USE OF DERIVATIVES BY AUSTRALIAN PROPERTY FUNDS

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ABSTRACT

Property derivatives as a financial tool have gained increasing attention by practitioners in recent years. However, there is relatively little evidence on the patterns of use and the property funds' attitudes with respect to derivatives. Therefore, this study seeks to address this shortfall and aims to examine the application of derivatives by Australian property funds. A survey of Australian property fund managers was undertaken. The results show that different types of property funds have exhibited various patterns regarding the use of derivatives. The results also reveal that large property funds are more likely to use derivatives. The motivation factors (namely to reduce cash flows volatility and hedging currency risk) and risk factors (development of internal control and complicated accounting procedures) for using derivatives have also been identified. In addition, significant differences are found between the perceptions of derivative users and non-users. The findings have offered some insights into the knowledge base of property investors towards derivatives.

Keywords: Derivatives, property funds, motivation factors, risk factors, Australia.

INTRODUCTION

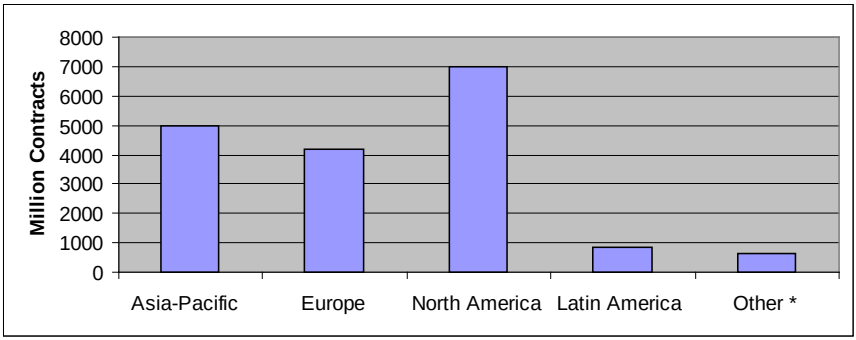
Extensive studies have demonstrated that derivatives are valuable asset management tools. A derivative is a security between two or more parties, and the value of a derivative contract is determined by its underlying asset. Various forms of derivatives are available such as options, forwards, futures and swaps[1]. Nowadays, derivatives have become one of the basic banking businesses (Sinkey and Carter, 2000). Most importantly, derivatives have been widely used by financial companies, non-financial firms and insurance companies (Bodnar *et al.*, 1996; Sinkey and Carter, 2000; Ceuster *et al.*, 2003).

Despite the global financial crisis, global listed derivatives achieved a double digit growth rate (13.7%), with 17.7 billion contracts in 2008. Importantly, the Asia-Pacific

[1] *The mechanics of these derivatives are discussed extensively by Clayton (2007).*

listed derivatives market accounted for around 28% of the total global trading volume in 2008. This figure was ahead of the European listed derivatives market (23.61%) and just behind North America (Burghardt and Acworth, 2009).

Figure 1: Global listed derivatives volume: 2008



Source: Futures Industry Association (2009)
Note: * includes South Africa, Turkey, Israel and Dubai

Numerous Asia-Pacific exchanges are also on the list of the world's top 25 derivatives exchanges. As depicted in Table 1, the Korea Exchange appeared as the largest market in the Asia-Pacific, with the total volume of 2.9 billion contracts in 2008. Australia was also one of the top 10 derivative markets in the region and it was ranked at number 21 in the world with 94.8 million contracts.

In response to the tremendous growth of derivatives globally, property derivatives have also been introduced in the US, Europe and Australia. In recent years, the use of property derivatives is also growing at a rapid pace, particularly in the UK. The annual volume of property derivatives traded in the UK reached £2.7 billion in 2009 (IPF, 2009). Importantly, the total notional value of trades executed in the fourth quarter of 2008 has increased over fivefold than the total transaction values at the end of 2005 (IPD, 2009). Currently, the UK market is the largest and most liquid property derivatives market in the world. The success of property derivatives in the UK has become the benchmark or model for other property derivative markets (IPF, 2010).

Table 1: Top 25 derivatives exchanges: trading volume (contracts) in 2008

Rank	Exchange	2008 (million)
1	CME Group	3,277.7
2	Eurex	3,172.7
3	Korea Exchange	2,865.5
4	NYSE Euronext	1,675.8
5	Chicago Board Options Exchange	1,194.5
6	BM&F Bovespa	741.9
7	Nasdaq OMX Group	722.1
8	National Stock Exchange of India	590.2
9	JSE South Africa	513.6
10	Dalian Commodity Exchange	313.2
11	Russian Trading Systems Stock Exchange	238.2
12	Intercontinental Exchange	234.4
13	Zhengzhou Commodity Exchange	222.6
14	Boston Options Exchange	178.7
15	Osaka Securities Exchange	163.7
16	Shanghai Futures Exchange	140.3
17	Taiwan Futures Exchange	136.7
18	Moscow Interbank Currency Exchange	131.9
19	London Metal Exchange	113.2
20	Hong Kong Exchanges & Clearing	105.0
21	**Australian Securities Exchange**	**94.8**
	Sydney Futures Exchange	74.6
	Australian Stock Exchange	20.2
	A-REIT futures	**0.3**
22	Multi Commodity Exchange of India	94.3
23	Tel-Aviv Stock Exchange	92.6
24	Mercado Espanol de Opciones y Futuros Financeiros	83.4
25	Mexican Derivatives Exchange	70.1

Source: Adopted from ASX (2009) and Futures Industry Association (2009)
Note: the figures are based on the number of futures and options traded and/or cleared

In Australia, although property derivatives based on the IPD/PCA Composite Property index did not receive an overwhelming response[2], a rapid growth in REIT futures was also evident. The trading volume of Australian REIT futures has increased

[2] *The Grosvenor's property derivative transaction was the only direct property derivative trade in Australia.*

dramatically from 109,593 lots in 2006 to 256,322 lots in 2008(ASX, 2009b). Ong and Ng (2009) have pointed out the advantages of using property derivatives such as hedging financial risk and enhancing liquidity of property investments. Moreover, institutional investors have also agreed that property derivatives would also help investors in managing the liquidity risk and the risk of reliable valuation data in property investment (Dhar and Goetzmann, 2005; Clayton, 2007).

Extensive finance studies have largely concentrated on the use of derivatives by financial firms, non-financial firms and insurers. Up till now, however, there is nominal evidence on the extent and nature of derivatives that are used by property funds. Two exceptions are Horng and Wei (1999) and Ertugrul *et al.* (2008). Both studies focus in REITs, while the use of derivatives among unlisted property funds has been largely ignored. In Australia, REITs are the largest and most successful indirect property investment vehicle, whereas unlisted property trusts and property securities funds are also major players in the Australian property fund industry.

With an increasing acceptance of property derivatives and significance of property funds in Australia, it is critically important to assess the extent of derivatives used by property fund managers and their perceptions towards derivatives, to enable more informed and practical investment decision-making regarding the role of derivatives in property fund management. The purpose of this study is to examine the usage of derivatives by property funds in Australia and the perceptions of property fund managers towards derivatives. The motivating factors and obstacles for employing derivatives are also examined.

The contributions of this paper are threefold. Firstly, this study is one of the limited studies to shed some light on the extent of derivatives that are used by the property fund industry. In contrast to Horng and Wei (1999) and Ertugrul *et al.* (2008), REITs and unlisted property funds are included in this study in relation to the significance of these funds in the Australian property market. Secondly, this study is the first attempt to ascertain management perceptions about the usefulness of derivatives and their role in fund management. Importantly, Geltner and Fisher (2007) have highlighted the issue of insufficient understanding of derivatives by property investors. In other words, the findings from previous studies in non-property companies would not necessarily be generalised into a property context. More importantly, Bodnar *et al.* (1996) and Ceuster *et el.* (2000) found a sector effect in which the use of derivatives is strongly subject to sectors. Thus, it is crucial to understand property fund managers' perception towards derivatives. Thirdly, the use of derivatives in the Australian property funds context is examined for the first time. The findings from the study provide some insight into property funds' decision for using derivatives and their attitudes towards derivatives.

The remainder of this paper is organised as follows. The significance of property funds in Australia is discussed in Section 2. The next section reviews the related

literature in derivatives. Data and methodology of this study are examined in Section 4. The results are reported and discussed in Section 5. The last section concludes the paper.

SIGNIFICANCE OF PROPERTY FUNDS

Australia is one of the largest indirect property markets in the world. In 2007, the Australian securitised property market was ranked as the 4th largest world's securitised real estate market (RREEF, 2007). Australian property funds have dominated the Australian direct commercial property market. It is estimated that 70%-80% core commercial properties are institutionally owned by property funds (Higgins, 2007; JLL, 2008).

Numerous indirect property investment vehicles are available in Australia, such as REITs (public investment products), unlisted property trusts and property syndicates (private investment products). The REIT market is the largest indirect property sector in Australia, representing 54.5% of the total assets of Australian property funds (PIR, 2009). Australian REITs are also the second largest REIT market in the world with a market capitalisation of £31.3 billion (MS, 2009). Moreover, unlisted property trusts and wholesale property funds also play a significant role in the Australian property fund industry. These funds contributed almost 39.2% of the total assets of Australian property funds with 3,818 commercial properties in their portfolios (PIR, 2009).

Similar to the stock market, Australian property funds have been significantly affected by the Global Financial Crisis. As demonstrated by Table 2, in 2008, massive losses were observed in the REIT and stock markets. Besides, a downward trend was also evident in direct properties and unlisted property funds. Figure 2 presents the rolling risk analyses for direct property, REITs and unlisted property funds using three-year windows over Q4:2002-Q4:2008. Apparently, rapid increases of the volatilities for these assets were found since Q3:2007, particularly in the Australian REIT market.

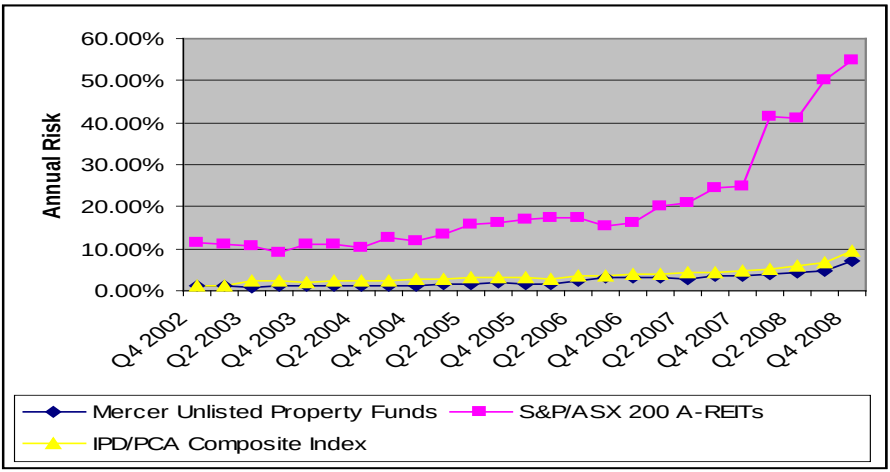
Table 2: Asset class performance analysis: December 2008 (annualised return)

Market	1Y	3Y	5Y
Shares (ASX All Ordinaries)	-40.4% (4)	-4.2% (4)	6.3% (3)
Direct Property (Australian Composite Property)*	-0.3% (3)	12.2% (2)	12.7% (2)
A-REITs (S&P/ASX LPT 300)	-55.3% (5)	-18.1% (5)	-3.9% (5)
Unlisted Property Funds (Mercer Unlisted Property Funds)	9.4% (2)	14.9% (1)	13.7% (1)
Bonds (UBA Australia Composite All Maturities)	10.3% (1)	6.1% (3)	6.0% (4)

Source: IPD/PCA (2009)

Note: Parenthesis shows the rank and (*) Australian Composite Property return is represented by the IPD/Property Council Investment Performance Index.

Figure 2: Annual rolling 3-year risk: Q4:2002-Q4:2008



Sources: Author's calculation based on the data from DataStream and IPD Australia

More importantly, the increasing level of cross border property investment is also evident in recent years. The amount of global cross border property investment activities increased over fourfold in 2007 to US$225 billion (RREEF, 2008). As discussed by Newell and MacIntosh (2007), at December 2006, 63% of Australian LPTs had international property in their portfolios. Importantly, 13 LPTs had 100% international real estate in their portfolios.

Apparent increases in price volatility and international property investment activities in the Australian property market, developments in the range and complexity of tools such as derivatives, available to manage financial risks are deserved by institutional investors. As a result, it is essential to understand the extent to which derivatives are used by property funds and the perceptions of property fund managers towards derivatives.

LITERATURE REVIEW

Many studies have demonstrated that derivatives are widely used by US financial and non-financial companies, insurance companies and multinational companies. For instance, Nance *et al.* (1993) found that derivatives were employed by 104 firms out of the 169 firms in their sample. The results also documented that reducing expected liabilities and transaction costs, as well as agency problems are important factors in

affecting a firm's hedging decision. Additionally, they also documented that size is an important determinant for the usage level of derivatives. This is attributed to the information and transaction cost scale of economies in which large companies are more likely to hire managers with expertise in setting up a hedging program and pay lower transaction costs for hedging instruments. Mian (1996) also demonstrated that larger firms are more likely to use derivatives. Bodner *et al.* (1996) surveyed US non-financial firms about the use of derivatives. The results showed that less than half US non-financial firms employ derivatives. Besides, they also found the presence of a sector effect. Interestingly, the use of derivatives is greater for large firms in the commodity and manufacturing sectors. Additionally, the results also demonstrated that "hedging for the cash flows" is the main reason for these firms to employ derivatives.

Geczy *et al.* (1997) have also provided similar evidence in which larger firms and firms with greater growth opportunities and tighter financial constraints are more likely to use currency derivatives, suggesting that firms use derivatives to reduce the volatility in cash flows or earnings. They also found a positive link between R&D expenditures and the use of derivatives. More recently, Heaneya and Winata (2005) showed there are significant differences between large and small firms for derivative transactions. Specifically, 3 variables, namely R&D, director shareholding and market-to-book ratios, are significant in explaining the use of derivatives by large firms, but not for small firms. In Europe, Ceuster *et al.* (2000) found that large non-financial companies focus relatively more on the reduction of volatility in cash flows rather than earnings.

Hoyt (1989) has offered the evidence that larger life insurers are more likely to use derivatives in comparison to smaller life insurers. Additionally, the results also suggested that futures users strongly believe that the financial risk of their companies can be reduced with a proper use of financial futures. Besides, the survey demonstrated that educating management for using financial futures is the most significant obstacle. A survey of property insurers by Bouzouita and Young (1998) indicated that hedging financial risk is the main reason for property insurers to use financial derivatives. The results also revealed the difference between users and non-users in terms of the perceptions of financial derivatives. Interestingly, a lack of qualified personnel is a major problem for non-users to implement the hedging program via derivatives. Nonetheless, derivative users tend to disagree with this statement.

In Australia, derivatives were employed by around 75% of the top 500 Australian listed companies (Nguyen and Faff, 2003; Benson and Oliver, 2004). Benson and Oliver (2004) have presented evidence of the reduction in cash flow volatility and earnings volatility are key motivating factors for these firms to use derivatives. Nguyen and Faff (2002, 2003) also showed that derivatives are used with a view to

enhance the firm's value. Specifically, the results showed that a firm's leverage, size and liquidity are important determinants of derivatives usage.

In the real estate literature, Horng and Wei (1999) have exhibited that there is a greater usage level of derivatives by larger equity REITs and mortgage REITs. The results also demonstrated the differences between mortgage REITs and equity REITs for using derivatives. Mortgage REITs tend to increase their hedging activities when they are exposed to higher prepayment risk, while equity REITs are more concerned with interest rate risk, which is the most important factor for them to use derivatives. Comparable results are also illustrated by Ertugrul *et al.* (2008). Nevertheless, the results also suggested that the use of derivatives is greater for smaller REITs once the hedging program is in place. A strong positive relationship between the use of derivatives and institutional ownership has also been identified, suggesting that the hedging practice via derivatives is preferred by institutional investors. However, JLL (2007) has highlighted that derivatives based on direct property did not receive overwhelming response by institutional investors in Australia. This could be attributed to complicated taxation issues. In addition, Lecomte (2007) urged that the development of real estate index-based derivatives may not be appropriate in the light of real estate is a heterogeneous asset class. He also discussed the importance of risk understanding in developing efficient property derivatives.

In summary, derivatives are widely employed by non-property firms and size is related to the usage level of derivatives by many companies. Additionally, hedging the volatility in cash flows is the main factor for using derivatives. However, little study has been placed on property funds, particularly unlisted property funds. Besides, the use of property derivatives by property funds has also been largely ignored in the real estate literature.

DATA AND METHODOLOGY

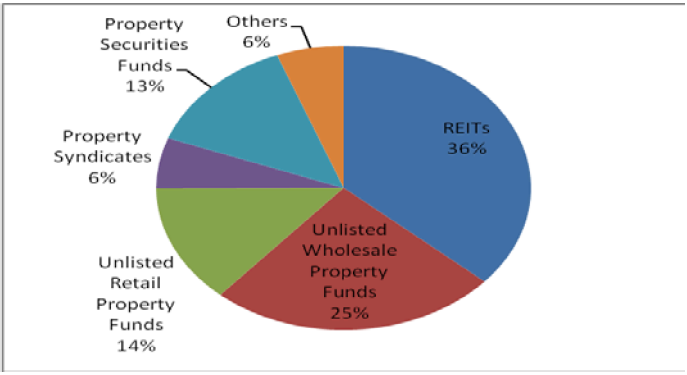
Since public data on the use of derivatives by Australian property funds are difficult to obtain, a questionnaire was designed to examine the extent and the perceptions of property fund managers towards derivatives. A survey has been viewed as the most effective way to assess the perceptions of humans (Rogelberg and Stanton, 2007). Thus, the survey of Australian property fund managers would provide a fuller understanding of institutional property investors' attitudes in relation to the use of derivatives in their fund management.

A total of 264 property funds were identified from the Australian Property Funds Industry Survey 2008 report and the ASX website (www.asx.com.au). Mortgages funds (72 funds) were excluded from this survey due to the fact that this study only focuses on equity property funds. Three property funds declined to participate and 11 funds were without complete mailing addresses or contact person. In turn, this resulted in a total of 178 samples with complete corresponding information being used in this

analysis. A pilot test with small number of funds was conducted in May 2009. This was followed by minor changes before the questionnaire was distributed.

53 respondents responded to the survey, with the survey response rate being 30%.[3] As shown in Figure 3, the largest group of respondents are from REITs (36%). This group is followed by unlisted property funds (25%), unlisted retail property funds (14%), property securities funds (13%) and property syndicates (6%). The response rate is comparable to the response rates reported by other derivative studies in non-property companies such as Ceuster *et al.* (2000; 21.9%) and Benson and Oliver (2004; 23%).

Figure 3: Organisation: survey respondent profile



This survey addressed a range of issues, but largely focused on the use of derivatives by property funds and motivating factors, as well as impediments for using derivatives. The survey was conducted during June-July 2009 and the questionnaires were distributed to property fund managers that based throughout Australia via mail or email. Most questionnaires were sent to the respondents who are at the level of "Managing Director" or "General Manager" or "Fund Manager". Funds which had not responded within a month were sent a follow-up letter. Their responses were analysed with frequency analysis and cross tabulation analysis.

[3] *Non-response bias was examined by comparing the responses of early and late respondents. No significant variation is found in results, suggesting that the non-response bias is unlikely to be a cause for concern.*

RESULTS AND DISCUSSION

The use of derivatives

As depicted in Table 3, almost 80% of property funds employ derivatives, exceeding the findings from the top 500 Australian companies that are found by Nguyen and Faff (2003) and Benson and Oliver (2004). More importantly, more than 85% of REITs and property securities funds stated that they are derivative users, suggesting that derivatives are not relatively new products for property fund managers. In fact, derivatives have been widely employed by Australian property funds. Table 4 compares derivative instruments that are used by property fund managers. The results indicate that the most frequently used derivatives instruments among property fund managers are swaps (64%). It is followed by forwards (31%) and futures (21%). The pattern is not consistent with the findings of previous studies in non-property companies (Benson and Oliver, 2004) in which options only play a marginal role, reflecting that property funds have demonstrated different patterns for derivatives in comparison to non-property companies.

Table 3: Derivatives usage by organisations

Organisation	Derivative Users	Non-users of Derivatives	Total
REITs	32.7% (89.5%)	3.8% (10.5%)	36.5%
Unlisted Wholesale Property Funds	17.3% (69.2%)	7.7% (30.8%)	25.0%
Unlisted Retail Property Funds	9.6% (71.4%)	3.8% (28.6%)	13.5%
Property Syndicates	3.8% (66.7%)	1.9% (33.3%)	5.8%
Property Securities Funds	11.5% (85.7%)	1.9% (14.3%)	13.5%
Others	3.8% (66.7%)	1.9% (33.3%)	5.8%
Total	**78.8%**	**21.2%**	**100.0%**

Note: Parentheses show the percentages within each type of property fund

Table 4: Derivative instruments by organisations

Organisation	Swaps	Forwards	Futures	Options	Others
REITs	78.9%	36.8%	15.8%	15.8%	0.0%
Unlisted Wholesale Property Funds	53.8%	23.1%	23.1%	15.4%	0.0%
Unlisted Retail Property Funds	57.1%	42.9%	14.3%	28.6%	14.3%
Property Syndicates	66.7%	0.0%	0.0%	0.0%	0.0%
Property Securities Funds	42.9%	42.9%	57.1%	28.6%	0.0%
Others	66.7%	0.0%	0.0%	0.0%	0.0%
Total	**63.5%**	**30.8%**	**21.2%**	**17.3%**	**1.9%**

Table 5 reports the types of derivatives that are utilised by property funds. Derivatives based on interest rates are the most popular financial derivatives among property funds. This is attributed to the volatile interest rate movements in recent years. Rising interest rates prior to the Global Financial Crisis and the sharp decline afterward have been a major concern for property fund managers. Therefore, a derivative contract based on interest rates appears as a desired product to minimise the interest rate risk. Interestingly, compared to the findings of the Australian top 200 companies by Berkman *et al.* (1997), property funds in Australia are more concerned with the interest rate risk in which the usage of interest rate derivatives is greater for those funds. The results in Table 5 also indicate that derivatives based on foreign currency are other common used derivatives. Specifically, 40% of property funds use foreign currency derivatives. Nonetheless, less than 10% of respondents used stock- and property-based derivatives. This can be explained by the unpopularity of these derivatives. It should be noted that the trading volume of interest rate derivatives is considerably larger than property and stock derivatives (ASX, 2009a).

Table 5: Types of derivatives

Types of derivatives	Usage percentage
Foreign currency	40.4%
Fixed income assets including interest rate	51.9%
Stocks	9.6%
Properties	9.6%
Others	3.8%

Table 6 provides an insight into the use of derivatives among different types of property funds. It is noteworthy that more than half of REITs, unlisted wholesale property funds and property syndicates use derivatives based on interest rates, while

less than one third of property securities funds employ interest rate derivatives. The results also exhibit that property securities fund managers are heavy users of foreign currency derivatives, as 86% of these funds utilised derivatives based on foreign currency. One of the possible explanations is many of these funds are global property securities funds (e.g. UBS Global Property Securities Funds and AMP Global Property Listed Securities Funds) with large international property portfolios. More importantly, property funds with and without international property are significantly different in terms of the use of foreign currency derivatives with a statistically significant chi-square coefficient at 1% level[4].

Table 6: Types of derivatives by organisations

Organisation	Foreign currency	Interest rate	Stock	Property
REITs	36.8%	57.9%	5.3%	0.0%
Unlisted wholesale property funds	46.2%	53.8%	15.4%	7.7%
Unlisted retail property funds	28.6%	42.9%	0.0%	0.0%
Property syndicates	0.0%	66.7%	0.0%	0.0%
Property securities funds	85.7%	28.6%	28.6%	57.1%
Others	0.0%	66.7%	0.0%	0.0%
Total	**40.4%**	**51.9%**	**9.6%**	**9.6%**

Another important point that has emerged from Table 6 is there is a greater usage level of property derivatives in the property securities funds sector. More than half of the property securities funds use property derivatives. Nevertheless, no similar evidence was found from other property funds. Although derivatives based on direct and indirect properties are available in Australia, indirect property derivatives (e.g. REIT futures and options) are the largest and most liquid property derivative markets. These products are more applicable derivative products for property securities funds compared to other property funds. It should be noted that some property funds only invested in direct property. Thus, indirect property derivatives are irrelevant for these

[4] *The results are available from the author*

funds[5]. These could explain the low usage of property derivatives among other property funds.

Property securitises funds also appeared as heavy stock derivative users. It is attributed to many property securities funds are required to outperform stock indices. As pointed out by Lee *et al.* (2008), stock indices are commonly used as the benchmarks for property securities funds. Hence, property securities funds would use stock derivatives to hedge the market risk. Higher liquidity of stock derivatives in comparison to property derivatives could be another plausible reason. As discussed by Newell and Tan (2004), the transaction volume of stock futures is significantly higher than property futures in Australia.

An investigation of size effects was also performed to assess the presence of size effects in the Australian property fund industry. Specifically, property funds were classified into three groups (Small, Medium and Large) based on their total assets. The portfolio values of small funds are less than A$350million, while the medium group is between A$350million to A$1.3billion. The portfolio values of large property funds are more than A$1.3billion. The results are reported in Table 7.

Table 7: Use of derivatives by size

Group	Derivative users	Non-users of derivatives
Small	52.9%	47.1%
Medium	87.5%	12.5%
Large	88.9%	11.1%
Chi-square coefficient	7.855***	

Notes: *, **, *** denotes significant at 10%, 5% and 1% respectively

As can be seen from Table 7, derivatives are utilised by almost 90% of large property funds, whereas only 53% small property funds use derivatives. Importantly, the statistically significant chi-square statistic (7.855), with the probability level of 1% has further reinforced the statement, meaning that the use of derivatives is sensitive to the size of the fund. The presence of size effects provides some indirect support to previous studies such as Nancy *et al.* (1993) in which the derivative hedging program

[5] *This difference between property securities funds and other property funds should be borne in our mind when interpreting the results.*

is easier to be implemented by larger companies with reference to the scale of economies.

In short, there are significant differences in terms of the use of derivatives by different property funds. Specifically, property securities funds and REITs are more likely to use derivatives in comparison to other property funds. Besides, derivative contracts based on property and foreign currency are more frequently used by property securities funds. Additionally, the linkage between the size of a property fund and the use of derivatives is also demonstrated. This could be attributed to the scale of economies and demonstrate the cost issue in which large firms are more likely to set up a hedging program and pay lower transaction costs.

Motivating factors and impediments of using derivatives

Previous section has provided some insights into the use of derivatives among property funds in Australia. This section attempts to understand the attitudes of property fund managers towards the use of derivatives. Table 8 compares the perceptions of derivative users and non-users towards derivatives. Property funds currently using derivatives were asked to indicate which of the factors are valuable for using derivatives. Non-users were asked to indicate which of the factors will potentially be valuable for employing derivatives. Respondents are allowed to choose all factors that are applicable.

Table 8: Motivating factors for using derivatives

Response	Derivative users	Non-users of derivatives	Total	Chi-square
To hedge against the foreign currency risk	48.8%	36.4%	46.2%	0.538
To manage the market risk more effectively by altering the risk positions	46.3%	0.0%	36.5%	8.033***
To reduce cash flows volatility	70.7%	27.3%	61.5%	6.921***
To reduce earnings volatility	51.2%	18.2%	44.2%	3.838**
To trade for profits	4.9%	9.1%	5.8%	0.283
To increase the liquidity of the investment portfolio	2.4%	18.2%	5.8%	3.954**
To quickly adjust sector weighting	2.4%	0.0%	1.9%	0.274
To hedge against the depreciation of fixed-income assets as interest rates rises	14.6%	18.2%	15.4%	0.084
To allow the company to move into higher yielding assets	4.9%	0.0%	3.8%	0.558

Notes: *, **, *** denotes significant at 10%, 5% and 1% respectively

The three most important issues regarding the use of derivatives are to "reduce cash flow volatility" (61.5%), "hedge against the foreign currency risk" (46.2%) and "reduce earnings volatility" (44.2%). On the other hand, the three least important factors for using derivatives are to "quickly adjust sector weighting" (1.9%), "allow the company to move into higher yielding assets" (3.8%) and "trade for profits" (5.8%). In other words, hedging rather than trading for profits is the main reason for property funds to use derivatives. Although the top 3 important factors are quite comparable to the findings from previous studies, other often cited reasons by non-property companies, such as enhancing the firm's value and adjusted sector allocation, are less agreed by property fund managers. Interestingly, hedging currency risk was ranked the least important factor by property insurers, although it has been viewed as the second most important factor by property funds. This highlights the importance of treating property funds and non-property funds heterogeneously, reflecting that previous findings from non-property firms could not be totally translated into property funds.

Some variations in ranking between users and non-users are also evident from Table 8. The most frequently stated factor for using derivatives by users is to reduce the cash flow volatility. The second most common factor is to reduce the volatility of earnings. Interestingly, fewer non-users indicated that these factors are potentially valuable for them to use derivatives. For non-users, the effectiveness of hedging the foreign currency risk is the most important factor that will encourage them to use derivatives. Interestingly, none of the non-users agreed that the use of derivatives can facilitate their risk management, in which derivatives could be used to manage the market risk more effectively by altering their risk positions, whereas 46% of users agreed with this statement. Another interesting observation is almost 20% of derivative users agreed that derivatives can increase the liquidity of the investment portfolio, while this factor is also reckoned by few users (2.5%). To shed more light on the differences between users and non-users, a chi-square test was performed. A positive and statistically significant chi-square statistics for the factors of "to manage the market risk", "to reduce cash flow volatility", "to reduce earning volatility" and "to increase the liquidity of the investment portfolio" confirmed the significant differences between the responses of users and non-users for these factors, indicating that users and non-users have different perceptions towards derivatives.

Both users and non-users were also asked questions regarding problems of implementing and administering the use of derivatives. The results are reported in Table 9. Development of internal control and review systems is the only problem that was ranked as the important factor by both users and non-users. Non-users have significantly more problems with the issue of lacking qualified personnel to implement the hedging practice via derivatives than users. Interestingly, this factor was viewed as the most critical issue for non-users. Nevertheless, users do not recognise this factor is an important issue. The scale of economies can be the plausible

explanation for this divergence. As pointed out by Table 7, large property funds are more likely to use derivatives as they afford to hire the expertise in setting up the hedging program. Therefore, lacking qualified personnel is more significant for non-users as many of them are smaller property funds. Complicated accounting procedures were ranked as the most serious problem by users, although non-users of derivatives are less agreed with this statement. Since non-users have never used derivatives before, it is not surprising that they are not fully aware with the accounting issues in relation to derivatives. Besides, a higher percentage of non-users listed regulatory restrictions as a major concern compared to users.

Table 9: Obstacles for using derivatives

Response	Derivative users	Non-users of derivatives	Total	Chi-square
Resistance from the Board of Directors	14.6%	18.2%	15.4%	0.084
Lack of qualified personnel to implement the program	14.6%	63.6%	25.0%	11.107***
Development of internal control and review systems	34.1%	54.5%	38.5%	1.525
Educating management in the use of financial derivatives	17.1%	36.4%	21.2%	1.935
Regulatory restrictions	14.6%	36.4%	19.2%	2.637
Complicated accounting procedures	39.0%	27.3%	36.5%	0.517
Not considered as a popular tool	7.3%	18.2%	9.6%	1.178

Notes: *, **, *** denotes significant at 10%, 5% and 1% respectively

Another important observation from Table 9 is derivative users did not score these 7 difficulties as highly as non-users, although the chi-square statistics are insignificant. This indicates that property funds currently using derivatives are comfortable with the use of derivatives where they already have the expertise and experience in dealing with derivatives and are quite familiar with derivatives.

In summary, the attitudes of property funds towards derivatives are different between those funds that used derivatives and those that do not. More specifically, they have somewhat divergent opinions on motivating factors for using derivatives. Non-users also scored the risk factors for using derivatives much higher than users, although the chi-square statistics are not statistically significant.

CONCLUSIONS

In recent years, the use of derivatives by non-property firms has become a topic of considerable interest to regulators and investors, although little study has been done in the property funds context. Importantly, the existing literature and evidence concerning derivatives do not necessarily generalise into property funds. Therefore, this study aims to examine the use of derivatives by property funds, and to determine the motivating factors and risk factors for using derivatives.

There are several important findings from this study. Firstly, almost 80% of Australian property funds are derivative users, suggesting that derivatives are not relatively new products for property funds. Secondly, there are some variations in terms of the use of derivatives by different types of funds. Specifically, the greater levels of derivative usage are found for property securities funds and REITs. Besides, large property funds are more likely to use derivatives than small funds. Thirdly, derivatives are used for a range of different purposes. In general, hedging instead of speculation is the main motivating factor for derivative transactions. However, derivative users and non-users have divergent attitudes towards derivatives.

Finally, these results have improved the knowledge base on the use of derivatives by property funds. Given property companies have exhibited different patterns of using derivatives and divergent attitudes towards derivatives in comparison to non-property companies, practitioners and academics should be cautious with this difference and an in-depth study in the property context in relation to derivatives, particularly property derivatives is therefore a worthwhile task for future study.

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