

THE IMPACT OF LIQUIDITY ON VALUATION AND CAPITAL RAISING FOR GLOBAL LISTED REAL ESTATE COMPANIES



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CONTENTS

2

- Background
- Purpose of the Study
- Methodology
- Results
- Summary and Conclusions

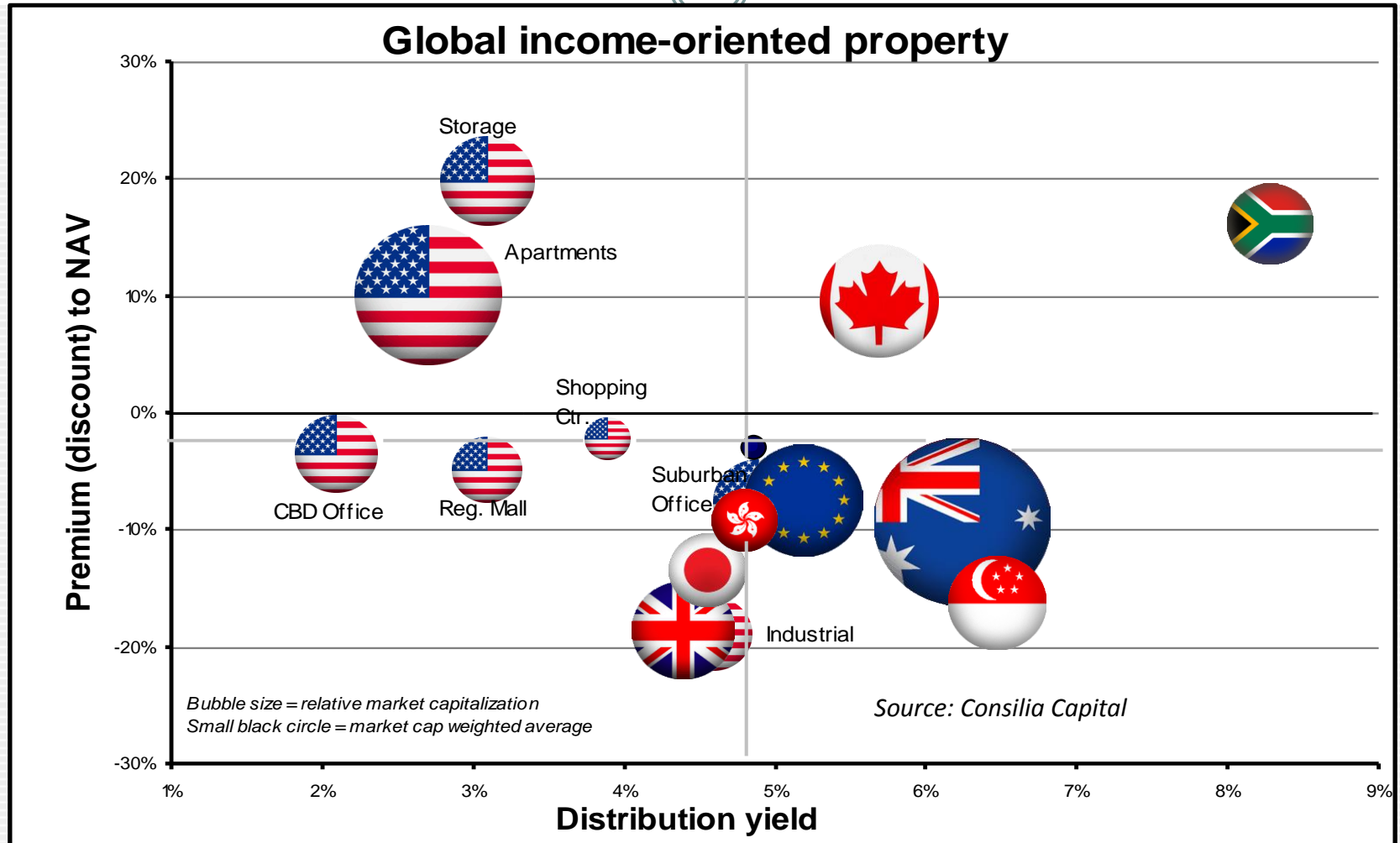
BACKGROUND – KEY POINTS

3

- The Fama-French three factor model (1993) highlighted the concept that less liquid stocks (should and do) yield higher returns.
- The endowment model, which was pioneered by David Swenson at Yale emphasised investing in illiquid alternative assets such as real estate to improve longer term incremental returns.
- Recent evidence* however suggests that the sensitivity of stock returns to liquidity and liquidity premia have declined significantly over the last four decades.
- The importance of liquidity moves over time **, and over the last 5 years higher levels of liquidity have become more highly prized.
- Reflecting this there has been an increase in the use of sector indices and strategies based purely on liquidity.
- In a previous study we looked at the evidence for European real estate companies to 2012. In this study we expand the time period to 2014, include Asia Pac, Japan and the US, and examine the impact of size on fund raising for European companies.
- The diminishing liquidity premium, Ben-Raphael, Kadan, and Wohl 2010, **Liquidity driven dynamic asset allocation , Xiong, Sullivan and Wang 2012,

BACKGROUND - DOES SIZE & LIQUIDITY MATTER IN VALUATION ?

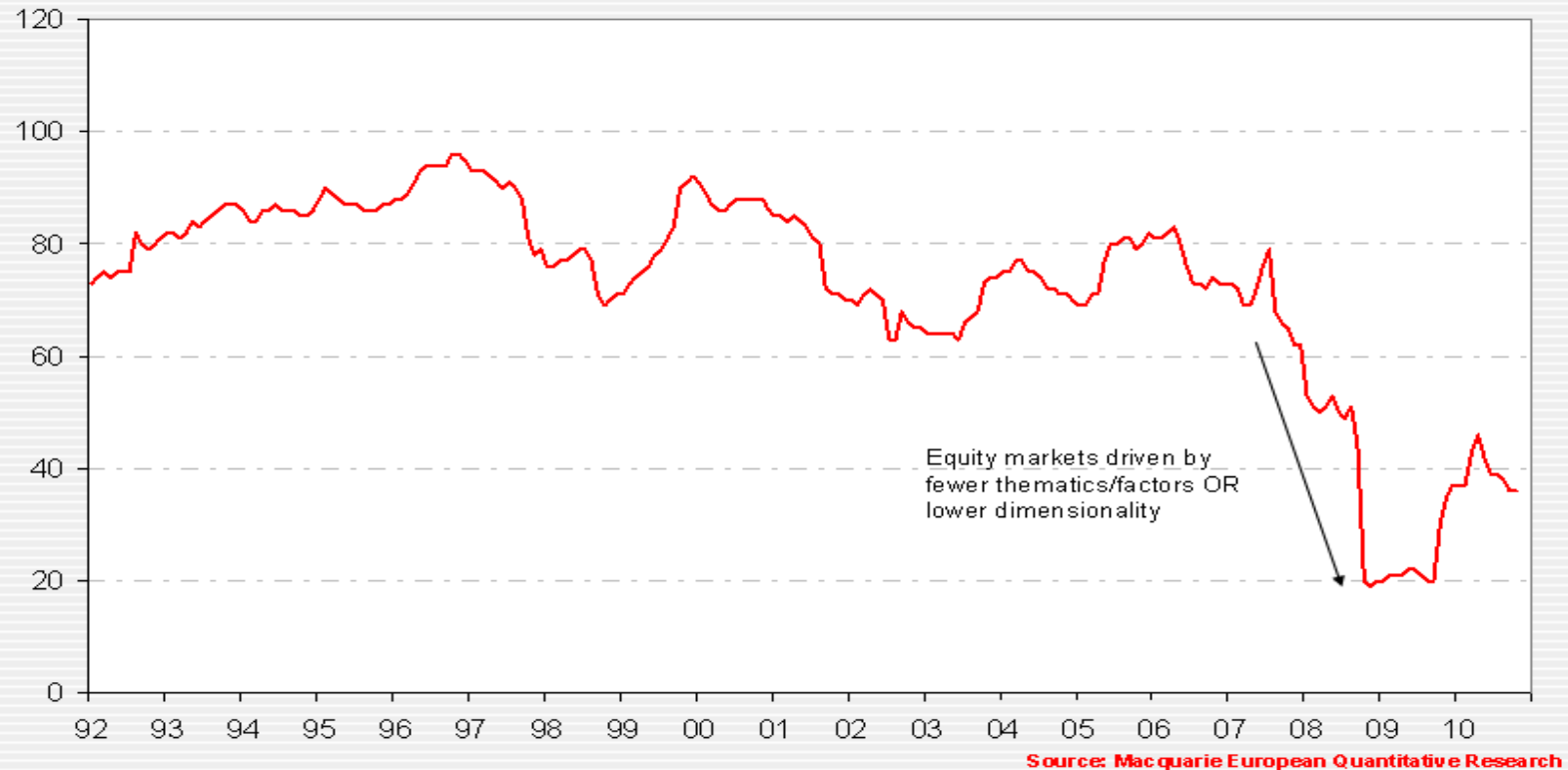
4



BACKGROUND - FACTORS AFFECTING RETURNS AND VALUATIONS

5

- Concept of market dimensionality and importance of liquidity as a factor



PURPOSE OF THE STUDY

6

In this study we are interested in discovering :

- 1) Whether the European evidence on liquidity and valuation we discovered in our previous study holds true globally
- 2) If there is a size bias in returns as well as valuations
- 3) The impact size has had on the equity and debt capital raising ability of companies in Europe

CAVEATS AND EXPECTATIONS

7

- The sample size is relatively small, limited by the number of “large” companies in Europe.
- Ideally the underlying assets of the companies would be homogenous so that the liquidity premium could be isolated. In practice this is not the case.
- The sensitivity of valuations to size and liquidity is time-variant.
- It is also stock specific, such that the most highly regarded (valued) stocks may not be the largest, and may still benefit from an “illiquidity” or scarcity premium.
- The valuation premium for liquidity may not be linear or “graded”, but indeed binary, i.e. only companies with a minimum level of liquidity are included in portfolios, and can raise further equity capital

THE SAMPLE

8

| | UK | Europe | US |
|---------------|-------------------------------|----------------------------|-------------------------|
| Large | Land Securities Group PLC | Unibail-Rodamco SE | Simon Property |
| | British Land Co PLC | Corio NV | Public Storage |
| | Hammerson Plc | Klepierre | Equity Residential |
| | Segro | Wereldhave NV | Prologis |
| Medium | Derwent London | Wihlborgs Fastigheter AB | Apartment Inv't |
| | Great Portland Estates Plc | Beni Stabili SpA | National Retail Prop |
| | Shaftesbury Plc | Sponda OYJ | Omega Healthcare |
| | Capital Shopping | Vastned Retail NV | VP Carey Inc |
| Small | Primary Health Properties PLC | Vastned Offices/Industrial | Corporate Office Prop |
| | Development Securities PLC | Societe de la Tour Eiffel | First Industrial Realty |
| | ST Modwen Properties Plc | DIC Asset AG | Mack Cali Realty |
| | Helical Bar Plc | Fastighets AB Balder | Cousins Properties |

| | Asia | Japan |
|---------------|-----------------------|-------------------------------|
| Large | Sun Hung Kai Prop | Mitsubishi Estate |
| | Wharf Holdings | Mitsui Fudosan |
| | Stockland | Sumitomo Realty & Development |
| | Capitaland | Nippon Building Fund |
| Medium | Sino Land | Japan Prime Realty Investment |
| | CapitalWall trust | Frontier Real Estate |
| | Novion Property Group | Japan Logistics |
| | Hysan Development | Nomura Real Estate Office |
| Small | Keppel land | Mori Trust Sogo REIT |
| | Investa Office | Kenedix Office |
| | New World China Land | NTT Urban Development |
| | BWP Trust | Premier Investment |

METHODOLOGY

9

Measuring Liquidity

- Bid-ask spread
- Turnover ratio
- Value traded / Market Cap.

Relative Liquidity

- Hui-Heubel Liquidity Ratio

Valuations

- Discount to NAV (smoothed on a monthly basis)
- Monthly data used

METHODOLOGY - BID ASK SPREAD

10

- Definition

$$Spread = \frac{(P_{ask} - P_{bid})}{(P_{ask} + P_{bid}) / 2}$$

- The bid-ask spread arises from three main components: order processing, adverse information and inventory costs.
- A high level of competition between intermediaries allows for a reduction of the order processing component and improves the liquidity condition of the market.
- The informational component of the bid-ask spread sheds light on the degree of efficiency due to the presence of hidden information or insider trading

METHODOLOGY - TURNOVER RATIO

11

- Definition

$$V = \frac{N_t}{N_{total}}$$

- It represents the number of shares traded vs. the total number of shares outstanding
- As a volume based measure it is defined as the volume traded vs. the total volume outstanding
- We prefer this to the daily value traded measure

METHODOLOGY - HUI HEUBEL LIQUIDITY RATIO

12

- Definition

$$HH = \frac{[(P_{\max} - P_{\min}) / P_{\min}]}{(V / (S * \bar{P}))}$$

- The Hui Heubel liquidity ratio is a volume based measure, relating average volumes over a defined period (i.e. 1 day, month, etc.) to observed price ranges
- Pmax is the highest daily price over a 1month-day period, Pmin is the lowest daily price over the same horizon, V is the total volume of assets traded over a 1month-day period, S is the total number of assets outstanding and P denotes the average closing price
- The larger the volume of trades relative to the price the deeper and more resilient the market

METHODOLOGY – VALUATION – DISCOUNT/PREMIUM TO NAV

13

- NAV was chosen as a metric rather than dividend yield, as payout ratios vary between REITs and PropCos, and FFO multiples are not commonly used in Europe.
- For NAV we have taken the published “EPRA” NAV or equivalent, and smoothed the figures between the published updates (typically 6 months).
- Price and NAV data are calculated on a monthly basis

RESULTS – BID-ASK SPREADS

14

| | Pre GFC | | |
|----------------|--------------|--------------|--------------|
| | Large | Medium | Small |
| UK | 0.33% | 0.67% | 1.56% |
| Europe | 0.38% | 0.60% | 1.37% |
| US | 0.06% | 0.09% | 0.08% |
| Japan | 0.39% | 0.62% | 0.51% |
| Asia | 0.33% | 0.68% | 0.94% |
| Average | 0.30% | 0.53% | 0.89% |
| | GFC | | |
| | Large | Medium | Small |
| UK | 0.15% | 0.26% | 0.93% |
| Europe | 0.33% | 0.43% | 1.95% |
| US | 0.10% | 0.15% | 0.19% |
| Japan | 0.42% | 0.96% | 0.91% |
| Asia | 0.35% | 0.59% | 1.11% |
| Average | 0.27% | 0.48% | 1.02% |
| | Post GFC | | |
| | Large | Medium | Small |
| UK | 0.11% | 0.18% | 0.82% |
| Europe | 0.12% | 0.47% | 0.79% |
| US | 0.03% | 0.06% | 0.07% |
| Japan | 0.39% | 0.57% | 0.43% |
| Asia | 0.30% | 0.52% | 0.80% |
| Average | 0.19% | 0.36% | 0.58% |

Smaller bid-ask spreads for larger companies consistent across regions

Spreads have come down dramatically in UK and Europe , less so in Asia

RESULTS – TURNOVER RATIO

15

| | Pre GFC | | |
|----------------|----------|--------|--------|
| | Large | Medium | Small |
| UK | 12.49% | 7.97% | 3.32% |
| Europe | 4.25% | 4.58% | 5.63% |
| US | 8.92% | 10.60% | 10.33% |
| Japan | 9.68% | 5.43% | 6.40% |
| Asia | 4.74% | 3.67% | 4.21% |
| Average | 8.02% | 6.45% | 5.98% |
| | GFC | | |
| | Large | Medium | Small |
| UK | 20.81% | 15.95% | 6.54% |
| Europe | 6.74% | 8.79% | 4.08% |
| US | 32.29% | 31.56% | 34.24% |
| Japan | 17.50% | 6.93% | 6.25% |
| Asia | 7.83% | 5.74% | 4.51% |
| Average | 17.04% | 13.80% | 11.12% |
| | Post GFC | | |
| | Large | Medium | Small |
| UK | 6.96% | 5.04% | 3.24% |
| Europe | 7.46% | 4.69% | 3.44% |
| US | 15.84% | 21.64% | 22.59% |
| Japan | 10.58% | 5.71% | 6.26% |
| Asia | 4.15% | 3.50% | 2.84% |
| Average | 9.00% | 8.12% | 7.67% |

Higher levels of turnover in larger companies in UK Europe and Asia

Liquidity more evenly spread by size band in US

RESULTS – VALUE TRADED/ MARKET CAP

16

| | Pre GFC | | |
|----------------|---------------|---------------|---------------|
| | Large | Medium | Small |
| UK | 12.44% | 7.84% | 3.49% |
| Europe | 4.22% | 4.57% | 4.17% |
| US | 8.77% | 10.61% | 10.31% |
| Japan | 9.56% | 5.35% | 6.32% |
| Asia | 4.74% | 3.61% | 4.19% |
| Average | 7.95% | 6.40% | 5.70% |
| | GFC | | |
| | Large | Medium | Small |
| UK | 20.34% | 15.50% | 6.04% |
| Europe | 6.75% | 8.77% | 4.07% |
| US | 32.24% | 31.71% | 34.16% |
| Japan | 17.40% | 6.91% | 6.19% |
| Asia | 7.78% | 5.74% | 4.59% |
| Average | 16.90% | 13.72% | 11.01% |
| | Post GFC | | |
| | Large | Medium | Small |
| UK | 6.94% | 5.03% | 3.21% |
| Europe | 7.42% | 4.65% | 3.12% |
| US | 15.54% | 21.44% | 22.46% |
| Japan | 10.53% | 5.62% | 6.22% |
| Asia | 4.13% | 3.49% | 2.81% |
| Average | 8.91% | 8.05% | 7.56% |

Similar results when calculated by value rather than number

Value will reflect free float weighting

RESULTS – HUI HEUBEL LIQUIDITY RATIO

17

| | Pre GFC | | |
|----------------|----------|--------|---------|
| | Large | Medium | Small |
| UK | 20.92% | 14.61% | 21.52% |
| Europe | 10.91% | 17.41% | 18.51% |
| US | 15.61% | 17.54% | 15.58% |
| Japan | 29.20% | 16.77% | 26.22% |
| Asia | 19.60% | 27.36% | 32.63% |
| Average | 19.25% | 18.74% | 22.89% |
| | GFC | | |
| | Large | Medium | Small |
| UK | 56.96% | 35.59% | 43.43% |
| Europe | 12.05% | 33.55% | 65.09% |
| US | 42.34% | 49.15% | 62.33% |
| Japan | 47.25% | 36.06% | 62.73% |
| Asia | 49.28% | 65.75% | 106.56% |
| Average | 41.57% | 44.02% | 68.03% |
| | Post GFC | | |
| | Large | Medium | Small |
| UK | 19.26% | 16.75% | 24.41% |
| Europe | 5.42% | 16.69% | 30.79% |
| US | 19.26% | 19.95% | 22.22% |
| Japan | 28.26% | 20.98% | 26.87% |
| Asia | 23.93% | 26.36% | 40.13% |
| Average | 19.22% | 20.14% | 28.88% |

Reasonably consistent levels of resilience post GFC , with the exception of European large caps

RESULTS – VALUATION

18

| | Pre GFC | | |
|----------------|----------|---------|---------|
| | Large | Medium | Small |
| UK | -5.79% | 4.17% | 24.09% |
| Europe | 1.91% | 3.55% | 2.70% |
| US | 8.92% | 10.60% | 10.33% |
| Average | 1.68% | 6.11% | 12.37% |
| | GFC | | |
| | Large | Medium | Small |
| UK | -33.41% | -27.61% | -5.89% |
| Europe | 3.00% | -4.33% | -12.17% |
| US | 32.29% | 31.56% | 34.24% |
| Average | 0.63% | -0.12% | 5.39% |
| | Post GFC | | |
| | Large | Medium | Small |
| UK | -12.08% | 3.20% | -0.14% |
| Europe | -5.20% | -13.87% | -24.80% |
| US | 15.84% | 21.64% | 22.59% |
| Average | -0.48% | 3.66% | -0.78% |

Based on discount / premium to last stated NAV

Superior valuations for UK medium sized cos reflects Central London bias

Superior valuations for European large caps most pronounced

Valuations more consistent across size band in US even though metric relates to book rather than market value

RESULTS – PERFORMANCE

19

| Performance since the Peak (%) | | | | | | | | | |
|--------------------------------|--------|---------------|--------|-----------|--------|--------------|-------|-------------|-------|
| UK large | -40.54 | Europe large | 2.81 | US large | 84.75 | Japan large | -0.90 | Asia large | 42.98 |
| UK medium | 8.50 | Europe medium | 21.00 | US medium | 182.63 | Japan medium | 28.42 | Asia medium | 54.23 |
| UK small | -26.83 | Europe small | 159.27 | US small | -43.70 | Japan small | 21.41 | Asia small | 55.98 |

| Performance since the Trough (%) | | | | | | | | | |
|----------------------------------|--------|---------------|--------|-----------|--------|--------------|--------|-------------|--------|
| UK large | 309.64 | Europe large | 232.77 | US large | 546.82 | Japan large | 188.82 | Asia large | 222.55 |
| UK medium | 477.80 | Europe medium | 214.81 | US medium | 514.18 | Japan medium | 143.69 | Asia medium | 225.15 |
| UK small | 275.86 | Europe small | 897.66 | US small | 268.12 | Japan small | 200.80 | Asia small | 485.40 |

UK large caps still way off peak levels due to dilutive impact of rescue rights issues – mid caps performed best since trough

Europe small caps have outperformed

Since the trough mid and larger cap US name have outperformed

RESULTS – PERFORMANCE

20

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ASIA | | | | | | | | | | | |
| Asia large | 37.20 | 18.93 | 44.13 | 42.04 | -53.19 | 78.45 | 14.89 | -26.23 | 50.93 | -9.43 | 9.72 |
| Asia medium | 46.34 | 25.96 | 46.23 | 29.02 | -48.65 | 67.14 | 26.62 | -11.90 | 35.98 | -11.20 | 11.13 |
| Asia small | 45.65 | 22.15 | 55.24 | 29.14 | -58.42 | 82.74 | 18.56 | -18.20 | 80.51 | -6.31 | 15.17 |
| Large over Small | -8.44 | -3.22 | -11.11 | 12.90 | 5.24 | -4.29 | -3.67 | -8.03 | -29.58 | -3.12 | -5.45 |
| Medium over Small | 0.69 | 3.82 | -9.00 | -0.12 | 9.77 | -15.60 | 8.06 | 6.30 | -44.53 | -4.89 | -4.05 |
| EUROPE | | | | | | | | | | | |
| Europe large | 56.85 | 0.03 | 70.88 | -9.71 | -33.08 | 53.70 | 2.51 | -19.12 | 26.18 | 18.48 | 6.25 |
| Europe medium | 44.60 | -1.53 | 73.64 | -13.30 | -40.95 | 40.46 | 29.66 | -24.52 | 23.25 | 14.05 | 5.42 |
| Europe small | 31.24 | 15.79 | 86.31 | -16.56 | -64.51 | 79.95 | 44.39 | -26.49 | 44.60 | 35.90 | 6.47 |
| Large over Small | 25.61 | -15.76 | -15.43 | 6.85 | 31.43 | -26.25 | -41.88 | 7.37 | -18.42 | -17.42 | -0.22 |
| Medium over Small | 13.36 | -17.33 | -12.67 | 3.27 | 23.57 | -39.49 | -14.72 | 1.96 | -21.36 | -21.84 | -1.05 |
| JAPAN | | | | | | | | | | | |
| Japan large | 35.75 | 55.19 | 38.97 | -8.56 | -28.90 | 3.17 | 25.46 | -21.20 | 63.00 | 35.68 | -23.25 |
| Japan medium | 37.02 | 5.11 | 36.65 | -5.46 | -24.64 | 13.73 | 42.02 | -13.84 | 17.21 | 10.81 | 7.64 |
| Japan small | 46.58 | 16.96 | 23.85 | 4.39 | -36.54 | -1.47 | 55.13 | -26.19 | 26.21 | 17.52 | 19.82 |
| Large over Small | -10.83 | 38.23 | 15.12 | -12.95 | 7.65 | 4.64 | -29.67 | 4.99 | 36.79 | 18.16 | -43.07 |
| Medium over Small | -9.56 | -11.85 | 12.79 | -9.84 | 11.90 | 15.20 | -13.12 | 12.35 | -9.00 | -6.72 | -12.18 |
| UK | | | | | | | | | | | |
| UK large | 53.33 | 7.17 | 70.66 | -35.57 | -56.88 | 18.80 | -1.35 | -11.25 | 38.26 | 24.94 | 15.87 |
| UK medium | 60.35 | 11.12 | 79.44 | -28.70 | -57.80 | 66.35 | 15.05 | -6.06 | 39.55 | 15.01 | 17.41 |
| UK small | 52.76 | 19.39 | 61.39 | -30.01 | -51.12 | 54.64 | -12.81 | -23.80 | 44.16 | 54.76 | -0.42 |
| Large over Small | 0.57 | -12.22 | 9.27 | -5.56 | -5.76 | -35.83 | 11.46 | 12.55 | -5.90 | -29.82 | 16.29 |
| Medium over Small | 7.59 | -8.28 | 18.05 | 1.31 | -6.69 | 11.72 | 27.86 | 17.74 | -4.61 | -39.75 | 17.83 |
| US | | | | | | | | | | | |
| US large | 34.48 | 22.14 | 35.59 | -14.36 | -23.86 | 25.17 | 36.29 | 19.18 | 17.91 | 1.38 | 30.32 |
| US medium | 25.54 | 0.88 | 38.13 | -1.92 | -21.38 | 34.30 | 35.47 | 6.79 | 28.34 | 14.34 | 35.93 |
| US small | 29.81 | 6.16 | 35.85 | -29.96 | -32.33 | 2.10 | 20.71 | -13.52 | 24.63 | 9.62 | 12.89 |
| Large over Small | 4.67 | 15.97 | -0.25 | 15.60 | 8.48 | 23.07 | 15.58 | 32.70 | -6.72 | -8.24 | 17.44 |
| Medium over Small | -4.27 | -5.29 | 2.29 | 28.04 | 10.95 | 32.20 | 14.76 | 20.31 | 3.71 | 4.73 | 23.04 |

IMPACT OF SIZE ON EQUITY FUND RAISING

21

- Distribution by frequency and quantum of secondary equity issues (not IPOs) by European listed RE cos ranked by Index weighting decile 2010-2014 .
- Concentration in mid cap names 2012-13

Number

| Decile | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------|-----------|-----------|-----------|-----------|-----------|
| 1st | 0 | 1 | 2 | 1 | 2 |
| 2nd | 2 | 3 | 3 | 2 | 2 |
| 3rd | 1 | 0 | 2 | 2 | 3 |
| 4th | 3 | 4 | 4 | 0 | 3 |
| 5th | 0 | 2 | 11 | 12 | 5 |
| 6th | 3 | 4 | 5 | 2 | 8 |
| 7th | 6 | 2 | 3 | 6 | 3 |
| 8th | 2 | 0 | 3 | 7 | 5 |
| 9th | 2 | 2 | 1 | 9 | 11 |
| 10th | 0 | 0 | 0 | 0 | 2 |
| Total | 19 | 18 | 34 | 41 | 44 |

Amount raised (€)

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------|------------------|------------------|------------------|------------------|------------------|
| 1st | 0 | 113,041 | 473,402 | 563,595 | 818,620 |
| 2nd | 860,863 | 305,767 | 636,204 | 517,842 | 799,770 |
| 3rd | 122,891 | 0 | 269,477 | 347,649 | 956,676 |
| 4th | 102,149 | 318,025 | 396,994 | 0 | 942,921 |
| 5th | 0 | 171,376 | 81,628 | 420,346 | 364,228 |
| 6th | 167,232 | 540,709 | 213,028 | 500,214 | 2,111,690 |
| 7th | 367,979 | 163,583 | 110,677 | 180,698 | 185,913 |
| 8th | 182,832 | 0 | 190,718 | 86,909 | 238,460 |
| 9th | 61,734 | 57,043 | 27,314 | 189,381 | 271,823 |
| 10th | 0 | 0 | 0 | 0 | 225,861 |
| Total | 1,865,679 | 1,669,544 | 2,399,442 | 2,806,636 | 6,915,963 |

IMPACT OF SIZE ON DEBT FUND RAISING

22

- Distribution by frequency and quantum of debt issues by European listed RE cos ranked by Index weighting decile 2010-2014 .
- Concentration in large cap names.

Number

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------|-----------|-----------|-----------|-----------|-----------|
| 1st | 10 | 18 | 16 | 13 | 15 |
| 2nd | 3 | 5 | 9 | 14 | 6 |
| 3rd | 6 | 7 | 5 | 5 | 5 |
| 4th | 2 | 1 | 2 | 9 | 10 |
| 5th | 3 | 4 | 7 | 9 | 3 |
| 6th | 1 | 0 | 7 | 6 | 6 |
| 7th | 2 | 0 | 1 | 9 | 5 |
| 8th | 1 | 1 | 7 | 4 | 2 |
| 9th | 0 | 4 | 0 | 3 | 2 |
| 10th | 1 | 0 | 1 | 2 | 3 |
| Total | 29 | 40 | 55 | 74 | 57 |

Amount raised (€)

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------|------------------|------------------|------------------|-------------------|-------------------|
| 1st | 2,562,225 | 2,394,632 | 5,265,513 | 3,028,479 | 4,477,558 |
| 2nd | 926,391 | 1,129,070 | 1,346,576 | 2,906,369 | 2,076,951 |
| 3rd | 1,350,000 | 948,970 | 1,072,900 | 677,168 | 1,690,000 |
| 4th | 96,600 | 115,625 | 143,209 | 971,207 | 1,854,431 |
| 5th | 205,562 | 412,371 | 550,477 | 1,177,939 | 178,555 |
| 6th | 135,000 | 0 | 1,066,743 | 997,326 | 2,635,000 |
| 7th | 253,674 | 0 | 94,825 | 921,816 | 867,203 |
| 8th | 11,441 | 33,548 | 296,931 | 160,717 | 185,271 |
| 9th | 0 | 120,040 | 0 | 180,000 | 150,000 |
| 10th | 75,000 | 0 | 5,000 | 144,900 | 156,000 |
| Total | 5,615,894 | 5,154,258 | 9,842,174 | 11,165,921 | 14,270,969 |

SUMMARY AND CONCLUSIONS

23

We believe that the questions posed at the outset can be answered as follows:

- 1) Whether the European evidence on liquidity and valuation we discovered in our previous study holds true globally

Yes, except US where liquidity is more evenly spread across market cap bands

- 2) If there is a size bias in returns as well as valuations

European valuation bias not as apparent in US - no consistent pattern of returns by market cap. , although smaller co's have outperformed in Europe and Asia in each of last three years

- 3) The impact size has had on the capital raising of companies in Europe

Increasing number of mid-sized European cos raising equity , suggesting no evidence of equity capital rationing by size which was true in 2008 and 2009, but size is a major factor in companies ability to utilise debt capital markets.

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24

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