



Atchison Consultants

Investment Report

Direct Property

Performance Analysis

10 and 25 Years to December 2016

April 2017

**ATCHISON
CONSULTANTS**

**PFA**
Property Funds Association

Summary

The performance of Direct property has been examined in the context of major asset classes. The report is the latest in a series produced since 2002.

Analysis of the performance of major investment assets available for investors has been undertaken over 10 and 25 years to December 2016.

Analysis of the key attributes of major investment assets has been undertaken. Key attributes include the following:

- Total returns
- Variability of total returns
- Real total returns
- Income returns
- Variability of income returns
- Returns for variability – Sharpe Ratio
- Downside risk
- Prospect of negative annual return

Major asset classes include the following:

- Direct property
 - ◆ Retail
 - ◆ Office
 - ◆ Industrial
- Australian shares
- Managed funds
- Overseas shares
- AREITs
- Residential property
- Australian fixed interest
- Cash

An appropriate time frame for individuals saving for retirement will be a minimum of 10 years and more likely 25 years, being the bare minimum working life.

Total returns and volatility of returns after costs and fees and before tax over 10 years and 25 years to December 2016 are shown in the following table. Office property achieved highest total returns over 10 years to December 2016, followed by Direct property. Retail property achieved highest total returns over 25 years to December 2016 followed by Industrial property.

Total Returns and Volatility of Total Returns and Inflation

Asset Class	10 years to December 2016			25 years to December 2016		
	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	4.4	14.5	1.8	9.4	13.2	6.9
Overseas Shares	4.6	12.8	2.0	6.8	13.2	4.3
Residential property	7.1	3.8	4.5	9.2	4.1	6.8
AREITs	0.3	19.0	(2.3)	8.5	14.3	6.0
Fixed Interest	6.1	3.4	3.5	7.0	4.1	4.5
Cash	4.1	1.1	1.5	5.1	1.1	2.7
Managed Funds	4.7	7.6	2.0	7.9	7.0	5.4
Direct property	8.1	3.2	5.5	8.7	2.9	6.3
Retail property	7.7	2.6	5.1	10.3	2.3	7.8
Office property	8.2	3.7	5.6	7.6	3.7	5.1
Industrial property	8.0	3.8	5.4	10.2	3.1	7.8
Inflation	2.6	0.9		2.5	1.2	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Retail, Direct, Industrial and Office property have provided at or below median volatility of total returns over both 10 and 25 years, as shown in the table above. Total returns from AREITs were significantly lower than from Direct property over 10 years. This is a result of significant set backs during the global financial crisis for AREITs which forced recapitalisation on dilutive terms.

Office, Direct, Industrial and Retail Industrial property have provided strong real total returns of 5.1% p.a. or greater over 10 years. Retail property, Industrial property, Australian shares and Residential property have provided strong real total returns of 6.8% p.a. or greater over 25 years.

Income returns and volatility of income returns over 25 years to December 2016 are shown in the following table. Direct property and all property sectors provided high income returns of 6.7% p.a. or greater. AREITs have provided a high income return of 7.0% p.a. with higher volatility of income returns. Overseas shares provided a low income return of 1.7% p.a. Similar income returns have been provided over 10 years.

Income Returns and Volatility of Income Returns 25 years to December 2016

Asset Class	Income Return (% p.a.)	Volatility (% p.a.)	Real Income Return (% p.a.)
Australian Shares	4.2	1.0	1.8
Overseas Shares	1.7	0.2	(0.7)
Residential property	3.2	0.4	0.7
AREITs	7.0	2.5	4.5
Fixed Interest	5.1	3.9	2.6
Cash	7.0	0.9	4.5
Managed Funds	4.6	1.2	2.1
Direct property	6.9	0.3	4.5
Retail property	6.9	0.4	4.5
Office property	6.7	0.3	4.2
Industrial property	8.3	0.5	5.8
Inflation	2.5	1.1	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Industrial, Direct, Retail and Office property have provided strong real income returns of 4.2% p.a. or greater and very low volatility of income returns over 25 years to December 2016 as shown in the table above. AREITs have provided a strong real income return of 4.5% p.a. with higher volatility of income returns.

Strong income returns underpin property as an absolute return investment.

Performance Analysis 10 Years to December 2016

Introduction

A clearly defined time frame will be a part of any investment portfolio framework. Defining time frames for an investment objective at the outset assists in deciding between investment alternatives.

Long term accumulation of savings for retirement will have a perspective of 10 years. Investments are chosen which would provide reward for holding them over the long term.

Performance Attributes

Highest total returns after costs and fees and before tax over 10 years to December 2016 were from Office, Direct, Industrial and Retail property at 8.2% p.a., 8.1% p.a., 8.0% p.a. and 7.7% p.a. respectively.

Retail, Direct, Office, Industrial and Residential property and Fixed Interest have provided low volatility of total returns at or below 3.8% p.a.

Highest real total returns after costs and fees and before tax over 10 years to December 2016 are from Office, Direct, Industrial and Retail property at 5.1% p.a. or greater.

Over 10 years to December 2016, Direct property and all Commercial property sectors have provided the highest levels of income returns at 6.1% p.a. or greater and among the lowest volatility of income returns. The high and sustainable income is attractive for investors who seek consistent absolute returns. The prospect of sustainable pension payments received by investors in retirement is significantly enhanced.

Relative rewards for volatility of total returns arising from investments as measured by the Sharpe Ratio are higher for Retail, Direct, Office and Industrial property than for other asset classes.

Retail, Direct, Industrial and Office property provided the lowest loss on a one year time frame when measured historically against other asset classes.

When examined over the past 10 years, listed growth assets being Australian and Overseas shares and AREITs have experienced the greatest downside. This time period includes the impact of the global financial crisis on listed markets.

The extent of the negative annual returns in Direct property and all Commercial property sectors was significantly lower than other growth assets.

Increasing exposure in Direct property would have reduced the prospect of negative annual returns in diversified portfolios. Growth portfolios (70% growth assets) would have had a significantly reduced likelihood of incurring negative annual returns with material Direct property exposure.

Total Returns and Volatility of Total Returns under four Tax Regimes

Total returns after costs and fees under four tax regimes over 10 years to December 2016 are shown in Table 1. The four regimes are nil, superannuation, company and individual tax.

Table 1: Total Returns Under Four Tax Regimes

Asset Class	Nil Tax (% p.a.)	Super Tax (% p.a.)	Company Tax (% p.a.)	Individual Tax (% p.a.)
Australian Shares	4.4	5.2	4.1	3.3
Overseas Shares	4.6	4.2	3.8	3.2
Residential Property	7.1	6.2	5.6	4.7
AREITs	0.3	0.5	(0.1)	(0.1)
Fixed Interest	6.1	5.2	4.3	3.1
Cash	4.1	3.5	2.9	2.1
Managed Funds	4.7	4.6	3.8	3.0
Direct Property	8.1	7.1	5.9	4.9
Retail Property	7.7	6.7	5.6	4.6
Office Property	8.2	7.2	6.0	5.0
Industrial Property	8.0	7.0	5.7	4.7
Inflation	2.6	2.6	2.6	2.6

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Imputation credits materially enhanced the after tax returns from Australian Shares. Depreciation allowances on property had a marginal impact.

Volatility of total returns after costs and fees under the four tax regimes over 10 years to December 2016 are shown in Table 2.

Table 2: Volatility of Total Returns Under Four Tax Regimes

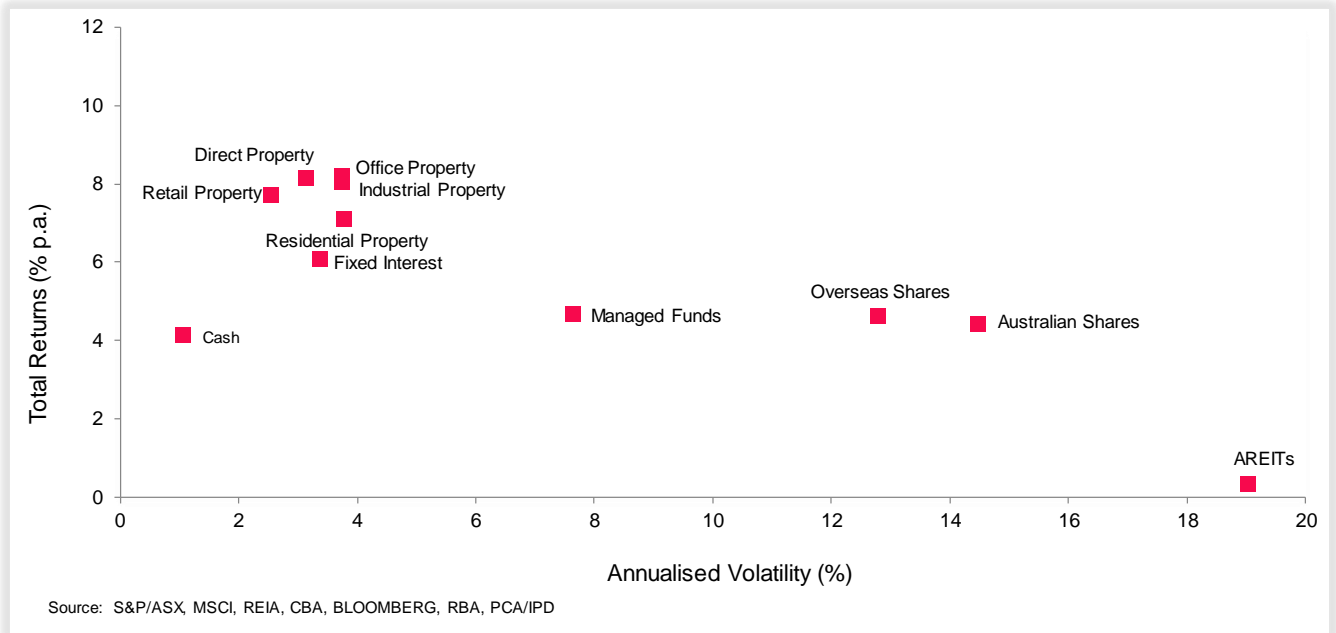
Asset Class	Nil Tax (% p.a.)	Super Tax (% p.a.)	Company Tax (% p.a.)	Individual Tax (% p.a.)
Australian Shares	14.5	13.1	12.7	12.1
Overseas Shares	12.8	12.1	11.7	11.5
Residential Property	3.8	3.4	3.3	3.0
AREITs	19.0	17.4	17.0	15.6
Fixed Interest	3.4	2.8	2.8	2.2
Cash	1.1	0.9	1.3	0.7
Managed Funds	7.6	6.9	6.5	6.3
Direct Property	3.2	2.9	3.4	2.7
Retail Property	2.6	2.3	2.9	2.2
Office Property	3.7	3.4	3.7	3.1
Industrial Property	3.8	3.4	4.0	3.3
Inflation	0.9	0.9	0.9	0.9

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Nil Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns after costs and fees, before tax over 10 years to December 2016 are shown in Chart 1. Office, Direct, Industrial and Retail property provided the highest total returns. AREITs provided lowest total returns with high volatility of total returns.

Chart 1 – Asset Class Total Returns (after fees and costs)



Retail, Direct, Office, Residential and Industrial property have provided at or below median volatility of total returns as shown in Table 3. Median volatility of total returns was 3.8% p.a. Office, Direct, Industrial and Retail property have provided strong real total returns of 5.1% p.a. or greater. AREITs have provided a negative real total return of 2.3% p.a. over the period.

Table 3: Total Returns and Volatility of Total Returns and Inflation

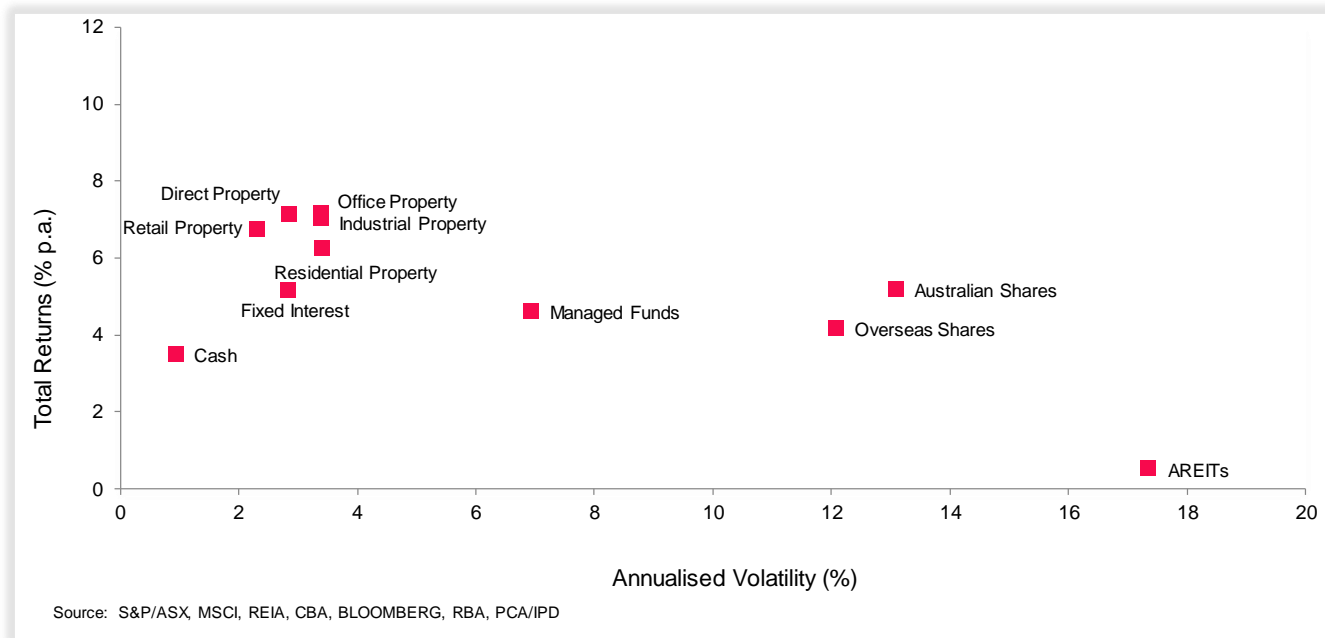
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	4.4	14.5	1.8
Overseas Shares	4.6	12.8	2.0
Residential Property	7.1	3.8	4.5
AREITs	0.3	19.0	(2.3)
Fixed Interest	6.1	3.4	3.5
Cash	4.1	1.1	1.5
Managed Funds	4.7	7.6	2.0
Direct Property	8.1	3.2	5.5
Retail Property	7.7	2.6	5.1
Office Property	8.2	3.7	5.6
Industrial Property	8.0	3.8	5.4
Inflation	2.6	0.9	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Superannuation Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns for an investor through superannuation over 10 years to December 2016 are shown in Chart 2. Total returns are after costs and fees and tax on superannuation funds. Office, Direct, Industrial and Retail property have provided the highest total returns. AREITs provided low total returns with high volatility of total returns.

Chart 2 – Asset Class Total Returns (after fees, costs and superannuation tax)



Retail, Direct, Office, Residential and Industrial property have produced at or below median volatility of total returns as shown in Table 4. Median volatility of total returns was 3.4% p.a. Office, Direct, Industrial and Retail property have provided strong real total returns of 4.1% p.a. or greater. AREITs have provided a negative real total return of 2.1% p.a. over the period.

Table 4: Total Returns and Volatility of Total Returns and Inflation

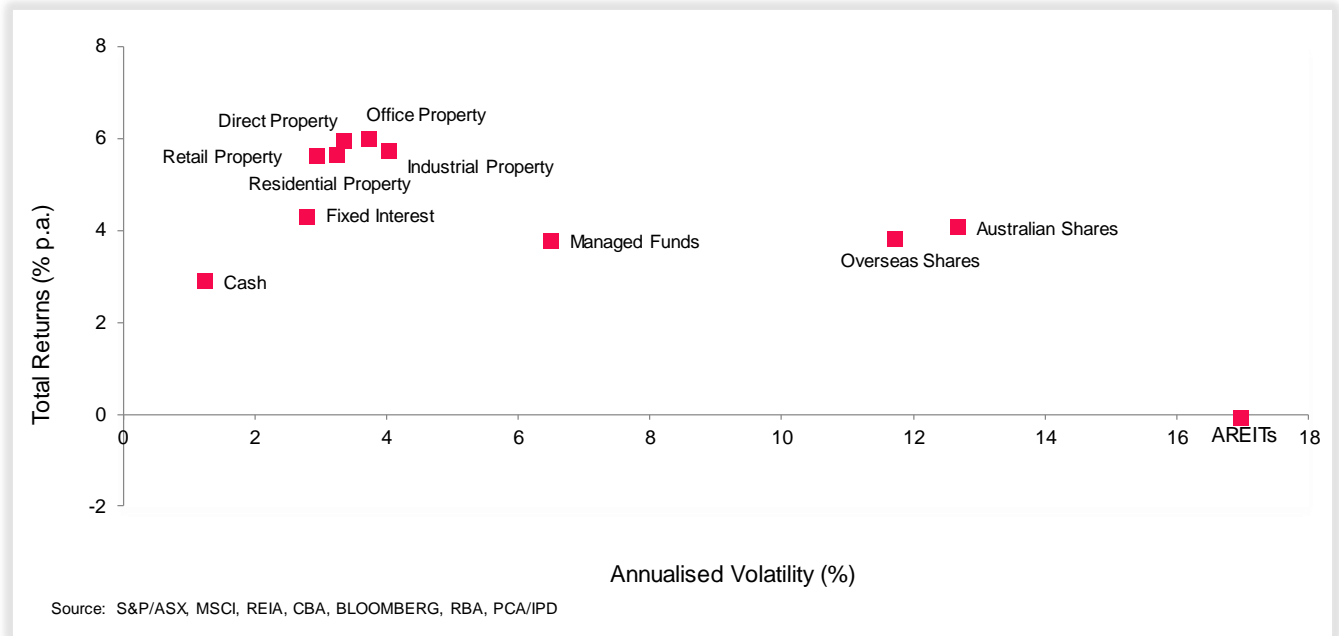
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	5.2	13.1	2.6
Overseas Shares	4.2	12.1	1.6
Residential Property	6.2	3.4	3.6
AREITs	0.5	17.4	(2.1)
Fixed Interest	5.2	2.8	2.6
Cash	3.5	0.9	0.9
Managed Funds	4.6	6.9	2.0
Direct Property	7.1	2.9	4.5
Retail Property	6.7	2.3	4.1
Office Property	7.2	3.4	4.6
Industrial Property	7.0	3.4	4.4
Inflation	2.6	0.9	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Company Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns for a corporate investor over 10 years to December 2016 are shown in Chart 3. Total returns are after costs and fees and company taxation. Office, Direct, Industrial, Retail and Residential property provided the highest total returns. AREITs provided negative total returns with high volatility of total returns.

Chart 3 – Asset Class Total Returns (after fees, costs and company tax)



Retail, Direct, Office and Residential property have provided at or below median volatility of total returns as shown in Table 5. Median volatility of total returns was 3.7% p.a. Office, Direct, Industrial and Retail property have provided strong real total returns of 3.0% p.a. or greater. AREITs provided a negative real total return of 2.7% p.a. over the period.

Table 5: Total Returns and Volatility of Total Returns and Inflation

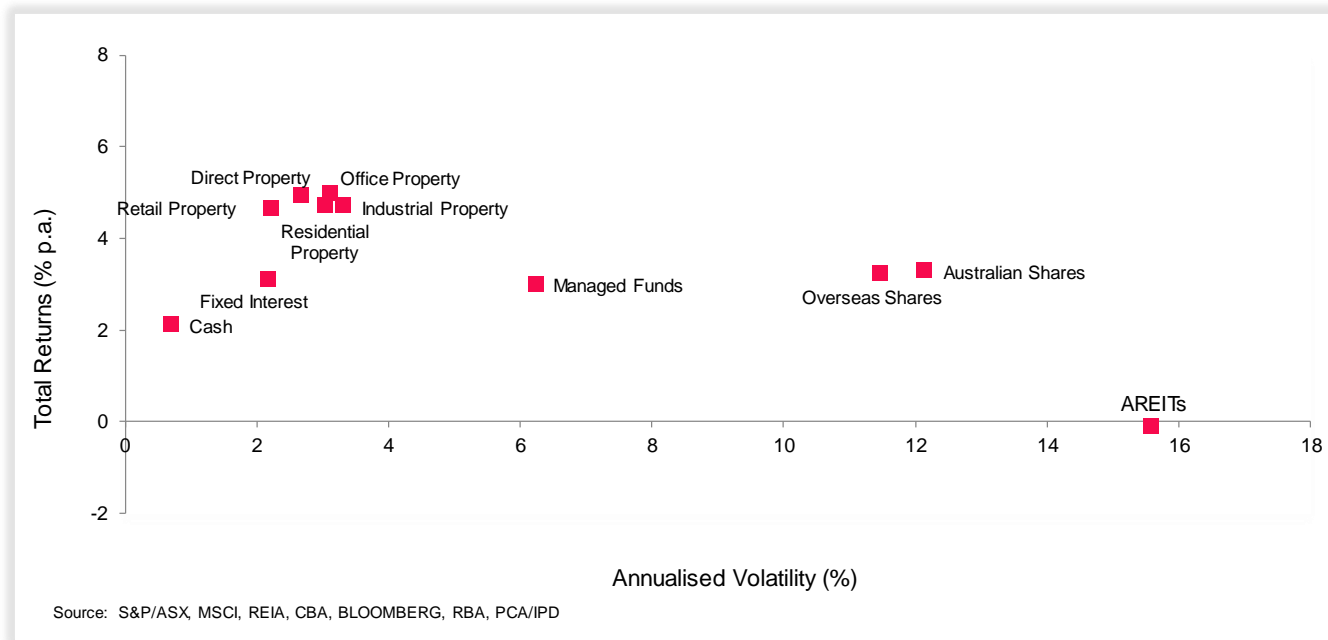
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	4.1	12.7	1.4
Overseas Shares	3.8	11.7	1.2
Residential Property	5.6	3.3	3.0
AREITs	(0.1)	17.0	(2.7)
Fixed Interest	4.3	2.8	1.7
Cash	2.9	1.3	0.3
Managed Funds	3.8	6.5	1.2
Direct Property	5.9	3.4	3.3
Retail Property	5.6	2.9	3.0
Office Property	6.0	3.7	3.4
Industrial Property	5.7	4.0	3.1
Inflation	2.6	0.9	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Individual Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns for individual investors over 10 years to December 2016 are shown in Chart 4. Total returns are after costs and fees and taxation at the highest marginal tax rate on individuals. Office, Direct, Industrial, Residential and Retail property provided the highest total returns. AREITs provided negative total returns with high volatility of total returns.

Chart 4 – Asset Class Total Returns (after fees, costs and individual tax)



Retail, Direct, Residential and Office property have provided at or below median volatility of total returns as shown in Table 6. Median volatility of total returns was 3.1% p.a. Office, direct, industrial and Residential property have provided strong real total returns of 2.1% p.a. or greater. AREITs have provided a negative real total return of 2.7% p.a. over the period.

Table 6: Total Returns and Volatility of Total Returns and Inflation

Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	3.3	12.1	0.7
Overseas Shares	3.2	11.5	0.6
Residential Property	4.7	3.0	2.1
AREITs	(0.1)	15.6	(2.7)
Fixed Interest	3.1	2.2	0.5
Cash	2.1	0.7	-0.5
Managed Funds	3.0	6.3	0.4
Direct Property	4.9	2.7	2.3
Retail Property	4.6	2.2	2.0
Office Property	5.0	3.1	2.4
Industrial Property	4.7	3.3	2.1
Inflation	2.6	0.9	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Income Returns and Volatility of Income Returns

Income returns and volatility of income returns over 10 years to December 2016 are shown in Chart 5. Industrial property followed by Direct, Office and Retail property provided highest income returns. Income returns are after costs and fees and before tax. AREITs provided high income returns with higher volatility of income returns than the Direct property classes. Overseas shares provided the lowest level of income returns.

Chart 5 – Income Returns and Volatility of Income Returns



Industrial, Direct, Office and Retail property have provided very strong real income returns of 3.5% p.a. or greater and low volatility of income returns as shown in Table 7. Strong real income returns underpin property as an absolute return investment. Overseas shares have provided negative real income returns of 0.6% p.a.

Table 7: Income Returns and Volatility of Income Returns and Inflation

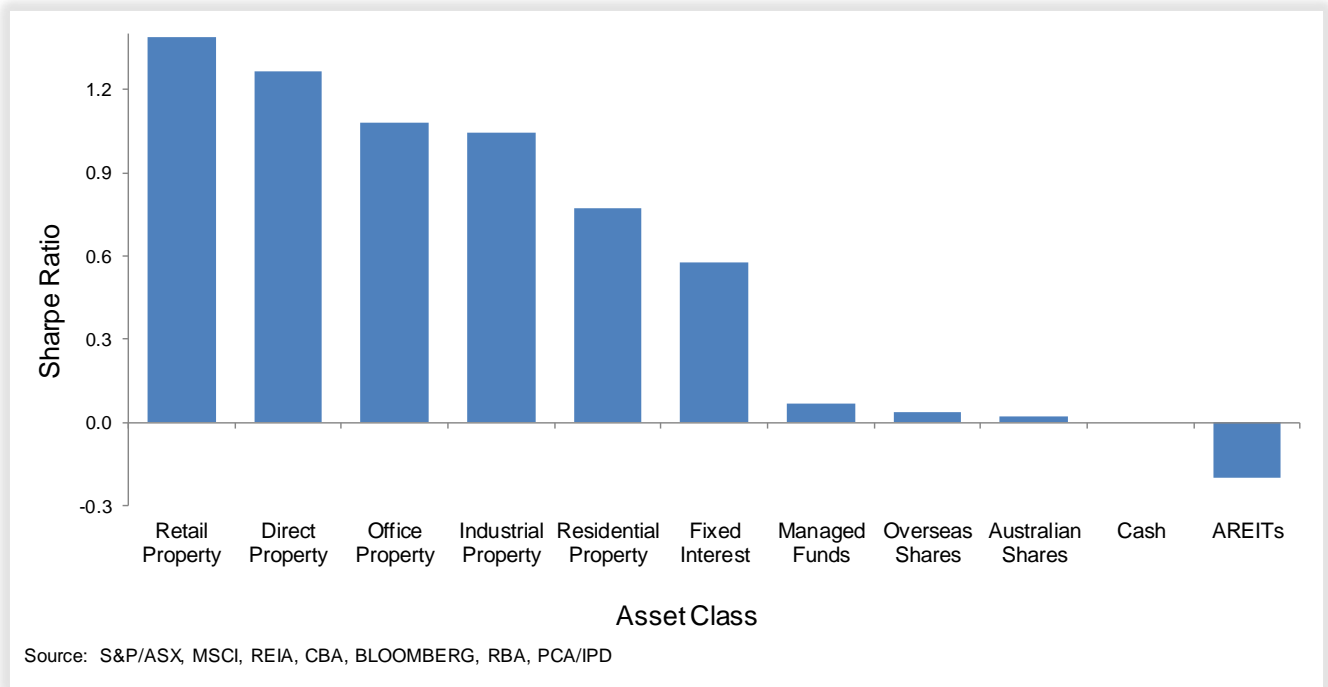
Asset Class	Income Return (% p.a.)	Volatility (% p.a.)	Real Income Return (% p.a.)
Australian Shares	4.4	1.1	1.8
Overseas Shares	2.0	0.3	(0.6)
Residential Property	2.6	0.1	0.0
AREITs	4.6	2.3	2.0
Fixed Interest	4.1	2.8	1.5
Cash	4.9	0.5	2.3
Managed Funds	4.2	0.6	1.6
Direct Property	6.4	0.2	3.8
Retail Property	6.1	0.2	3.5
Office Property	6.4	0.2	3.8
Industrial Property	7.2	0.3	4.6
Inflation	2.6	0.9	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Reward and Volatility - Sharpe Ratio

The ratio of additional return above the risk free rate, being measured as cash, and the volatility of total returns of each asset class, being the Sharpe Ratio, are shown in Chart 6. Returns are after costs and fees and before tax over 10 years to December 2016. An outcome above 0.5 is preferred.

Chart 6 – Sharpe Ratio measured after fees and costs with nil tax



Retail, Direct, Office and Industrial property provided strong returns on a volatility adjusted basis as shown in Table 8.

Table 8: Sharpe Ratio

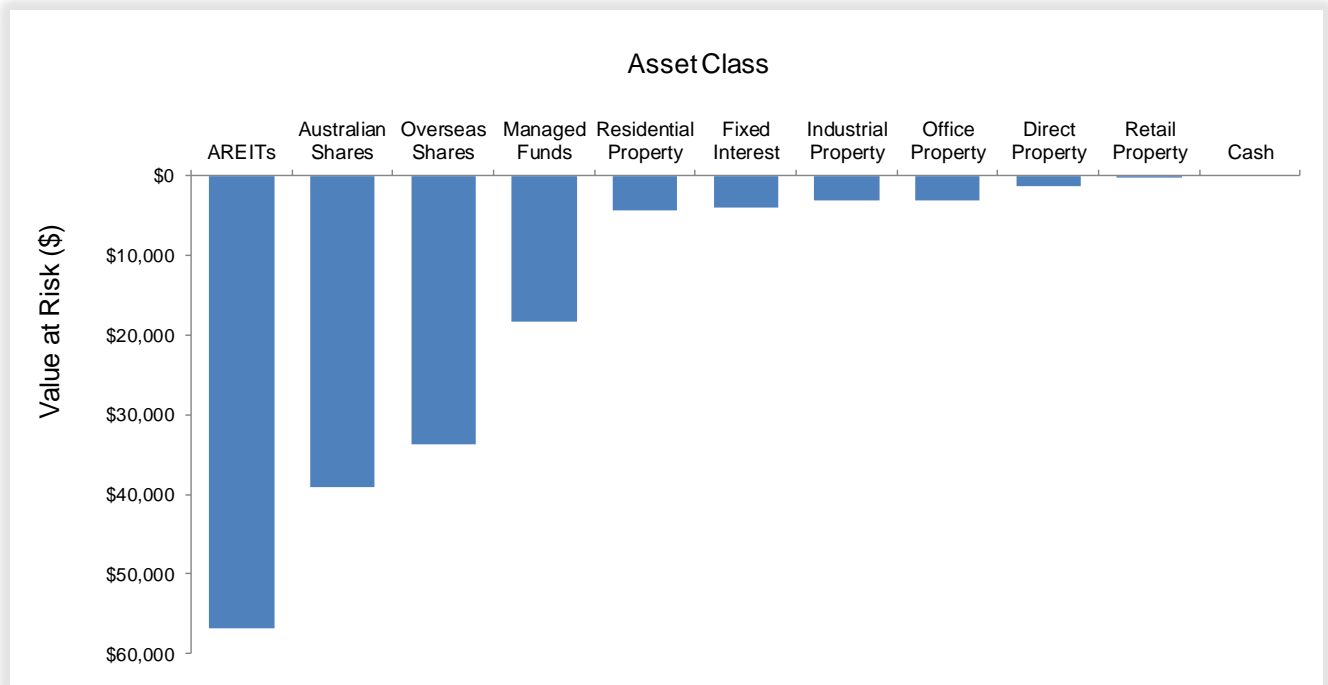
Asset Class	Sharpe Ratio
Retail Property	1.4
Direct Property	1.3
Office Property	1.1
Industrial Property	1.0
Residential Property	0.8
Fixed Interest	0.6
Managed Funds	0.1
Australian Shares	0.0
Overseas Shares	0.0
Cash	0.0
AREITs	(0.2)

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Downside Risk - Value at Risk

Value at risk (VaR) being the dollar amount of prospective loss per year of a \$100,000 investment is shown in Chart 7. It is based on total returns after costs and fees and before tax over 10 years to December 2016.

Chart 7 – Asset Class Value at Risk (VaR)



Retail, Direct and Industrial property and fixed interest have been least exposed to loss on a one year time frame as shown in Table 9.

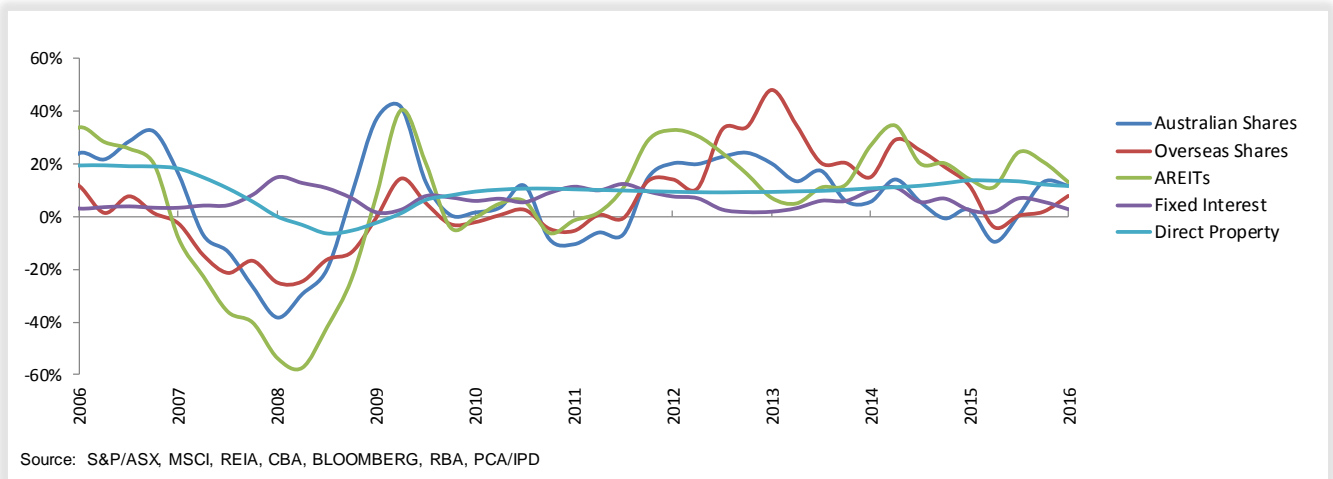
Table 9: Value at Risk

Asset Class	Value at Risk
AREITs	\$56,783
Australian Shares	\$39,078
Overseas Shares	\$33,749
Managed Funds	\$18,265
Residential Property	\$4,353
Office Property	\$4,061
Industrial Property	\$3,212
Fixed Interest	\$3,064
Direct Property	\$1,345
Retail Property	\$11
Cash	\$0

Worst Annual Period - Timing Risk

Rolling annual total returns measured quarterly are shown in Chart 8 illustrating periods and extent of negative annual total returns. Total returns are after costs and fees and before tax for 10 years to December 2016. The significant negative returns from listed assets being Australian and Overseas shares and AREITs are evident in 2007 - 2009.

Chart 8 – Rolling Annual Total Returns



Fixed interest has not experienced negative annual total returns. Residential and Commercial property sectors have not suffered the extent of negative annual total returns that the listed growth asset classes, being shares and listed property, have experienced. This is illustrated in Table 10.

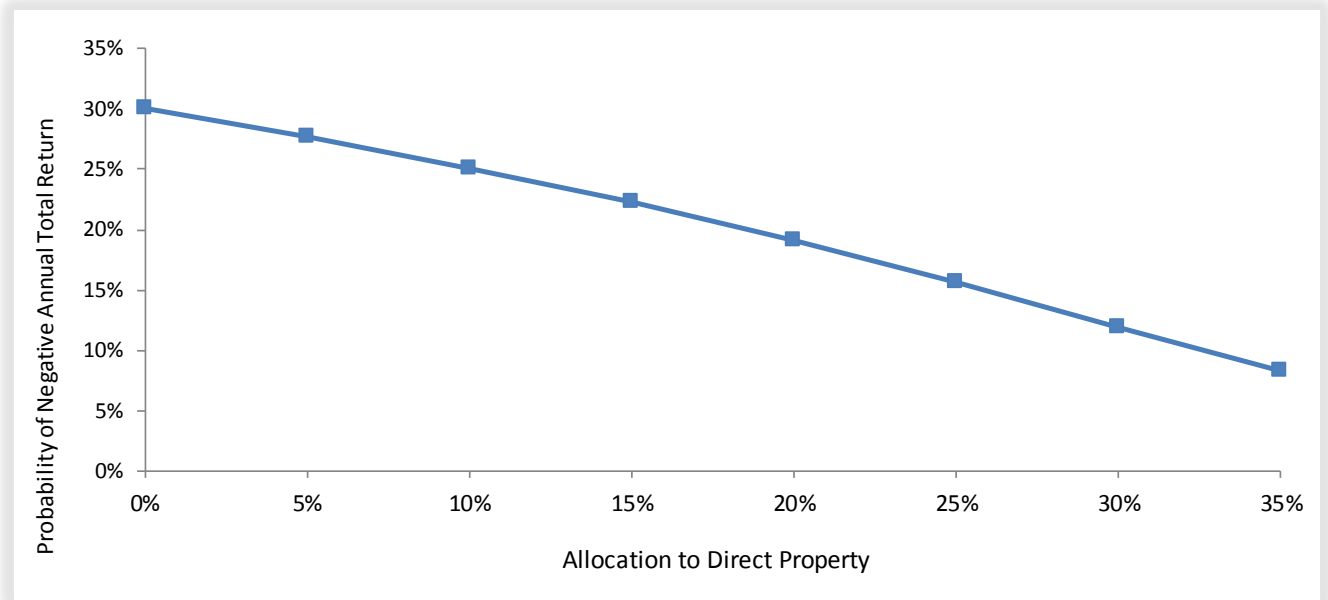
Table 10: Worst Annual Total Returns

Asset Class	Worst Annual Total Returns
AREITs	(57.8)%
Australian Shares	(38.6)%
Overseas Shares	(25.0)%
Managed Funds	(20.6)%
Industrial Property	(9.5)%
Office Property	(8.7)%
Direct Property	(7.0)%
Retail Property	(4.7)%
Residential Property	(3.9)%
Fixed Interest	1.6%
Cash	2.1%

Property within a Diversified Portfolio - Probability of Negative Annual Total Return

Chart 9 represents the probability in years of a negative annual total return within a diversified growth (70% growth asset) portfolio with increasing proportions invested in Direct property.

Chart 9 – Direct property within a growth (70% growth asset) portfolio



When included in a growth portfolio increasing Direct property would have reduced the prospect of a negative annual return as shown in Table 11.

Table 11: Direct Property within a growth portfolio

Proportion Direct Property	Probability of Negative Annual Total Return
0%	30.0%
5%	27.7%
10%	25.1%
15%	22.3%
20%	19.1%
25%	15.6%
30%	12.0%
35%	8.2%

Performance Analysis 25 Years to December 2016

Introduction

A clearly defined time frame will be a part of any investment portfolio framework. Defining time frames for an investment objective at the outset assists in deciding between investment alternatives.

Long term accumulation of savings for retirement will have a perspective of 25 years. Investments are chosen which should provide reward for holding them over the long term.

Performance Attributes

Highest total returns after costs and fees and before tax over 25 years to December 2016 were from Retail property, Industrial property, Australian shares and Residential property at 10.3% p.a., 10.2% p.a., 9.4% p.a. and 9.2% p.a. respectively.

Retail, Direct, Industrial, Office and Residential property have provided at or below median volatility of total returns of 4.1% p.a.

Retail property, Industrial property, Australian shares and Residential property have provided strong real total returns of 6.8% p.a. or greater.

Over 25 years to December 2016, Industrial, Retail, Direct and Office property and AREITs have provided the highest levels of income returns of 6.7% p.a. or higher. Direct property and property sectors have provided among the lowest volatility of income returns. The continued high and sustainable income remains attractive for investors who seek consistent absolute returns. The prospect of sustainable pension payments received by investors in retirement is significantly enhanced.

Relative rewards for volatility arising from investments as measured by the Sharpe Ratio are higher for Retail, Industrial, Direct and Residential property than for other asset classes.

Retail, Industrial and Direct property and cash represents the lowest loss on a one year timeframe when measured historically against other asset classes.

When examined over the past 25 years listed growth assets being Australian and Overseas shares and AREITs have experienced the greatest downside.

The extent of negative annual returns in Direct property and all property sectors were lower than other growth assets.

Increasing exposure in Direct property would have reduced negative annual returns in diversified portfolios. Growth portfolios (70% growth assets) would have had a reduced likelihood of incurring negative annual returns with material property exposure.

Total Returns and Volatility of Total Returns Under Four Tax Regimes

Total returns after costs and fees under four tax regimes over 25 years to December 2016 are shown in Table 12. The four regimes are nil, superannuation, company and individual tax.

Imputation credits in Australian shares materially enhanced the relative returns. Depreciation allowances on property had a marginal impact.

Table 12: Total Returns Under Four Tax Regimes

Asset Class	Nil Tax (% p.a.)	Super Tax (% p.a.)	Company Tax (% p.a.)	Individual Tax (% p.a.)
Australian Shares	9.4	9.5	8.1	6.9
Overseas Shares	6.8	6.1	5.6	5.0
Residential Property	9.2	8.1	7.3	6.2
AREITs	8.5	7.6	6.2	5.5
Fixed Interest	7.0	6.0	4.7	3.6
Cash	5.1	4.4	3.5	2.6
Managed Funds	7.9	7.4	6.3	5.3
Direct Property	8.7	7.6	6.2	5.3
Retail Property	10.3	9.0	7.5	6.5
Office Property	7.6	6.6	5.2	4.5
Industrial Property	10.2	9.0	7.2	6.2
Inflation	2.5	2.5	2.5	2.5

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Volatility of total returns after costs and fees under the four tax regimes over 25 years to December 2016 are shown in Table 13.

Table 13: Volatility of Total Returns Under Four Tax Regimes

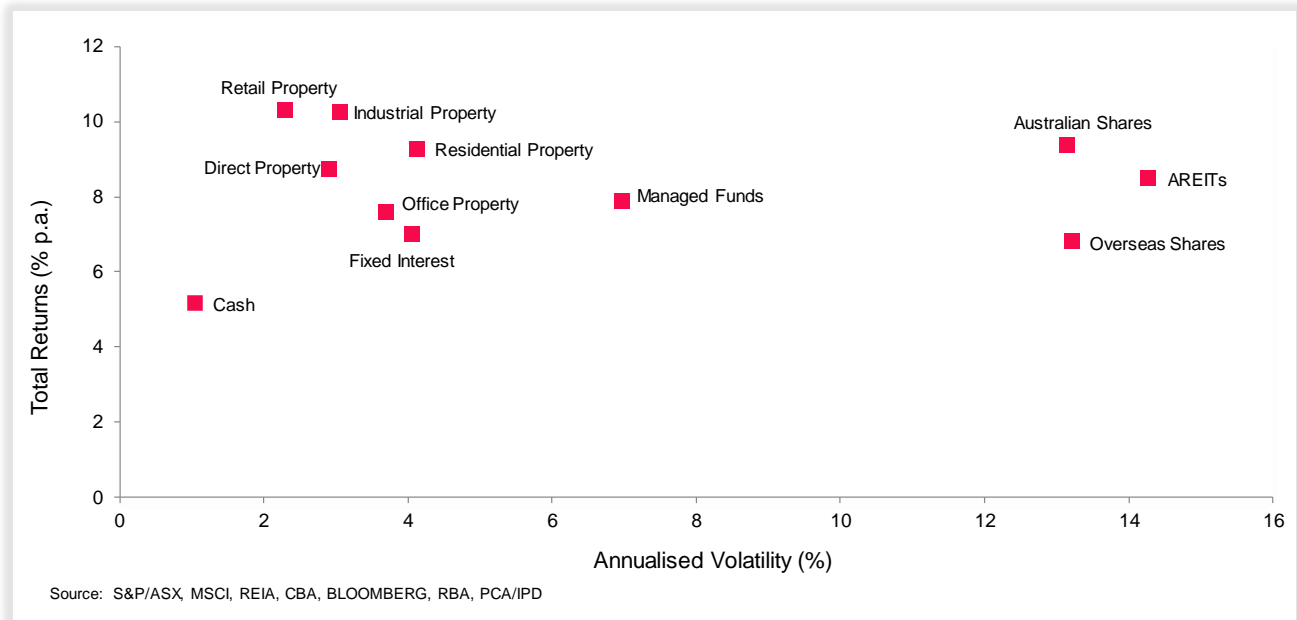
Asset Class	Nil Tax (% p.a.)	Super Tax (% p.a.)	Company Tax (% p.a.)	Individual Tax (% p.a.)
Australian Shares	13.2	12.0	11.7	11.2
Overseas Shares	13.2	12.4	12.0	11.5
Residential Property	4.1	3.7	3.5	3.1
AREITs	14.3	13.1	12.9	11.9
Fixed Interest	4.1	3.5	3.0	3.7
Cash	1.1	0.9	1.1	0.6
Managed Funds	7.0	6.4	5.9	5.6
Direct Property	2.9	2.6	3.2	2.4
Retail Property	2.3	2.1	2.7	1.8
Office Property	3.7	3.3	3.7	3.0
Industrial Property	3.1	2.8	3.5	2.5
Inflation	1.2	1.2	1.2	1.2

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Nil Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns after costs and fees before tax over 25 years to December 2016 are shown in Chart 10. Retail property provided the highest total returns of 10.3% p.a. Industrial property provided the second highest total returns of 10.2% p.a. followed by Australian Shares at 9.4% p.a. and Residential property at 9.2% p.a. Overseas Shares and Cash provided the lowest total returns.

Chart 10 – Asset Class Total Returns (after fees and costs)



Retail, Direct, Industrial, Office and Residential property have provided at or below median volatility of total returns as shown in Table 14. Median volatility of total returns was 4.1% p.a. Retail property, Australian shares, Industrial property and Residential property have provided strong real total returns of 6.8% p.a. or greater.

Table 14: Total Returns and Volatility of Total Returns and Inflation

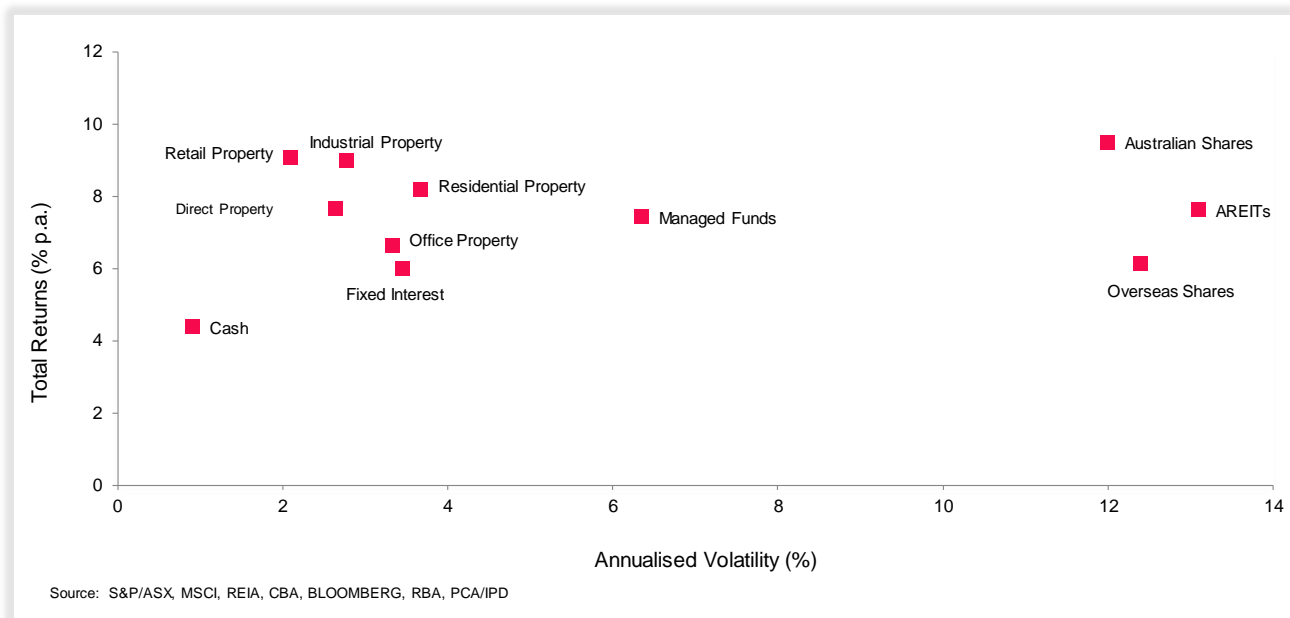
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	9.4	13.2	6.9
Overseas Shares	6.8	13.2	4.3
Residential Property	9.2	4.1	6.8
AREITs	8.5	14.3	6.0
Fixed Interest	7.0	4.1	4.5
Cash	5.1	1.1	2.7
Managed Funds	7.9	7.0	5.4
Direct Property	8.7	2.9	6.3
Retail Property	10.3	2.3	7.8
Office Property	7.6	3.7	5.1
Industrial Property	10.2	3.1	7.8
Inflation	2.5	1.2	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Superannuation Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns for an investor through superannuation over 25 years to December 2016 are shown in Chart 11. Total returns are after costs and fees and tax on superannuation funds. Australian shares, Retail, Industrial and Residential property have provided the highest total returns. Cash and Fixed interest have provided the lowest total returns.

Chart 11 – Asset Class Total Returns (after fees, costs and superannuation tax)



Retail, Direct, Industrial and Office property have produced at or below median volatility of returns as shown in Table 15. Median volatility of returns was 3.5% p.a. Australian shares, Direct, Retail, Industrial and Residential property and AREITs have provided strong real returns of 5.2% p.a. or greater.

Table 15: Total Returns and Volatility of Total Returns and Inflation

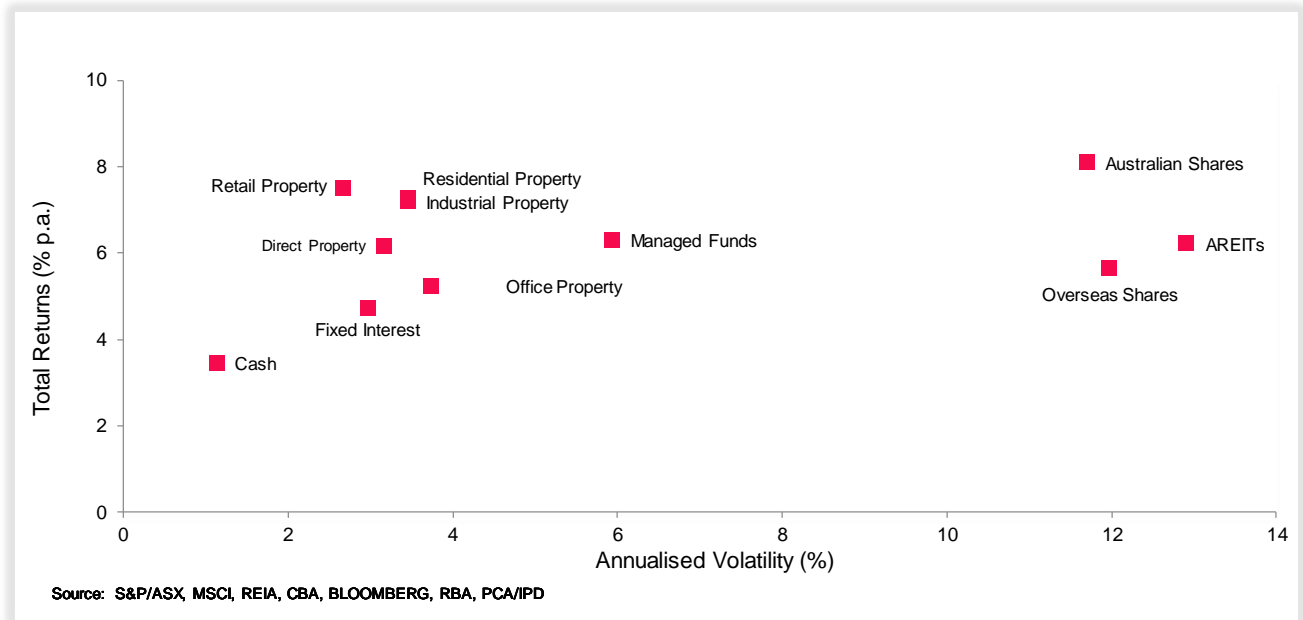
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	9.5	12.0	7.0
Overseas Shares	6.1	12.4	3.7
Residential Property	8.1	3.7	5.7
AREITs	7.6	13.1	5.2
Fixed Interest	6.0	3.5	3.5
Cash	4.4	0.9	1.9
Managed Funds	7.4	6.4	5.0
Direct Property	7.6	2.6	5.2
Retail Property	9.0	2.1	6.6
Office Property	6.6	3.3	4.2
Industrial Property	9.0	2.8	6.5
Inflation	2.5	1.2	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Company Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns for a corporate investor over 25 years to December 2016 are shown in Chart 12. Returns are after costs and fees and company taxation. Australian shares, Retail, Residential and Industrial property provided the highest total returns. Fixed Interest and Cash provided the lowest total returns.

Chart 12 – Asset Class Total Returns (after fees, costs and company tax)



Retail, Direct, Industrial and Residential property have provided at or below median volatility of total returns as shown in Table 16. Median volatility of returns was 3.5% p.a. Australian shares, Retail, Residential and Industrial property have provided strong real total returns of 4.7% p.a. or greater.

Table 16: Total Returns and Volatility of Total Returns and Inflation

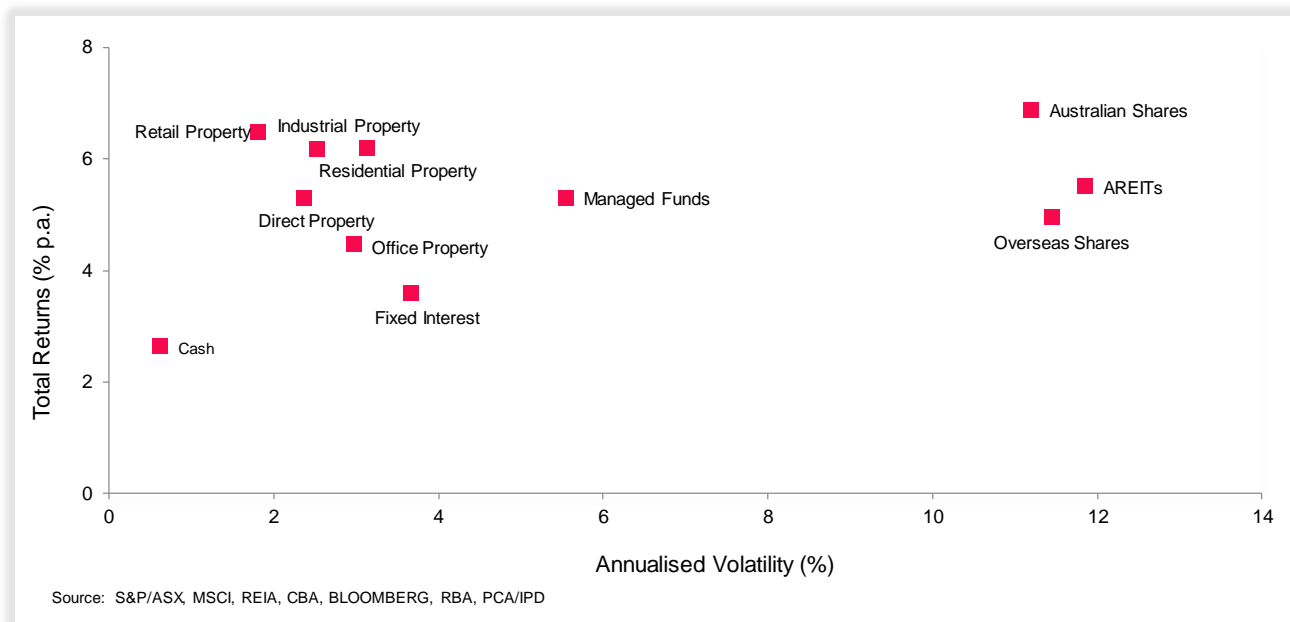
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	8.1	11.7	5.6
Overseas Shares	5.6	12.0	3.2
Residential Property	7.3	3.5	4.8
AREITs	6.2	12.9	3.8
Fixed Interest	4.7	3.0	2.3
Cash	3.5	1.1	1.0
Managed Funds	6.3	5.9	3.8
Direct Property	6.2	3.2	3.7
Retail Property	7.5	2.7	5.0
Office Property	5.2	3.7	2.8
Industrial Property	7.2	3.5	4.7
Inflation	2.5	1.2	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Individual Tax: Total Returns and Volatility of Total Returns

Total returns and volatility of total returns for individual investors over 25 years to December 2016 are shown in Chart 13. Total returns are after costs and fees and taxation at the highest marginal tax rate on individuals. Australian shares, Retail, Industrial and Residential property provided the highest total returns. Fixed Interest and Cash provided the lowest total returns.

Chart 13 – Asset Class Total Returns (after fees, costs and individual tax)



Retail, Direct, Industrial, Office and Residential property have provided at or below median volatility of total returns as shown in Table 17. Median volatility of total returns was 3.1% p.a. Australian shares, Retail, Industrial and Residential property provided real total returns of 3.7% p.a. or greater.

Table 17: Total Returns and Volatility of Total Returns and Inflation

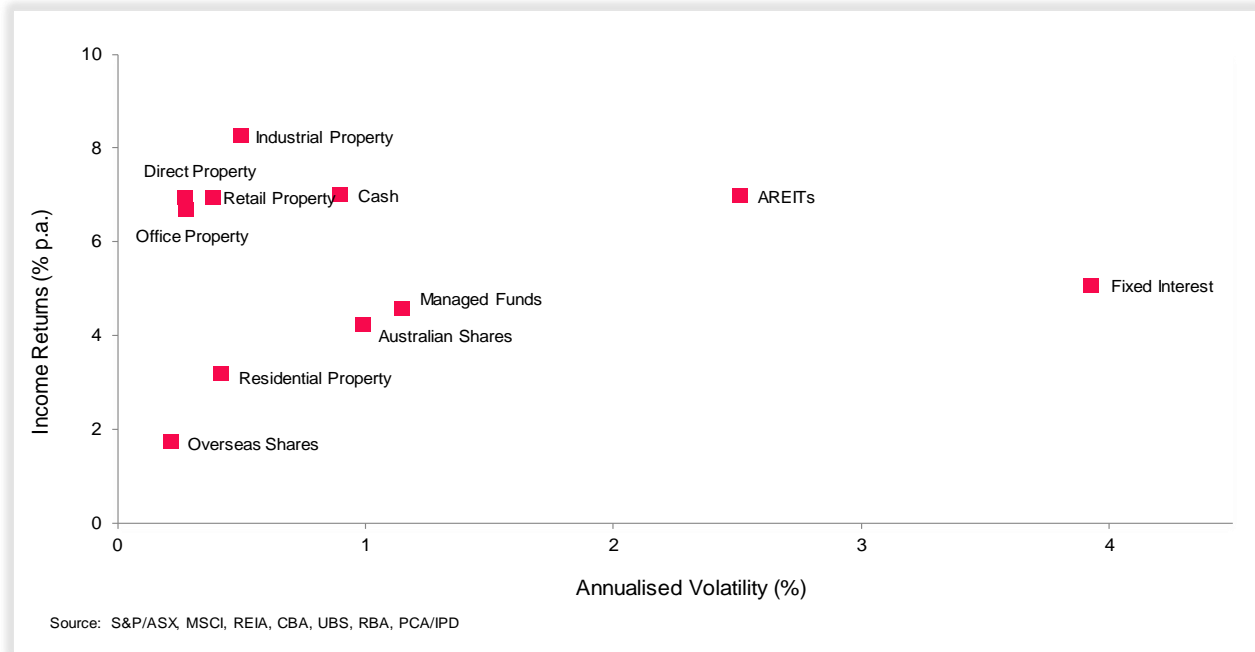
Asset Class	Total Return (% p.a.)	Volatility (% p.a.)	Real Return (% p.a.)
Australian Shares	6.9	11.2	4.4
Overseas Shares	5.0	11.5	2.5
Residential Property	6.2	3.1	3.7
AREITs	5.5	11.9	3.0
Fixed Interest	3.6	3.7	1.1
Cash	2.6	0.6	0.2
Managed Funds	5.3	5.6	2.8
Direct Property	5.3	2.4	2.8
Retail Property	6.5	1.8	4.0
Office Property	4.5	3.0	2.0
Industrial Property	6.2	2.5	3.7
Inflation	2.5	1.2	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Income Returns and Volatility of Income Returns

Income returns and volatility of income returns over 25 years to December 2016 are shown in Chart 14. Income returns are after costs and fees and before tax. Industrial property, AREITs, Direct, Retail and Office property provided highest income returns. AREITs provided high income returns with higher volatility of income returns than Direct property. Overseas shares provided the lowest level of income returns.

Chart 14 – Income Returns and Volatility of Income Returns



Industrial, Direct, Retail, and Office property have provided very strong real income returns of 4.2% p.a. or greater and low volatility of income returns as shown in Table 18. Strong real income returns underpin property as an absolute return investment. AREITs have provided strong real income returns with higher volatility of income returns. Overseas shares have provided negative real income returns.

Table 18: Income Returns and Volatility of Income Returns and Inflation

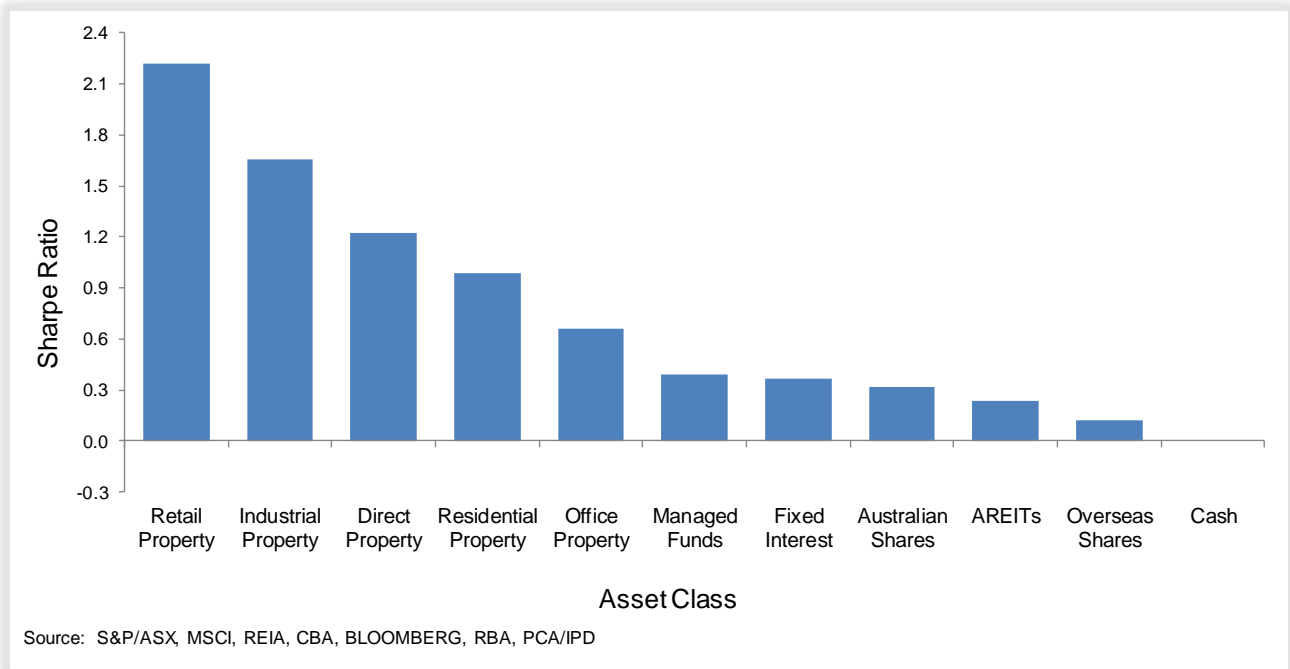
Asset Class	Income Return (% p.a.)	Volatility (% p.a.)	Real Income Return (% p.a.)
Australian Shares	4.2	1.0	1.8
Overseas Shares	1.7	0.2	(0.7)
Residential Property	3.2	0.4	0.7
AREITs	7.0	2.5	4.5
Fixed Interest	5.1	3.9	2.6
Cash	7.0	0.9	4.5
Managed Funds	4.6	1.2	2.1
Direct Property	6.9	0.3	4.5
Retail Property	6.9	0.4	4.5
Office Property	6.7	0.3	4.2
Industrial Property	8.3	0.5	5.8
Inflation	2.5	1.1	

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Reward and Volatility - Sharpe Ratio

The ratio of additional return above the risk free rate, being measured as cash, and the volatility of returns of each asset class, being the Sharpe Ratio, is shown in Chart 15. Returns are after costs and fees and before tax over 25 years to December 2016. An outcome above 0.5 is preferred.

Chart 15 – Sharpe Ratio measured after fees and costs with nil tax



Retail, Industrial, Direct and Residential property provided strong returns on a volatility adjusted basis as shown in Table 19.

Table 19: Sharpe Ratio

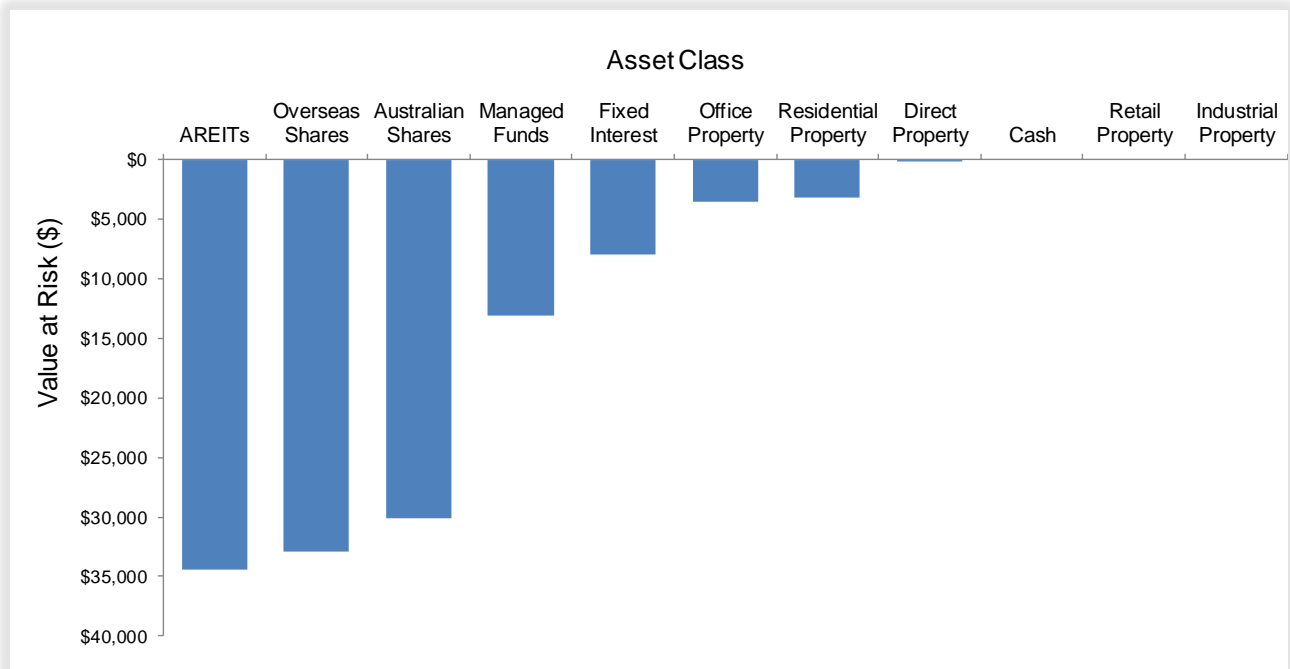
Asset Class	Sharpe Ratio
Retail Property	2.2
Industrial Property	1.7
Direct Property	1.2
Residential Property	1.0
Office Property	0.7
Managed Funds	0.4
Fixed Interest	0.4
Australian Shares	0.3
AREITs	0.2
Overseas Shares	0.1
Cash	0.0

Source: S&P/ASX, MSCI, REIA, CBA, BLOOMBERG, RBA, PCA/IPD

Downside Risk - Value at Risk

Value at risk (VaR) being the dollar amount of prospective loss per year of a \$100,000 investment is shown in Chart 16. It is based on returns after costs and fees and before tax over 25 years to December 2016.

Chart 16 – Asset Class Value at Risk (VaR)



Retail, Industrial and Direct property and cash are least exposed to loss on a one year time frame as shown in Table 20.

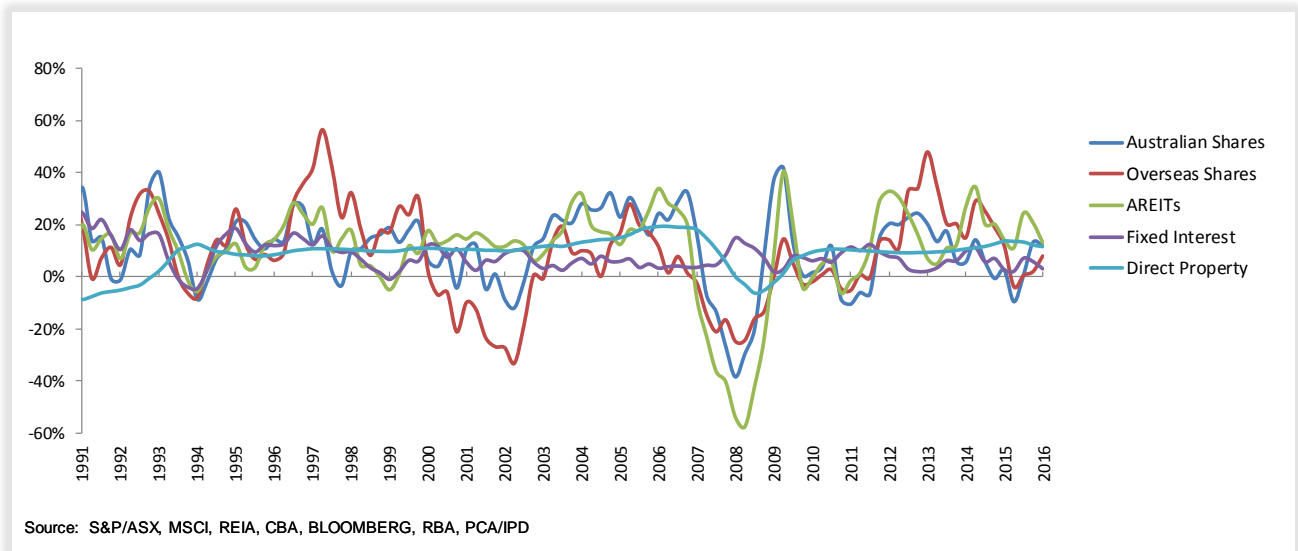
Table 20: Value at Risk

Asset Class	Value at Risk
AREITs	\$34,391
Overseas Shares	\$32,862
Australian Shares	\$30,102
Managed Funds	\$13,068
Fixed Interest	\$8,009
Office Property	\$3,506
Residential Property	\$3,168
Direct Property	\$24
Cash	\$0
Retail Property	\$0
Industrial Property	\$0

Worst Annual Period - Timing Risk

Rolling annual total returns, measured quarterly, are shown in Chart 17 illustrating periods and extent of negative annual total returns. Total returns are after costs and fees and before tax for 25 years to December 2016. The significant negative returns from listed assets being Australian and Overseas shares and AREITs are evident in the early 1990s, early 2000s and 2008/2009.

Chart 17 – Rolling Annual Total Returns



Residential property, Fixed interest and Commercial property sectors have not suffered the extent of negative annual total returns that the listed growth asset classes, being shares and AREITs, have suffered as illustrated in Table 21.

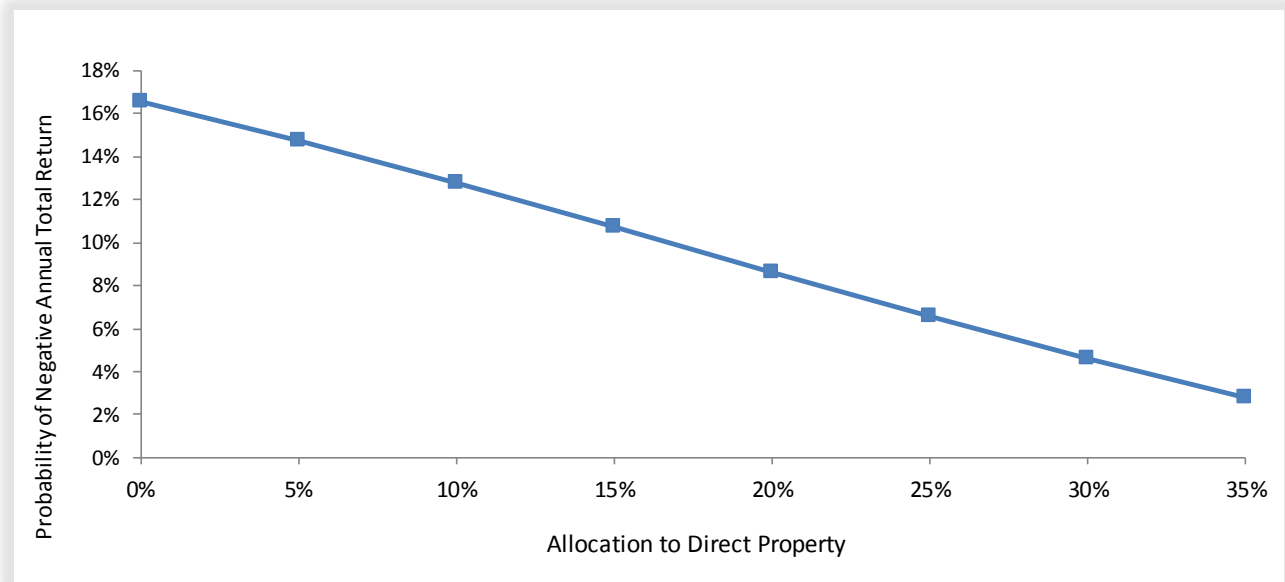
Table 21: Worst Annual Total Returns

Asset Class	Worst Annual Total Returns
AREITs	(57.8)%
Australian Shares	(38.6)%
Overseas Shares	(33.5)%
Managed Funds	(20.6)%
Office Property	(12.0)%
Industrial Property	(9.4)%
Direct Property	(6.9)%
Fixed Interest	(4.8)%
Retail Property	(4.6)%
Residential Property	(3.8)%
Cash	2.1%

Property within a Diversified Portfolio – Probability of Negative Annual Total Return

Chart 18 represents the probability in years of a negative annual total return within a diversified growth (70% growth asset) portfolio with increasing proportions invested in Direct property.

Chart 18 – Direct property within a growth (70% growth asset) portfolio



When included in a growth (70% growth assets) portfolio, increasing Direct property would have reduced the prospect of a negative annual return as shown in Table 11.

Table 22: Direct Property within a growth portfolio

Proportion Direct Property	Probability of Negative Annual Total Return
0%	16.6%
5%	14.7%
10%	12.8%
15%	10.7%
20%	8.6%
25%	6.6%
30%	4.6%
35%	2.8%

Appendix 1 – Calculations

Atchison Consultants have prepared an investment report that provides comparative performance measures of a full range of investment assets.

- Sectors covered by the report are: Australian Shares, Overseas Shares, Residential Property, AREITs, Australian Fixed Interest, Australian Cash, Managed Funds, Direct Property, Retail Property, Office Property and Industrial Property.
- Allowances have been made for management fees, costs, and four taxation regimes.
- Within Direct property there are three components: retail, office and industrial.
- Performance has been measured over 10 and 25 year periods ending 31 December 2016.
- Performance measures used are: total return, income return, volatility of returns, Sharpe ratio and value at risk.
- Analysis of the impact of property within diversified portfolios reflects frequency and extent of negative annual returns.
- Asset class indices without any adjustments provided the base for all calculations. All investment returns are determined after taking into account expenses relating to acquisition, management and disposal of the asset.
- Four tax structures have been considered being; nil, superannuation, company and individual (at the highest marginal tax rate). Each tax basis has been applied to all investment sectors.
- Compound returns have been calculated over the period from December 2006 to December 2016 and from December 1991 to December 2016. This is the annual return investors would have received from an investment in each asset class if invested in an equivalent portfolio over the 10 and 25 year periods respectively.
- Annual standard deviation of returns has been used as a measure of volatility of return.
- The percentage of negative annual returns has been calculated using 100 annual periods (annual returns measured quarterly for 10 and 25 year periods).
- Sharpe ratio has been calculated by dividing the excess return above the risk free rate by the volatility of the return of each asset class. The risk free rate is equal to the return of cash for the period.
- Value at Risk is a measure of the extent the value of an investment may decrease over a stated time frame being one year.
- Superannuation tax has been 15% over the 25 year period.
- Corporate tax rate has varied over the 25 year period, with an average of around 40% and currently 30%. These variations have been taken into account, including the impact on franking credits, arising from imputation credits from dividends on Australian shares.
- The highest marginal individual tax rate has averaged around 49% and includes the 1.5% Medicare levy to 30 June 2015 and 2.0% subsequently.
- Cash and fixed interest are the only sectors not subject to capital gains tax as all returns are taxed as income. All other assets are subject to capital gains tax.
- Capital gains tax has been calculated as a discount on the tax rate applicable to investors introduced in September 1999.
- Residential property is a population weighted average return across major capital cities. Increases in value based on median house prices and rental income are obtained from the Real Estate Institute of Australia. Adjustments for capital improvements have been made based on Australian Bureau of Statistics data. Net rental incomes are adjusted to cover the costs and outgoings associated with investment property.
- Cash is based on investment in cash management trusts.
- Australian shares are based on investment in listed shares with the price movements and dividends consistent with the S&P/ASX 200 Accumulation Index. Allowance is made for

brokerage on acquisition and disposal. Dividend imputation credits are taken into account in determining the impact of taxation.

- Fixed interest is based on investment in government and corporate bonds. Price movements and interest income are derived from the Commonwealth Bank Bond Index pre September 1989 and Bloomberg Composite Index after that date.
- Listed property returns are based on the S&P/ASX 200 AREITs Accumulation Index. Allowance is made for acquisition and disposal costs, such as brokerage. Depreciation allowance has been factored into after tax calculations.
- Overseas shares are based on investment in listed shares consistent with the MSCI World ex Australia Net Dividends Accumulation Index (Unhedged). Allowance is made for brokerage on acquisition and disposal.
- Managed funds reflect returns weighted by a growth fund asset allocation. Return figures for each asset class including tax, fees and costs have been weighted in the proportion adopted.
- Direct property returns are based on MSCI PCA/IPD indices. The measures include a Direct property index, being a composite of all property sectors, and the index of retail, office and industrial sectors. Returns have been adjusted for capital expenditure, maintenance expenses and management fees. Acquisition and disposal costs include conveyancing, stamp duty and agents' fees. Depreciation allowance has been factored into the after tax returns.

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ATCHISON CONSULTANTS

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