

# Factors Influencing Derivatives Usage by Selected Listed Companies in the Philippines

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This study examined the different firm-level factors that affect listed Philippine companies' decision to use derivatives for corporate hedging. Data from annual reports of 74 corporations over a span of five years (2007 to 2011) were gathered, resulting in 329 firm-year observations. Results of random-effects logistic regression showed that, on one hand, firm size and presence of employee stock option plans were significant incentives for firms to use corporate hedging. On the other hand, liquidity and the existence of growth opportunities were negative influences on derivatives usage. These results may be consistent with the reality that the Philippine derivatives market is underdeveloped relative to the rest of Asia. Only large and financially sophisticated firms, such as those that can develop stock option plans, are more likely to utilize corporate hedging techniques. The negative effect of liquidity further supports this assertion. Philippine firms in the sample would rather use liquidity than derivatives as a way of anticipating potential cash flow volatility. Philippine firms may prefer to use financial buffer, rather than financially sophisticated tools such as derivatives. The study exposed that only large or financially savvy corporations are more likely to take advantage of the benefits of hedging. Philippine regulatory agencies and market participants must work harder to make corporate hedging an alternative that all corporations can take advantage of.

*Keywords:* derivatives, risk management, corporate hedging, emerging markets

## 1 Introduction

In a perfect capital market as described by Miller and Modigliani (1958), financing policies of firms should be irrelevant and non-value adding. Individual investors may undo or alter the firm's financial policy to suit his or her own risk preference. Risk management can be regarded as under the realm of the financial policies of the firm, and will be more relevant as market imperfections are introduced into the basic Modigliani and Miller world. Market imperfections will make it difficult for individual investors to replicate (or undo) the financial policies of the firm. Therefore, the presence of market imperfections like taxes, distress costs, and imperfect information allow for the effective use of risk management in order to avert these costs and add value to the firm. This, in turn, contributes to the widespread use of derivatives in financial risk management.

There have been considerable research studies worldwide, both theoretical and empirical, on corporations' use of derivatives for risk management purposes. Most studies aim to relate the use of derivatives with the costs of financial distress (Smith & Stulz, 1985), tax incentives (Smith & Stulz, 1985) and the underinvestment problem (Bessembinder, 1991; Froot, Scharfstein, & Stein, 1993) – some of the market imperfections that are not present in the assumptions of Modigliani and Miller. This study aimed to further test the validity of various derivatives usage theories in the Philippine context. It was particularly interesting to test whether these theories also apply to a relatively underdeveloped derivative market – like that existing in the Philippines. The study followed from, and tried to improve on, the application of these theories by Nguyen and Faff (2002) and Berkman and Bradbury (1996), where these theories were tested on firms from Australia and New Zealand, respectively.

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## 2 Factors influencing Derivatives use

The use of derivatives for risk management purposes is influenced by three factors. First, derivatives can be used to maximize shareholder value by mitigating market imperfections. Second, derivatives can be used to fix agency conflicts between management and shareholders. Lastly, derivative usage is influenced by the presence of other substitute tools that firms may use to curb these market imperfection costs.

### 2.1 Shareholder Wealth Maximization

There are three distinct market imperfections that were excluded from the perfect MM world: the presence of underinvestment costs, bankruptcy costs, and tax benefits. These factors influence the use of corporate hedging and, thus, may serve as motivation or deterrence for derivatives use.

Froot et al. (1993) initially developed the first theory on the relationship between hedging and underinvestment costs. They proposed that hedging ensures that a firm has sufficient internal funding available to take advantage of projects with a positive net present value. The ability to manage and predict cash flow enables a firm to plan its financing and will give the firm an opportunity to negotiate lower costs for planned external financing. This argument consequently presumes that capital market imperfections make unplanned external sources of funds more costly. Underinvestment costs are related to growth opportunities of the firm. The larger the potential growth opportunities, the more motivated firms are in implementing corporate hedging to ensure that they can take advantage of all these opportunities by effectively planning the sources of financing. This, in turn, encourages derivatives use as a risk management tool.

The second theory pertains to bankruptcy costs. Smith and Stulz (1985), Bessembinder (1991), and Mayers and Smith (1990) argued that hedging reduces expected costs of financial distress by reducing the variability of cash flows and thus reducing the state or probability of a company experiencing bankruptcy. Therefore, firms that are more exposed to potential bankruptcy costs, like firms with a high level of leverage, will turn to corporate hedging to reduce the probability of that loss.

The third argument for corporate hedging is that it increases the value contribution of taxation. Hedging can reduce the expected tax liability for a firm facing a progressive corporate tax structure over the range of possible income outcomes (Smith & Stulz, 1985; Graham & Rogers, 2002). Smith and Stulz (1985) posited that "if effective marginal tax rates on corporations are an increasing function of the corporation's pre-tax value, then the after-tax value of the firm is a concave function of its pre-tax value. If hedging reduces the variability of pre-tax firm values, then the expected corporate tax liability is reduced and the expected post-tax value of the firm is increased, as long as the cost of the hedge is not too large" (p. 392).

According to the Tax Reform Act of 1997, as amended by Republic Act No. 9337 (2005), the corporate tax rate in the Philippines is flat at 30% over all income levels. However, the presence of fixed tax credits, like net operating loss carry over, makes the effective tax schedule of Philippine firms progressive. Tax credits are earned by operation or definition of the tax law and may be fixed and unrelated to taxable income. Initial tax liability is computed from taxable income and is then reduced by tax credits. This reduction results in a lower net tax paid, which effectively lowers the tax rate. However, the change in effective tax rate varies depending on the taxable income of the firm. Given a fixed level of tax credits, a firm with higher taxable income will have a higher effective tax rate than a firm with lower taxable income.

### 2.2 Managers' Personal Utility Maximization

Managers may or may not diversify or manage firm-specific risks (Stulz, 1984; Smith & Stulz, 1985), and a manager's motivation depends on the kind of wealth he owns. This argument implies that on one hand, a manager who has more wealth invested in the firm's equity will have a greater incentive to manage the firm's risks, simply because it may be more costly for him to diversify his personal equity risks on his own. On the other hand, managers' compensation plans can influence the managers' hedging choices (Stulz, 1984; Smith & Stulz, 1985). For instance, the incorporation of option-like provisions in managers' compensation increases the incentives for managers to take risks. Consequently, if there is more option-like compensation for managers, it is less likely that they will

hedge the firm's performance. Less hedging will increase earnings volatility and will, in turn, increase the value of employee stock options they own.

### 2.3 Hedging Substitutes

Some of the market imperfections (e.g., underinvestment costs, etc.) may be remedied by other financing policies other than derivatives usage. Thus, the presence of some of the following factors may discourage the use of derivatives for hedging because it cures the problems of market imperfection.

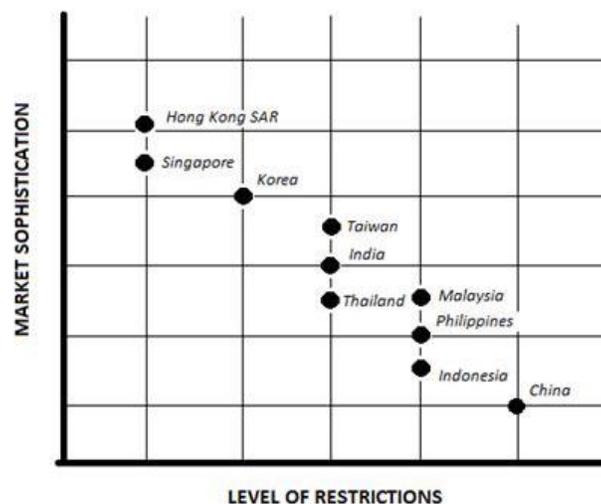
Nance, Smith, and Smithson (1993) suggested that a firm can reduce the conflict between shareholders and bondholders by means other than hedging with financial instruments. For instance, firms can reduce the agency conflict between shareholders and bondholders by issuing convertible bonds or preferred stock. They also proposed that dividend policy, too, influences a firm's need to hedge. Higher dividend declarations make it more likely that the firm will need funds to pay the fixed claimholders. This, in turn, will encourage firms to hedge to ensure that funds are available to cover fixed dividend payments.

Derivatives use can also be discouraged by ample liquidity. Eiteman (2009) contended that firms may have different classes of foreign exchange exposures – transaction, operating, or translation exposure. Natural hedges can mitigate transaction exposures and large cash balances may contribute to that hedge. A firm with more cash or liquid assets is less likely to engage in risk management, since it has a larger financial buffer. Therefore, it can easily absorb transactional exposures or volatility. This additional liquidity is enough to compensate for the increased exposure. In this case, firms may not be encouraged to use derivatives.

## 3 Derivatives use in the Philippines<sup>1</sup>

The level of sophistication of derivatives markets among Asian countries varies widely. Many markets are still in the early stages of development, while others boast of a relatively broad range of derivative products. Hohensee and Lee (2006) attributed this disparity to a strong inverse relationship between market sophistication and regulatory restrictions. In countries where regulation is lenient, such as Hong Kong and Singapore, derivatives markets are found to be the most sophisticated. At the other end of the spectrum, countries with more stringent policies such as China and Indonesia lag behind most of their Asian neighbors in terms of derivatives market development.

**Figure 1. Market Sophistication and Level of Restrictions in some Asian Countries**



Source: Hohensee and Lee (2006), DB Global Markets Research

<sup>1</sup> Discussions in this section are largely based from Circular no. 594 Series of 2008 of the Bangko Sentral ng Pilipinas.

While still relatively underdeveloped, the Philippines is moving towards improving the utilization of derivatives for risk management purposes. The International Monetary Fund's Monetary and Capital Markets and Asia Pacific Departments in its Financial System Stability Assessment—Update (2010) determined that the notional amount of stand-alone derivatives held by Philippine banks was—on average between February 2008 and August 2009—about PHP2.3 trillion (USD50 billion). Embedded derivatives amounted to about PHP13 billion (USD275 million). Foreign exchange derivatives are reported to be the most frequently traded stand-alone instruments, with foreign exchange forwards and swaps together constituting two-thirds of all derivative contracts and foreign exchange swaps representing about half of the derivatives markets.

Although there is currently no public market for derivatives in the Philippines, banks and other financial intermediaries, in recent years, have been empowered to offer derivative products with the help of some regulatory relief from the Bangko Sentral ng Pilipinas (BSP). Circular No. 594 Series of 2008 was promulgated by the BSP (amending Section X602 and its subsections of the Manual of Regulations for Banks or MORB), which softened the regulations governing derivative activities of banks. The new circular aimed to “promote growth in the domestic capital market by expanding the range of available derivatives which a bank can originate, distribute or use, without need of prior BSP approval (also known as generally authorized activities)” (Bangko Sentral ng Pilipinas). It had the dual effect of allowing banks to have more control over their own risks, while providing non-financial corporations with a wider array of derivative products to manage their own risks.

Circular No. 594 expanded the tenors of derivative products that banks could originate and use without prior BSP approval. Prior to this circular, the blanket approval given by the BSP for universal and commercial banks to engage in derivative activities was limited to Foreign Exchange (FX) forwards and swaps with tenor of one year or less. The new circular expanded this coverage. Starting 2008, Universal and Commercial Banks could transact in the following derivatives activities as dealers:

1. FX Forwards, FX Swaps, Currency Swaps and analogous financial futures with a tenor of three years or less, and
2. Interest rate swaps, forward rate agreements and analogous financial futures with a tenor of ten years or less.

Banks' additional allowable risk-taking was balanced by additional risk management systems required by the BSP. Universal and Commercial Banks wanting to offer more sophisticated derivative securities now had to lodge an application for expanded authority with the BSP. They could apply for one of the following types of expanded authority:

1. Type 1 – Expanded Dealer Authority. A Universal or Commercial Bank may apply for a Type 1 authority. A bank with this type of authority may transact in any financial derivatives as a dealer. Provided that a Bank with Type 1 authority shall comply with marketing and sales guideline of the BSP. Also, the BSP expects Banks with Type 1 authority to institutionalize a comprehensive and integrated risk management system, and sales and marketing practices that are deemed appropriate and adequate for the different derivatives activities it expects to engage in. The Bank must be rated at least “4” or better in the BSP CAMELS framework.
2. Type 2 – Limited Dealer Authority. As opposed to a general / comprehensive authority given in Type 1 authorization, Type 2 authorizations are only for marketing and sale of specific types of derivative securities. A bank with Type 2 authority may operate as a dealer in specific types of derivative products with specific underlying reference, as applied for by the bank, outside those financial derivative instruments under the expanded general authority to all Universal and Commercial Banks.

The relaxation of the rules that limited derivative marketing and distribution contributes to the increasing awareness and usage of derivative securities in the Philippines. These ongoing changes in the regulatory environment, combined with the robust economic growth and stability of the Philippine economy, are expected to add on to the dynamism of risk management activities of Philippine firms.

## 4 Research Objectives

This study aimed to test whether these theories behind derivatives use discussed hold true for Philippine firms. The study tested whether the theorized benefits, costs, and substitutes of derivatives in risk management affect Philippine firms' decision to use derivatives. Specifically, the study sought to answer the following questions:

1. Do derivative users (hereinafter referred to as 'Users') and derivative non-users (hereinafter referred to as 'Non-Users') have different firm characteristics? We tested these through tests of differences in means of different firm characteristics like firm size, liquidity, leverage, and others.
2. Do these firm-level characteristics affect the decision to use derivatives? The effects of firm-level characteristics were tested using random-effects logistic regression.

## 5 Sample and Variables

### 5.1 Sample

The study utilized data from annual reports submitted by listed companies to the Securities and Exchange Commission (SEC) and the Philippine Stock Exchange (PSE). Initially, seventy-seven (77) firms compose the sample. In particular, the sample is composed of firms included in the following sector indices of the PSE –Industrials, Property, Holding Firms, Mining, and Services. Financial Institutions were excluded in the sample because these companies may use derivatives for purposes other than risk management. For instance, they can use derivatives as a form of investment or an instrument to seize arbitrage opportunities. Since these motivations for derivatives use are outside the scope of this study, Financial Institutions were excluded from the sample.

Five years' worth of financial data (2007-2011) from annual reports were gathered, resulting in an initial firm-year observation count of 385. However, some of the firm-year observations needed to be excluded. Some firm-years lack market prices because the specific firm was listed after 2007. Some observations have negative book value of equity or negative earnings rendering the market-to-book ratio or the dividend payout ratio meaningless. Market-to-book ratio and the dividend payout ratio are used as explanatory variables in the logistic regression. The rest of the observations were excluded due to lack of some needed information since some firms had incomplete SEC submissions or did not disclose the study's required information in submitted Annual Reports. This resulted in a final firm count of 74 firms and 329 firm-year observations.

The final number of firms per sector, firm-year observations and percentage of firm-year observations wherein derivatives are used by firms is indicated below:

**Table 1. Sample Count and Statistics**

<b>Sector</b>	<b>Firms in Sample</b>	<b>Firm-year Observations</b>	<b>% of firm-years as Users</b>
Industrials	16	73	57.53%
Property	13	58	22.41%
Holding	13	64	42.19%
Mining	16	67	20.90%
Services	16	67	37.31%
<b>Total</b>	<b>74</b>	<b>329</b>	<b>36.78%</b>

## 5.2 Variables

### 5.2.1 Dependent Variable

**Derivatives usage (*deriv*).** The study aimed to determine the factors affecting the decision of the firms to hedge using derivatives. The dependent variable took the form of a binary variable wherein a value of “1” has been assigned when *firm<sub>i</sub>* used a derivative instrument at *time<sub>j</sub>* and “0” otherwise.

### 5.2.2 Explanatory Variables

#### 5.2.2.1 Market Imperfections

**Bankruptcy Costs.** Bankruptcy costs were represented in the analysis through Firm Size and Leverage. Leverage (*lev*) was defined as the ratio of book value of debt to firm size market value of equity (as previously defined). Myers (1984) proposed that, “risky firms ought to borrow less, other things equal” (p. 581). Here, leverage was attributed to costs of financial distress. A high leverage position will increase the probability that a firm will be under financial distress. Therefore, highly leveraged firms are more motivated to use derivatives to counteract its higher probability of distress brought about by leverage.

On the other hand, Firm Size (*logfs*) was defined as the natural logarithm of the sum of the book value of debt, book value of preferred shares (or market value, if traded) and market value of common equity. Ang, Chua, and McConnell (1982) proposed that bankruptcy costs increase less than proportionately as firm size increases. This implies that for larger firms, bankruptcy costs may be less significant. Since bankruptcy costs constitute a smaller portion of asset size, large firms are not motivated to curb bankruptcy costs. The opposite is true for smaller firms. They would have greater incentive to hedge so that they can reduce the probability of bankruptcy, which may take away a higher proportion of their assets.

However, the hedging decision can also be driven by the cost of setting up the corporate hedging activity (Nguyen & Faff, 2002). Over the counter markets may require minimum notional amounts which may be too large for some firms to take in. If this is the case, then a larger firm will be poised to use derivatives more often and will prohibit small firms from instituting risk management programs. Therefore, firm size may represent two ideas – if a positive relationship arises, then scale determines derivatives use. If a negative relationship is observed, then bankruptcy costs will be the determinant for derivatives use.

**Underinvestment Costs.** As previously discussed, underinvestment costs are potentially present when firms have growth opportunities. Therefore, the presence of growth opportunities should motivate derivatives use to minimize opportunity costs from underinvestment. The ratio of market value of equity to book value of equity (*mb*) was used to capture growth opportunities (Smith Jr. & Watts, 1992; Gaver & Gaver, 1993).

**Tax Benefits.** Theory posits that when the tax schedule is progressive, then risk management has value to the firm (Smith & Stulz, 1985; Graham & Rogers, 2002). However, the tax schedule is uniform in the Philippines as mandated by the Tax Reform Act of 1997. The presence of tax credits can potentially make the effective tax rate progressive, and that is the case in Philippine taxation. Taxation disclosure varies across the firms sampled. It was observed that of the different potential tax credits, only the Net Operating Loss Carryovers (*lognolco*) are consistently reported. Therefore, this metric was used to represent tax credits in the analysis. The natural logarithm of unused Net Operating Loss Carryovers was used in the regression.

#### 5.2.2.2 Managers’ Personal Utility

Agency costs depend on the security ownership of managers (Smith & Stulz, 1985). On one hand, if management owns equity shares of the firms they manage, then they would be encouraged to use corporate hedging to protect their own wealth. On the other hand, if management owns options, then they would want more equity volatility on the firms underlying equity to increase the value of their options. Management ownership of shares (*mgtown*) was measured as total shares owned by directors and management divided by the total outstanding shares similar to the measurement of Nguyen and Faff (2002). To account for options ownership (*esop*), a binary variable represented the presence of employee stock option plans in the firm sample.

### 5.2.2.3 Alternatives to Hedging

**Liquidity.** Liquidity was measured using two variables – the cash ratio (cash) and the current ratio (cr). Cash ratio is defined as the ratio of total cash and cash equivalents to current liabilities. Current ratio is computed the traditional way—the ratio of current assets to current liabilities.

**Dividend Policy.** The dividend policy was measured through the dividend payout ratio (dpo) of the firm in the sample. The dividend payout ratio is computed as the ratio of dividends per share to earnings per share. Nguyen and Faff (2002) and other empirical research used the dividend yield (ratio of dividends per share and price per share) as a measure of dividend policy. However, we used the dividend payout ratio in this study since we are trying to relate dividends to the ability to meet fixed payments. The dividend payout ratio may be a more consistent measure of dividend policy, an approach that was also considered by Berkman and Bradbury (1996).

**Presence of preferred shares.** The variable (ps) was measured by the ratio of book value (or market value, if traded) of preferred shares of a firm to the total firm size similar to the treatment and measurement of Nguyen and Faff (2002).

### 5.2.2.4 Regulatory Relief

**Regulatory relief.** The regulatory relief accorded by the BSP via Circular No. 594 Series of 2008 should encourage financial firms to offer more derivative products for non-financial firms. It will be interesting to note whether derivatives use was more encouraged after 2008. A dummy (postreg) was included in the analysis if the firm-year observation occurred after the regulatory relief (2009-2011).

## 5.3 Tests and Specification

Two levels of analysis were conducted. Key firm-level characteristics of Users versus Non-users are explored. Univariate analysis was undertaken to determine whether the means of these factors affecting derivative usage are significantly different for derivative users (users) and derivative non-users (non-users). Statistical tests of differences in means were employed in this analysis.

Simple univariate analysis was done to ascertain whether the means of these factors for users and non-users are statistically different from each other. The second layer of the analysis was through the use of panel logistic regression to assess the influence of these factors, taken together, on the firms' decision to use derivatives. The following logit model was employed to estimate the probability of derivatives use.

$$\Pr(\text{deriv}_i = 1) = \Phi \left( \alpha + \sum_{j=1}^J \beta_j MI_{ji} + \sum_{k=1}^K \beta_k MPU_{ki} + \sum_{l=1}^L \beta_l Alt_{li} + \sum_{m=1}^M \beta_m Others_{mi} \right) \quad (1)$$

where *deriv* takes on values of “1” (for users) and “0” (for non-users) for the *i*<sup>th</sup> firm-year observation, *MI*<sub>*j**i*</sub> is the *j*<sup>th</sup> Market Imperfection variable, *MPU*<sub>*k**i*</sub> is the *k*<sup>th</sup> Manager's Personal Utility variable, *Alt*<sub>*l**i*</sub> is the *l*<sup>th</sup> Alternatives to Hedging variable and *Others*<sub>*m**i*</sub> is the *m*<sup>th</sup> Other variable. Also,  $\Phi(\cdot)$  denotes the cumulative logistic distribution function.

The Hausman test was conducted with the results pointing to the use of a random-effects panel model. Fixed-effects models cannot be used to investigate time-invariant causes of the dependent variables. According to Kohler and Kreuter (2012), fixed-effects models are designed to study the causes of changes within a person (or entity). This was not the main direction of the study.

**Table 2. Hausman Test Results**

Variable	Coefficients		Standard Error
	Fixed	Random	
Firm Size ( <i>logfs</i> )	-3.057	2.504	3.010
Leverage ( <i>levm</i> )	0.253	0.360	0.405
Market-Book Ratio ( <i>mb</i> )	-1.050	-0.747	0.792
NOLCO ( <i>lognol</i> )	0.385	0.126	0.260
ESOP ( <i>esop</i> )	3.062	3.611	3.726
Mgt Ownership ( <i>mgtown</i> )	-141.720	2.596	192.645
Cash Ratio ( <i>cash</i> )	-69.169	-16.753	29.740
Current Ratio ( <i>cr</i> )	-0.615	-0.871	1.160
Preferred Shares ( <i>ps</i> )	39.875	8.678	58.955
Dividend Payout Ratio ( <i>dpo</i> )	0.640	0.646	1.750
Post Regulation Relief ( <i>postreg</i> )	3.363	0.770	1.517

Note.  $H_0$  = difference in coefficients is not systematic;  $\text{Chi}^2_{(11)} = 13.56$ ;  $\text{Prob} > \text{Chi}^2 = 0.2585$

Hausman test results indicated that the null hypothesis that the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables is not rejected. Thus, a random effects panel logistic regression was more appropriate.

## 6 Empirical Results

### 6.1 Univariate Analysis Results

The table below shows the descriptive statistics for derivative users and non-users as a group. As indicated by the p-values, users were statistically different from non-users with respect to firm size, leverage, growth opportunities, current ratio, dividend policy, presence of employee stock options, and holdings of preferred shares. The predictions for the difference in means were also consistent for all significant variables except for growth opportunities, the presence of employee stock option plans, management ownership, dividends, and preferred shares. Table 3 below shows the results of the tests.

**Table 3. Results of Univariate Tests (Differences between Means of Users versus Non-Users)**

Motivation	Variable	Theory	USERS		NON-USERS		Users = Non-Users
			Mean	Std Error	Mean	Std Error	p value
Bankruptcy Costs or Scale	Firm Size ( <i>logfs</i> )	U < NU / U > NU	25.31	.1194	22.70	.1299	0.0000*
Bankruptcy Costs	Leverage ( <i>levm</i> )	U > NU	1.57	.2272	.8299	.1422	0.0037*
Underinvestment	Growth Opp( <i>mb</i> )	U > NU	2.01	.1437	2.85	.2788	0.0289*
Tax Benefits	NOLCO ( <i>lognol</i> )	U > NU	16.36	0.678	12.85	0.586	0.0002*
Agency Cost	ESOP ( <i>esop</i> )	U < NU	.521	.0456	.1875	.0271	0.0000*
Agency Cost	Mgmt Ownership ( <i>mgtown</i> )	U > NU	.066	.0152	.088	.0119	0.2442
Alternatives	Cash Ratio ( <i>cash</i> )	U < NU	.0084	.0072	.0889	.0075	0.6551
Alternatives	Current Ratio ( <i>cr</i> )	U < NU	1.448	.0697	5.399	.7921	.0002*
Alternatives	Dividend Payout( <i>dpo</i> )	U < NU	.420	.0645	.223	.0537	0.0222*
Alternatives	Preferred Shares ( <i>ps</i> )	U < NU	.0248	.0071	.0059	.0012	.0010

\*p < .05.

### 6.2 Logistic Regression Results

Random-effects logistic regression predicts the relationship between the likelihood that a firm uses derivatives and the incentives or disincentives to use derivatives as represented by the independent variables. The table below presents the results of the logistic regression.

**Table 4. Results of Random-effects Logistic Regression**

Variable	Notation	Coefficient	Odds Ratio	Z	P> z
Firm Size	<i>Logfs</i>	2.504	12.23	4.35	0.000*
Leverage	<i>levm</i>	0.360	1.434	1.714	0.087
Market-Book Ratio	<i>mb</i>	-0.748	0.474	-2.09	0.036*
NOLCO	<i>lognol</i>	0.126	1.135	1.87	0.061
Stock Options	<i>esop</i>	3.611	36.980	2.65	0.008*
Mgr Shares	<i>mgtown</i>	2.596	13.410	0.73	0.463
Cash Ratio	<i>cash</i>	-16.753	5.30e-08	-2.25	0.024*
Current Ratio	<i>cr</i>	-0.871	0.418	-1.80	0.072
Preferred Shares	<i>ps</i>	8.678	5869.76	0.56	0.577
Dividend Payout	<i>dpo</i>	0.646	1.908	0.81	0.418
Post regulation relief	<i>postreg</i>	0.769	2.158	1.02	0.306
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Sigma_μ	4.5795				
Rho	0.8643988				
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Wald Chi <sup>2</sup> <sub>(11)</sub>	27.13	<b>Log likelihood</b>		-71.64327	
Prob> Chi <sup>2</sup>	0.0044				

\*p &lt; .05.

Results indicated that the following variables significantly influence the decision of firms to use derivatives for risk management purposes: Firm Size, Growth Opportunities, Presence of Employee Stock Option Plans, and Liquidity.

## 7 Discussion of Results

### 7.1 Positive Influences on Derivatives Use

Results have shown that firm size has a positive influence on derivatives use, suggesting that scale—rather than bankruptcy costs—determine derivative usage in the Philippines. This is understandable because of the relatively underdeveloped derivative market in the Philippines. Over-the-counter markets may require higher notional principals before agreeing to open derivative positions. Thus, the market may require scale before firms can use derivatives. Also, this may reflect the high cost of setting up a risk management department and the lack of skills relevant for risk management (Berkman & Bradbury, 1996).

Another result was that the presence of employee stock options is an incentive for derivatives use. However, it is interesting to note that the resulting relationship is contrary to theory. Theory posits that employee stock options will influence management to encourage volatility of firm value because it will increase the value of their option holdings (Smith & Stulz, 1985). Therefore, we expect an inverse relationship between management option-holding and use of corporate derivatives. The opposing result from the logistic regression may indicate that this is because the presence of stock options is positively related to the sophistication of a firm's financial policies. Naturally, a firm that uses stock options has a better grasp of how derivative products work and will be more likely to use derivatives for corporate hedging.

### 7.2 Negative Influences on Derivatives Use

Liquidity is a disincentive for derivatives use. This may be due to the nature of the risks being hedged by Philippine firms. When the risks hedged are transactional in nature, then having sufficient liquidity may be enough to handle the impending risks. While stocking up on cash is a completely valid way to anticipate volatility, this may prove costly because short-term assets are generally low yielding. The use of derivatives allows this “financial buffer” to be freed up and used in a more productive

manner. Therefore, the use of liquidity for risk management purposes is consistent with the lack of sophistication of risk management for firms in the sample.

The logistic regression showed that growth opportunity has a negative effect on the decision to use derivatives. However, this result is contrary to theory. Previous studies have had conflicting empirical results on the relationship between growth opportunities and derivatives use. A positive association is generally expected under the assumption that underinvestment is more severe when firms have more opportunities for growth. Since underinvestment is more severe, then there is more motivation to use derivatives to arrest these underinvestment costs. Studies by Nance et al. (1993), Geczy, Minton, & Schrand (1997), Gay and Nam (1998), and Allayannis and Ofek (2001) have been consistent with this conclusion. However, other research that used different proxies for growth opportunities, different samples, and time periods conclude the opposite or no relation between growth opportunities and derivatives use (Tufano, 1996; Haushalter, 2000; Graham & Rogers, 2002).

Chiorean, Donohoe and Sougiannis (2012) exhaustively studied underinvestment costs and derivative usage and proposed that previous studies fail to consider two aspects of growth opportunities— endogeneity and monotonicity. Chiorean et al. (2012) explained that “endogeneity arises in the underinvestment setting because an underinvestment problem can lead some firms to use derivatives, while the use of derivatives can simultaneously reduce observable underinvestment. As a result, it can be difficult to estimate the cross-sectional association between derivatives use and underinvestment at a single point in time” (p. 3). They also explained that there may be differing empirical evidence because these previous research “assumes a monotonic relation between measures of growth opportunities and underinvestment. However, economic theory suggests that access to growth opportunities and the ability to invest in those opportunities vary according to firm life cycle. As a result, more growth opportunities do not necessarily imply more underinvestment because access to growth opportunities and investment ability are not equivalent across firms” (p. 3). Chiorean et al. (2012) then fixed these two failures in their empirical model and concludes that “firms neither implement derivatives to reduce underinvestment nor alter their investment behavior after beginning to use derivatives” (p. 1), which is consistent with the results of this study.

### **7.3 Factors with No Significant Effect on Derivatives Use**

Leverage has no significant influence on derivatives use. Although the relationship is consistent with theory, it is not statistically significant at the 95% level. Also, tax incentives have no significant effect on derivatives use. The main reason is that the Philippine corporate tax schedule is uniform and is not progressive as embodied in the Tax Reform Act (1997). Tax credits in the Philippine taxation system such as NOLCOs, and tax holidays may not be enough or too insignificant to transform effective tax rates to progressive.

Lastly, a dummy variable was included in the regression to indicate periods after the implementation of Circular No. 594 Series of 2008 of the BSP on the theory that regulatory relief on banks’ ability to distribute derivative products will encourage the practice of corporate hedging. Logistic regression, however, shows no significant effect. A main contributing factor to this result might be the continual relative inaccessibility of derivative products. There is neither a public market nor more formal infrastructures to aid corporations in obtaining products. Therefore, the regulatory relief is clearly not enough to augment the practice of corporate hedging. This may be due to the possibility that there may be very limited programs for corporations and its management regarding the benefits and use of corporate hedging.

## **8 Conclusion**

We gathered data from the Annual Reports of listed companies in the Philippine Stock Exchange to determine the firm-level characteristics that influence decisions to use derivatives for corporate hedging. We anchored the analysis on three specific points. First, we contend that corporate hedging maximizes shareholder value by mitigating the negative effects and enhancing the positive effects of market imperfections (underinvestment costs and bankruptcy costs, and tax shield, respectively). Second, derivative usage can also be influenced by the personal motivations of managers. If their wealth is in the form of equity shares then they will favor corporate hedging, but if wealth is in the

form of options then they would favor more volatility. Lastly, the use of derivatives can be affected by other substitutes that can effectively mitigate agency costs and market imperfections, such as use of preferred shares, liquidity, or large dividends.

We used random-effects logistic regression and determined that firm size, growth opportunities, presence of employee stock option programs, and liquidity significantly affect the decision of firms to use derivatives. The positive effects of firm size and use of employee stock options on the decision to use derivatives may signal that, in the Philippines, only corporations which are big enough or are more financially sophisticated (which is largely determined by scale) have a greater probability of using derivatives. The negative effect of liquidity on the decision to use derivatives may partially confirm this theory. If firms use more liquidity to serve as their “natural hedge” or financial buffer, instead of using derivatives, then this speaks on the level of sophistication of firms’ financial policies. This may partially be backed up by the fact that the improvements brought about post-Circular No. 594 Series of 2008 have an insignificant effect on derivatives usage. While BSP’s efforts are laudable, it is not enough. Knowledge on corporate hedging may not be enough or, simply, the infrastructure or market where derivatives can be obtained is not very accessible to some firms. In any case, the Philippines has a long way to go in order to develop a dynamic derivatives market. The data shows that only big or the financially savvy corporations are more likely to take advantage of the benefits of hedging. Philippine regulatory agencies have to work harder to make corporate hedging an alternative that all corporations can take advantage of.

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