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Author

Ben Burston

Associate Director
 Forecasting & Strategy Research
 +44 (0)20 3296 2296
 ben.burston@dtz.com

Contacts

Tony McGough

Global Head of Forecasting & Strategy Research
 +44 (0)20 3296 2314
 tony.mcgough@dtz.com

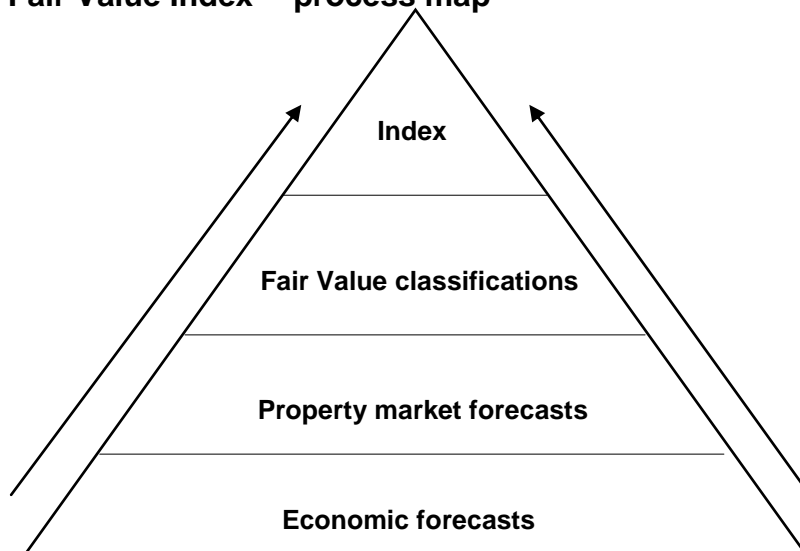
Hans Vrensen

Global Head of Research
 +44 (0)20 3296 2159
 hans.vrensen@dtz.com

- DTZ Research has launched the first ever forward looking global commercial property value index. The DTZ Fair Value Index™ offers investors insight into the relative attractiveness of current pricing in 180 prime office, retail and industrial property markets across Europe, Asia Pacific and the US.
- The global all-property Fair Value Index is complemented by a suite of 16 sub-indices covering different sectors and regions.
- Index scores range from 0 to 100: scores close to 100 indicate that most of the markets covered by the index offer attractive returns (**HOT**); and, scores close to zero indicate that the markets covered generally offer inadequate returns (**COLD**).
- Markets are categorised by comparing required and expected returns. Markets estimated to be more than 5% under-valued are classified as **HOT**. Markets estimated to be more than 5% over-valued are classified as **COLD**. Markets trading in between this range are classified as **WARM**.
- Expected returns are estimated using DTZ Research's extensive market forecasts, which encompass rent and yield forecasts for all 180 global markets. These forecasts provide a solid foundation for the index; especially as they are in turn underpinned by rigorous econometric modelling complemented by DTZ's extensive local property market knowledge. Figure 1 provides a schematic diagram of the process leading to the formation of the Fair Value Index.

Figure 1

DTZ Fair Value Index™ process map



First forward looking commercial property value index

The DTZ Fair Value Index is the first ever forward looking global commercial property value index. The index offers investors insight into the relative attractiveness of current pricing in prime office, retail and industrial property markets across Europe, Asia Pacific and the US, based on DTZ Research's extensive market forecast coverage (Table 1 provides a breakdown of the number of markets covered within each index, and Appendix 1 provides a listing of the markets covered in each region).

The index is supported by a rigorous and robust methodology, which has been developed over the last two years.

Scores based on proportion of markets offering investors attractive returns

Fair Value Index scores are based on the proportion of commercial property markets within the index coverage that offer investors expected returns above or below their estimated risk-adjusted required return. Index scores range from 0 to 100: with readings close to 100 indicating that most of the markets covered by the index offer attractive returns (**HOT**); and, readings close to zero indicating that the markets covered generally offer inadequate returns (**COLD**).

Report structure

This report explains the process leading to the formation of the Fair Value Index. It explains the process step by step (Figure 2 provides a schematic diagram of the process):

- Firm foundations: DTZ Research produce extensive property market forecasts, which encompass rent and yield forecasts for all markets covered by the index. These forecasts provide a solid foundation for the index; the next section provides an outline of the forecasting process.
- Identifying opportunities: using the property market forecasts, we identify markets where investors can expect to earn attractive returns (**HOT**) and inadequate returns (**COLD**). The five-step approach used to classify markets is explained in Section 2.
- Aggregating our market views: having identified **HOT**, **COLD** and **WARM** markets, we are able to form Fair Value Indices. The index calculation process is described in Section 3.

Table 1

Breakdown of DTZ Fair Value Indices – total markets covered

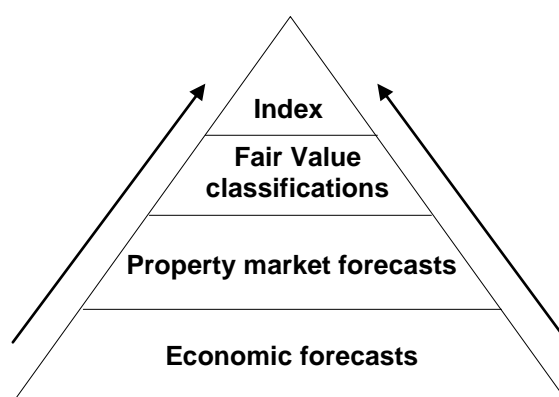
	Office	Retail	Industrial	All-property
Europe ¹	42	26	27	95
Asia Pacific	23	18	9	50
US	19	16	---	35
UK	12	---	---	20 ²
Global	84	60	36	180

Source: DTZ Research

1. The UK is included within the European index.
2. Four UK retail markets and four industrial markets are included in the UK all-property index, but this is regarded as insufficient to form UK retail and industrial indices.

Figure 2

DTZ Fair Value Index process map



Source: DTZ Research

1. Firm foundations: property market forecasts

Robust forecasts for global property markets

DTZ Research provides an extensive property market forecasting service encompassing all 180 global markets covered by the Fair Value Index. The forecasts provide critical insight into the outlook for rents, yields and capital values, and are used to determine expected returns in each of the different markets. In addition to rent and yield forecasts, take-up, availability and stock forecasts are produced for many markets.

Local insight and market intelligence

Importantly, the forecasts are constructed using a 'bottom up' approach that takes advantage of city and sector specific data and expertise. This approach allows us to capture market-specific trends more readily than a 'top-down' approach based on national level data. Figure 3 provides a sample of our recent rent forecasts.

This broad coverage and detailed approach is possible because of DTZ's extensive network of local offices throughout the world. Local market presence and expertise is a critical input to the process in providing accurate and timely data on which to base the forecasts.

Forecasting approach

The forecasts are supported by rigorous econometric modelling. Each market is covered by a specifically tailored model encompassing city level, sector specific economic forecasts delivered by Oxford Economics, a leading forecasting house.

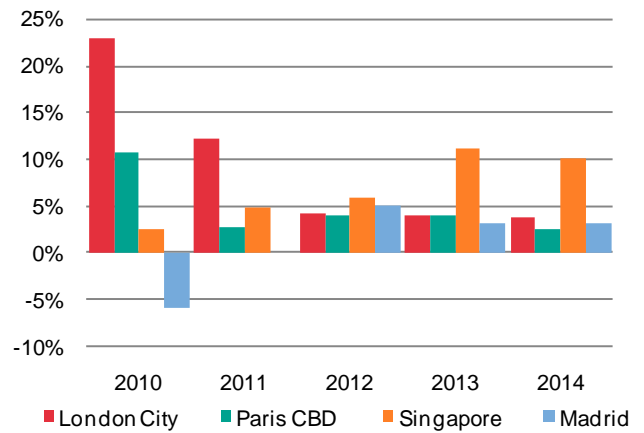
While all markets are influenced by the level of supply, and many have a degree of dependency on neighbouring markets, our approach to modelling the demand drivers in different sectors is outlined below:

- The **office** sector is dependent on office-based employment. This can be driven by different types of economic activity; for instance, the London City market is dependent on employment in finance and business services (Figure 4), whereas Brussels is dependent on public sector employment.
- The **retail** sector is driven by retail sales and household disposable income.
- The **industrial** sector is driven by output and employment in manufacturing and distribution.

Yields in all sectors are driven by rental growth forecasts, government bond yields and market participants' degree of risk aversion.

Figure 3

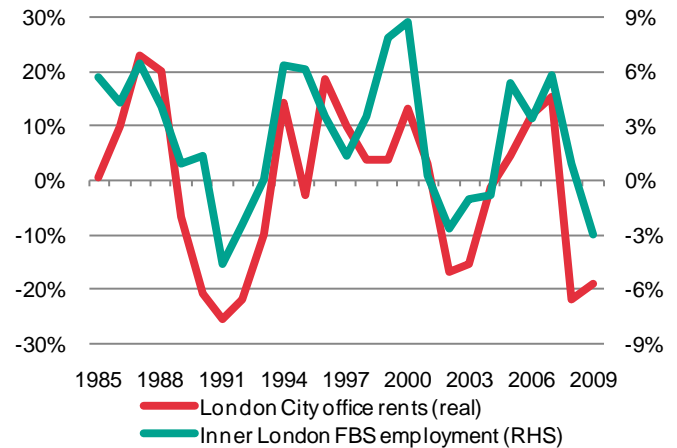
Example office rental growth forecasts



Source: DTZ Research

Figure 4

London City office rental growth and FBS employment



Source: DTZ Research

2. Identifying opportunities to invest: Fair Value classifications

Classifying markets with a five-step approach

DTZ Research assesses fair value in property markets by comparing the annualised nominal returns a property investor could expect over a five-year investment horizon in their chosen market with the estimated risk-adjusted nominal required return for that market. For instance, the results for Q2 2010 compare the annualised returns an investor could expect from property investment over the five-year period from end Q2 2010 to end Q2 2015, with the required return for investment over that period. Note that since we are comparing nominal returns throughout, there is no need to separately adjust for inflation. Likewise, we assume that investors are either local or hedged against exchange rate movements.

Having made this comparison, we then assess whether the market is over or under-valued and classify it accordingly. Our approach is described below in five sequential steps.

Step 1: Estimate a required rate of return over the five year horizon

The required return is defined as the return available from a five-year government bond, allowing for the additional cost and risk associated with property investment. Table 2 (overleaf) provides examples of estimated required returns in different markets (C), split between the government bond yield (A) and a premium for cost and risk labelled the property premium (B).

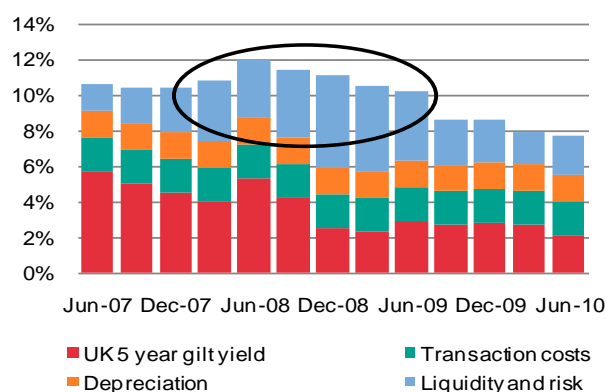
The premium takes into account the compensation required for depreciation, transaction costs, illiquidity and risk. We recognise that required compensation for risk changes over time, reflecting market sentiment and buyers' degree of risk aversion; for instance, at the height of the credit crunch buyers were demanding a higher risk premium on most asset classes including commercial property. Figure 5 provides an illustration of the required return for a five-year investment in prime London City offices commencing in recent quarters.

Step 2: Estimate an expected return over the five year horizon

The expected return from property investment is determined by the prime yield currently available in the market and our forecast for future capital growth, driven by the combination of forecast rental growth and changes in yield over the five-year period. Table 2 also provides examples of expected returns (F), splitting these between the prime yield (D) and capital growth (E) components. Figure 6 provides an illustration of the expected return for a five-year investment in prime London City offices commencing in recent quarters. Figure 7 compares expected and required returns.

Figure 5

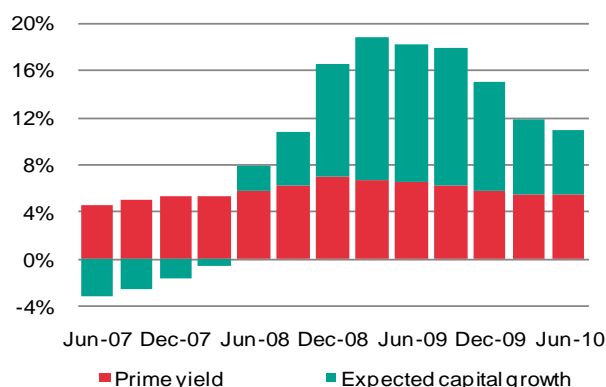
Estimated required return: London City offices



Source: DTZ Research

Figure 6

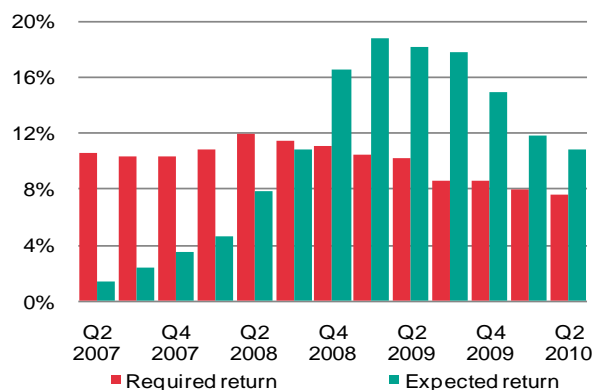
Expected return: London City offices



Source: DTZ Research

Figure 7

Comparing required and expected return: London City offices



Source: DTZ Research

2. Identifying opportunities to invest: Fair Value classifications

Table 2: Evaluation of selected office markets – end Q2 2010

	Step 1			Step 2			Step 3	Step 4	Step 5
	5 year bond yield	Property premium	Required return (= A + B)	Prime market yield	Expected annualised capital growth	Expected annualised total return (= D + E)	Fair Value yield: prime yield to set F = C	Implied degree of market over-pricing (%) = 100*(G/D-1)	Classification (if H<-5% then HOT , if H>5% then COLD , otherwise WARM)
	A	B	C	D	E	F	G	H	I
Hong Kong offices	1.6	5.3	6.9	3.0	8.7	11.7	2.5	-18.3	HOT
London City offices	2.1	5.6	7.6	5.5	5.4	10.9	4.9	-11.6	HOT
Singapore offices	0.8	5.3	6.1	3.6	4.8	8.4	3.3	-9.4	HOT
Paris CBD offices	1.8	5.7	7.6	5.0	3.2	8.2	4.9	-2.6	WARM
Frankfurt offices	1.4	5.5	6.9	5.4	1.9	7.3	5.3	-1.4	WARM
West End offices	2.1	5.6	7.6	4.8	2.3	7.0	4.9	2.5	WARM
Birmingham offices	2.1	6.1	8.2	6.0	0.2	6.2	6.5	7.8	COLD
Budapest offices	7.6	7.2	14.8	8.3	3.0	11.2	9.3	12.7	COLD
Taipei offices	1.1	6.5	7.6	3.5	0.5	4.0	4.1	16.0	COLD

Step 3: Calculate a fair value yield

Once the required return (step 1) and expected return (step 2) have been established, we calculate a fair value yield (G). The fair value yield is the prime market yield that would set the expected return (F) equal to the required return (C). The calculation of the fair value yield takes account of the fact that the expected capital growth (E) would change if the fair value yield were to take the place of the current prime market yield.

Note that if the expected return on property is higher than the required return, the fair value yield will be lower than the prime market yield, because the investor could afford to pay more for property and still earn an adequate return.

Likewise, if the expected return is lower than the required return, the fair value yield will be higher than the prime market yield, because the investor would need to pay less for property to earn an adequate return.

Step 4: Calculate the extent to which the market is over or under-valued

By comparing the prime market yield (D) with the fair value yield (G), we can provide a quantified estimate of the degree to which a property market is over or under-valued. The calculation effectively compares the market price of property to its estimated fair value. Appendix 2 explains this calculation in more detail and Table 2 provides some examples.

Step 5: Classify the markets into three different categories

We classify markets into three categories:

- **HOT**: Markets estimated to be more than 5% under-valued are classified as **HOT**. In these markets expected returns exceed required returns, offering investors attractive buying opportunities.
- **WARM**: Markets estimated to be close to fair value – between 5% under-valued and 5% over-valued – are classified as **WARM**. In these markets expected returns are approximately equal to required returns. Property is appropriately priced for investors.
- **COLD**: Markets estimated to be more than 5% over-valued are classified as **COLD**. In these markets expected returns are below required returns. Property is over-valued and investors should avoid these markets.

It is important to note that these classifications reflect our view on the prime market performance on average. Stock selection remains critical to investment performance: **HOT** deals can be done in **COLD** markets and vice versa.

3. Aggregating our market views to form DTZ Fair Value Indices™

Calculating Fair Value Indices

Based on the number of markets rated as **HOT**, **WARM** or **COLD**, DTZ Research has constructed Fair Value Indices to provide an overview of the state of investment markets in different sectors and regions.

Scores above 50 indicate that more markets in a particular sector or region are rated **HOT** rather than **COLD**, and vice versa. Likewise, the higher the score, the greater the number of **HOT** relative to **COLD** markets.

The index calculations are based on the following formula (Figure 8):

$$\text{Index score} = (H - C) / (T) * 50 + 50$$

Where:

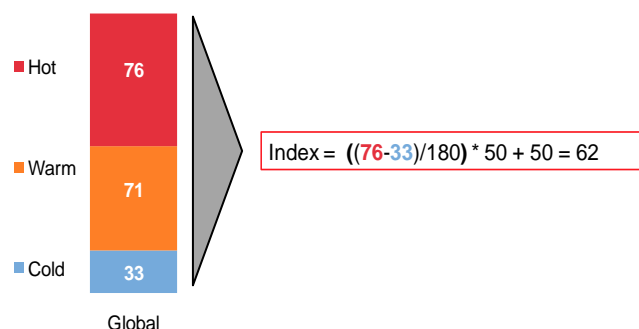
- H = Number of **HOT** markets in the sector or region
- C = Number of **COLD** markets
- T = Total number of markets covered

The highest index score attainable is 100 (achieved if every market is rated as **HOT**) and the lowest is 0 (achieved if every market included is rated as **COLD**). The mid-point is 50, and this score is achieved if there are an equal number of **HOT** and **COLD** markets. Figure 9 provides some examples of index composition

Figure 8

Example index calculation

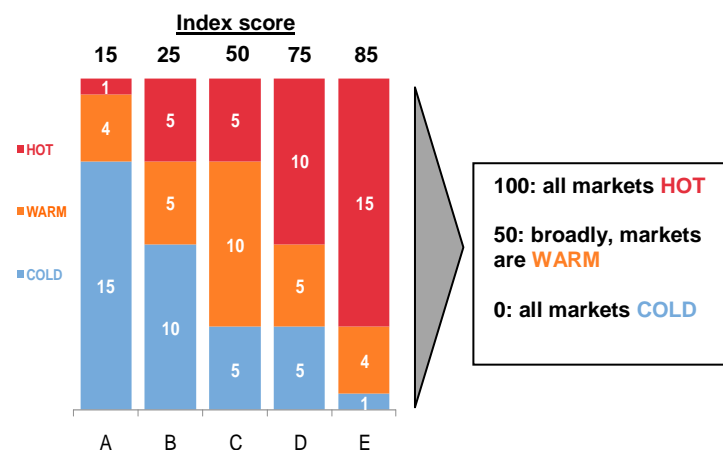
$$\text{Index} = ((\text{Number of } \text{HOT} - \text{Number of } \text{COLD}) / \text{Total number of markets}) * 50 + 50$$



Source: DTZ Research

Figure 9

Example index composition



Source: DTZ Research

3. Aggregating our market views to form DTZ Fair Value Indices™

Providing historical perspective

By performing this analysis each quarter using actual data for rents, prime market yields and bond yields in different markets up to the present, and forecasts for rents and yields beyond Q2 2010, we can calculate a historical time series of expected and required returns for five-year investments commencing at different points in time.

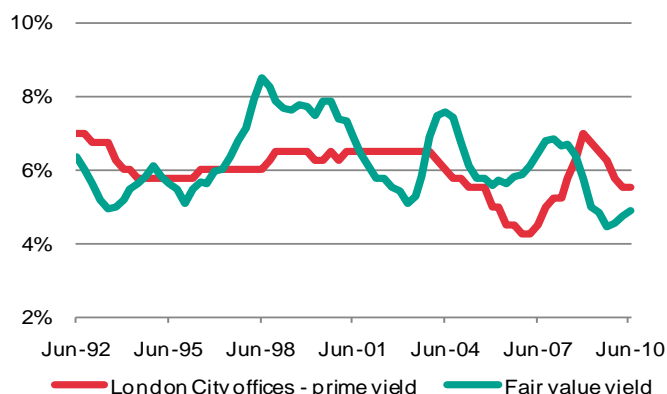
Using this information, we can then calculate a historical time series of fair value yields in each market, and consequently a historical Fair Value Index series. Figure 10 provides an illustration of the estimated fair value yield for London City offices over time.

Figure 11 provides an illustration of the changing index composition over recent quarters for the global all-property index. Figure 12 illustrates the movements in our global all-property Fair Value Index over a longer time period.

Note that because we use actual data up to the present time, we effectively assume that investors in prior years had perfect foresight with regard to future rent and yield movements. As such, the full historical series can be interpreted as providing insight into value in property markets with the benefit of hindsight.

Figure 10

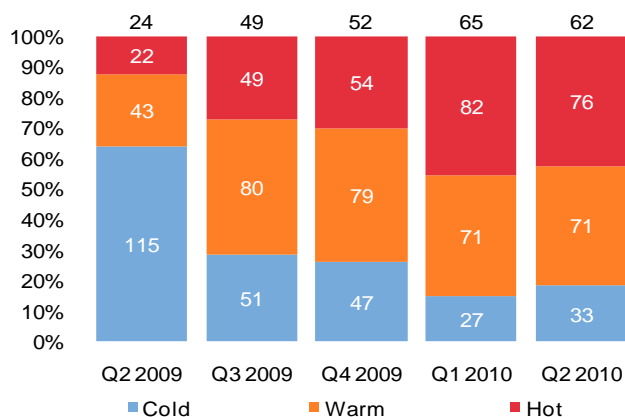
Prime yield and fair value yield: London City offices



Source: DTZ Research

Figure 11

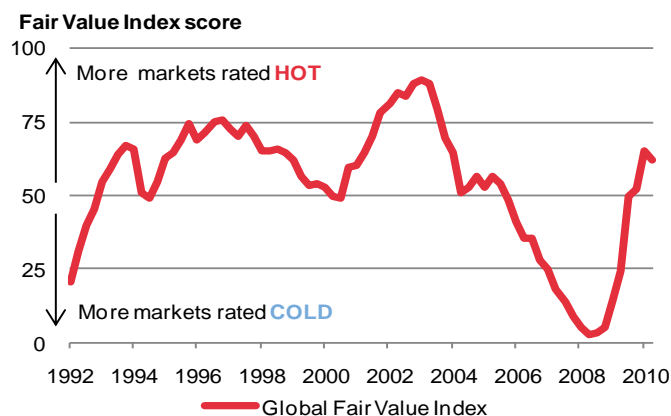
Global all-property Fair Value Index scores



Source: DTZ Research

Figure 12

Global all-property Fair Value Index history



Source: DTZ Research

Appendix 1: DTZ Fair Value Index™ market coverage

Table 1

European market coverage		
Office	Retail	Industrial
London City	London West End	London Heathrow
London West End	Birmingham	Birmingham
London Midtown	Manchester	Manchester
Manchester	Glasgow	Glasgow
Birmingham	Paris CBD	Paris (IDF)
Edinburgh	Lyon	Lyon
Glasgow	Berlin	Marseille
Bristol	Frankfurt	Berlin
Cardiff	Munich	Frankfurt
Leeds	Barcelona	Hamburg
Newcastle	Madrid	Barcelona
Nottingham	Brussels	Madrid
Paris CBD	Milan	Antwerp
Paris La Défense	Rome	Brussels
Lyon	Copenhagen	Milan
Marseille	Helsinki	Rome
Berlin	Oslo	Copenhagen
Dusseldorf	Stockholm	Helsinki
Frankfurt	Amsterdam	Oslo
Hamburg	Dublin	Gothenburg
Munich	Prague	Amsterdam
Barcelona	Warsaw	Rotterdam
Madrid	Budapest	Dublin
Antwerp	Moscow	Prague
Brussels	Istanbul	Warsaw
Milan	Bucharest	Budapest
Rome		Bucharest
Copenhagen		
Helsinki		
Oslo		
Malmö		
Stockholm		
Amsterdam		
Luxembourg		
The Hague		
Dublin		
Prague		
Warsaw		
Budapest		
Moscow		
Istanbul		
Bucharest		

Source: DTZ Research

Table 2

Asia Pacific market coverage		
Office	Retail	Industrial
Auckland	Auckland	Auckland
Bengaluru	Bangalore	Brisbane
Bangkok	Bangkok	Gold Coast
Beijing	Beijing	Hong Kong
Brisbane	Brisbane	Melbourne
Chengdu	Chengdu	Perth
Chennai	Chennai	Singapore
Delhi	Delhi	Sydney
Gold Coast	Gold Coast	Taipei
Guangzhou	Guangzhou	
Hong Kong	Hong Kong	
Jakarta	Kuala Lumpur	
Kuala Lumpur	Melbourne	
Melbourne	Mumbai	
Mumbai	Perth	
Perth	Shanghai	
Shanghai	Singapore	
Shenzhen	Sydney	
Singapore		
Sydney		
Taipei		
Tianjin		
Tokyo		

Source: DTZ Research

Appendix 1: DTZ Fair Value Index™ market coverage

Table 3

US market coverage	
Office	Retail
Atlanta	Atlanta
Baltimore	Baltimore
Boston	Boston
Chicago	Chicago
Dallas	Dallas
Washington DC	Denver
Denver	Houston
Houston	Los Angeles
Los Angeles	Miami
Miami	Minneapolis
Minneapolis	Philadelphia
New York	Phoenix
Philadelphia	San Diego
Phoenix	San Francisco
San Diego	Seattle
San Francisco	Tampa
Seattle	
St Louis	
Tampa	

Source: DTZ Research

Table 4

UK market coverage		
Office	Retail	Industrial
London City	London West End	London Heathrow
London West End	Birmingham	Birmingham
London Midtown	Manchester	Manchester
Manchester	Glasgow	Glasgow
Birmingham		
Edinburgh		
Glasgow		
Bristol		
Cardiff		
Leeds		
Newcastle		
Nottingham		

Source: DTZ Research

Appendix 2: Calculation of market over and under-pricing

Estimating the degree of over or under-pricing

This section extends the analysis set out in Table 2 to provide more detail on calculating the degree of over-pricing in a given market based on our fair value analysis.

We outline the general approach, and then provide a worked example to explain the finding in Table 2 that London City offices is under-priced by 11.6%.

General approach	London City example – Q2 2010
Prime market rent = R	£50 per square foot (psf) per year
Prime market yield = Y	5.5%
Fair value yield = FVY This is the prime market yield that would set the expected return equal to the required return.	4.86%
Market capital value = CV $CV = \frac{R}{Y}$	$= \frac{£50}{5.5\%}$ = £909 psf
Fair capital value = FCV $FCV = \frac{R}{FVY}$ The fair capital value is a notional concept arising from the calculation of the fair value yield. It is the capital value that is consistent with the fair value yield.	$= \frac{£50}{4.86\%}$ = £1029 psf
Degree of over pricing (negative indicates under-priced, %): $= 100 \left[\frac{CV}{FCV} - 1 \right]$ $= 100 \left[\frac{\left(\frac{R}{Y} \right)}{\left(\frac{R}{FVY} \right)} - 1 \right]$ $= 100 \left[\frac{FVY}{Y} - 1 \right]$ This maps directly to the description in Table 2, where we stated that: Degree of over-pricing: $= 100 \left[\frac{G}{D} - 1 \right]$	$= 100 \left[\frac{£909}{£1029} - 1 \right]$ = -11.6% Likewise, when calculated with the prime market and fair value yields: $= 100 \left[\frac{4.86\%}{5.50\%} - 1 \right]$ = -11.6%

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