

## Determinants of Hedging: A Review of Theoretical Studies

Abdullah Bin Omar <sup>a,\*</sup>, Kamarun Nisham B Taufil Mohammad <sup>b</sup>,  
Norzalina Binti Ahmad <sup>c</sup>

<sup>a,b,c</sup> School of Economics, Finance and Banking, University Utara Malaysia(UUM), Malaysia

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### ARTICLE INFO

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#### Article History

Submitted	22 Jan 2017
Accepted	06 Feb 2017
Available online	12 Feb 2017

#### JEL Classification

F31  
G32

#### Keywords

Derivatives  
Hedging  
Financial Risk

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### ABSTRACT

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Hedging instruments are deemed as value enhancing tool for both financial and nonfinancial firms. The aim of this study is to highlight those theoretical studies which are written in context of hedging determinants. Theoretical studies argued that in a world with no taxes, no transaction costs, and with fixed investment policies, hedging with derivatives is irrelevant to firm value. However, some studies suggests that derivative instruments can increase firm value when the premises of a perfect market have been relaxed, since they can eliminate corporate tax liabilities, financial distress costs, dependence on costly external financing, and agency costs.

Journal of Insurance and Financial Management

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\*Corresponding Author:  
[abo776@gmail.com](mailto:abo776@gmail.com)

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## 1 Introduction

Intense competition, market imperfections, and political uncertainties in the world bring forth different types of risks attached with corporations subject to their environment in which they operate. Management/operational risk, financial/liquidity risk, product & services risk, and economic stability, political and market risk are the most common types of risk which are faced by the companies as they operate in dynamic environment. To counter these risks, corporate managers feeling a need to establish such a effective control system that manage and measure the likelihood of risks to tolerable level and mitigate the adverse consequences that arise due to exposure of these risks. This conceptual paper aims to provide deeper insight to different types of concepts related to risk management and hedging through derivatives.

## 2 Risk Management

There is simultaneous increase in number of studies along with increased magnitude of firm's exposure addressing how, and at what extent, firms should do risk management. Different authors set down different definitions and objectives of risk management. Kloman (1992, p. 302) defines risk management as *"the art of making alternative choices, an art that properly should be concerned with anticipation of future events rather than reaction to past events"*. He also states that to decrease fear of the unexpected and the unknown, and to establish self-confidence for future are the true objectives of risk management. Head and Horn (1997) state that risk management is a name of common sense to cope actual and possible daily calamity, and major occasional disasters that increase the likelihood of financial losses and lead the organizations and individuals to their unfulfilled plans. Stulz (1996, pp. 23-24) defines the primary objective of risk management is *"to eliminate the probability of costly lower-tail outcomes—those that would cause financial distress or make a company unable to carry out its investment strategy"*. Likewise there are several authors who explain risk management, its objectives and applying methods in their own words.

## 3 Financial Risk and its Types

Financial risk is generally comprised of *cash flow/liquidity risk, credit risk, foreign exchange risk, and interest rate risk*. Foreign exchange risk is deemed as most baneful and lethal risk whose effects are multidimensional. With the economic globalization in the world, volatilities in foreign exchange rates influence both: domestic and, specially, multinational companies. Due to foreign exchange variation, company's cash flow likely to change (Jacque, 1981). By the change of relative prices of foreign and domestic goods, foreign exchange rate

fluctuations directly influence current and future expected cash flows of importing and exporting companies (Géczy, Minton, & Schrand, 1997). Random variations in commodity prices, interest rates and exchange rates not only affect firm's earning but also determine the firm survival. Over last two decades, financial risk has become one of the most awful challenge for firms. It is no longer enough for firms to only equip with best sales and marketing plans, cheapest and skilled workforce, or having advance technology because of variations in exchange rates, commodity prices and interest rates that make it difficult for them to do so, and more than that, these volatilities can put well-running firms out of business.

#### **4 Risk Management and Firm Value**

As we said earlier, that movements in foreign exchange rates, commodity prices and interest rates can influence firm value adversely, then an involuntarily conclusion can be drawn here that by managing these exposures firm value will essentially increase. But this conclusion doesn't follow directly that it is necessary condition for a firm to manage its strategic risks if it is confronted them. But, however, the sufficient condition can be drawn that in response of managing risk by a firm, the present value of future net cash flows should be increased.

#### **5 Classical Financial Theory and Perfect Market Hypothesis**

Classical financial theory assumes that there is absolute perfection in capital markets. This states that capital markets are extremely competitive and participants of these markets are not supposed to any frictions. Highly competitive capital market subject to atomistic competition and there are a large number of firms and consumers which implies that no firm is in a position to disturb the market equilibrium; i.e. all firms are market price taker (Danthine & Donaldson, 2002). Absence of friction implies that there is no existence of any type of cost<sup>1</sup>.

While discussing the risk, we might observe an effect on firm's value with the decrease in discount rate of cost of capital of a firm. Shareholders, real owners of a corporation, are individuals and individuals are usually risk averse, hence they want proper management of financial risk. On the other hand, the firms, opposed to shareholders, believe that to stay away from risk management may be the best policy for them. This will cut the cost and increase the probability of their more earnings. As portfolio theory suggest that risks associated to individuals are diversifiable and can be encountered by holding well-diversified portfolios.

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<sup>1</sup> Frictions such as progressive tax rates, information and contracting cost, commissions, transaction costs, bankruptcy cost, agency cost, incomplete and asymmetric information, conflict of interest among stakeholders and financial distress cost etc.

By relaxing this assumption, it can be said that if owners does not hold well-diversified portfolios then risk aversion can be rationale for the firm.

## **6 Risk Management at Corporate Level**

For individual investor, at firm level, decision of managing financial risk exposure may not be a prudent decision since he/she can manage such risk more efficiently by appropriate diversification of their investment portfolios. But, however, financial risk management can make sense at corporate level as it adds value in company's profile, not because it is inherently essential to reduce risk by the firm whenever they face risk. So several researchers tried to explore how risk management led the firm towards increase its value by increasing its expected net cash flows. By recalling the basic canon of modern financial theories we can understand how hedging can have favorable effect on firm's real cash flows. The relationship between financial policies and firm's real cash flows has first established by Franco Modigliani and Merton miller in 1958 which is known as M&M proposition.

## **7 Modigliani and Miller Model (1958)**

Classical financial theory also relies on Modigliani and Miller (1958) (MM) model which provides a deeper insight to the modern philosophy of capital structure. MM theory states that risk management is insignificant to the firm hence shareholders can do at their own while management efforts regarding managing risk cannot affect firm value. In perfect capital market where there is no tax, no transaction cost, and symmetry information, MM model shows that firm value is unaffected and independent to how any firm is financed, what is its dividend policy and no matter how it raised its capital; either through stocks or debt. Risk management at corporate level will only be valuable if there are market imperfections in capital market like asymmetry information, limited commitments, financial distress etc. Standard view of classical theory also based on MM model which suggest that decisions regarding financial policy affect how firm value is divided among its stakeholders.

## **8 Frictions in Financial Markets**

In real, the financial markets are supposed to face variety of frictions as it's too hard to find frictionless market. This divergence between reality and theory create path for researchers to write extensively by relaxing the assumptions of MM model as they were questionable and deemed unrealistic. Past studies justify that in presence of capital market imperfection risk management can increase firm value. MM proposition can be used to determine the expected effect of risk management on net cash flows. Several hedging theories introduce some

frictions to classic MM model and arrive at optimal corporate hedging policies (Allayannis & Weston, 2001).

Previous researchers put forward several arguments on the relationship between firm value and corporate risk management by relaxing the assumptions in MM proposition. Past theories suggest that financial derivative instruments are deemed as tool of value enhancing for the firms, since they can bring reduction in expected tax liability (Smith & Stulz, 1985), reduce the cost of financial distress (Mayers & Smith, 1982; Smith & Stulz, 1985), resolving underinvestment problem (Froot, Scharfstein, & Stein, 1993; Géczy et al., 1997; Nance, Smith, & Smithson, 1993; Smith & Stulz, 1985), dependence on costly external financing (Froot et al., 1993; Gay & Nam, 1998), and agency cost (Smith & Stulz, 1985) etc. Some of them are briefly described below.

### **9 Tax Reduction**

Smith and Stulz (1985) and Graham and Smith (1999) show that in the presence of a convex corporate tax function the firm's expected tax liability can be reduced by hedging. The more convex the tax schedule the greater the incentive to hedge. The factors that cause convexity in the effective tax function are progressivity in the statutory tax code and tax preference items such as tax loss carry-forwards, investment tax credits and foreign tax credits. Risk management can make possible of lesser tax amount by reducing the variability in taxable income by falling the highest possible corporate taxable income in optimal array of tax rate (Graham & Smith, 1999). Past evidences are consistent with Smith & Stulz's Tax Convexity argument that those firms are more likely of derivative users that have more convex tax function. Mian (1996) and Nance et al. (1993), for example, found positive and significant relationship between use of derivative instruments and tax credits. Additionally, Dolde (1995) reported a significant and positive relationship between financial derivative instruments and tax loss carry forwards.

### **10 Underinvestment**

Froot et al. (1993), Smith and Stulz (1985), Mayers and Smith (1987), Bessembinder (1991) argue that through effective risk management, the potential problem of underinvestment is reduced which normally arise between management and bondholders when management want to maximize its wealth at the cost of bondholders and refuses to invest in low-risk projects. Although low risk projects assure more security to bondholders, but, on the other hand, excessive return cannot be obtained through low risk projects which is the primary

objective of management in selection of high risk projects. Consequently, likelihood of the project rejection is increased, notwithstanding it can enhance overall firm's value. This conflict sometimes also arise due to cash flow variation and high cost of external financing between shareholders and debt holders but can be resolved by hedging (Mello, Parsons, & Triantis, 1995).

### **11 Cost of Financial Distress**

Risk management can reduce the probability of firm's financial distress cost by reducing cash flow volatility. How much benefit can get by reducing this cost from risk management depends on two factors: the likelihood of encountering distress (if firm doesn't hedge), and financial distress cost (if it occurs). The greater the possibility of distress the greater the benefits from risk management. Stulz (1996), Leland (1998) and Ross (1998) suggest that with the reduction in probability of financial distress, the financial distress cost can also reduced. It increases the firm's propensity of higher leverage which ultimately yields a benefit of greater tax shield which in turn increase firm value. The empirical evidences by Froot et al. (1993) and Smith and Stulz (1985) provide support to theoretical arguments that high probability of financial distress increase the likelihood of financial derivative use.

### **12 Foreign Exchange Rate Risk**

High level of fluctuations in accounting earnings and greater variation in firm's cash flows arise from foreign exchange rate risk. This risk can be significantly countered by using foreign currency derivatives. Suppose, firm's cash flow volatility is directly related to the probability of controlling financial distress (Smith & Stulz, 1985). The firm value which is influenced by changes in exchange rate is heavily depends on several factors such as import and export activity level, foreign operations involvement, the currencies of its competitors and output/input market competitiveness. In the light of cash flow models, it can be argued that foreign currency exposure should be related to net foreign currency which is equal to total revenues minus total cost.

### **13 Managerial Risk Aversion**

There are several ways through which shareholders can make sure whether or not managers are acting in the best interest of a firm (i.e. maximizing firm's value). One method is a managerial compensation which yields managers a large stake that how much firm can performs well. If personal wealth of a managers increase with the increase of firm value then

managers will get more earnings if the performance of a firm gets better. Consequently, managers motivate to work more and more in order to increase value of a firm.

In contrast, if managerial incentives are closely attached with the share price, this can raise serious problems and put adverse impact on managers. In actual, managerial incentives that are heavily depend on stock returns, either partially or fully, can be out of control for the management and can be counterproductive. If a firm having large amount of raw material, for example, which would be used in production process, then in the absence of effective risk management, the raw material value can be fluctuate over the time period. Variations in the prices of raw material can be the primary source of change in stock prices. As the prices of raw materials are out of management control, therefore, managerial compensation closely associated with the prices of the stocks may force to managers to bear risk. But, in result, it would not provide any incentive to managers and would not provide motivate managers for hard work.

#### **14 Other Risk Management Theories**

Apart from different aforementioned theories of risk management like taxes, underinvestment, external financing, financial distress and contracting cost; there are some other theories that can influence firm's decision to hedge and may impact on financing strategy of a firm. These theories are given below.

##### **14.1 Firm Size**

The relationship between derivative use and firm size is still ambiguous empirically. The vast majority of the researchers indicated that in order to mitigate variability in equity prices and cash flows, the small firms having larger incentives to hedge. Moreover, as Altman and Hotchkiss (2006) stated, large firms may be able to find cost-effective substitutes for derivatives to hedge away the risk through line-of-business and geographic diversification. On previous empirical researches on the area of derivatives, Smith and Stulz (1985) states that smaller firms get more benefits from hedging as compared to large firms if the bankruptcy cost is less than proportional to firm size and if the cost of using derivatives is proportional to firm size. It can be argued from these evidences that firm size and derivative use should be negatively related with each other. Some other cross-sectional studies on derivatives determinants, for example, states that firm size and derivative use are positively related with each other. A vast variety of researches support this view. For example, Nance et al. (1993) and Géczy et al. (1997) argued that size of a firm is highly related with substantial

information and transactional cost scale economies to establish derivative use for speculation or hedging. Conversely, small firms are having fewer resources to hedge their risk; therefore, it is difficult for them to afford hedging cost. Since, smaller firms are not likely to hedge their risk through derivatives.

## **14.2 Substitutes for Hedging**

Some studies showed that decision of a firm regarding derivative use is also affected by the decision of option other financial policies. Instead of hedging through derivatives, for example, the financial price risk on balance sheet could be reduced by restructuring its liabilities and assets to mitigate its economic exposure i.e. movements its financial prices. Therefore, with the help of reducing debt amount in capital structure, a firm can reduce conflict between bondholders and shareholders as an alternative means of hedging. However, these mechanisms can mitigate the incentives of derivative use. On the other hand, reducing debt/equity ratio can be less attractive due to reduction in debt associated benefits such as advantage of tax shield and ultimately it will increase firm's tax liability. As Nance et al. (1993) suggested, a firm can smooth away the agency problems through convertible debt or preferred stock rather than straight debt so as to reduce the conflict between shareholders and bondholders. Convertible debt helps to manage the conflicts of interest among stockholders and bondholders and thereby reduces the incentives to hedge. Instead of reducing the variability of the firm's equity by reducing the variance of the firm's net cash flows as the hedging instruments do, convertible debt involves an embedded option on the firm's assets which makes this liability more sensitive to firm-value changes and thereby reduces the sensitivity value to firm-value changes. In a similar fashion, preferred stock decreases the likelihood of encountering financial distress. Although similar to debt, preferred stock pays periodic dividends rather than interest. Thus, while preferred shares do not produce tax shields, firms can omit a preferred dividend payment without being forced into bankruptcy. In contrast, a bankruptcy filing is virtually inevitable if an interest payment on debt is not met.

## **14.3 Speculation**

As the prior sections showed, previous empirical studies incorporate the use of derivatives into their hedging definition. However, derivatives can also be used for speculation. Adam and Fernando (2006) identifies the incentive for speculation. Given these incentives it is possible that derivative users are speculating rather than hedging. Much of the recent debate



on derivative use has focused on whether firms use these instruments for hedging purpose or for speculation. Therefore, the issue is whether these studies are measuring hedging or speculation on the use of derivatives. If the incentives for optimal hedging and speculation are correlated empirical results might not distinguish between these two activities.

## **15 Conclusion**

The purpose of this article is to take a brief theoretical review of hedging motives. Firms do hedging to mitigate their risk whether they are small or large, national or international and domestic or foreign. Among large number of risk types, financial risk is considered as most dangerous risk. Several theories were presented in past that describes the factors which motivate firms to hedge. Some says that there should be absolute perfection in the market; otherwise firms will tend to hedge. Authors introduced some frictions which lead towards hedging. Tax motives, underinvestment problem, financial distress, foreign exchange rate risk, managerial risk aversion, firm size substitutes of hedging and speculation intentions are those factors that determine the use of financial derivatives.

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