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CROSS BORDER FUNDS AS A DRIVER OF COMMERCIAL PROPERTY MARKET PERFORMNCE: A CASE OF MELBOURNE, AUSTRALIA.

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ABSTRACT

Over the last decade, there has been increased cross border real estate investments in the Australian direct commercial (office) property market. As a result, several media publications have suggested that cross border investment was driving property values, however, no empirical evidence exist to support this argument. The purpose of this study is to evaluate the role of cross border real estate funds/investments on direct commercial property market performance (total returns).

Using an established econometric technique; Autoregressive Distributed Lag Model, traditionally established long-term determinants of Melbourne commercial property market drivers were determined as real GDP, stock of office space, vacancy rate and net absorption rate. A newly emerging factor; cross border investments was determined to have an impact on the performance of Melbourne office property market albeit some surprises.

The study provides current relevant information on the drivers of Melbourne office property market performance with new dynamics. The results would aid property investors, developers and other key stakeholders in property investment decision making. Similarly, the Foreign Investment Review Board of Australia (a public agency) can use the results in policy formulation. The study contributes to the literature on cross border investments in Australian commercial property market which has barely been examined.

Keywords: Commercial property, Office, Determinants, Cross border investments, Foreign real estate investments, ARDL, Drivers of property market performance.

1.0 INTRODUCTION AND MOTIVATION FOR THE CURRENT RESEARCH

The direct commercial property sector (office market) is an important sub-sector in the property investment environment contributing significantly to economic development of nations. The Australian direct office property investment market is an important economic sector due to the substantial quantum of capital invested into the market by both local and overseas property investors. According to JLL (2019), total investments in the Australian office market as at year end 2018 was AUD 288 billion. In the year 2018, Australia recorded $AUD 19.53 billion worth of office transaction volumes which is the first time it has crossed the $AUD 19 billion mark (JLL, 2019). Thus, the Australian office market is an important investment space for property investors and showing a growth trajectory.

Over the last decade, substantial cross border real estate capital flows have spurred massive investments in the Australian direct commercial property market (office sector) thereby raising substantial interest in the scholarly literature on the role of cross border real estate funds in market performance. Lane et al. (2014) argued that available data suggests that since 2008, cross border real estate investments have accounted for around one-quarter of the value of major commercial property purchases, and this is up from one-tenth in the previous 15

[1] Additional Author details may be added as a footnote on page one

years. Within the Australian direct commercial property market space, cross border real estate investments have primarily focused on the office property market (Lane et al., 2014).

Figure 1 Foreign Investors' office market buyer and seller activity: 2007-2018

Source: JLL (2019)

Figure 1 visually presents the quantum of cross border real estate investments in the Australian office market in terms of purchases and divestments. Starting from the year 2012, cross border real estate investments in terms of buying have been increasing. Except for 2016, which recorded a sharp drop in value, the trend has reached record levels in 2018.

According to estimates from The Foreign Investment Review Board of Australia (FIRB), the value of cross border real estate investment approvals for commercial property was $AUD44 billion in the year 2016/2017 financial year (ABC, 2017). Current data suggests that out of a total of $AUD 19.53 billion office transactions, cross border real estate investments accounted for $AUD 9.46 billion representing about 48% of the total transactions by value in 2018 and this is an increase of about $AUD1.9 billion from the previous year (Knight Frank, 2019). The weight of such substantial capital from cross border sources invested into local markets can have significant impact on the performance of the local market. Thus, cross border real estate investments could be a driver of office market performance as a newly emerging factor.

Recently, several Australian media organisations reported a decline in cross border real estate investments. Naturally, this would have an impact on the Australian office market performance because cross border funds is a major source of capital into the direct office property market. For example, the Asian review reported that tough capital controls are stalling China's offshore capital investments (Asian Review, 2016). Similarly, The Urban developer reported that Chinese interest in Australian direct commercial real estate has declined following regulations on outbound investment (The Urban Developer, 2017). Since cross border real estate investments from China is a major source of capital flowing into the Australian office market, a decline of it could have negative impact on the performance of the market.

Several studies have examined the impact of cross border real estate investments on stock market (see Henry (2000), Reis et al. (2010)). Similarly, other studies have focused on the impact of internationalisation of local host real estate markets via foreign real estate investments (D'Arcy and Keogh (1998), Falkenbach and Toivonen (2010), and Adair et al. (2006)). In terms of impact of cross border real estate investments on the performance of local real estate markets, scholars including Dunse et al. (2007) suggest that exogenous investment funds are a significant influence on office market performance in the short term but not the long term. However, the variable exogenous investment fund in the work of Dunse et al. (2007) is represented by the level of investment activity within a specific city without a thorough examination of foreign funds invested in the specific property sub-sector. Keogh (1996), Falkenbach and Toivonen (2010), McAllister and Nanda (2015) and Oikarinen and Falkenbach (2017) have argued that cross border real estate investments have a negative relationship with capitalisation rates or yields. There is paucity of empirical evidence that evaluates the impact of cross border real estate investments on the performance of Melbourne office property market using total return. This paper aims to contribute to filling this gap by examining the impact of cross border real estate funds on direct commercial real estate values in Melbourne, Australia by adopting total return of direct commercial real estate as a performance measure.

2.0 LITERATURE REVIEW

Several factors with varying impacts account for the performance of office property market in various countries. As a result, over the years, researchers have focused on investigating the determinants of office property market performance to provide property stakeholders with pertinent information for property investment decision making. Similar to such lines of enquiry, this paper is focused on determining the factors that drive the performance of Melbourne office property market using total return as dependent variable, with the aim of providing empirical evidence required to inform property practitioners, policy makers and other stakeholders on the impact of cross border real estate investments on the performance of Australian office market using Melbourne as a case study. Since the examination of determinants of office market performance has adopted different dependent variables including rent, yields, property prices etc, studies focusing on office market performance are reviewed to glean the independent variables that impact on total return for this current study.

DiPasquale and Wheaton (1992) presented an analytic framework that examines the impact of shocks to demand and supply and used it to explain the impact of economic and financial exogeneous shocks on rents, asset prices, construction and stock of real estate assets. Wheaton et al. (1997) applied a structural econometric model to evaluate the performance of the London office market and suggested that supply and demand are inelastic, hence, in the absence of economic shocks to the market, there is a dynamically stable system. Higgins (2000) argued that space market factors include economic influences that drives demand and supply in the property market, where demand is usually represented by net absorption rates and supply is denoted by new constructions or permit approvals. The interplay of the forces of demand and supply impacts on market conditions which shapes financial sector factors, thereby combining to impact on the performance of office market.

Using real estate investment trust returns as a proxy for office returns, McCue and Kling (1994) explored the linkages between the macroeconomy and real estate returns through time. Tsolacos et al. (1998) estimated separate econometric models for rents, capital values, and development activity in the national office market in Great Britain. Results suggest significant influence of demand-side economic forces in the real estate user market and the importance of use and investment market signals in the determination of office building output or stock addition. Brooks and Tsolacos (1999) evaluated the impact of economic and financial factors on the performance of UK property market. The research employed a Vector Autoregression (VAR) model and adopted factors including property returns, unemployment, short term interest rate, interest rate spread, unanticipated inflation and dividend yield. Results indicated that unexpected inflation, and the interest rate term spread have explanatory powers for the performance of the UK property market.

Liow (2000) examined the dynamics of the Singapore commercial property market over a 17-year period using a multivariate VAR model which included factors such as GDP, interest rates, existing stock of space and prime lending rate. Results of the modelling indicated that office property performance is linked to macroeconomic conditions in the long run and that office property market in Singapore has developed in tandem with the economy, making it sensitive to changes in macroeconomic factors such as growth in GDP, interest rate fluctuation, availability of credit and stock market condition (Liow, 2000). McGough et al. (2000) modelled office property returns in the Helsinki area using a VAR model which had demand and supply factors in addition to real economy, and monetary and financial market indicators to explain the variation in office property returns. Results indicate that GDP in Finland is a key variable for modelling office property returns in Helsinki.

De Wit and Van Dijk (2003) investigated the determinants of direct office real estate returns by analysing rents, capital appraisals, and total return of major cities in Asia, Europe, and the United States. Using Generalized Method of Moments (GMM) to estimate a dynamic panel-data model which included supply, demand and economic factors, the study provides evidence that GDP, inflation, unemployment, vacancy rate, and the available stock all influence real estate returns. Macgregor and Schwann (2003) established that there are similarities in direct property returns across regions and sectors and that returns are impacted by factors such as interest rates, bond yields, inflation and capital markets. Karakozova (2004) similarly compared three alternative econometric models for modelling office market performance in the Helsinki area; a regression model, an ECM, and an ARIMA model with exogenous explanatory variables (ARIMAX). The study found that incorporating past values of capital growth, growth in service sector employment and GDP, the ARIMAX models provided the best results on office market performance.

Since there is no consensus on model specification with accompanying variables that should be employed for the determination of office market performance, Öven and Pekdemir (2006) argued for the use of factor analysis to select the most important factors that should be included in a model. West and Worthington (2006) studied Australian commercial real estate returns and argued that the returns are influenced by short, medium and long-term interest rates, construction activity, expected and unexpected inflation, industrial employment and production. de Wit (2007) concluded that the most important factors that drive long-term returns are the

vacancy rate and unemployment rate a multinational level. Baum (2009) argued that the performance of commercial property sector is linked to the performance of the economy and capital markets, and suggested that factors such as depreciation, cash flow, supply and demand and valuations have an influence on total returns of direct commercial real estate. Crowe et al. (2012) examined the effect of monetary and macro-financial stability on the performance of real estate over real estate booms and busts. Chaney and Hoesli (2012) argued that direct commercial real estate returns are influenced by cap rates and vacancy rates. Using alternative autoregressive distributed lagged co-integration method, Koon and Lee (2013) studied the causal relationship between inflation and property returns in Hong and found inflation rate can be used to predict and explain real estate returns. Kohlert (2010) concluded that there is a causal relationship between commercial real estate returns and changes in economic variables; GDP, unemployment rates and interest rates. Similarly, Hin and Addae-Dapaah (2014) found that GDP, interest rates, rents and vacancies are negatively correlated to commercial real estate returns.

The current paper leverages on earlier studies and considers several factors to examine the determinants of total return for Australia (using Melbourne data) in addition to cross border real estate investment as an emerging driver. Within the Australian commercial real estate market, this is the initial study to examine the impact of cross border real estate investments on total return using Melbourne as a case study. As a result, it contributes to the extant literature by opening discussions on this important subject. The study also uses an established econometric model, which has seldomly being used for modelling the performance of commercial real estate returns; autoregressive distributed lagged model to examine the role of cross border real estate investments on total return. Previous studies have mostly adopted either an ordinary least squares or vector autoregressive models.

3. DATA AND METHODOLOGY

3.1 Data

This study examines the role of cross border real estate investments in explaining direct office market performance by using total return from one of Australia's major commercial property markets: Melbourne, between 2007-2018. The Melbourne property market is a major market because together with Sydney, these two markets account for approximately 78% of the nation's total office investment universe of around AUD$226 billion. The sample period spans several important phases of the economic cycle from the crisis episode of 2007-2009 to the post crisis recovery era thus providing a rich source of financial information.

Apart from cross border real estate funds, all macroeconomic indicators are widely available from official sources such as the Australian Bureau of Statistics (ABS) and the Reserve Bank of Australia (RBA) while property market indicators are available from the Property Council of Australia (PCA). Data relating to cross border real estate funds was generously provided by Real Capital Analytics (RCA). Direct office market performance was measured using total return. The total return is a combination of income received by property investors and the growth in capital value of office properties. As a result, it measures the yearly return on office property investments and accounts for capital growth due to property market dynamics. It is an important measure of property market performance as property investors base their investment decisions on total return

compared to other asset classes. Usually, total return is a direct measure of the overall performance of office property as an investment asset class. Explanatory variables included RGDP per capita, office stock, vacancy rates, net absorption rates and cross border (foreign) real estate investment in the office sector. These variables are summarised in Table 1. As already mentioned, there are several drivers of office property market performance (total return). As a result, other factors were explored including population growth, the number of persons employed in professional, scientific and technical services, building approvals and unemployment rates though these were not included in the final model due to a lack of statistical significance after controlling for the variables. This augments the thesis of this paper that certain traditional determinants might not be statistically significant over time. Concurrently, there is a possibility of newly emerging factors impacting on the Melbourne office property market performance that needs exploration.

Table 1 Variables and their description in the study

Variable	Code	Description
Office total return	TOT RET	Measured as quarterly total return (income and capital growth) of office investments in Melbourne.
Real GDP per capita	RGDP	Real GDP per capita was used as an indicator of economic growth and activity. GDP was divided by CPI to compute real GDP which was then divided by population to derive per capita measures at national level.
Office stock	STOCK	Semi-annual data on office stock available in Australia at national level.
Vacancy rates	VACANCY	Semi-annual vacancy rates for office market in Australia at national level.
Net absorption rates	NAR	Quarterly net absorption rates for Melbourne measured as uptake of office space per period.
Cross Border (Foreign) Real Estate Investment	FREI	Quarterly data on total cross border (foreign) investments (office transactions) in the Australian office sector measured at national level.

Table 1: Office total returns were modelled against real GDP per capita, office stock, vacancy rates, net absorption and foreign real estate investment.

Source: Authors, 2019

Table 2 Annualised summary statistics for growth rates of selected variables

In Table 2, annualised summary statistics for growth rates of selected variables are presented as description for the data used in the study.

	Total Return: MEL	RGDP	STOCK	VACANCY
Mean	9.34%	0.69%	1.80%	8.70%
Median	8.42%	0.49%	1.11%	9.31%
Std Dev	3.5%	2.12%	1.58%	2.14%
Min	-0.06%	-2.87%	-0.41%	3.88%
Max	18.57%	5.57%	4.54%	10.90%

Table 2: Annualised office total returns and office vacancy rates; and annualised growth rates for real GDP per capita and office stock.

Source: Authors, 2019

Average annual office total return in Melbourne market was 9.34% while average annual vacancy rates was 8.70%. Office stock grew at a rate of 1.80% per year while real GDP per capita increased by 0.69% per year on average over the modelling period.

3.2 Methodology

In theory, total return varies in accordance with demand and supply conditions. Periods of high demand (and relatively limited supply) will place upward pressure on total return while additions to the supply stock (to the extent that surpluses are created) will place downward pressure on total return which would inevitable affect office market performance. Accordingly, demand side factors should correlate positively with total return while supply side factors are expected to vary inversely. As RGDP is a measure of economic activity, growth in this factor should result in higher demand for office space and therefore higher rents leading to higher total return (if capital growth also experiences growth). Conversely, as office stock represents the amount of available space, growth in this factor results in higher supply and lower rents leading to lower total return. Vacancy rates on the other hand are derived from a combination of demand and supply. If a given increase in demand is met with a proportionate increase in supply, vacancy rates will remain unchanged. Therefore, an increase in vacancy rates represents a growth in supply in excess of demand, i.e. a surplus. Conversely, a decrease in vacancy rates represents the opposite. A related concept is that of net absorption rate. An increase (decrease) in net absorption represents a net increase (decrease) in demand over supply. Consider a tenant that currently occupies 1000 square metres of space. If in a given period, the tenant relocates from one site to another of equivalent size, then net absorption is zero. There is an additional demand of 1000 square metres as the tenant relocates. However, this is met with an additional supply of 1000 square metres as the previous site becomes available. However, if the tenant relocates to a site of 1500 square metres, then net absorption is 500; as there is an additional demand of 1500 square metres while only 1000 square metres becomes available from the previous site.

Estimation wise, the long run relationships and short run dynamic interactions among the variables of interest was estimated via the autoregressive distributed lag (ARDL) cointegration approach developed by Pesaran and Shin (1999) and Pesaran et al. (2001). This method was selected as it is one of the least 'restrictive' among the class of equivalent time series estimation techniques. Traditional approaches such as OLS require all variables to be stationary. In the case that all variables are non-stationary and integrated of the same order (e.g. I(1)) *but* not cointegrated, then differencing may be applied until stationarity is achieved. Even if all variables were integrated of the same order *and* cointegrated, then an error correction model (ECM) may be specified to estimate a long run model considering short run dynamics. However, while theoretically valid, these conditions are rarely met in applied work. In cases where variables contain a mixed order of integration (some may be stationary while others are not) and there exists the possibility of cointegration among *some* of the I(1) variables, the ECM approach is no longer valid while the ARDL model is.

Broadly speaking, the ARDL model involves the following steps: Firstly, an unrestricted error correction model (ECM) is specified. Next, an appropriate lag structure is determined. Common lag order selection

criteria include the Akaike information criterion (AIC), the Schwarz/Bayes criteria (SC) and Hannan-Quinn information criteria (HQ). Following this, a separate long run model in 'levels' is estimated with the (lagged) residuals included as an error correction term in the 'restricted' error correction model. Long run coefficients may also be recovered from the unrestricted ECM while the coefficient of the error correction term is commonly interpreted as the speed of adjustment – that is, the speed with which the system returns to its long run equilibrium following a short-term shock. Accordingly, the unrestricted ECM may be expressed as follows:

$$\begin{aligned}\Delta\big(ln(Total\ Return_t)\big) &= \beta_0 + \sum_{i=1}^{p}\beta_{1i}\Delta\big(ln(Total\ Return_{t-i})\big) + \sum_{i=0}^{q}\beta_{2i}\Delta\big(ln(RGDP_{t-i})\big) \\ &+ \sum_{i=0}^{q}\beta_{3i}\Delta\big(ln(STOCK_{t-i})\big) + \sum_{i=0}^{q}\beta_{4i}\Delta\big(ln(VACANCY_{t-i})\big) + \sum_{i=0}^{q}\beta_{5i}\Delta\big(ln(NAR_{t-i})\big) \\ &+ \sum_{i=0}^{q}\beta_{6i}\Delta\big(ln(FREI_{t-i})\big) + \theta_{11}ln(Total\ Return_{t-1}) + \theta_{21}ln(RGDP_{t-1}) \\ &+ \theta_{31}ln(STOCK_{t-1}) + \theta_{41}ln(VACANCY_{t-1}) + \theta_{51}ln(NAR_{t-1}) + \theta_{61}ln(FREI_{t-1}) + \varepsilon_t\end{aligned}$$

The restricted ECM may be expressed as:

$$\begin{aligned}\Delta\big(ln(Total\ Return_t)\big) &= \beta_0 + \sum_{i=1}^{p}\beta_{1i}\Delta\big(ln(Total\ Return_{t-i})\big) + \sum_{i=0}^{q}\beta_{2i}\Delta\big(ln(RGDP_{t-i})\big) \\ &+ \sum_{i=0}^{q}\beta_{3i}\Delta\big(ln(STOCK_{t-i})\big) + \sum_{i=0}^{q}\beta_{4i}\Delta\big(ln(VACANCY_{t-i})\big) + \sum_{i=0}^{q}\beta_{5i}\Delta\big(ln(NAR_{t-i})\big) \\ &+ \sum_{i=0}^{q}\beta_{6i}\Delta\big(ln(FREI_{t-i})\big) + \emptyset z_{t-1}\end{aligned}$$

where:

$$\begin{aligned}ln(Total\ Return_t) &= \alpha_0 + \alpha_1 ln(RGDP_t) + \alpha_2 ln(STOCK_t) + \alpha_3 ln(VACANCY_t) + \alpha_4 ln(NAR_t) \\ &+ \alpha_5 ln(FREI_t) + v_t\end{aligned}$$

$$\begin{aligned}z_{t-1} = ln(Total\ Return_{t-1}) &- \alpha_0 - \alpha_1 ln(RGDP_{t-1}) - \alpha_2 ln(STOCK_{t-1}) - \alpha_3 ln(VACANCY_{t-1}) \\ &- \alpha_4 ln(NAR_{t-1}) - \alpha_5 ln(FREI_t)\end{aligned}$$

The parameter ϕ may be interpreted as the 'speed of adjustment'. This estimation procedure was applied to the Melbourne market.

4. RESULTS AND DISCUSSION

The ARDL bounds testing approach requires that no variables be integrated of order 2 or greater to avoid spurious results. Unit Root (breakpoint) tests are summarised in Table 3. The results of the unit root tests indicate the presence of a unit root in some variables but not others suggesting a mixed order of integration. Note that all variables were stationary after first differencing.

Table 3 Unit Root breakpoint non-stationarity tests for the presence of unit roots

Melbourne Model		
Variable	ADF	p-value
TOT_RET	-5.35502	< 0.01
LN_RGDP_CAPITA	-2.32398	0.9423
VACANT	-5.05185	< 0.01
LN-STOCK	-6.09298	< 0.01
LN-NAR	-4.91493	0.0118
LN-UNEMP	-4.1619	0.1083
LN-FREI	-3.58851	0.3377

Table 3: Unit Root breakpoint non-stationarity tests for the presence of unit roots. Note: the null hypothesis is that a unit root exists. Therefore, failure to reject the null hypothesis indicates the presence of a unit root.

Source: Authors, 2019

For brevity, full estimation output including the unrestricted and restricted ECM are reproduced in Table 5 and Table 6 in the appendices respectively. Long run parameter estimates, F-statistics for the 'bounds' testing and the coefficient of the error correction term (the so-called 'speed of adjustment') are reproduced in Table 4. Testing of residuals indicate the error terms are free from serial correlation. The null hypothesis for the ARDL bounds test is rejected at the 1% level for both models indicating long run cointegrating relationships between the variables. Furthermore, all variables are at least statistically significant at the 10% level. Cross border (Foreign) real estate investment was found to be statistically significant. Similarly, while results on net absorption rates was statistically significant, the direction of movement contradicts expectation.

In terms of real GDP per capita, an increase of 1% in real GDP per capita lead to an estimated increase of 0.46% in Melbourne direct office property market. GDP is a fundamental driver of property market performance, as a result, changes in GDP impacts on total return. The positive relationship between GDP per capita and total return confirms the hypothesis of this paper because variation in the level of economic activity (GDP) affects demand for office space, which leads to changes in rents and property values, and hence total return. As economic activity increases (which is denoted by positive changes in RGDP), it translates into expansion of the economy. Organisations usually expand their businesses in response to RGDP growth, which leads to increased demand for office space. Thus, GDP per capita has a long run positive correlation with office total return. This is consistent with theory that economic growth impacts positively on commercial property market performance. De Wit and Van Dijk (2003) found similar results in the study of global determinants of office property market performance.

Table 4 Long run coefficients via the ARDL estimation procedure

Variable	Melbourne
Constant	19.4474***
LN(RGDP)	0.46903***
LN(STOCK)	-1.35613***
LN(VACANCY)	-2.94526***
LN(NAR)	-0.14399***
LN(FREI[2])	0.031001***
ARDL Bounds test: F-stat	13.50331
Critical value bounds	I(1)
10%	3.35
5%	3.79
1%	4.68
Speed of adjustment	-0.17131

Long run coefficients via the ARDL estimation procedure. *, ** and *** denotes statistical significance at the 10%, 5% and 1% levels of significance respectively.

[1] Note the original series was exponentially smoothed (smoothing constant = 0.3) to reduce noise.

Source: Authors, 2019

An increase of 1% in vacancy rates lead to an estimated decrease of 2.95% in total return in Melbourne property market. This finding is consistent with theory and practice because there is a negative relationship between change in vacancy rates and total return. Since vacancy rate is a supply variable, this negative relationship is expected. Higher vacancy rates generally depict oversupply, as a result, landlords usually decrease rents to clear vacancies in the property market, thereby impacting on income return and hence, total return. Consistent with neo-classical economic assumptions, thus, as office space supply increases disproportionately over demand and becomes less scarce, market performance and confidence decrease with an attendant negative effect on total return. This finding is supported by results of earlier studies including D'Arcy et al. (1999) who found that changes in vacancy rates is a key determinant of property market performance in Dublin.

Surprisingly, net absorption rate, though was significant in the model, had a negative relationship with total return at 0.14% decrease for every 1% increase. It is argued that this could be due to the use of long-term leases in the office market which tends to bind tenants to their spaces, thereby slowing down adjustment of space consumption (DiPasquale and Wheaton, 1995) to impact on rents payable by tenants at a point in time, hence, impacting on income return and by extension, total return in the Melbourne property market. Besides, it is

possible that total return performance in the Melbourne office market may not be responsive to increases in net absorption rates. This suggests a different phenomenon in the Melbourne property market, hence, the need for further research to ascertain the reasons behind such unexpected results. Another reason that could explain the surprising results is the nature of lease incentive packages available to tenants. Lizieri (1998) and Hendershott et al. (2010) suggested that incentive packages were a function of supply and demand in the marketplace and varies according to the letting cycle. Thus, during market downturn, landlords are inclined to offer higher rent-free periods/lease incentives to persuade tenants to rent office space and vice versa. If asking rents are adjusted for rent free periods (which in some cases could be 12 months rent-free depending on lease lengths), effective rents received by landlords would be lower than market rents. This has the effect of lowering rental yields which leads to lower total return. Historically, Sydney office market has outperformed the Melbourne office market due to Sydney's stature as the financial capital of Australia with several businesses having their headquarters located there. As a result, it is argued that tenant's incentives may be high in Melbourne compared to Sydney, which is essential to drive uptake of office space. Since such tenant incentives has the impact of reducing rents payable, which affects rental yield and hence total return, the negative relationship between total return and net absorption rates is plausible. Therefore, the surprising results could be due to higher lease incentive packages such as rent-free periods prevalent in the Melbourne office market. This is supported by Saviils (2019) that incentive packages in Melbourne have remained high and is attributable to strong competition between institutional landlords and high levels of upcoming supply. These supply in the pipeline could cause pre-leasing difficulties, hence, landlords have to offer high incentive packages to achieve maximum levels of preleasing to minimise risks of rental voids in large portfolios.

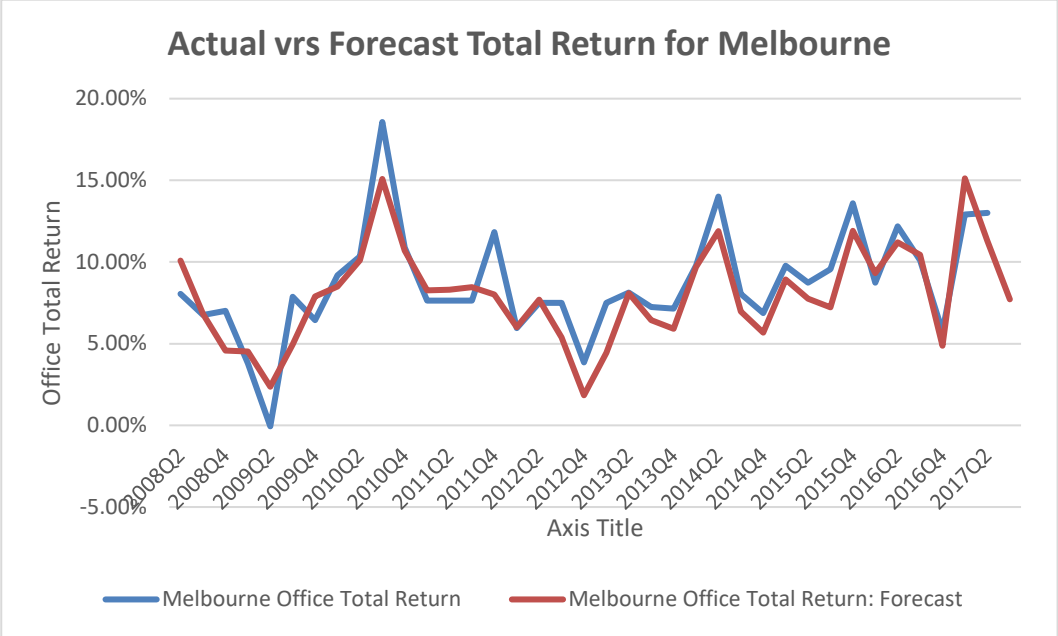
Probably, a more advanced time series technique may explain the phenomenon behind such a relationship. Alternatively, the issue of a larger sample size of data may produce different results or modelling by using cross border real estate investment funds data captured at state-level rather than country-level. Furthermore, it is argued that with a large sample size, the possibility of sub-period analysis could be explored to determine which specific periods that the data cointegrates negatively with total return. It is similarly contended that probably, a different measure of cross border real estate investment could be explored to examine whether the relationship would be different. For example, the Foreign Investment Review Board of Australia collects data on foreign investments and could be a useful source of information for further research.

The crux of the study was on the impact of foreign/cross border real estate investments on total return. The results indicated that an increase of 1% in cross border real estate investment leads to an estimated increase of 0.03% in office total return in Melbourne property market. It is argued that cross border real estate investment represents demand for property because the approach of foreign investors has been to buy and hold property assets over a long-term investment horizon. This has an impact of increasing demand for office property with an attendant effect of a rise in property values, hence, total return. The reason is that stock of office space is slow to adjust in the property market and hence, any significant demand for office space would ultimately impact on property market performance. This finding provides evidence that cross border real estate investments are a demand side variable in the Melbourne property market, as a result, significant capital flow

from foreign sources could exacerbate the already expensive property market in Melbourne. Conversely, it is positive for the property sector as it depicts a signal for demand and hence, property developers would respond with stock addition appropriately. The modelling strategy employed in this study integrates both short run dynamics with long run equilibrium relationships without losing long run information. As Table 5 indicates, the macroeconomic factors explored such as RGDP, vacancy rates, office stock, net absorption, unemployment and foreign real estate investment can continue to exert an influence on total returns for up to three quarters. This finding is not unexpected given that changes in the macroeconomic environment can take time to filter through to individual sectors.

Lastly, the 'speed of adjustment' is relatively swift with up to 17.1% correction to equilibrium in Melbourne market indicating relatively efficient markets and associated transmission mechanisms. Therefore, deviations from long run equilibrium does not persist. The market can correct itself to reach an acceptable equilibrium after every distortion. To examine the potential of the developed model to predict future performance of the office market in Melbourne, a graph of actual/observed values was plotted against forecasted values derived from using the model. The results of the plots for Melbourne office market is shown in Figure 2.

Figure 2 Actual against forecasted values for office Total return for Melbourne



Source: Authors, 2019

Figure 2 shows that forecasted values for office total return in Melbourne closely follow the actual/observed values. The correlation coefficient between the series is 0.8827. This confirms that the variables in the model have strong relationship with the observed values. Therefore, changes in these variables or determinants would lead to variations in office total return in the Melbourne commercial property market. There is a slight divergence between actual and predicted total return towards the end of the series which indicates that there are some unexplained components. This could be due to an over-reaction in the market, which is driven by irrational behaviour, and as a result, the model cannot capture.

Essentially, this study has unravelled several determinants of the performance of the office market in Melbourne, Australia, using total return as a dependent variable. The study has confirmed the existence of long run relationship between office total return and traditional determinants including RGDP, stock of office space at a time, vacancy rates and net absorption rates. Thus, the relationship between demand and supply side variables in the developed model have been confirmed, albeit some surprising results on the relationship between total return and net absorption rates. Therefore, practitioners and various stakeholders operating in the office market in Melbourne, Australia should focus on these determinants in evaluating investment decisions. Furthermore, the emergence of cross border real estate investments as a determinant of direct office market performance in Melbourne is significant and confirms several media reports that cross border investments in the property market is a driver of office property performance. Thus, property total returns in the Melbourne office market are positively correlated or cointegrated with cross border real estate investments. As a result, based on the findings of this study, drivers of commercial property market performance should include cross border real estate investments.

The implications of this study are profound. Firstly, several media organisations through reportages have portrayed cross border real estate investments as having impact on property prices. This study has confirmed that cross border real estate investments has a positive impact on Melbourne direct commercial real estate returns, as a result, the discussions in the media have been validated. Since the impact of cross border real estate investments has been confirmed, stakeholders including public sector agencies mandated to regulate cross boarder investments, such as the Foreign Real Estate Investment Review Board (FIRB), can rely on the findings of this study to determine and formulate policies to mitigate the impact of cross border investments on the Melbourne office property market in Australia. This study contributes to extend the existing literature on determinants of office total returns, but significantly, it has identified cross border real estate investments as a driver of direct commercial real estate returns, which is the initial study to explore this relationship using data from Melbourne, Australia. Other researchers may conduct similar studies using data from different geographic markets and other performance measures such as yields or capital values. The Melbourne direct commercial property industry, developers and investors would benefit from this study as it has unravelled a new determinant that drives total returns. In practice, investors and developers decide to invest in specific geographic property markets based on performance measures including total returns. As a result, property investors are always evaluating factors that pose a threat to the performance of these markets. The findings of this paper would inform property investors and developers to consider cross border real estate investments as an important determinant in their decision making.

5. CONCLUSIONS

The thesis of this paper was to examine the role of cross border investments on the performance of the Melbourne direct commercial office market after a decade of significant cross border investments in Australia using total return as the dependent variable. Independent variables examined included both demand and supply side variables in addition to economic variables. The variables included real GDP per capita, net absorption rates, stock of office space, vacancy rates and cross border real estate investments/funds. Using ARDL model

as presented in section 3 and the evidence obtained after modelling, the paper suggests the following conclusions.

With regards to the thesis of this paper, it is concluded that change in direct commercial office total returns in Melbourne is influenced by RGDP, net absorption rates, stock of office space, vacancy rates and foreign real estate investments, albeit some surprises with respect to the relationship between net absorption and total returns. Apart from net absorption rate showing unexpected relationship with total return, all the examined determinants displayed the expected relationships with total return. The Melbourne office property market is further influenced by cross border investments positively. It is concluded that factors such as vacancy, real GDP, stock and net absorption rates are all determinants of Melbourne property market performance. The effects of all the determinants examined were contemporaneous with no lags. As a result, the reaction of the market to changes in these determinants are faster than expected because information flow through property market is usually slow. Cross border real estate investments have been determined to be a demand variable as it positively cointegrates with total return.

The findings of this study would benefit practitioners and stakeholders in the property industry because it reveals new findings, confirms certain traditionally established determinants and unravels newly emerging factors that influence direct commercial real estate returns of Melbourne property market thereby opening the opportunity for further investigation. It has confirmed several media publications about the perceived impact of cross border real estate investments on the performance of the Melbourne office market. Thus, increased cross border real estate investments pushes property prices upwards. For further research, there is the opportunity to examine the impact of cross border real estate investments on the performance of the Sydney office market. The study could also be extended using other sophisticated econometric techniques suitable for incorporating other variables such as interest rates, building approvals and unemployment rates which are equally important determinants of direct commercial property total returns.

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Appendix 1

Table 5: Unrestricted ECM parameter estimates

Variable	Melbourne Model
D(TOTRET(-1))	3.164997
D(TOTRET(-2))	1.523807
D(TOTRET(-3))	0.28191
D(LN_RGDP_CAPITA)	-1.915259
D(LN_RGDP_CAPITA(-1))	-1.65879
D(LN_RGDP_CAPITA(-2))	5.113187
D(LN_RGDP_CAPITA(-3))	2.638245
D(VACANT)	3.17636
D(VACANT(-1))	-26.77712
D(VACANT(-2))	2.15705
D(VACANT(-3))	-27.04833
D(LN_STOCK)	18.70308
D(LN_STOCK(-1))	-22.1264
D(LN_STOCK(-2))	37.27782
D(LN_STOCK(-3))	-3.160767
D(LN_NAR)	-0.217101
D(LN_NAR(-1))	0.391194
D(LN_NAR(-2))	0.271348
D(LN_NAR(-3))	0.259575
D(LN_FREI_ES)	-0.0281
D(LN_FREI_ES(-1))	-0.151643
D(LN_FREI_ES(-2))	-0.062956
TOTRET(-1)	-6.14747
LN_RGDP_CAPITA(-1)	2.883367
VACANT(-1)	18.1059
LN_STOCK(-1)	-8.336747
LN_NAR(-1)	-0.885161
LN_FREI_ES(-1)	0.190577
C	119.552

Source: Authors, 2019

Appendix 2

Table 6: Restricted ECM parameter estimates

Variable	Melbourne Model
D(TOTRET(-1))	-0.982566
D(TOTRET(-2))	-0.679799
D(TOTRET(-3))	-0.369013
D(LN_RGDP_CAPITA)	0.507877
D(LN_RGDP_CAPITA(-1))	2.632925
D(LN_RGDP_CAPITA(-2))	1.260195
D(LN_RGDP_CAPITA(-3))	-1.215201
D(VACANT)	-3.02726
D(VACANT(-1))	10.75561
D(VACANT(-2))	-11.70084
D(VACANT(-3))	13.10372
D(LN_STOCK)	1.080618
D(LN_STOCK(-1))	-5.390404
D(LN_STOCK(-2))	8.171882
D(LN_STOCK(-3))	-10.84584
D(LN_NAR)	-0.110887
D(LN_NAR(-1))	-0.143256
D(LN_NAR(-2))	0.06231
D(LN_NAR(-3))	-0.101003
D(LN_FREI_ES)	0.022065
D(LN_FREI_ES(-1))	0.037989
D(LN_FREI_ES(-2))	0.02579
Z_TOTRET(-1)	-0.171306
C	0.012972

Source: Authors, 2019

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