The Macroeconomic Forces that drive REIT returns in Australia

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Introduction

Real Estate Investment Trusts (REITs) are companies that own or finance income producing real estate. As an alternative to direct (unsecuritised) investment in property, REITs confer at least two advantages:

- Liquidity: The securitised nature of REITs allow investment without cumbersome transaction costs and lengthy delays in execution
- Diversification: The relatively low unit cost enables the allocation of funds across the sector resulting in diverse portfolio holdings

Furthermore, as REITs are openly traded on securities exchanges, they operate in well established regulatory environments providing a level of governance that is typically not offered in the direct property market

REIT Features

- As a security, it offers the potential for capital appreciation and high rates of dividend yield. The latter occurs by virtue of the regulatory environment
  - In the United States for example, REITs are exempt from corporate income taxes if they distribute at least 95% of net income in the form of dividends to shareholders
  - In Australia, no formal distribution requirements exist however, undistributed income is taxed at the highest marginal rate (46.5%) thus creating an incentive for full distribution
- These benefits however come at a cost. As an openly traded security, it faces exposure to risk factors inherent to equities such as market exposure, interest rate risk, default risk, inflation and so on

Risk Profile

Systematic Risk Factors

- REITs typically experience lower exposure to market risk (vs. common equities) but greater sensitivity to interest rates, which is especially true for highly leveraged firms (Chan, Hendershott & Sanders;1990)

- Furthermore as REITs primarily derive their revenue from rents, higher inflationary expectations tend to improve rental yields, flowing through as higher distributions to investors

- However, the same cannot be said for unexpected increases in inflation, which reduce performance

Risk Profile

Idiosyncratic Risk Factors:

- Size and Value (common risk factors)
- Financial leverage, liquidity and the value of underlying real estate owned by the fund (Chan, Hendershott & Sanders 1990; Conover, Friday & Howton 2000; Clayton & MacKinnon 2000; McIntosh, Liang & Tompkins 1991; Patel & Olsen 1984)

- Australian evidence:
  - Management structure: Outperformance by internally (stapled) versus externally (traditional) managed funds (Newell and Tan 2005; Tan 2004; Lee, Robinson and Reed 2008)
  - Interest rates: Inverse relationship to long term interest rates but positive relationship to short term interest rates (Yong and Singh 2015; Stevenson et al. 2007; Ratcliffe and Dimovski 2007; Newell and Peng 2009)

Objectives

To evaluate the exposure of REITs to common macroeconomic risk factors in the Australian market; and to examine the varying impacts of:

- Management structure: Internally (stapled) vs. Externally (traditional) managed funds
- Leverage: Low vs. High Debt funds (measured by debt to capital ratio)
- Size: Small, Medium and Large funds;

In a manner consistent with multi factor asset pricing models (MFAPM) towards an arbitrage pricing theory model (APT)

Methodology

- In principle, stock prices can be written as a function of discounted dividends

$$p = f\left(\frac{E(c)}{r}\right)$$

Where: *c* represents a dividend stream

r is the discount rate

- Therefore, systematic forces which affect either expected cash flows and/or the discount rate will influence returns

Macroeconomic Risk Factors

The economic factors employed in this study are based on the work of Chen, Roll and Ross (1986). These include:

- unexpected inflation
- changes to expected inflation
- changes to risk premia
- term structure of interest rates

Macroeconomic Risk Factors

The effects of inflation on stock returns are not immediately clear. Unexpected changes in inflation can exert an effect on returns:

- Perhaps one of the more obvious explanations is that higher inflation leads to higher input costs and lower levels of consumer spending resulting in declining profits

- Returns may also be affected if inflation exceeds dividend growth resulting in reductions to income streams. This may be particularly true for income generating securities such as REITs

Macroeconomic Risk Factors

Other theories suggest that the link between inflation and returns depends on whether an asset is perceived to be a 'value' or 'growth' stock

- Value stocks have strong current cash flows that diminish over time while growth stocks are characterised by the opposite
- If an increase in inflation leads to a commensurate rise in interest rates (via the Fisher equation) then growth stocks would experience greater discounted cash flows than value stocks as cash flows are generated further into the future
- Therefore, growth stocks would be more negatively affected by periods of high inflation

Macroeconomic Risk Factors

- The timing of inflation may also have a varying impact on asset prices. Inflation may correlate positively with stock returns during economic contractions. This stems from the notion that unexpected inflation may contain new information about forthcoming economic recovery.
- However, if changes to inflation are expected, returns may improve to the extent that the security is able to act as a partial hedge against rising prices. REITs in particular may fulfil this role.

Macroeconomic Risk Factors: Unexpected Inflation

Unexpected inflation is defined as the difference between actual and expected inflation:

$$UI(t) = I(t) - E[I(t)|t-1]$$

Expected Inflation, $E[I(t)|\ t-1]$ is obtained via the Fisher equation:

$$E[I(t)|t-1] = E[RIR(t)|t-1] - TB(t-1)$$

Where: $I(t)$ is the natural logarithm of the ratio between CPI(t) and CPI($t-1$)

$TB(t-1)$ represents the Treasury Bill rate at the end of period, $t-1$

$RIR(t-1)$ represents the real interest rate at period t which is calculated as the difference between $TB(t-1)$ and $I(t)$

$E[RIR(t\ |\ t-1]$ is the expected real interest rate and is obtained using the methodology of Fama and Gibbons (1984)

Macroeconomic Risk Factors: Expected Inflation and Risk Premium

Changes to expected inflation is defined as the difference between one period ahead expected inflation and expected inflation in the current period:

$$DEI(t) = E[I(t+1)|t] - E[I(t)|t-1]$$

Unexpected changes to the risk premium is defined as the difference in return between a portfolio of long term corporate bonds and long term government bonds:

$$URP(t) = BBB(t) - LGB(t)$$

Where *BBB*(t) represents the return on BBB rated low-grade bonds and *LGB*(t) represents the return on long term government bonds. *URP*(t) would be zero in a default-free economy. Therefore, changes to *URP*(t) can be interpreted as shifts in the probability of default.

Macroeconomic Risk Factors: Term structure

The **term structure of interest rates** is defined as the difference between long and short term government bonds:

$$TERM(t) = LGB(t) - TB(t-1)$$

Under the assumption of risk neutrality, TERM can be interpreted as reflecting the unexpected return on long term government bonds.

Methodology: Asset Pricing Tests

To test the sensitivities of returns to the aforementioned risk factors, the following factor model was used:

$$R = \beta_0 + \beta_1 STOCK + \beta_2 UI + \beta_3 DEI + \beta_4 URP + \beta_5 TERM + \varepsilon$$

Where: R = vector of expected returns

STOCK = monthly logarithmic returns for the ASX200 stock market index

UI = Unexpected Inflation

DEI = Changes to Expected Inflation

URP = Unexpected changes to the risk premium

TERM = Term structure of interest rates

Methodology

- **Leverage**: To evaluate the effect of leverage, funds were divided into high and low debt groups based on gearing levels as measured by debt to capital ratios. Funds were considered as high debt (HD) if their debt to capital ratio exceeded the cross sectional average in the prevailing time period and low debt (LD) otherwise.

- **Management structure**: Funds were divided into two portfolios: internally managed (stapled) and externally managed (traditional). Under a traditional trust, external parties perform many of the management functions such as tenant management, asset acquisition and disposal and negotiation of debt contracts.

- **Size**: A common risk factor not only among REITs but for equities in general, size risk measures the premium attached to small cap stocks. Funds with:
  - less than AUD$1bn in market capitalisation were considered *Small*
  - between AUD$1 – 3bn were considered *Medium* and
  - greater than AUD$3bn were considered *Large*.

Data

- This study includes REITs listed on the Australian Stock Exchange (ASX) between 1995 and 2015.
- All financial variables including: adjusted closing prices, number of shares outstanding, debt to capital ratios, market capitalisation and market price indices were obtained from Datastream.
- Macroeconomic variables such as GDP, inflation, 90 day bank accepted bill rates and 10 year treasury bond rates are widely available from official public sources. BBB rated bond rates however were only available from 2005 onwards.
- To be included in the sample, REITs must satisfy size and data availability requirements. Funds with less than 24 months of available data were removed from the sample. Also, funds with less than AUD$100m in market capitalisation were not considered.

Data

Annualised summary statistics are presented in the following table:

	A-REITs	ASX200	UI	DEI	URP	TERM
Arithmetic mean	5.66%	5.31%	0.97%	-0.12%	23.01%	5.03%
Geometric mean	3.12%	3.86%	0.74%	-0.17%	22.81%	4.42%
Median	9.53%	7.23%	0.56%	-0.04%	19.85%	5.32%
Standard Deviation	18.95%	15.11%	7.10%	1.41%	15.57%	9.19%
Skewness	-1.6026	-1.0797	0.4250	-0.4597	1.2358	-0.1072
Kurtosis	3.1446	1.8618	0.0188	-0.1824	1.0580	-0.7545
Number obs.	229	229	229	229	128	229

- A-REITs generated lower returns than general equities; and
- Exhibited greater volatility over the sample period: 1995 – 2015
- Strong negative skewness in A-REIT returns suggests period of negative outliers (possibly due to Financial crisis of 2007-09)

Data

Summary statistics during the pre-GFC, GFC and post-GFC periods are further presented in the following table:

		A-REITs	ASX200	UI	DEI	URP	TERM
Pre-GFC	Arithmetic mean	11.89%	9.11%	0.29%	-0.06%	9.23%	6.33%
	Geometric mean	11.08%	9.52%	-0.14%	-0.09%	2.76%	5.23%
	Median	11.23%	9.40%	-1.09%	-0.09%	9.49%	6.08%
	Standard Deviation	9.24%	10.15%	7.54%	1.47%	4.09%	7.55%
	Skewness	0.0660	-0.4719	0.7533	-0.5649	-0.4077	-0.0304
	Kurtosis	0.5378	-0.0924	0.5203	0.1916	-0.4756	-1.2681
	Number obs.	133	133	133	133	32	133
GFC	Arithmetic mean	-34.00%	-18.23%	2.99%	-0.98%	39.54%	-8.79%
	Geometric mean	-35.83%	-17.94%	7.59%	-0.72%	47.73%	-3.60%
	Median	-35.77%	-19.88%	6.63%	-0.92%	33.74%	-9.37%
	Standard Deviation	23.26%	22.67%	9.16%	1.45%	18.47%	5.96%
	Skewness	0.7440	0.5479	-0.5446	0.0412	0.2760	1.1912
	Kurtosis	-0.2082	-0.5238	-1.3198	-1.4026	-1.6085	1.6336
	Number obs.	24	24	24	24	24	24
Post-GFC	Arithmetic mean	7.38%	6.13%	1.54%	0.05%	23.62%	7.23%
	Geometric mean	5.28%	1.85%	0.17%	-0.13%	20.30%	5.71%
	Median	6.39%	6.57%	0.86%	0.27%	21.49%	6.49%
	Standard Deviation	14.55%	12.64%	5.16%	1.20%	11.72%	9.02%
	Skewness	-0.0560	0.3250	0.1418	-0.2557	1.2293	0.1214
	Kurtosis	-0.2647	-0.3192	-0.7005	-0.8954	2.0413	-0.8941
	Number obs.	72	72	72	72	72	72

Data

- A-REITs outperformed general equities during pre-GFC period (with lower σ)
- A-REITs performed very poorly during the GFC
- During post GFC recovery period, A-REITs outperformed general equities
- Note also that unexpected changes to the risk premium (URP) more than quadrupled during GFC and remained fairly high after GFC
- TERM was negative over GFC indicating yield curve inversion

Empirical Results: Leverage and Mgt. Structure

	ALL Funds	*LD*	*HD*	*Stapled*	*Unit*
Constant	-0.0049	-0.0044	-0.004	-0.0053	-0.0038
STOCK	0.764***	0.8892***	0.6926***	0.7984***	0.6575***
UI	-1.4243***	-1.6415***	-1.6603***	-1.5475***	-1.1004***
DEI	4.7393***	3.9073**	5.5084***	4.8876***	4.0036**
TERM	1.0813***	0.4009	0.9438**	1.0723***	1.0171***
Adjusted R^2	0.400	0.402	0.402	0.396	0.377

- **Market risk**: Low β suggesting REITs have less market exposure than general equities
  - More prevalent in LD than HD funds
  - More prevalent in Stapled than Unit trusts
- **Unexpected changes to inflation** had a strongly significantly negative impact on REIT performance suggesting that securitised property may not be an effective hedge against inflation
- Higher **inflationary expectations** however improved fund performance possibly due to higher expected rents
- Lower **term structure** spreads had negative impact (possible indication of economic stress)

Empirical Results: Leverage and Mgt. Structure

- Default risk (URP) was only available from 2005 onwards. This was tested in a separate set of regressions:

	ALL Funds	*LD*	*HD*	*Stapled*	*Unit*
Constant	0.0067	0.0071	0.0093	0.0073	0.0039
STOCK	1.0197***	1.1319***	0.8645***	1.0719***	0.8918***
UI	-1.4146**	-0.9429	-1.6477**	-1.5138**	-1.1834
DEI	2.6304	2.2971	4.585*	2.2728	3.5587
TERM	1.1228**	0.5597	1.1749**	1.092**	1.2007**
URP	-0.7693*	-0.6362	-0.9768**	-0.8422**	-0.5451
Adjusted R^2	0.648	0.613	0.553	0.642	0.537

- The impact of default risk is only evident in High Debt funds and Stapled trusts. This is to be expected given their added propensity for risk taking and the commensurate premia that must be paid to investors. HD funds for example borrowed aggressively to fund expansion; while stapled trusts are permitted to undertake development activities

Empirical Results: Size

	Small	*Medium*	*Large*	*Small*	*Medium*	*Large*
Constant	-0.0064	-0.0068	0.0002	0.0085	0.007	0.0074
STOCK	0.7017***	0.8333***	0.8333***	1.003***	1.017***	0.9236***
UI	-1.6614***	-0.8412	-0.7635**	-1.6591**	-0.6053	-0.7369
DEI	5.7376***	3.8782*	0.0982	2.7598	3.4393	-0.7306
TERM	1.3046***	0.9483*	0.3661	1.4599***	0.8976	0.4339
URP				-0.8822*	-1.0204	-0.587
Adjusted R^2	0.305	0.239	0.463	0.605	0.281	0.529

- **Market risk**: All size sorted portfolios exhibited some exposure to market risk
- **Unexpected Inflation**: Inverse relationship in Small and Large funds
- **Expected Inflation**: Positive relationship in Small and Medium funds
- **Term structure changes**: Greater sensitivity in Small funds
- **Default Risk**: Only significant for Small funds. Larger funds more robust to this source of risk.
- Overall, small funds had a greater exposure to the various risk factors than larger funds, which were driven predominantly by market exposure

Conclusions

General findings

- A-REITs exhibited lower levels of **market exposure** than general stocks
- Inflation had a dual effect:
  - **Unexpected increases in inflation** had a negative impact on performance suggesting that REITs are not an effective hedge against inflation
  - Changes to **expected inflation** however had a positive effect, possibly due to higher expected rents
- Higher **term spreads** (in the yield curve) correlated positively to returns
- Unexpected increases in **default risk** had a negative impact

Conclusions

Leverage

- In terms of gearing levels, highly leveraged funds exhibited less exposure to market risk but greater exposure to unexpected inflation
- Changes to expected inflation however were of greater benefit to highly leveraged funds as were wider interest spreads
- These funds however performed poorly during unexpected increases in the risk premium suggesting that higher gearing levels increased exposure to default risk

Management structure

- Internally managed funds were found to have greater exposure to market risk and unexpected inflation
- However, they exhibited superior performance when inflation was expected to rise
- Internally managed funds also experienced greater exposure to default risk (possibly due to development activities)

Conclusions

Size effects

- Small cap funds displayed a higher degree of exposure to market risk, unexpected inflation, changes to the term structure and default risk
- Medium and large funds were driven predominantly by market risk

Implications for asset allocation strategies

- Portfolio managers and other investors seeking more aggressive returns may select highly leveraged funds with a stapled trust structure operating in a low interest environmental with higher expected inflation
- Those wishing to adopt a more defensive stance may consider less heavily geared funds with external management