from the researcher point of view, it should be mandatory especially for banking institutions as they are the main supplier of funds and they invest others money (individual and institutions) thus, as any loss may be suffered by banks will adversely affect depositors' confidence in these banks and this may adversely affect the whole financial system in the country. Preserving the financial system stability must be the ultimate concern of management and regulatory bodied that supervise the financial institutions operations.

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