

LISTED REAL ESTATE IN A MULTI-ASSET PORTFOLIO: A EUROPEAN PERSPECTIVE

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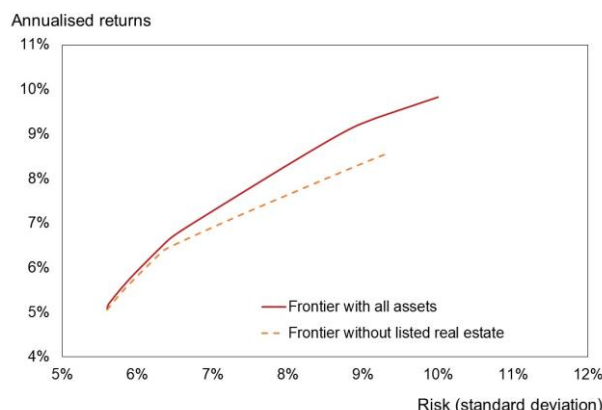
EXECUTIVE SUMMARY

The European listed real estate market has expanded rapidly in terms of size and diversity in recent years. Yet the benefits of investment in listed real estate companies are not uniformly accepted and strategic allocations to property remain low for most institutional investors across Europe. This study examines whether more substantial dedicated allocations to listed real estate could enhance the performance of investor portfolios.

We examine the characteristics of European listed real estate as an asset class by comparing its historical performance with a range of more 'traditional' asset classes including stocks, bonds and commodities. We find relatively low historical correlations with traditional asset classes, implying that listed real estate should have valuable diversification potential.

Focussing on the potential contribution of listed real estate to the performance of a multi-asset portfolio, we find that a substantial allocation to this asset class does generally improve the portfolio's risk-return characteristics. The optimal allocation tends to increase with both the holding period of the portfolio and its level of risk/return, reflecting our finding that listed real estate has generated higher returns (with correspondingly elevated volatility) than competing asset classes.

Efficient Frontier (Jan 2010 - May 2019)



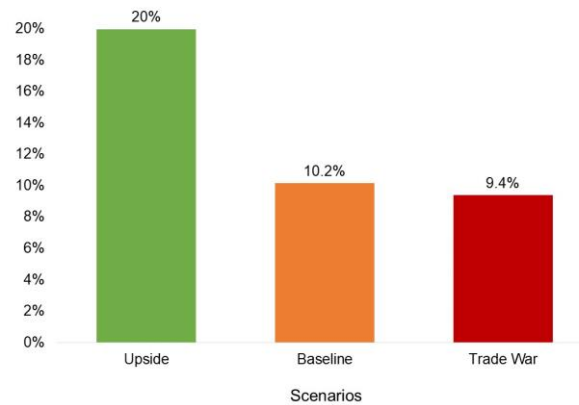
Source: Oxford Economics calculations

Looking forward to the next decade, the shifting economic and financial landscape could have significant implications for the performance of both European real estate and other asset classes. We used the Oxford Global Economic Model to investigate the potential behaviour of listed real estate relative to other asset classes under alternative economic scenarios. The results were then used to estimate optimal portfolios with varying risk-return characteristics.

Our results indicate that a significant allocation to listed real estate will continue to consistently enhance a portfolio's performance in coming years. We examined three alternative scenarios, finding that the optimal allocation to listed real estate would be higher in a scenario where the economy grows more strongly. This underscores that the performance of the asset class is sensitive to prevailing economic conditions (in common with other risky assets).

Table: Optimal allocations in alternative scenarios for the next decade

Allocation to Listed Real Estate at a Median Risk Level



Source : Oxford Economics calculations

We conclude that a substantial allocation to listed real estate does enhance the risk-return characteristics of a multi-asset portfolio. Our findings support the view that a larger dedicated allocation to this asset class would help European investors to better meet their strategic objectives.

1. INTRODUCTION

The ageing of populations is set to continue and even intensify across Europe in coming decades. The resulting upward pressure on public spending on pensions is likely to necessitate reforms to ensure fiscal sustainability, so citizens may no longer be able to rely wholly on the state to support them in retirement. It is therefore essential for individuals to save more and plan more effectively for retirement if they wish to enjoy a good standard of living in their later lives, which clearly includes a close involvement in the pension assets management, but also the effective use of insurance products, annuities, investment funds and many other financial products.

In order to benefit the most from savings efforts and reach long-range financial goals, it is essential to invest in a diversified portfolio that maximises returns while minimising risk. Real estate has long been viewed as a valuable component of such an investment portfolio, providing a number of benefits including high returns, stable income, inflation protection and diversification. But investing directly in real estate also entails inherent challenges, including high unit costs, illiquidity and the need for ongoing professional management of properties.

Indirect investment through listed equity vehicles offers investors a practical solution for avoiding many of the inherent challenges associated with this asset class while gaining exposure to a diverse portfolio of real estate assets. Past studies have shown that the performance of listed real estate is comparable to direct real estate holdings over an investment horizon of at least 18 months¹.

Nonetheless, investment in listed real estate companies is not uniformly accepted as beneficial for portfolio performance and there has so far been little research in a pan-European context of whether listed real estate should play a consistent role within multi-asset portfolios. This study helps to address this information deficit, finding that many institutional investors in the region are underweight in this asset class.

The report is organized as follows:

- **Section 2** describes the evolution of the listed real estate market in Europe
- **Section 3** reviews the historic performance of European listed real estate as an asset class
- **Section 4** examines the potential role of listed real estate within a multi-asset portfolio
- **Section 5** estimates optimal portfolio allocations to listed real estate over the next decade
- **Section 6** presents a short conclusion

Detail on data sources and simulation results are presented in Appendix I, while Appendix II provides a description of the Oxford Global Economic Model.

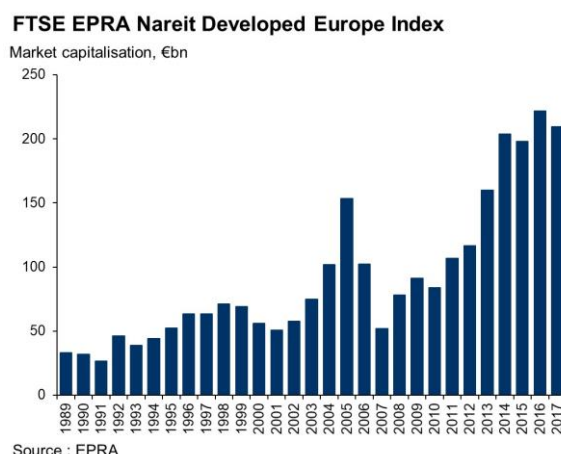
¹ For example, see MSCI (2017), *“Listed and Private Real Estate: Putting the Pieces Back Together”*

2. CHARACTERISTICS OF EUROPEAN LISTED REAL ESTATE

Listed real estate companies own or finance income-producing real estate. They are listed on a national stock exchange and so provide regular income streams, diversification and long-term capital appreciation to investors of all types. For example, it has been estimated that an investor seeking to effectively track the benchmark performance of just the London office market with direct real estate holdings would need to purchase around 80 properties². Small investors would never be able to purchase such properties directly, but listed real estate offers the opportunity to gain exposure to a diversified portfolio of such properties. Using again the example of the London office market, companies represented in the FTSE EPRA Nareit Developed Europe Index own a total of 189 properties in this market.

The European listed real estate market has expanded rapidly in terms of both size and diversity in recent years. The market capitalisation of the EPRA Nareit Developed Europe Index more than tripled from €69bn in 2000 to €209bn in 2018, with its share in the total value of the European stock market more than doubling from 0.7% to 1.8% over the same period.

Fig. 1. Market capitalisation of European listed real estate



Listed real estate companies can be divided into two categories, with key differences relating to permissible activities and taxation:

- **Real estate investment trusts (REITs):** A company that owns, operates or finances income-producing real estate. REITs are generally exempt from taxation at the trust level (as long they distribute at least 90% of their income to shareholders) while being subject to various operational restrictions.
- **Real estate operating companies (REOCs):** Real estate holding and development companies, which are more flexible than REITs in terms

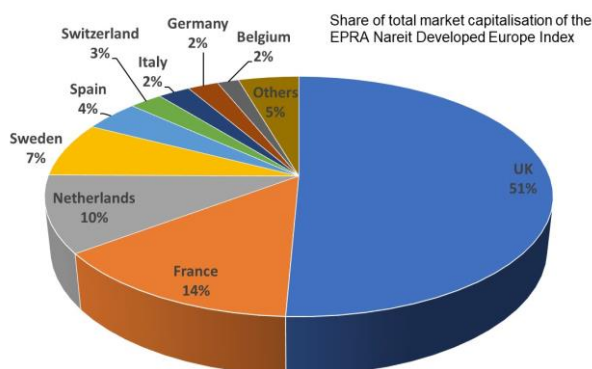
² Baum and Struempell (2007), "Managing Specific Risk in Property Portfolios", Property Research Quarterly

of what types of investments they can make. REOCs can reinvest earnings into the business rather than having to distribute them to shareholders, but they are subject to corporate tax just like any other company.

Although REOCs have been available in the European market for some time, the number of REITs has accelerated more recently as an increasing number of European countries have adopted specific legislation for these vehicles. The Netherlands was the first market to adopt REIT legislation in 1969, with Belgium the only other European country to introduce a REIT regime before the 1990s. More recently, Greece introduced a REIT law in 1999, followed by France in 2003, then Germany, the UK and Italy in 2007. A total of 13 countries in the European Union now have REIT regimes, although this number is expected to increase again later this year with the introduction of REIT legislation in Poland.

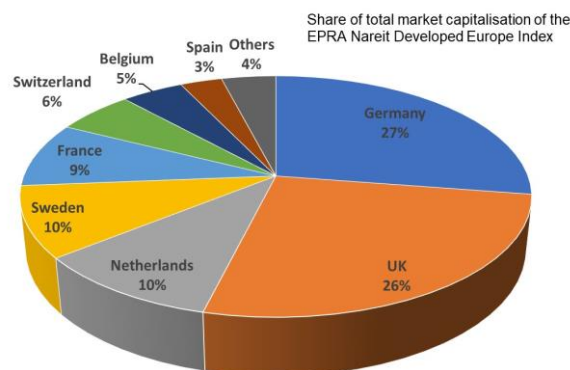
Fig. 2. Geographic breakdown of European listed real estate

Geographic breakdown of European listed real estate, Dec 2000



Source : EPRA

Geographic breakdown of European listed real estate, Dec 2018



Source : EPRA

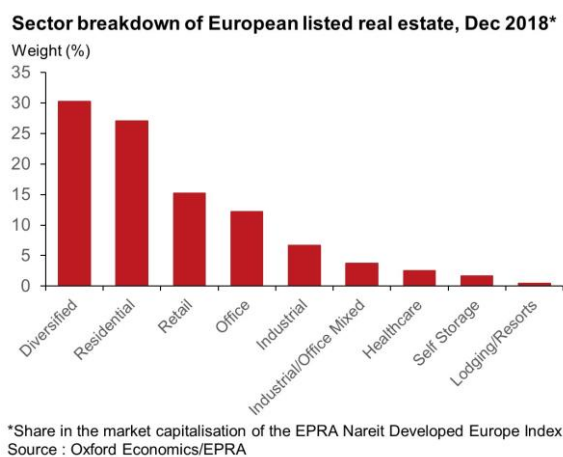
The development of the REITs market was a major driver of the growth in market capitalisation of European listed real estate. Indeed, the share of REITs in the market capitalisation of the EPRA Nareit Developed Europe Index increased significantly from less than 10% in 2000 to over 75% at its peak in 2009, although it has since moderated to around 55% more recently. Given that both REITs and REOCs co-exist in Europe and other markets suggests they have some distinct risk-return characteristics that appeal to different investor

preferences, although empirical studies have found a high correlation between these stock categories³.

As the European listed real estate market has matured, the geographical distribution of its constituent companies has also shifted significantly. In particular, the share of the UK in the market capitalisation of the EPRA Nareit Developed Europe Index has declined from over 50% in 2000 to 27% in 2018, while Germany's share has risen sharply from 2% to 27% over the same period.

In addition to geographic diversification, European listed real estate also offers exposure to properties in multiple sectors of the economy, spanning residential, commercial and industrial holdings, as well as sub-sectors such as healthcare, hotels and self-storage. While small investors would never be able to purchase such properties directly, even large investors are likely to benefit from gaining exposure to different segments of the market.

Fig. 3. Sector breakdown of European listed real estate



The diversification benefits offered by listed real estate also counter the common misconception amongst individual investors that homeownership provides adequate exposure to real estate. In fact, property markets do not generally move together, as most real estate is priced on a local basis and different sectors have different underlying drivers. In contrast to a diversified investment in listed real estate, homeownership concentrates risk in a single sub-segment of the market, with owner-occupation incurring ongoing costs without generating rental income.

We examine the historic performance of European listed real estate as an asset class in more detail in the next section.

³ Niskanen and Falkenbach (2011), "Liquidity of European Real Estate Equities: REITs and REOCs", International Journal of Strategic Property Management

3. PERFORMANCE OF LISTED REAL ESTATE AS AN ASSET CLASS

In order to examine the longer-term benefits of holding listed real estate as an asset class, we compared its historic performance with a range of more 'traditional' asset classes including stocks, bonds and commodities for the period Jan 1999 to May 2019. As shown in Fig.4, listed real estate has produced a similar performance to small cap equities over this period, albeit with slightly higher average annual returns and a slightly lower standard deviation (a measure of risk). The Sharpe ratio (which measures risk-adjusted returns) for listed real estate is comparable to both small cap equities and high-yield bonds. Only government bonds and investment-grade fixed income have provided superior risk-adjusted returns, while the performance of large-cap equities and commodities has been significantly less attractive from this perspective.

Although an understanding of risk-adjusted returns is crucial to the process of strategic asset allocation, so too is an understanding of correlations between asset classes. Modern portfolio theory shows that the goal of improved risk-adjusted returns in multi-asset portfolios can be achieved by investing in asset combinations that have little or no correlation. As market conditions evolve over time, a diverse group of assets will perform differently in different market regimes, dampening the overall volatility of the portfolio and generating more consistent returns over the long-term.

Fig. 4. Summary statistics on performance of asset classes

Total Returns by Asset Class, Jan 1999 - May 2019								
	Equities - Small Cap	Equities - Broad Market	Equities - Large Cap	Government Bonds	Corporate Bonds - High Yield	Corporate Bonds - Investment Grade	Diversified Commodities	Listed Real Estate
Summary Statistics								
Arithmetic Average growth rate	10.8%	5.6%	4.3%	4.0%	8.0%	4.6%	3.6%	11.2%
CAGR	8.2%	3.8%	2.2%	3.8%	7.1%	4.3%	1.8%	8.4%
Standard Deviation	22.9%	19.4%	21.3%	3.9%	18.0%	5.5%	18.9%	22.7%
Sharpe Ratio	0.47	0.29	0.21	1.02	0.45	0.84	0.19	0.49
Correlation between annual returns								
Equities - Small Cap	1.00							
Equities - Broad Market	0.92	1.00						
Equities - Large Cap	0.90	0.96	1.00					
Government Bonds	-0.11	-0.03	-0.05	1.00				
Corporate Bonds - High Yield	0.53	0.55	0.53	0.20	1.00			
Corporate Bonds - Investment Grade	0.15	0.26	0.21	0.73	0.47	1.00		
Diversified Commodities	0.17	0.19	0.22	-0.09	0.23	0.03	1.00	
Listed Real Estate	0.60	0.61	0.55	0.15	0.44	0.41	0.14	1.00

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The correlation matrix in Fig.4 shows that the major European equity indices have been closely correlated, despite small cap equities having produced significantly larger returns than large cap equities. This underscores the fact that the correlation coefficient measures co-movement between variables but provides little information on the absolute level of changes.

Focussing on listed real estate, the correlation matrix shows relatively low historical correlations with traditional asset classes. The correlation with equity indices (both large and small cap) is moderate at 0.6, correlation with corporate bond indices (both high-yield and investment grade) is low at 0.4, while the

correlations between listed real estate and both government bonds and commodities are very low at just 0.1. Overall, this implies that listed real estate should have valuable diversification potential.

It is possible that the summary statistics presented in Fig.4 are skewed by the period of history considered. In particular, the average annual returns from European equities appear disappointing, but this may reflect the timing of the peak in the tech bubble and the impact of the global financial crisis. In order to investigate whether our findings differ significantly if we consider a sub-period excluding those events, Fig.5 presents equivalent summary statistics for Jan 2010 to May 2019.

Of course, this recent sub-period was also characterised by idiosyncratic events that have affected financial markets - most notably, quantitative easing by central banks, which has pushed down interest rates and inflated the prices of many assets. In light of these developments, it is not surprising to find that Fig. 5 shows relatively higher risk-adjusted returns across all asset classes except government bonds and commodities (the performance of the latter having been dampened by the unwinding of the super-cycle in commodity prices). Still, the Sharpe ratio for listed real estate remains similar in magnitude to small cap equities, while being significantly higher than both large cap equities and the broad equity market. Risk-adjusted returns on high-yield bonds are much higher during this sub-period, which mainly reflects a reduction in volatility of this asset class in recent years.

Fig. 5. Summary statistics on performance of asset classes

Total Returns by Asset Class, Jan 2010 - May 2019								
	Equities - Small Cap	Equities - Broad Market	Equities - Large Cap	Government Bonds	Corporate Bonds - High Yield	Corporate Bonds - Investment Grade	Diversified Commodities	Listed Real Estate
Summary Statistics								
Arithmetic Average growth rate	13.3%	8.6%	6.3%	2.5%	7.6%	4.5%	-4.5%	11.9%
CAGR	11.7%	7.3%	4.0%	2.9%	7.7%	4.7%	-5.8%	10.3%
Standard Deviation	13.7%	11.7%	14.4%	3.7%	7.3%	4.3%	13.8%	13.2%
Sharpe Ratio	0.98	0.74	0.44	0.68	1.04	1.06	-0.32	0.91
Correlation between annual returns								
Equities - Small Cap	1.00							
Equities - Broad Market	0.89	1.00						
Equities - Large Cap	0.87	0.96	1.00					
Government Bonds	-0.03	0.12	0.04	1.00				
Corporate Bonds - High Yield	0.61	0.74	0.71	0.30	1.00			
Corporate Bonds - Investment Grade	0.22	0.42	0.30	0.70	0.65	1.00		
Diversified Commodities	0.08	0.15	0.20	-0.09	0.32	0.11	1.00	
Listed Real Estate	0.61	0.68	0.64	0.29	0.57	0.59	0.21	1.00
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While this recent period has been characterised by a fairly broad-based improvement in returns, Fig. 5 shows that the correlation matrix is not substantially changed. Correlations between real estate and other asset classes are moderately higher, which is likely reflective of the broad-based increase in the prices of risky assets. But these correlations remain at moderate levels, confirming the diversification potential of listed real estate.

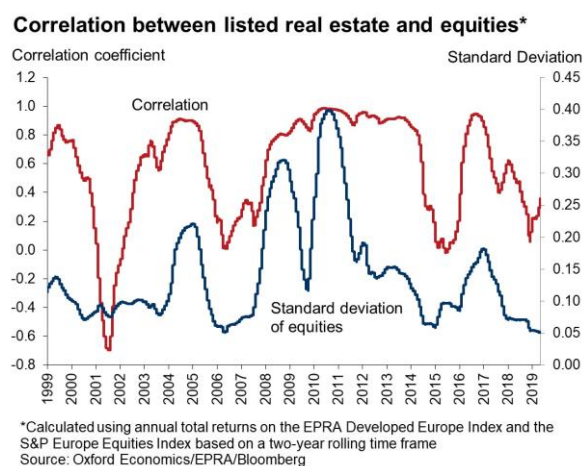
This analysis highlights that correlations between asset classes are not static, but instead vary over time. Correlations can change significantly under different market conditions - correlations between all risky assets tend to rise at times of heightened volatility, for example, especially when increased systematic risk results in broad-based declines in equity markets. Moreover, the rapidly

evolving composition of listed real estate as an asset class in Europe may also imply structural changes in its relationship with other asset classes over time.

In order to examine this in more detail, Fig.6 shows how the correlation between listed real estate and equities has moved over time and relative to the underlying volatility in the stock market. As may be expected, this suggests that the diversification benefits of listed real estate diminish during periods of heightened volatility in the stock market. On the other hand, there is little evidence of any obvious structural shift in the relationship between listed real estate and equities over time.

It may appear counterintuitive for listed real estate to be so closely correlated with equities during certain periods of history if its performance is comparable to direct real estate holdings. However, it is well documented that listed real estate tends to co-move with the broader stock market over short-term horizons, as the liquidity of these instruments means they are sensitive to changes in market sentiment that affect investor demand for risky assets in general. Such short-term fluctuations can still happen in the context of a longer-term trend where listed real estate performs as a good substitute for direct real estate holdings.

Fig. 6. Correlation of listed real estate and equities



Conversely, it is worth highlighting that the correlation between listed real estate and government bonds has tended to vary inversely with market volatility, as illustrated by Fig.7. This likely reflects the impact of “flight to quality” flows into government bonds during times of market turbulence and risk aversion.

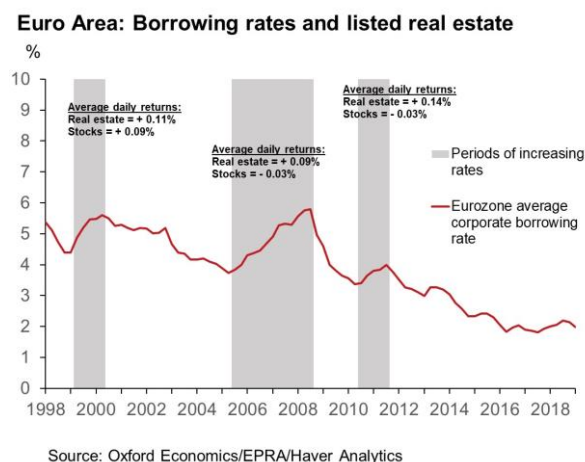
Finally, we examine the common perception that listed real estate is sensitive to interest rates and therefore tends to underperform during periods of rising rates. This would seem to be particularly pertinent at the present juncture, with market rates near to all-time lows, implying significant potential for rates to surprise on the upside in coming years.

Fig. 7. Correlation of listed real estate and government bonds



The perceived interest rate sensitivity of listed real estate reflects the fact that property companies tend to be highly leveraged. As higher interest rates feed into a higher cost of debt, this should dampen future profitability and lower the share price. While this transmission mechanism may be correct, it is also important to consider the broader economic context – in particular, interest rates tend to rise when the economy is strengthening, which should be positive for both rental rates and property prices. Assuming that listed real estate will underperform during periods of rising rates may therefore be an overly simplistic conclusion.

Fig. 8. Stock performances during periods of rising rates



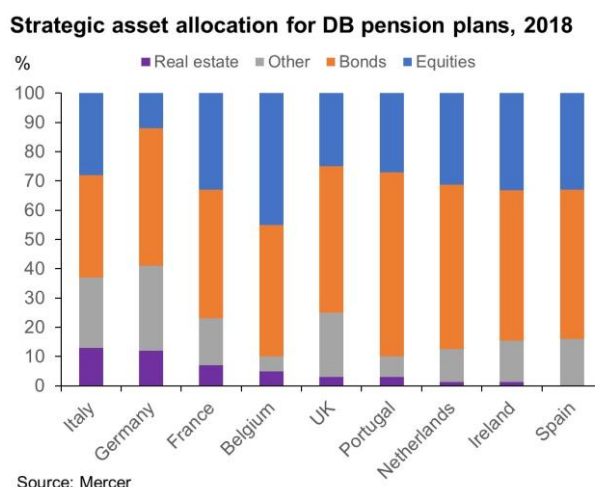
The above chart lends support to this more nuanced view of the sensitivity of listed real estate to rising interest rates. The chart above shows the (weighted) average corporate borrowing rate for the Eurozone. Periods of rising rates are highlighted, with the corresponding average daily returns for these periods reported for both the EPRA Developed Europe (ex. UK) Index and the Euro Stoxx Equity Index. With listed real estate having outperformed the broader stock market index during all three periods of rising rates, this suggests that any negative impacts from rising rates were offset by other factors.

4. LISTED REAL ESTATE WITHIN A MULTI-ASSET PORTFOLIO

4.1 ARE EUROPEAN INVESTORS UNDEREXPOSED TO REAL ESTATE?

The previous chapter provided compelling evidence that listed real estate could be expected to have a diversifying role in a portfolio of European assets. In practice, however, strategic allocations to property remain low for most institutional investors across Europe. Indeed, Mercer's latest survey of asset allocations for defined benefit (DB) pension plans in Europe showed an average allocation to property of just 3%. Looking across the EU, allocations ranged from zero in Spain to 13% in Italy.

Fig. 9. Asset allocations of European DB pension funds



Other studies of asset allocations of European institutional investors have shown similar results. For example, a recent study by CEM Benchmarking⁴ indicated that real estate allocations made up no more than 10% of pension portfolios across Europe, with the majority of holdings being unlisted.

In order to illustrate the implications of strategic asset allocations for risk/return outcomes, we examined the historic performance of a selection of hypothetical multi-asset portfolios over the period Jan 2010 to May 2019. These hypothetical portfolios were constructed around varying allocations to European stocks, fixed income (government, corporate investment grade and high yield), commodities and listed real estate. Asset allocations for these hypothetical portfolios were defined broadly as follows:

- **Portfolio One:** A 'classic' portfolio weighting of 60% stocks and 40% bonds

⁴ CEM Benchmarking Inc. (2018), "Asset allocation, cost of investing and performance of European DB pension funds: The impact of real estate", European Public Real Estate Association

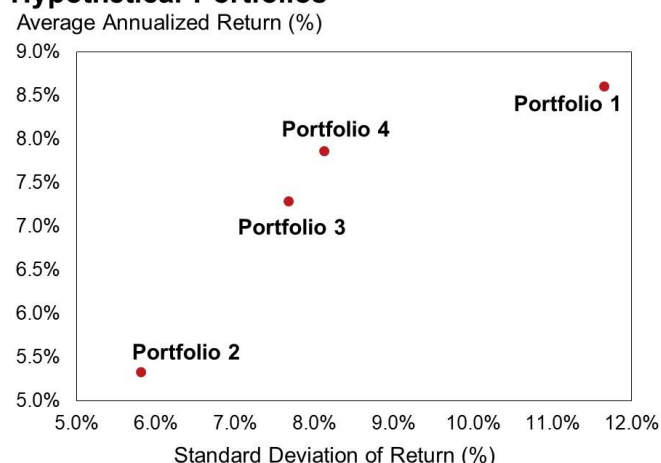
- **Portfolio Two:** A portfolio closely aligned to the strategic allocations of the average DB pension plan in Europe (based on Mercer data)
- **Portfolio Three:** A 10% allocation to listed real estate (with reduced allocation to government bonds)
- **Portfolio Four:** A 25% allocation to listed real estate (with reduced allocation to both government bonds and equities)

A more complete breakdown of asset allocations is provided in Fig. 10, together with the resulting risk/return characteristics of the portfolios. This shows that the 'classic' 60/40 portfolio has provided superior returns over this period, but this has been at the cost of higher risk (measured by the standard deviation). Conversely, the average DB pension plan (Portfolio Two) would have provided comparatively lower returns, albeit also with a significant reduction in average volatility. Meanwhile, the higher allocations to listed real estate in Portfolios Three and Four generated higher returns than Portfolio Two, with lower volatility than Portfolio One.

Fig. 10. Risk/return of hypothetical portfolios, Jan 2010 - May 2019

Portfolio	Allocation	Sharpe Ratio
1	60% Equities - Broad Market 20% Government Bonds 5% Corporate Bonds - High Yield 15% Corporate Bonds - Investment Grade	0.74
2	42% Equities - Broad Market 35% Government Bonds 5% Corporate Bonds - High Yield 12% Corporate Bonds - Investment Grade 3% Diversified Commodities 3% Listed Real Estate	0.92
3	45% Equities - Broad Market 24% Government Bonds 5% Corporate Bonds - High Yield 11% Corporate Bonds - Investment Grade 15% Listed Real Estate	0.95
4	35% Equities - Broad Market 24% Government Bonds 5% Corporate Bonds - High Yield 11% Corporate Bonds - Investment Grade 25% Listed Real Estate	0.97

Hypothetical Portfolios



Source : Oxford Economics calculations

In order to differentiate between the risk/return performances of these hypothetical portfolios, the Sharpe ratio provides a measure of risk-adjusted returns. On this basis, it appears that the diversification into listed real estate offered by Portfolios Three and Four would indeed have provided a superior overall performance, as reflected in their higher Sharpe ratios. This (simplistic) analysis would imply that institutional investors in Europe could improve the risk-return characteristics of their portfolios with a substantial dedicated strategic allocation to listed real estate.

4.2 OPTIMAL PORTFOLIO ALLOCATIONS

Investors generally seek either to minimise risk for a given level of return or maximise return for a given level of risk. A clear understanding of investment objectives and risk tolerance is therefore necessary for strategic asset allocation decisions.

In order to take account of these varying investment objectives and provide a more rigorous test of whether listed real estate deserves a consistent place in a multi-asset portfolio, we need to use dynamic optimisation techniques. This involves running multiple portfolio allocation simulations that maximise the Sharpe ratio under varying constraints designed to reflect differing investor risk preferences. We can apply this methodology to create an 'efficient frontier' that maximises returns at varying risk levels through different combinations of asset classes.

The asset classes we consider for this exercise are again European stocks, fixed income (government, corporate investment grade and high yield), commodities and listed real estate. In order to avoid over-weighting the portfolio toward asset classes with large estimated returns, we imposed limits (upper and lower bounds) on the share of individual assets in the optimum portfolios, as detailed in the table below. These limits are also designed to reflect the fact that investors do not have perfect foresight, which constrains their ability to construct a portfolio to achieve the optimal outcomes of an unconstrained portfolio within any given time period. The constraints placed on the portfolio are the following:

- **Equities:** Minimum 30%, Maximum 60%
- **Fixed income:** Minimum 10%, Maximum 70%
- **Commodities:** No minimum, Maximum 10%
- **Real Estate:** No minimum, Maximum 25%

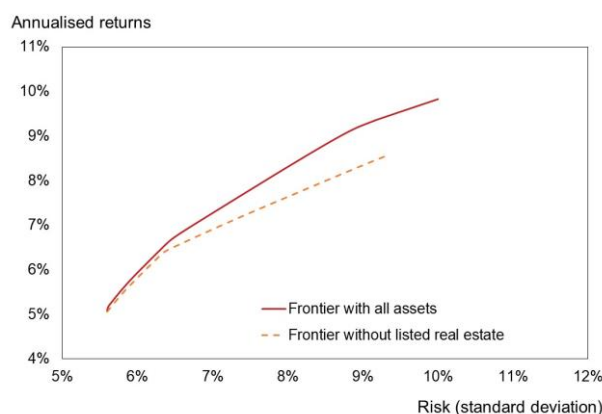
Using data for the period Jan 2010 to May 2019, we estimated an efficient frontier including all these asset classes, as well as a second efficient frontier where listed real estate is excluded from the portfolio calculations. The chart below illustrates the maximum average returns that could be achieved for varying levels of risk in the resulting portfolios (measured by standard deviation).

As the efficient frontier for a portfolio including listed real estate lies above the portfolio without listed real estate at all available levels of risk, we can conclude that an allocation to listed real estate consistently enhances the performance of the portfolio. It is also worth highlighting that the gap between the two efficient frontiers widens with increasing levels of risk, indicating that the potential return

enhancement from including listed real estate in a multi-asset portfolio tends to be more significant for higher risk/return portfolios.

Fig. 11. Efficient frontier of a multi-asset portfolio

Efficient Frontier (Jan 2010 - May 2019)



Source: Oxford Economics calculations

In order to more fully account for differing investment objectives, one should ideally consider different levels of risk tolerance together with varying investment holding periods. This latter consideration may be especially pertinent given that the correlation of listed real estate returns with financial assets such as equities has been shown to vary significantly over different time periods.

Using our complete data sample of Jan 1999 to May 2019, we therefore estimated the optimal asset allocations with alternative holding periods of 5, 10 and 15 years respectively. Optimal asset allocations were re-estimated on a rolling one-month basis for each of the holding periods across the entire data sample. For each holding period, we also estimated three portfolios representative of low, medium and high levels of risk-tolerance. These risk levels were defined in terms of different percentiles in the distribution of standard deviations across the entire efficient frontier of each estimated portfolio, such that they adjusted dynamically over time to reflect changing market conditions:

- **Low risk:** 20% percentile of standard deviations
- **Medium risk:** 50% percentile of standard deviations
- **High risk:** 80% percentile of standard deviations

We again imposed upper and lower bounds on the shares of individual asset classes in the optimum portfolios. These constraints were varied across the portfolios to reflect their risk characteristics, as summarised in the table below.

Fig. 12. Upper and lower bounds for portfolio optimisation

Weight limits by asset class (%)						
Asset class	Low Risk		Medium Risk		High Risk	
	Min	Max	Min	Max	Min	Max
Equities (broad)	20	50	30	60	40	70
Government bonds	20	50	10	40	-	30
Corporate bonds (IG)	-	20	-	10	-	10
Corporate bonds (HY)	-	10	-	20	-	20
Commodities	-	10	-	10	-	10
Listed real estate	-	25	-	25	-	25

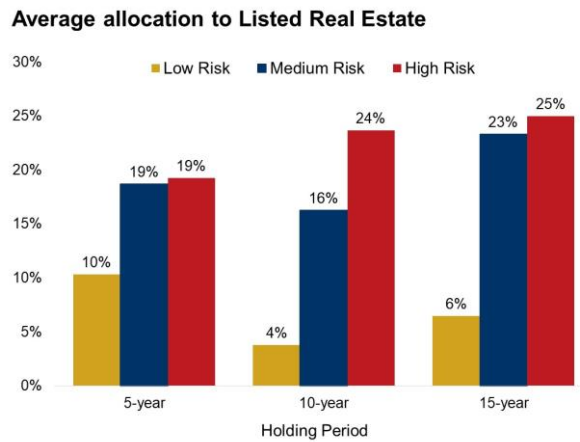
As shown in Fig. 13, listed real estate achieves a positive allocation across most periods in all three portfolios. Our simulations show that the optimal allocation to listed real estate tends to increase with both the holding period of the portfolio and its level of risk/return. Indeed, listed real estate enters both the high-risk and medium-risk portfolios 100% of the time for the 15-year holding period. Even for shorter holding periods, listed real estate enters the medium-risk portfolio around three-quarters of the time.

Fig. 13. Portfolios with a positive allocation to listed real estate

Portfolios with a positive allocation to listed real estate			
Holding period	Low Risk	Medium Risk	High Risk
5-year	68%	77%	76%
10-year	26%	74%	100%
15-year	60%	100%	100%

It is worth noting that the allocation to listed real estate does depend on the time period considered (tables detailing the average annual allocations to each asset class are available in Annex I). For example, results for the 5-year holding period show that listed real estate achieves substantial allocations during the early 2000s and also more recently, but allocations are much more limited for portfolios held around the time of the global financial crisis. This is not too surprising, however, as all risk-assets performed poorly during this period of heightened risk aversion. If we exclude this period from the analysis, listed real estate achieves the maximum 25% allocation across all periods for the 5-year high-risk portfolio and this result is not much different for the medium-risk portfolio.

Fig. 14. Average optimal allocation to listed real estate



The average allocations to listed real estate for the three portfolios across the varying holding periods are summarised in Fig.14 above. This table highlights the reduced presence of listed real estate within the low-risk portfolios, which have a high allocation to government bonds. As listed real estate has tended to have higher risk and return than competing asset classes (as demonstrated by our earlier analysis of the historic performance of various asset classes), this limits its ability to enter portfolios at the low end of the efficient frontier.

5. OPTIMAL PORTFOLIOS OVER THE NEXT DECADE

Looking forward to the next decade, the shifting economic and financial landscape could have significant implications for the performance of both European real estate and other asset classes. With this in mind, we used the Oxford Global Economic Model to investigate the potential behaviour of listed real estate relative to other asset classes under alternative economic scenarios (Annex II provides a description of the structure of the Oxford Model).

Reflecting the current threat from increased global trade tensions, the three scenarios we examined were:

- **Baseline:** This represents our central projection, where we see global growth easing only gradually in the near term despite increased trade tensions.
- **Trade War Scenario:** Trade tensions heighten as the US raises further tariffs on China, imposes a blanket tariff on all goods imported from Mexico and the EU and implements higher tariffs on the autos sector globally.
- **Upside Scenario:** Trade policy uncertainties fade on the back of a US-China deal, against a backdrop of supportive policy.

Additional detail on the assumptions underpinning each scenario are provided in Box 1. We used the Oxford Model to calculate the implications for asset returns in each scenario, with a corresponding variance-covariance matrix also calibrated.

For each scenario, we used these inputs to examine the potential future performance of alternative investment portfolios to see whether listed real estate would consistently feature in the optimal allocations. In common with the earlier historic analysis, constraints were placed on the portfolio as follows:

- **Equities:** Minimum 30%, Maximum 60%
- **Fixed income:** Minimum 10%, Maximum 70%
- **Commodities:** No minimum, Maximum 10%
- **Real Estate:** No minimum, Maximum 25%

The chart below (Fig.15) illustrates the resulting estimates of efficient frontiers under the varying economic and financial conditions of each scenario.

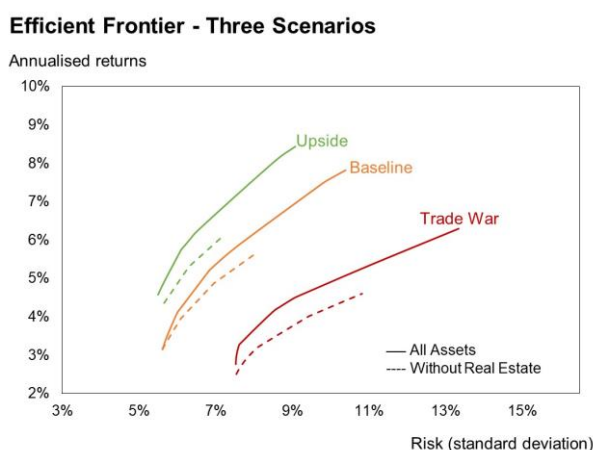
It is first worth highlighting that our baseline projections imply that the risk-return trade-off for investors will deteriorate over the next decade when compared with recent history. This is demonstrated by the fact that the efficient frontiers for the baseline in Fig. 15 sit below the historic efficient frontiers estimated in Fig.11 for the period Jan 2010 to May 2019. This is perhaps not surprising as recent years have witnessed a strong rally in risky assets that is unlikely to be repeated over the coming decade.

Indeed, the deteriorating business cycle, lower bond yields and fading cyclical earnings momentum all point towards the risk of a meaningful near-term

correction in global equity prices from current levels. We are also fairly pessimistic about high yield credit in Europe, given the downside risks to fundamentals and liquidity. And while the near-term performance of real estate in Europe appears rather more insulated from the slowing economy due to the persistent rental cycle, returns are also expected to moderate.

With the economy slowing, government bond yields are already trending lower in Europe. But despite low/negative yields, we think bonds will continue to be held by institutional investors as they act as effective portfolio hedges. Yields are expected to recover in coming years, but this will of course be at the cost of capital losses for bondholders. The low returns offered by government bonds explains the lacklustre returns expected for low-risk portfolios over the coming decade.

Fig. 15. Efficient frontiers in three scenarios for the next decade



Source: Oxford Economics calculations

Focussing on the relative positions of the efficient frontiers, Fig.15 shows that the upside delivers higher returns for a given risk level than baseline, while the trade war scenario delivers relatively lower returns. This reflects the transmission of economic conditions to asset returns in each scenario.

For example, equities fall sharply at the start of the trade war scenario, as investor sentiment deteriorates and risk premia increase. The shock to equities at a global level is approximately a quarter of that experienced during the global financial crisis. Amid rising risk aversion among investors and aggressive action from central banks to mitigate the demand impact of the shock, government bond yields fall sharply. Oil and commodity prices are likewise weighed down by weaker global demand.

Conversely, in the upside scenario with stronger global growth, investor sentiment improves, supporting equity valuations in the US and other countries. While bond yields initially rise, the increase in yields is limited and yields return toward baseline in the latter years of the scenario with price pressures still contained. Meanwhile, stronger global demand drives oil and other commodity prices above baseline levels.

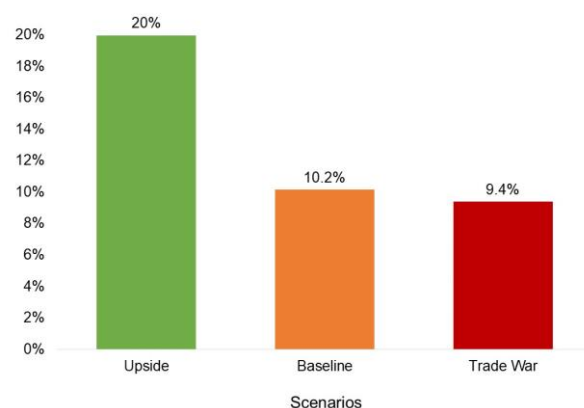
Within all three scenarios, however, the efficient frontier with all assets included in the portfolio lies above the frontier excluding listed real estate, indicating that an allocation to listed real estate consistently enhances the portfolio's

performance. The potential return enhancement from an allocation to listed real estate is highest in the upside scenario and lowest in the trade war, indicating that the performance of the asset class is still sensitive to prevailing economic conditions. But it is also notable that the difference in allocation between the trade war and baseline scenarios is only modest, in part reflecting the stability of dividends from listed real estate companies (especially REITs), which supports total returns during an economic downturn.

The table below summarises the corresponding optimal allocations to listed real estate for a portfolio with medium risk. This confirms that the allocation to listed real estate would be higher in an upside scenario, but still significant in both the baseline and trade war scenarios.

Fig. 16. Optimal allocation to listed real estate

Allocation to Listed Real Estate at a Median Risk Level



Source : Oxford Economics calculations

BOX 1: ALTERNATIVE SCENARIOS FOR THE GLOBAL ECONOMY

A single forecast for planning ignores the complexities of the global economic environment, which is heavily influenced by external factors that are challenging to predict. To help with the planning process, it is therefore informative to explore the implications of alternative scenarios for the future path of the global economy. The key assumptions underlying each of the three scenarios we evaluated using the Oxford Global Economic Model are detailed below.

Baseline

Our central forecast assumes that global growth slows only gradually in coming years. The recent growth slowdown can be attributed to several factors, including peaking fiscal stimulus in the US, a flagging pace of recovery in the Eurozone, the negative effects of the US-China trade dispute, and a general slowdown in world trade growth. But with policymakers expected to turn dovish words into actions soon, we still think recession risks remain low.

Trade War Scenario

In this scenario, we assume that renewed trade policy tensions escalate further. President Trump imposes additional tariff measures, directly affecting not only China but also Mexico, European trading partners and the global auto sector. World growth slows significantly and, against a backdrop of aggressive action from the Federal Reserve, abrupt market movements ensue. As investor sentiment deteriorates, the US dollar appreciates against the Euro and other currencies.

Upside Scenario

In this scenario, global growth strengthens on the back of an Emerging Market upturn. EMs benefit from three significant tailwinds: a further loosening of policy in China; a swift resolution to current trade tensions; and relatively supportive monetary policy among advanced economies. The result is a significant acceleration in the pace of global growth, accompanied by a period of broad-based US dollar weakness.

6. CONCLUSIONS

The strategic asset allocation decisions of many investors have tended to focus primarily on traditional asset classes of stocks and bonds. But expanding beyond these categories can potentially improve the risk-return characteristics of a portfolio. Specifically, this study supports the view that a strategic allocation to listed real estate can enhance the performance of a multi-asset portfolio for a European investor.

We find that listed real estate has historically had low correlations with fixed income and commodities, while having only a moderate correlation with equities. Our results illustrate that listed real estate provides the greatest benefits in higher risk/return portfolios. The benefits also tend to increase with longer holding periods, perhaps reflecting the findings of previous studies that the performance of listed real estate is more comparable to direct real estate holdings over time horizons of several years. This implies that the diversification benefits of this asset class increase over time.

In light of the low levels of dedicated property exposure of many institutional investors in Europe, our findings support the view that a reassessment of strategic allocations to listed real estate would be justified.

APPENDIX I: DATA AND RESULTS

DATA SOURCES

The historic analysis presented in this paper was based upon total return indices denominated in Euros:

- **Equities - Broad Market:** S&P Europe Index
- **Equities - Large Cap:** STOXX Europe 50 Index
- **Equities - Small Cap:** S&P Europe Small Cap Index
- **Government Bonds:** Bloomberg Barclays Pan European Aggregate Government A Index
- **Corporate Bonds - Investment Grade:** Bloomberg Barclays Pan European Aggregate Corporate index
- **Corporate Bonds - High Yield:** Bloomberg Barclays Pan-European High Yield Index
- **Diversified Commodities:** Bloomberg Commodity Index
- **Listed Real Estate:** FTSE EPRA Nareit Developed Europe Index

OPTIMAL ASSET ALLOCATIONS

Five-year holding period

Optimal Portfolio Allocation - Low Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	20%	50%	0%	11%	10%	9%
2001	20%	47%	5%	4%	10%	14%
2002	29%	29%	9%	0%	9%	23%
2003	48%	36%	1%	0%	10%	5%
2004	26%	50%	3%	12%	9%	0%
2005	20%	50%	3%	20%	7%	0%
2006	20%	50%	3%	20%	7%	0%
2007	20%	50%	6%	20%	4%	0%
2008	20%	41%	5%	20%	0%	14%
2009	20%	33%	9%	20%	1%	17%
2010	21%	34%	10%	20%	0%	15%
2011	20%	50%	10%	10%	0%	10%
2012	21%	50%	10%	5%	0%	14%
2013	20%	50%	10%	5%	0%	15%
2014	20%	49%	10%	0%	0%	21%

Optimal Portfolio Allocation - Medium Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	30%	34%	1%	0%	10%	25%
2001	32%	14%	19%	0%	10%	25%
2002	52%	10%	9%	0%	4%	25%
2003	59%	10%	0%	0%	7%	24%
2004	49%	34%	7%	0%	8%	3%
2005	32%	40%	20%	7%	0%	0%
2006	30%	35%	20%	11%	5%	0%
2007	30%	35%	20%	11%	0%	4%
2008	34%	12%	20%	10%	0%	25%
2009	35%	11%	20%	9%	0%	25%
2010	39%	10%	20%	7%	0%	25%
2011	31%	16%	20%	8%	0%	25%
2012	42%	10%	20%	3%	0%	25%
2013	45%	10%	20%	0%	0%	25%
2014	44%	11%	19%	0%	0%	25%

Optimal Portfolio Allocation - High Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	40%	18%	7%	0%	10%	25%
2001	42%	3%	20%	0%	10%	25%
2002	64%	0%	6%	0%	5%	25%
2003	68%	0%	0%	0%	7%	25%
2004	58%	22%	7%	0%	8%	5%
2005	42%	30%	20%	7%	0%	0%
2006	40%	26%	20%	10%	4%	0%
2007	42%	20%	20%	10%	0%	8%
2008	55%	0%	20%	0%	0%	25%
2009	57%	0%	18%	0%	0%	25%
2010	70%	0%	5%	0%	0%	25%
2011	68%	0%	7%	0%	0%	25%
2012	70%	0%	5%	0%	0%	25%
2013	70%	0%	5%	0%	0%	25%
2014	64%	0%	11%	0%	0%	25%

Ten-year holding period

Optimal Portfolio Allocation - Low Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	20%	50%	6%	10%	10%	4%
2001	20%	50%	10%	7%	10%	3%
2002	20%	50%	10%	7%	10%	3%
2003	21%	50%	10%	14%	1%	4%
2004	23%	49%	10%	18%	0%	0%
2005	22%	48%	10%	20%	0%	0%
2006	20%	50%	10%	20%	0%	0%
2007	20%	49%	10%	20%	0%	1%
2008	20%	45%	3%	20%	0%	12%
2009	20%	41%	9%	20%	0%	11%

Optimal Portfolio Allocation - Medium Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	30%	26%	13%	0%	10%	21%
2001	30%	21%	20%	0%	10%	19%
2002	30%	17%	20%	0%	9%	24%
2003	35%	25%	20%	0%	0%	21%
2004	60%	12%	20%	8%	0%	0%
2005	58%	11%	20%	11%	0%	0%
2006	40%	19%	20%	11%	0%	10%
2007	30%	21%	20%	11%	0%	17%
2008	33%	14%	18%	11%	0%	24%
2009	34%	11%	20%	11%	0%	25%

Optimal Portfolio Allocation - High Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	40%	9%	16%	0%	10%	25%
2001	43%	2%	20%	0%	10%	25%
2002	50%	0%	20%	0%	5%	25%
2003	55%	0%	20%	0%	0%	25%
2004	63%	0%	20%	0%	0%	17%
2005	55%	0%	20%	0%	0%	25%
2006	54%	0%	20%	6%	0%	20%
2007	53%	0%	20%	2%	0%	25%
2008	55%	0%	20%	0%	0%	25%
2009	66%	0%	9%	0%	0%	25%

15-year holding period

Optimal Portfolio Allocation - Low Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	20%	50%	10%	11%	0%	9%
2001	20%	50%	10%	12%	0%	8%
2002	20%	50%	10%	14%	0%	6%
2003	20%	50%	10%	14%	0%	6%
2004	20%	50%	10%	16%	0%	3%

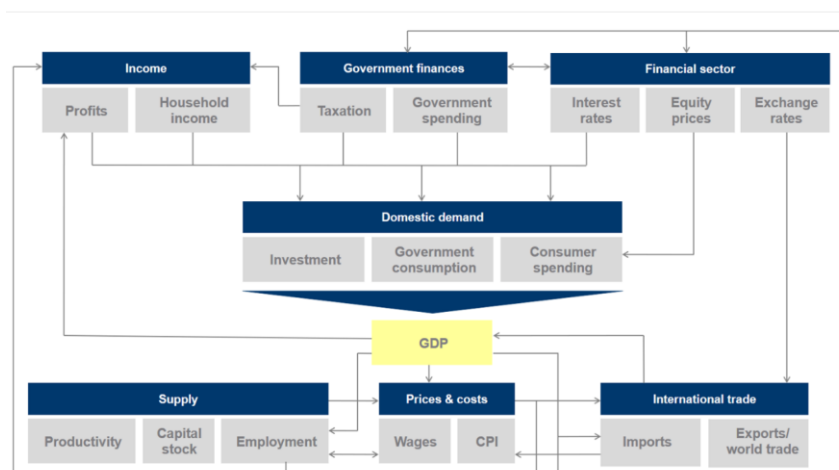
Optimal Portfolio Allocation - Medium Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	30%	26%	20%	0%	0%	24%
2001	30%	25%	20%	0%	0%	25%
2002	31%	24%	20%	1%	0%	25%
2003	31%	24%	20%	0%	0%	25%
2004	37%	26%	20%	0%	0%	18%

Optimal Portfolio Allocation - High Risk						
Start year	Equities	Government bonds	Corporate bonds (HY)	Corporate bonds (IG)	Commodities	Listed real estate
2000	46%	1%	20%	7%	1%	25%
2001	55%	0%	20%	0%	0%	25%
2002	55%	0%	20%	0%	0%	25%
2003	55%	0%	20%	0%	0%	25%
2004	55%	0%	20%	0%	0%	25%

APPENDIX II: THE OXFORD GLOBAL ECONOMIC MODEL

The key framework in which Oxford Economics' analysis is conducted is its own Global Econometric Model (GEM). The GEM replicates the world economy by interlinking 80 countries, 6 regional trading blocs and the Eurozone. These countries are interlinked through international trade in goods and services, competitiveness (measured by unit labour costs adjusted for the exchange rate), capital markets, interest rates and commodity prices. Historic data and forecasts are updated on a monthly basis by our country economists.

STYLISTED VERSION OF THE GEM



This Model—which is unique among the commercial economic consultancies—provides a rigorous and consistent structure for analysis and forecasting, and allows the implications of alternative global scenarios and policy developments to be readily analysed at both the macro, sectoral and regional level.

Asset prices are embedded in the Global Economic Model. Key financial variables include:

- **Interest rates:** policy rates, money market rates, sovereign yield curves, Swap curves.
- **Equity prices:** main stock market indices covered in each country.
- **Exchange rates:** spot rate against US\$ & € enabling calculation of other cross rates, and nominal/real effective exchange rates.
- **Commodity prices:** oil, natural gas, gold, and other metals.

For this project we also estimated an equation linking the performance of European listed real estate with fundamental economic drivers. This was incorporated into the GEM so that future performance of the EPRA Developed Europe Index could be assessed under alternative economic scenarios.

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