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Derivatives Usage by Australian Industrial Firms: Pre-, during and post-GFC

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***A*bstract**: We avail of International Accounting Standards IFRS 7 to investigate the usage and motivation of hedging by non-financial Australian firms. We examine the usage of derivative instruments in relation to features such as firm size, the firm's return on equity, leverage, and growth characteristics. The results of our panel data logistic regression indicate that the use of hedging instruments in Australia is influenced positively by the firm's gearing ratio and negatively by its propensity to growth.

Keywords: Derivatives; Hedging; Risk management; Panel data; Logit analysis

JEL Classifications: G32, G15, C33, G41

1. Introduction

A commonality across prior studies is that the industry and greater size of the firm are strongly related to financial derivative usage. Generally, firm leverage is also found to be positively related to derivative usage. Interestingly, past studies have indicated that German firms are more likely to use derivative contracts than US firms (Bodnar and Gebhardt,1999), as well as being more widespread in Canada than in the US and continental Europe (Jalilvand and Switzer, 2000). Our paper aims to verify if firm's characteristics are determinant to explain usage of derivative instruments in the context of Australia, pre-, during and post-GFC (Global Financial Crisis). Our findings show that firms with higher gearing ratios are more likely to hedge. However, we do not find that larger firms from our sample are statistically more likely to hedge. When we control for the period as pre-, during or post-GFC (final column) we observe that the dummy variable is more highly significant for the usage of derivatives in the period of the GFC.

Firms may use derivatives both for speculative, which is to say, profit seeking purposes, which activity may lead to an increase in the firm's risk, as well as using derivatives to hedge to reduce the firm's risk exposure. Both uses of determinants by firms have been reported, supporting both rationales. The use of derivative instruments as a means of hedging financial exposure has been researched in relation to such as exchange rates, interest rates and commodity prices. These papers

usually carry the additional objective of identifying the use of derivatives in hedging in relation to particular countries.[1]

We consider the use of derivatives as a hedging tool aimed at minimising firm-level cash flow volatility. Thus, we seek to contribute to the literature that considers that there might be an optimal hedging ratio for each firm depending on its own characteristics. For example, prior research seeks to relate the hedging use of derivatives to the firm's size, its exposure to foreign currency, denominated debt, growth opportunities, the ratio of foreign sales to total sales, and corporate governance (Birt *et al*. (2013); Smith and Stulz (1985); Froot *et al*., 1993).

Investigation of derivative usage by firms has, until recently, relied on questionnaire surveys addressed to firms. These have been dependent on the integrity - the knowledgeable authority and conscientious response - of the recipients to the survey. An alternative approach to determining the use and motivation of derivative usage by firms has been made available more recently by International Accounting Standards IFRS 7, which requires firms to report their motivation for derivative usage as it accords with their hedging of exposure. This paper takes advantage of reporting across firms in Australian non-financial firms. The paper's contribution lies in investigating derivative usage by firms pre-, during, and post-GFC in Australia.

To this end, we commence with application of panel data logistic regressions to the usage of derivatives by 72 non-financial companies that are listed in the ASX (Australian Stock Exchange) as constituents of the S&P/ASX 200, the most tradable investment benchmark in Australia. We are able to substantiate our findings with application of a panel data logistic methodology, which has the advantage of combining a cross-sectional data approach with a time-series dimension.

The structure of this paper is as follows. Section 2 introduces the International Accounting Standards IFRS 7 context of the study. Section 3 surveys the background literature on the use of derivatives. In Section 4, we present our data and report the main results of the paper. Concluding comments are provided in Section 5.

2. International Accounting Standards IFRS 7

Following International Accounting Standards IFRS 7, firms are now expected to report both qualitatively as well as quantitatively their exposures in relation to such as foreign exchange, interest rates, commodity prices, and their equity valuations, as well as making explicit reports in relation to their adopted category of hedging instrument. More specifically, IFRS 7.33 anticipates that management report qualitatively on its objectives, policies and processes for managing their risk exposures, as well as the type of financial instrument employed in relation to such risks, while IFRS 7.34 requires that the firm provide quantitative disclosure about the extent to which the firm is exposed to risk based on the firm's internal risk assessment indexes. This analysis is expected to make reference to the firm's credit risk (defined as the risk that one party to a financial instrument will cause a loss for the other party by failing to pay its obligation); liquidity risk (defined as the risk that an entity will have difficulties in paying its financial liabilities); and market risk (defined as the risk that the fair value of a financial instrument or cash flows will fluctuate due to changes in such as interest rates, currency exchange rates, and commodity prices).

[1] We have, for example, Bodnar *et al*., 1996; Bodnar *et al*., 1998 (US); Bodnar and Gebhardt, 1999 and Fatemi and Glaum, 2000 (Germany); Bodnar *et al*., 2003 (Netherlands); Bodnar *et al*., 2013) (Italy); Mallin *et al*., 2001; and Judge ,2006 (UK); Junior , 2013 (Brazil); Alkeback and Hagelin ,1999 and Brunzell *et al*., 2011 (Scandinavia); and Jalilvand and Switzer , 2000 (in a survey covering Canada, America, and Europe).

Thus, in relation to credit risk, firms are required to disclose their maximum credit exposure (before deducting the value of collateral), description of collateral, information about credit quality of financial assets that are neither past due nor impaired, and information about the credit quality of financial assets whose terms have been renegotiated (IFRS 7.36), as well as report on financial assets that are past due or impaired, analytical disclosures are required (IFRS 7.37), and provide information about collateral or other credit enhancements obtained or called (IFRS 7.38). In relation to liquidity risk, firms are required to include a maturity analysis of financial liabilities with a description of the firm's approach to risk management (IFRS 7.39). And in relation to market risk, firms should reflect their interest rate risk, currency risk and other price risks, with disclosures in relation to a sensitivity analysis of each type of market risk to which the entity is exposed (IFRS 7, Appendix A).

3. Literature Review

Studies on derivative use have generally relied on the use of survey results from firms, the format generally following that of the Wharton surveys for the US (Bodnar *et al.* , 1996; Bodnar *et al.* , 1998). A similar survey approach has been followed in an Australian context by Benson and Oliver (2004). In such studies, the firm's motivation for derivative usage is restricted to responses on factors such as firm size and the degree of foreign trade, as might reasonably be considered answerable by the recipient of the survey.

Notwithstanding such limitations, general patterns of application of derivatives have emerged from such surveys collectively. The usage by firms in New Zealand has been reported as 53.1% (Berkman *et al*., 1997); in Sweden, 52% (Alkeback and Hagelin, 1999); in Germany, 78% (Bodnar and Gebhardt, 1999); in Hong Kong and Singapore, 78% (Sheedy, 2001); in the UK, 60% (Mallin *et al*., 2001); and in the Netherlands, 60% (Bodnar *et al*., 2003). Usage of FX derivatives has traditionally not been as widespread in the US, which may be accounted for by a lower foreign exchange exposure. However, Bodnar *et al*., (1996) report 41% of US firms using derivative instruments, with considerably higher proportions at that time determined for other countries.

The motivations for the application of derivatives reveal some interesting comparisons across countries. For example, Bodnar *et al*. (1998) report that 4% (6%) of firms in the US frequently take active (long and short) positions in interest rate (foreign exchange) derivatives and that up to 37% (26%) do this sometimes. Ceuster *et al*. (2000) report that trading for profit is an important motive for more than 20% of the Belgian firms in their dataset. Alkeback and Hagelin (1999) report that 15% of firms frequently use derivatives for arbitrage in their Swedish sample and that another 23% do this occasionally; while Pramborg (2005) reports that 38% (10%) of Korean firms use derivatives to arbitrage (speculate), compared with 35% (33%) for Swedish firms. Brunzell *et al*. (2011) report that derivative users can be categorized as generally large firms, often concentrated in industries such as manufacturing or primary products - rather than, for example, services (excluding financials) and retail trade. The most common risks hedged are currency risk (using forwards) and interest rate risk (using swaps).

Studies have also sought to examine the motivation of management use of derivatives from a personal perspective. Thus, a theoretical argument predicts that if manager wealth is a concave function of firm value, the manager has incentive to hedge, whereas if wealth is a convex function of value (for example, the manager owns options on the firm's stock) the manager has an inducement not to hedge. Although initial research appeared to negate such a widespread possibility (Berkman and Bradbury,1996; Gèczy *et al*.,1997), subsequent research has tended to support the hypothesis. Thus, Whidbee and Wohar (1999) find that firms with a high percentage of CEO shareholdings in the banking industry are less likely to use derivatives. Rogers (2002) reports a

negative relationship between risk-taking incentives for US CEOs identified by their ownership of stocks and options and their use of corporate derivatives. Knopf *et al*. (2002) also identify the firm's propensity to hedge in relation to the manager's own sensitivity to stock price outcome.

The issue whether the motivation for derivative hedging is dominated by cost-related outcomes from the perspective of the firm, as opposed to managements' personal risk-related concerns, is addressed indirectly by studies that seek to identify a relation between firm value and hedging. Thus, Allayannis and Weston (2001) find a positive relationship between firm value and the use of foreign currency derivatives. Bartram *et al*. (2009) in an international setting of 48 countries find that the positive valuation effect of derivatives use is present primarily for firms using interest rate derivatives, which finding is supported by Allayannis *et al*. (2007) in their sample from 35 countries. Lel (2009) in a study for firms from 34 countries finds that firms that enjoy strong governance are more likely to use foreign exchange derivatives to hedge currency exposure and to overcome market frictions, whereas weakly governed firms use them for managerial reasons and engage only in selective hedging. Bartrama *et al*. (2011) also find a qualified support for a positive effect of derivatives usage on firm value.

Another line of study, which is followed by the present paper, utilizes data on derivatives positions and firm characteristics from corporate annual reports and proceeds to draw inferences as to the determinants of hedging or derivatives use. In this approach, tax-related reasons, costs of financial distress, and agency costs have been advanced as rational motivations for derivative usage (Nance *et al*., 1993). The above findings of Nance *et al*. (1993) confirming tax, financial distress, and agency costs as motivations for derivative usage, have received support from such as Berkman and Bradbury (1996) using data for New Zealand; Judge (2006) for the UK; and Gèczy *et al*. (1997 for the US. These studies also support the use of hedging to increase debt capacity. In addition, Brunzell *et al*. (2011) whose study seeks to overcome the limitation of survey studies by combining a survey sample with financial variables, emphasize only weak support for a speculative use of derivatives. For listed firms from four Nordic countries, they report that about 62% use derivatives, with the hedging motive clearly dominating.

A number of studies have been conducted in an Australian context. Typically, however, the papers report findings that predate the GFC. For example, we have Heaney and Winata (2005) who use 1999 annual reports; Benson and Oliver (2004) who use questionnaires mailed in 2000; Yong *et al*. (2014) who apply a time-series to data from beginning of 1999 to end of 2000; Nguyen and Faff (2010) who avail of two financial years, 1999 and 2000; Nguyen *et al*. (2010) who use August 2002-December 2005 data; Berkman *et al*. (2002) who use annual reports for 1995; Frino *et al*. (2009) who report on the period 31July 2003-31 July 2006; and Brailsford *et al*. (2005) use annual reports ended 30 June 1999. Yip and Nguyen (2012) use more recent data covering 2006-2009, which allows for pre-crisis and during-crisis analysis, but not post-crisis. Their analysis is also restricted to FX derivatives usage in the resources sector. The most recent study by Birt *et al*. (2013) investigates derivatives use in the extractive industries in 2008.[2]

[2] Yip and Nguyen (2012) in the context of Australian resource companies find that approximately 36% of their sample firms are users of derivatives with firm size a more significant determinant of derivative usage than the firm's risk exposure. The authors nevertheless cast doubt on the actual effectiveness of foreign currency derivatives in alleviating exchange rate exposures during the crisis and opposed to the pre-crisis period. This work follows from such as Bartram *et al*. (2011), which work questions the effectiveness of derivatives covering foreign exchange, interest rate, and commodities risk.

4. Data, Methodology, and Results

We restrict the sample to non–financial firms to reflect our focus on end–users of derivatives (recognizing that financial firms act as both users and dealers of derivatives). We obtain sector classifications as non-financial companies from NACE Rev.2. The European Classification of Economic Activities (NACE) is the European reference framework for the production and the dissemination of statistics related to economic activities. NACE Rev. 2, which was adopted in 2006 and replaces NACE Rev. 1.1.

For each non-financial company publicly listed on the ASX, we sought information on the company's use of derivatives, as well as the proposed explanatory variables: company size, return on equity (*ROE*), gearing ratio, and price to book (*P/B*). As an outcome, we succeeded in collecting the required information for 72 non-financial companies listed on the ASX for the period 2007-2010. GFC began on August 9, 2007 with a crisis in the subprime mortgage market in the US, and developed with the collapse of the investment bank Lehman Brothers on September 15, 2008. As the result, financial reports are selected to represent pre (2006-2007), during (2007-2008) and post (2009-2010) GFC.

Table 1 summarizes the hedging concerns and preferred derivative instruments of ASX firms. The table 1 captures the number of reported incidents of usage for each type of derivative (forwards, futures, Swaps and options) and their application (to foreign exchange, interest rate, commodity exposure or equity exposure). Foreign exchange and interest rate hedging dominate the objects of hedging, with forwards and Swaps as the preferred hedging devices.

Table 1. Number of company-year derivative use by instrument and exposure

Derivative type / **Risk type**	Forwards	Futures	Swaps	Options
Foreign Exchange	234	0	106	58
Interest Rate	11	1	255	51
Commodity	54	12	24	25
Equity	8	0	16	7

Descriptive statistics are presented in Table 2 [3]. Mean and median values are presented, together with standard deviations, maximum and minimum observations.

Table 2. Descriptive statistics for ASXC non-financial firms (June 2006-July 2010)

Item	**Mean**	**Median**	**Standard deviation**	**Maximum**	**Minimum**
Operating revenue (billion dollar)	4.51	1.43	9.62	59.97	4.18E-05
ROE (%)	19.9	19.3	29.5	146.9	-189.5
Gearing ratio (%)	80.7	66.9	63.8	427.1	0.26
P/B (times)	3.2	2.2	2.9	19.9	0.21

[3] As of 23/11/2015, the combined market capitalization of S&P/ASX 200 is about 1 trillion USD. The non-financial firms (industrials) selected market cap is close to 320 billon USD. Financials constitute more than 45% of the index weight.

The table reports descriptive statistics for non-financial listed firms on the ASX (72 firms for which we have data available from ORBIS). We report averages, medians, standard deviations, maximum, and minimum of firms, for which the financial information item has been obtained for the following variables: *operating revenue*, *return on equity* (*ROE*), *Gearing ratio*, and *price-to-book-value ratio* (*P/B*). Financial data are taken from the ORBIS database. Annual reports of companies are used for derivative usage.

To determine the firm characteristics that are associated with derivative usage, we run a panel data logistic regression model (applied to the period July 2006-June 2010 as a "short-wide" analysis) as

$$USE_{it} = \alpha_i + \beta_1 SIZE_{it} + \beta_2 ROE_{it} + \beta_3 gearing\ ratio_{it} + \beta_4 (P/B)_{it} + v_{it} \quad (1)$$

where,

it is the subscript for firm *i* in year *t* of the firm's annual report (2007- 2010);

USE_{it} for firm *i* in year *t* takes the value of 1 if the firm used a derivative in the report for that year, and is otherwise zero;

SIZE is the turnover in billion USD;

ROE is the ratio of net income to shareholder funds;

gearing ratio is the ratio of non-current liabilities plus loans to shareholder funds, which following the argument that higher gearing implies higher costs of financial distress is expected to be positively related to derivatives usage (Smith and Stulz, 1985);

P/B is *the market-price-of-equity-to-book-value ratio*, which proxies for growth options and is expected to be positively related to derivative usage, for example, due to agency considerations (Froot *et al*., 1993);

and v is an error term.

To allow for a comparative analysis of derivative usage, as pre-GFC, during-GFC and post-GFC, we also allow a dependence on the period of the reported usage as a pre-GFC (July 2006-June 2007), during-GFC (July 2007-June 2008), or post-GFC (July 2009-June 2010) applied as a dummy variable, $Year_{i,t}$ (= 1 if the particular period is captured, and 0 otherwise) in the analysis. Thus, we run a panel data logistic regression model that incorporates the additional coefficients β_5, β_6 *and* β_7 for the period of the survey:

$$USE_{it} = \alpha + \beta_1 SIZE_{it} + \beta_2 ROE_{it} + \beta_3 gearing\ ratio_{it} + \beta_4 (P/B)_{it} + \beta_5 Year_{i06\text{-}07} + \beta_6 Year_{i07\text{-}08} + \beta_7 Year_{i09\text{-}10} + v_{it} \quad (2)$$

A panel data Logit analysis is designed to be applicable to "short-wide" data, meaning data that is "short" in time, but "wide" with sufficient data points. The power of the analysis lies in its referencing of data simultaneously through time and in cross-sectional. We avail of 72 companies for which we have reports in each of the four 4 years, June 2006-July 2010. Thus, our analysis covers firms pre- during and post-GFC. The results of the analysis in Table 3 highlight a finding common to studies in other regions, in that firms with higher gearing ratios are more likely to hedge (middle and final columns), which supports the argument that higher gearing implies higher costs of financial distress and is therefore positively related to derivatives usage. However, we do not find that larger firms from our sample are statistically more likely to hedge. When we control for the period as pre-, during or post-GFC (final column) we observe that the dummy variable is more highly significant for the usage of derivatives in the period of the GFC.

Table 3. Derivatives usage and determinant factors

Model / Variables	"Short-Wide" panel data Logit analysis (June 2006-July 2010)		Panel data Logit analysis, with the period of the report as a dummy variable	
	Coefficient	**p-value**	**Coefficient**	**p-value**
Constant	11.86***	0.00	7.48**	0.02
SIZE	0.13	0.57	0.36	0.20
ROE	0.02	0.20	0.07**	0.04
gearing ratio	0.04***	0.06	0.11***	0.00
P/B	-0.52***	0.01	-0.34	0.18
July 2006-June 2007			3.73*	0.07
July 2007-June 2008			5.62***	0.01
July 2009-June 2010			3.56*	0.07
Cross-sections	72		72	
No. of observations	286		286	

Notes: ***,**, and * indicate statistical significance at the level of 1%, 5% and 10%, respectively.

The results in the middle column are for the coefficients β_1, β_2, β_3, and β_4 for the regression panel Logit model as Equation (1), combined "short-wide" analysis (June 2006 - July 2010) on determinants of derivative usage. "Derivative usage" as the dependent variable takes a value of 1 if the company has used derivatives, and 0 otherwise. *SIZE* is the firm turnover in billion USD; *ROE* is the ratio of net income to shareholder funds; *gearing ratio* is the ratio of non-current liabilities plus loans to shareholder funds, which captures the firm's capital risk management; *P/B* is the ratio of market-price-of-equity-to-book value, which proxies for growth.

The results in the right column allow for the additional coefficients of β_5, β_6, and β_7 for the year of the survey, respectively. Refer to Equation (2) above.

It is interesting to observe also that following our "short-wide" panel data Logit analysis, firms with a higher *P/B* ratio (a proxy for growth) appear *less* likely to hedge (middle column). However, when we allow the reporting year as a dummy (final column), the effect disappears. This suggests that the higher use of derivatives in the period of the GFC is captured by a lower *P/B* in this period (resulting in the negative relation in the "short-wide" analysis). Similarly, the positive relation between derivative usage and *ROE* when we have the period as a control dummy for the GFC (final column) is suppressed in the "short-wide" panel Logit data (middle column) due to the negative association between *ROE* and the period of the GFC.

5. Conclusion

Our contribution has been to acknowledge the growing importance of derivatives in Australia. We investigate industrial companies that comprises the Australia most tradeable and benchmark index S&P/ASX 200. We find that foreign exchange exposure and interest rate exposure, followed by commodity exposure and equity exposure, are the risks most likely to motivate hedging by firms. The hedging instruments that are most likely to be applied are forwards and swaps, followed by futures, and options. In addition, we are able to relate the hedging propensity of firms to characteristics of the firm, especially to the firm leverage ratio, but also to the firm's return on equity (*ROE*). It is noteworthy that firm usage of derivatives increased significantly during the GFC. Nevertheless, it appears that the use of derivatives by firms has significantly subsided post-GFC. On the evidence, a "fear-factor", has not been sustained.

References

[1] Alkeback, P., Hagelin, N. (1999). "Derivatives Usage by Non-Financial Firms in Sweden with an International Comparison", *Journal of International Financial Management and Accounting*, 10(2): 105-120.

[2] Allayannis, G., Miller, D.P., Lel, U. (2007). "Corporate governance and the hedging premium around the world", Darden Business School Working Paper.

[3] Allayannis, G., Weston, J. (2001). "The use of foregin currency derivatives and firm market value", *Review of Financial Studies*, 14(1): 243-276.

[4] Bartram, S.M., Brown, G.W., Conrad, J. (2011). "The effects of derivatives on firm risk and value", *Journal of Financial and Quantitative Analysis*, 46(4): 967-999.

[5] Bartram, S.M., Brown, G.W., Fehle, F. (2009). "International evidence on financial derivative usage", *Financial Management*, 38(1): 185-206.

[6] Benson, K., Oliver, B. (2004). "Management Motivation for Using Financial Derivatives in Australia", *Australian Journal of Management*, 29(2): 225-242.

[7] Berkman, H., Bradbury, M.E. (1996). "Empirical Evidence on Corporate Use of Derivatives", *Financial Management*, 25(2): 5-13.

[8] Berkman, H., Bradbury, M.E., Hancock, P., Innes, C. (2002). "Derivative financial instrument use in Australia", *Accounting and Finance*, 42(2): 97-109.

[9] Berkman, H., Bradbury, M.E., Magan, S. (1997). "An international comparison of derivatives use", *Financial Management*, 26(4): 69-73.

[10] Birt, J., Rankin, M., Song, C.L. (2013). "Derivatives use and financial instrument disclosure in the extractives industry", *Accounting and Finance*, 53(1): 55-83.

[11] Bodnar, G.M., Consolandi, C., Gabbi, G., Jaiswal-Dale, A. (2013). "Risk Management for Italian Non-Financial Firms: Currency and Interest Rate Exposure", *Eurpoean Financial Management*, 19(5): 887-910.

[12] Bodnar, G.M., De Jong, A., Macrae, V. (2003). "The Impact of Institutional Differences on Derivatives usage: a comparative study of US and Dutch Firms", *Eurpoean Financial Management*, 9(3): 271-297.

[13] Bodnar, G.M., Gebhardt, G. (1999). "Derivatives usage in risk management by US and German non-financial firms: a comparative survey", *Journal of International Financial Management and Accounting*, 10(3): 153-187.

[14] Bodnar, G.M., Hayt, G.S., Marston, R.C. (1996). "Wharton 1995 Survey of Derivative Usage by US Non-Financial Firms", *Financial Management*, 25(4): 113-133.

[15] Bodnar, G.M., Hayt, G.S., Marston, R.C. (1998). "1998 Wharton Survey of Financial Risk Management by US Non-Financial Firms", *Financial Management*, 27(4): 70-91.

[16] Brailsford, T., Heaney, R., Oliver, B. (2005). "Use of derivatives in public sector organisations", *Accounting and Finance*, 45(1): 43-66.

[17] Brunzell, T., Hansson, M., Liljeblom, E. (2011). "The Use of Derivatives in Nordic Firms", *The European Journal of Finance*, 17(5-6): 355-376.

[18] Ceuster, M.J.K.D., Durinck, E., Laveren, E., Lodewyckx, J. (2000). "A Survey into the use of Derivatives by large non-financial Firms operating in Belgium", *Eurpoean Financial Management*, 6(3): 301-318.

[19] Fatemi, A., Glaum, M. (2000). "Risk management practices of German firms", *Managerial Finance*, 26(3): 1-17.

[20] Frino, A., Lepone, A., Wong, B. (2009). "Derivative use, fund flows and investment manager performance", *Journal of Banking and Finance*, 33(5): 925-933.

[21] Froot, K., Scharfstein, D., Stein, J. (1993). "Risk management: coordinating corporate investment and financing policies", *The Journal of Finance*, 48(5): 1624-1658.

[22] Gèczy, C., Minton, B.E., Schrand, C. (1997). "Why firms use currency derivatives", *The Journal of Finance*, 52(4): 1323-1354.

[23] Heaney, R., Winata, H. (2005). "Use of derivatives by Australian Companies", *Pacific-Basin Finance Journal*, 13(4): 411-430.

[24] Jalilvand, A., Switzer, J. (2000). "A Global Perspective on the Use of Derivatives for Corporate Risk Management Decisions", *Managerial Finance*, 6(3): 29-38.

[25] Judge, A. (2006). "Why and How UK Firms Hedge", *Eurpoean Financial Management*, 12(3): 407-441.

[26] Junior, J.L.R. (2013). "Hedging, Selective Hedging, or Speculation? Evidence of the Use of Derivatives by Brazilian Firms During the Financial Crisis", *Journal of Multinational Financial Management*, 23(5): 415-433.

[27] Knopf, J.D., Nam, J., Thornton, J.H. (2002). "The volatility and price sensitivities of managerial stock option portfolios and corporate hedging", *The Journal of Finance*, 57(2): 801-813.

[28] Lel, U. (2009). "Currency hedging and corporate governance: A cross-country analysis", Indiana University Working Paper, FEDS Discussion Paper No. 858.

[29] Mallin, C., Ow-Yong, K., Reynolds, M. (2001). "Derivatives Usage in UK Non-Financial Listed Companies", *The European Journal of Finance*, 7(1): 63-91.

[30] Nance, D.R., Smith, C.W., Smithson, C.W. (1993). "On the determinants of corporate hedging", *The Journal of Finance*, 48(1): 267-284.

[31] Nguyen, H., Faff, R. (2010). "Does the type of derivative instrument used by companies impact firm value?", *Applied Economics Letters*, 17(7): 681-683.

[32] Nguyen, H., Faff, R., Hodgson, A. (2010). "Corporate Usage of Financial Derivatives, Information Asymmetry, and Insider Trading", *The Journal of Futures Markets*, 30(1): 25-47.

[33] Pramborg, B. (2005). "Foreign exchange risk management by Swedish and Korean firms: A comparative survey", *Pacific Basin Finance Journal*, 13(3): 343-366.

[34] Rogers, D.A. (2002). "Does exectutive portfolio structure affect risk management? CEO risk-taking incentives and corporate derivatives usage", *Journal of Banking and Finance*, 26(2): 271-295.

[35] Sheedy, E.A. (2001). "Corporate Use of Derivatives in Hong Kong and Singapore: A Survey", Macquarie Applied Finance Centre Research, Research Working Paper No. 23.

[36] Smith, C.W., Stulz, R.M. (1985). "The determinants of firms' hedging policies", *Journal of Financial and Quantitative Analysis*, 20(4): 391-405.

[37] Whidbee, D.A., Wohar, M. (1999). "Derivative activities and managerial incentives in the banking industry", *Journal of Corporate Finance*, 5(3): 251-276.

[38] Yip, W.H., Nguyen, H. (2012). "Exchange rate exposure and the use of foreign currency derivatives in the Australian resources sector", *Journal of Multinational Financial Management*, 22(4): 151-167.

[39] Yong, H.H.A., Faff, R., Chalmers, K. (2014). "Determinants of the extent of Asia-Pacific banks' derivative activities", *Accounting and Management Information Systems*, 13(3): 430-448.