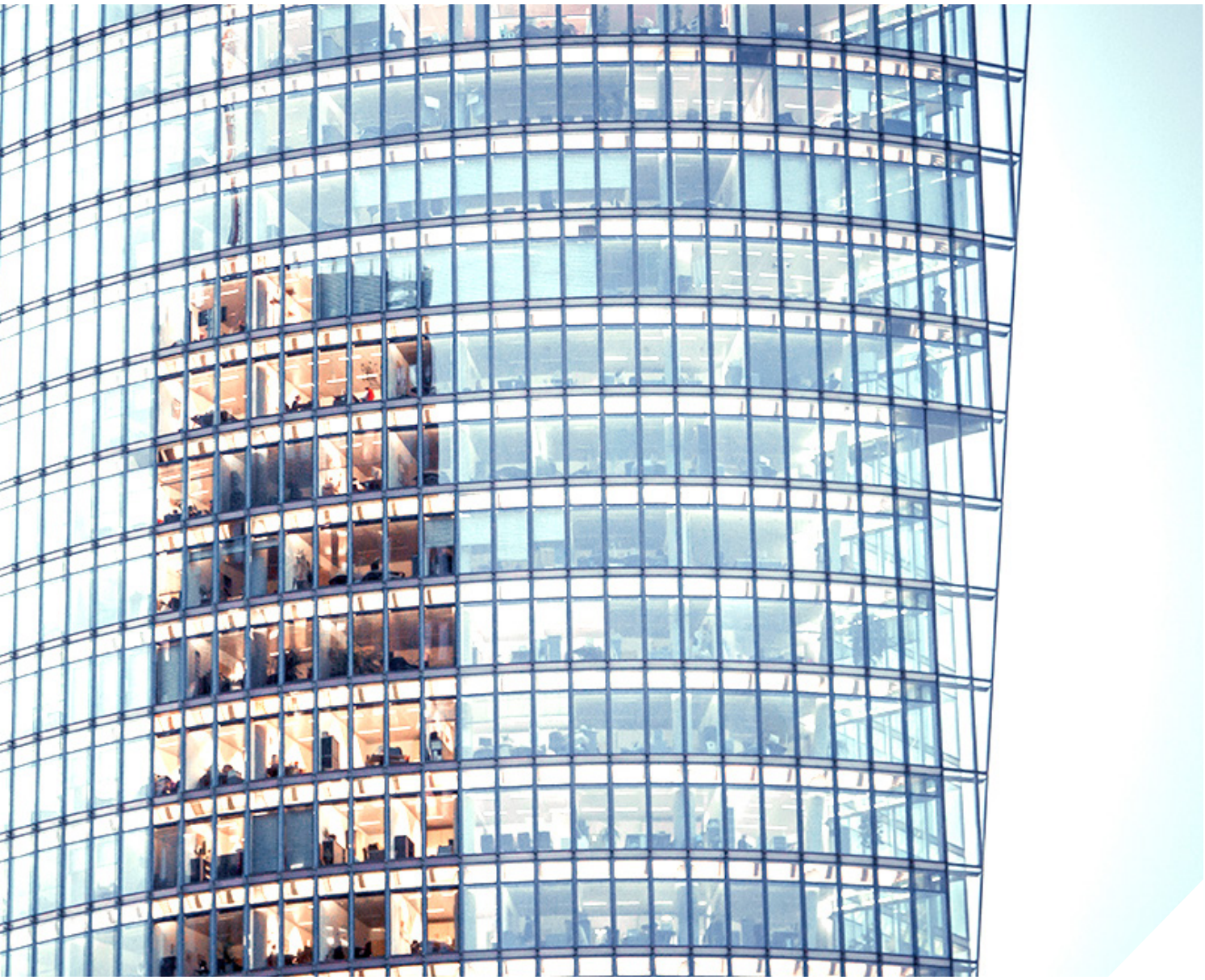
MSCI REAL ESTATE SOLVENCY II 2017 UPDATE REPORT

MARCH 2017



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This research update of the IPD Solvency ll Review, originally published in April 2011, was commissioned by INREV, the European Association for Investors in Non-listed Real Estate Vehicles, and supported by five other key associations from the real estate and insurance industries in Europe:

- The Association of Real Estate Funds (AREF)
- The British Property Federation (BPF)
- Bundesverband Investment und Assetmanagement (BVI)
- The Investment Property Forum (IPF)
- The German Property Federation (ZIA)

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EXECUTIVE SUMMARY

The primary purpose of the 2011 IPD Solvency II Review was to assess the information base used by the European Insurance and Occupational Pension Authority (EIOPA) in determining an appropriate solvency capital requirement for real estate portfolios held by insurance companies.

This update report adds six years of European investment market data to that available for the original study, bringing the capital risk analysis up to December 2015.

A three-step approach was adopted. This involved:

1. Constructing full 15-year quarterly valuation-based indexes (VBI) for each of the 17 European markets fully covered by MSCI.
2. Estimating any additional trading volatility using transaction-linked indicator (TLI) methods for key national markets and all relevant pan-European composites.
3. Utilizing these new series to establish better grounded "value at risk" estimates, using EIOPA-defined methodologies to identify worst case 12-month negative return sequences.

This comprehensive scan for the most extreme current evidence of European tail values at risk indicates that any downside disruptions since 2009 have not been of a scale to merit revising the core 2011 conclusions. The appropriate shock factors to use for determining real estate solvency capital requirements need not, therefore, be pushed in excess of the 15% mark for all Europe, or 12% for European composites which exclude the U.K.

RESEARCH UPDATE REPORT

The full April 2011 IPD research report offered a detailed review of the Solvency II regulatory framework proposed for determining insurance company capital adequacy rules from 2013 onwards. The study focused specifically upon real estate, and was funded by a consortium of seven key trade bodies representing the insurance and property investment sectors across Europe.

The European Insurance and Occupational Pensions Authority (EIOPA) Solvency II papers advocated risk-based regulation and included a proposal – to apply a 25% solvency capital requirement (SCR) for directly held real estate investments – which could have profound effects upon real estate allocations amongst insurance companies across Europe. They remain one of the sector's most important investor groups, accounting for between 25% and 35% of the total European property investment market covered by MSCI.

The 25% threshold test was part of a direct response to the collective financial sector failure to effectively hedge the implicit market risks of the asset classes in which they were invested prior to 2007. It was defined for real estate by identifying the most volatile major European property investment market over the 25 years to December 2009 – the U.K. – and finding the greatest 12-month loss of return by comparing extreme tail values at risk (VaR).

This note aims to update the quantitative analysis of the original study, from the historical period available in 2010 (through to December 2009) to that now available (through to December 2015).

REVISITING THE INFORMATION BASE FOR SOLVENCY MODELING

To meet the original study demand to better inform the new regulations, the IPD project team created a series of 10-year quarterly indexes for all main European property markets, enabling more effective downside risk analyses and tracking no less than two years both before and after the 2007 financial/economic crisis period.

December 2009, however, in no sense marked either the end of the cycle or a coverage of its several European aftershocks which was manifestly sufficient for robustly establishing a prudent solvency capital margin for real estate investment.

Since the finalization of the IPD Report in April 2011, we have therefore continued to update and deepen our reporting on European property investment markets and are thus in a position to refresh the core risk analyses reported at that time, encompassing significantly more of the evolving property market responses to an unprecedented and prolonged economic and financial crisis.

A three-step approach has been adopted for the purposes of this purely statistical update. This approach has involved:

1. **Constructing full 15-year quarterly valuation-based indexes (VBI)** for each of the 17 European markets covered by MSCI's Real Estate team.

This phase – aimed at updating (to December 2015) the full quarterly Pan-European index developed for the initial project – involved a major internal data re-processing exercise for MSCI. The currently published IPD European Indexes vary in their predominant frequency from quarterly (U.K., Ireland, and the Netherlands) to annual (all the rest, including the key European and Eurozone composites), though half-yearly results in France and Italy do at present support small sample Indexes.

The task was thus to maximize the timeliness in reporting the available data in each national market by utilizing all valuations and cash flow evidence within a flexible interpolation framework. In 2011, this supported the construction of 15 national quarterly series. For the update study this count was stretched to 17 and quarterly data points were added consistently and continuously between end-2009 and end-2015 for all markets, in most cases to generate a full 15-year series, as noted in Appendix 1.

For cross-market correlation analyses, the East European markets – Hungary, Poland and the Czech Republic – had to be excluded, as their shorter time series were incompatible with the full 15-year analysis.

2. **Estimating additional trading volatility using transaction linked indicator (TLI) methods** for 12 key national markets and all relevant pan European composites.

   The second phase of research data generation augmented the newly extended valuation based series with a parallel set of quarterly transaction-linked performance measures, using the same regression-based technology as was developed for the original report. In 2011, we were cautiously able to include nine markets (as well as pan-European composites) within the bulk of the TLI analyses. For most of the time periods up to 2015, we were able to stretch this total to 12 markets (also noted in Appendix 1), due to a mix of modestly improved market coverage ratios and continuing reasonable levels of liquidity within each of the markets covered.

   The purpose of these parallel indexes is to compensate, using documented and standardized transaction evidence within a transparent methodology, for the unavoidable smoothing effects of the real estate valuation process, and thereby more accurately reflect the full risk of low liquidity/large lot size trading in extreme property investment market circumstances.

3. **Utilizing these new series to establish better grounded "value at risk" estimates**, using EIOPA-defined methodologies to identify worst case 12-month negative returns.

   The third and main analysis phase of the study used both the valuation-based and transaction-linked quarterly measures for the composite European and Eurozone markets, as well as for between 12 and 17 national markets, to determine the 0.5% tail values at risk (one-in-200 year events) defined by the cyclical track records of each market and grouping of markets. The SCR of 25% adopted for all European real estate, originally proposed by EIOPA and still retained in the current Council Directive, was based upon this 0.5% tail risk approach. But it was derived in 2009 by EIOPA through the application of the method exclusively to an IPD UK total return series. The number so produced was then generalized across the rest of Europe to constitute a single real estate solvency capital requirement.

   In this update study it has proved possible to apply the EIOPA approach at an even more granular level than in 2011, utilizing both the TLI and VBI methodologies, to get a rich statistical picture of the geographical variation in downside cyclical reactions to the economic/financial crisis for the purposes of rigorously informing prudential capital requirements. This final phase of the update project was focused specifically upon demonstrating the downside risk impacts as they have unfolded, now up until end-2015, and providing evidence-based national, Eurozone and pan-European measures to inform any future regulatory review of such requirements. EIOPA's original exclusive focus upon measures of total return, rather than simpler price indicators, was however retained throughout this work.

UPDATED RESULTS

MEASURES OF MARKET DIVERSITY

Our research comparisons between valuation-based and transaction-linked measures have consistently demonstrated that, whilst the VBIs may and often do understate the volatility of markets in real estate, they are more robust as baseline measures and pretty consistently capture the essential cyclical patterns of each market.

For this reason, we have chosen in the update study to use the valuation-based indexes primarily for an analysis of European market covariance rather than more directly as the definitive source of volatility measures. This has enabled us to cover 14 individual national markets as well as the three main European composites, and to run the covariance analysis over two time periods – both from Q1 2002, but the first running right the way through to end-2015 and the second running only to the end date of the original study, 2009. Each of these analyses was run using a full quarterly dataset of national and European returns.

The comparison provides an interesting context for the more direct extreme volatility tests of the next section. Exhibit 1 shows that whilst there are a significant number of relatively high cross-market correlations – as we should expect in a period of closely synchronized economic and financial recession and recovery – the average level across all pairwise comparisons is only 0.42. Moreover this average has noticeably fallen (from 0.52) since the period through to 2009 available for analysis in the original study.

This drop is not surprising given the scale of the financial and macro-economic shock following the 2007 global crisis. Despite significantly varying levels amongst the downside responses of the main European markets in 2008 and 2009, synchronization remained high. Since the collapse however markets have responded very differently to the painstaking process of recovery. The Eurozone sovereign debt crisis certainly differentiated core Europe from the peripheral non-euro markets immediately after 2009. But even within the Eurozone some markets managed to bounce back very much more rapidly than others. So diluting the consistently shared boom and bust year responses between 2003 and 2009 with a six-year period of much more nationally idiosyncratic recovery since that time, has had the inevitable effect of re-establishing the underlying diversity across markets, and with that the possibility of risk management through diversification.

Whilst none of this offsets the severity of any specific downside collapse (if such a collapse is the exclusive focus of the regulation), it certainly strengthens the case for fully exploring the diversity of market and regional downside sensitivities in designing an SCR regime which is reasonable, defensible and well rooted in all the available evidence.

EXHIBIT 1

Cross-market Correlations: 2001 to 2015 and 2001 to 2009 (>.75 highlighted)

VBI TR (Direct) - 2015

	AUSTRIA	BELGIUM	DENMARK	FRANCE	GERMANY	IRELAND	ITALY	NETHERLANDS	NORWAY	PORTUGAL	SPAIN	SWEDEN	SWITZERLAND	UK
AUSTRIA														
BELGIUM	0.4194													
DENMARK	0.4239	0.6433												
FRANCE	0.7151	0.7686	0.8110											
GERMANY	0.2588	0.0074	-0.2938	-0.0845										
IRELAND	0.4768	0.4848	0.4503	0.6356	0.1524									
ITALY	0.2660	0.7451	0.5977	0.5793	-0.1896	0.2760								
NETHERLANDS	0.3710	0.7519	0.7016	0.7535	-0.0031	0.5107	0.6982							
NORWAY	0.6051	0.7398	0.7476	0.8910	-0.0619	0.6566	0.4840	0.6321						
PORTUGAL	0.2698	0.8183	0.6860	0.6602	-0.0327	0.5073	0.8117	0.7770	0.6337					
SPAIN	0.4977	0.7640	0.7614	0.8397	0.0298	0.7325	0.6295	0.7816	0.7897	0.8551				
SWEDEN	0.8113	0.6737	0.5598	0.8096	0.1535	0.6311	0.1182	0.4789	0.8380	0.3617	0.6881			
SWITZERLAND	0.4496	0.0431	-0.2189	0.0758	0.3523	-0.1495	-0.2650	-0.0873	0.0165	-0.3013	-0.1366	0.3142		
UK	0.2625	0.1462	0.3045	0.4147	-0.0499	0.6983	0.1922	0.3419	0.4847	0.2528	0.4123	0.4092	-0.2367	
PAN EURO	0.4457	0.3714	0.5076	0.6498	0.0045	0.8040	0.3363	0.5336	0.6820	0.4459	0.6378	0.6101	-0.1694	0.9504
EUROZONE	0.7045	0.8261	0.7445	0.9538	0.1510	0.6887	0.6122	0.8020	0.8725	0.7619	0.9010	0.7978	0.0888	0.3946
PANEUROEXUK	0.7337	0.8149	0.7479	0.9604	0.1424	0.6876	0.5396	0.7679	0.8970	0.7116	0.8866	0.8589	0.1500	0.3958

VBI TR (Direct) - 2009

	AUSTRIA	BELGIUM	DENMARK	FRANCE	GERMANY	IRELAND	ITALY	NETHERLANDS	NORWAY	PORTUGAL	SPAIN	SWEDEN	SWITZERLAND	UK
AUSTRIA														
BELGIUM	0.8431													
DENMARK	0.7944	0.6114												
FRANCE	0.8961	0.8672	0.8517											
GERMANY	0.1704	0.1523	-0.1265	-0.0075										
IRELAND	0.6423	0.6336	0.7467	0.8440	-0.1112									
ITALY	0.6835	0.7815	0.4255	0.6056	0.2082	0.6717								
NETHERLANDS	0.7004	0.7104	0.6407	0.8031	0.1760	0.7812	0.6404							
NORWAY	0.8064	0.7673	0.7768	0.8996	-0.0522	0.7882	0.4940	0.6285						
PORTUGAL	0.7782	0.8273	0.6378	0.8092	0.1306	0.7546	0.9167	0.7380	0.6843					
SPAIN	0.7725	0.7531	0.8390	0.9274	-0.0379	0.8521	0.7301	0.7909	0.8003	0.8901				
SWEDEN	0.8984	0.8417	0.8338	0.9225	-0.0717	0.7125	0.3369	0.6502	0.9305	0.5909	0.7797			
SWITZERLAND	0.3902	0.5620	-0.0510	0.2185	0.2901	-0.1508	-0.0501	0.1750	0.1667	0.0664	-0.0041	0.3021		
UK	0.2700	0.2037	0.4620	0.4717	-0.2393	0.7310	0.3727	0.4799	0.5238	0.3963	0.4487	0.3908	-0.4413	
PAN EURO	0.4982	0.4363	0.6568	0.6979	-0.1530	0.8669	0.5129	0.6520	0.7072	0.5983	0.6712	0.6051	-0.3193	0.9532
EUROZONE	0.8990	0.8902	0.7951	0.9773	0.1762	0.8247	0.6930	0.8267	0.8700	0.8650	0.9196	0.8670	0.2684	0.4185
PANEUROEXUK	0.9102	0.8908	0.8222	0.9865	0.1333	0.8140	0.6319	0.8075	0.8986	0.8276	0.9100	0.9115	0.2902	0.4143

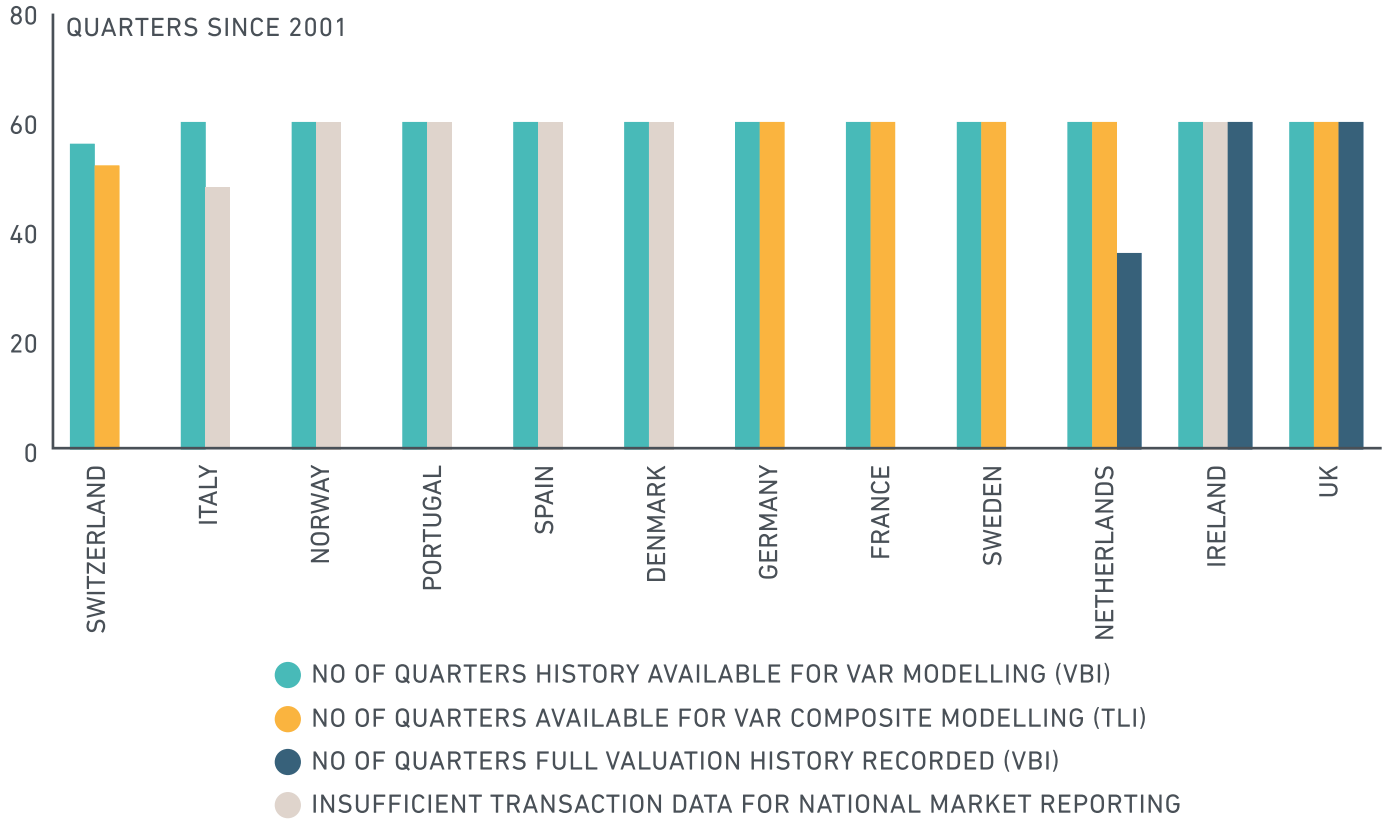
MEASURES OF MARKET VOLATILITY

For the reasons noted above, the original research adjusted the 10-year quarterly valuation- based indexes (VBIs) to allow for the transaction-driven volatility intrinsic to illiquid real estate markets. These new hybrid transaction-linked indicators (TLIs) revealed clear patterns of extra volatility in most markets, and thus tail values at risk, in many cases well above valuation determined levels. This parallel approach has been continually updated since 2011, and is summarized in this section, now through to end-2015.

Given the illiquidity of some individual European markets, particularly during key periods since 2007, results are presented individually only for those six markets which meet a continuous sample size threshold of at least 10 sales in each two-quarter period since 2006. Thus, in circumstances where markets effectively dried up altogether in the immediate aftermath of the crisis (Spain and Portugal for example), they have been excluded from these update reports, but only at national market level. All eligible transactions from all 12 European markets are included in each of the relevant composites of which they form a part. This data availability position is summarized in Exhibit 2 below.

EXHIBIT 2

Quarterly Data used in Risk Modeling (2001 – 2015)

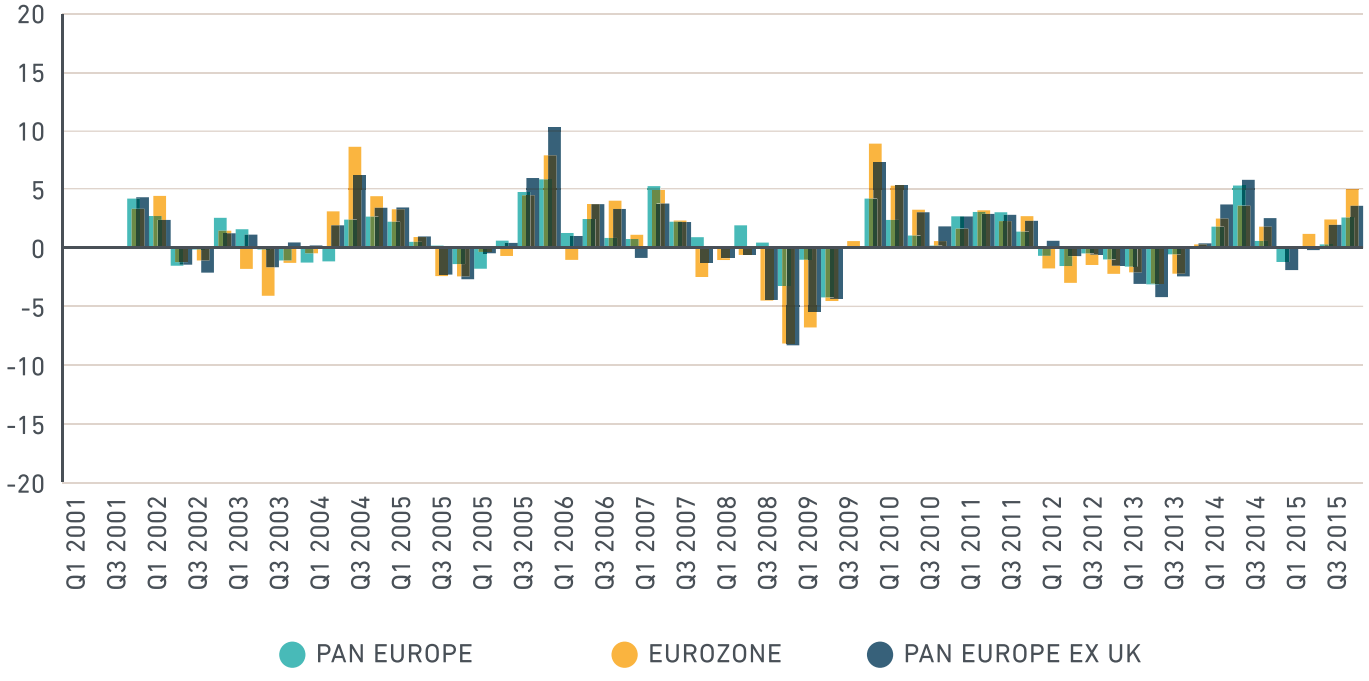


The analyses described in this section report rolling average 12-month risk scores as completely as is currently possible given the longer data series that can now be subjected to EIOPA defined methodologies, both for the six major individual European investment markets identified in Exhibit 2 above, and for the three main composites – the Eurozone and the wider European market, both with and without the U.K.

Before addressing (in the next section) the central question of the long-term evidence of extreme downside risk, it is important to revisit the relationship between the two parallel measures of performance utilized in the 2011 study – valuation-based and transaction-linked measures of return. Exhibits 3-5 now compare the VBI and TLI measures over a 15-year period for the three major composites and the six national markets that can be separately reported. In each case the zero horizontal represents the VBI measure of rolling 12-month return for the full period, and the vertical bars therefore describe the excess movement, both above and below the valuation baseline record, to give an indication of the additional volatility and thus risk associated with the transaction complexity and associated illiquidity typical of real estate investment.

EXHIBIT 3

Excess TLI over VBI 12-month Return Instability for Major European Composites



The three main composites each display broadly consistent patterns, as detailed in Exhibit 3. Whilst at the overall index level both VBI and TLI measures describe a broadly synchronized cyclical pattern, the return deficits and excesses associated with trading appeared to be generally pro-cyclical. Thus at the height of the markets in 2005 and 2006, profits associated with transactions also peaked, and persisted until the summer of 2008. Thereafter trading losses/profits helped accelerate the major composites both into and then out of recession in 2008 and 2009, and since end-2010, transaction impacts have been more muted, though on balance more often positive than negative.

The pattern disparities between the three composites appear to be relatively small. The only consistent difference appears to be that of the lower overall level of excess TLI volatility demonstrated by the largest pan-European composite. This will in part reflect the greater diversification benefits of the broadest possible European specification. However, probably of more significance is the fact that, of the three, only the full pan-European composite contains the large U.K. market in which the differences between VBI and TLI results have been shown in the past to be at their smallest within Europe.

EXHIBIT 4

Excess TLI over VBI 12-month Return Instability for Non-euro Markets

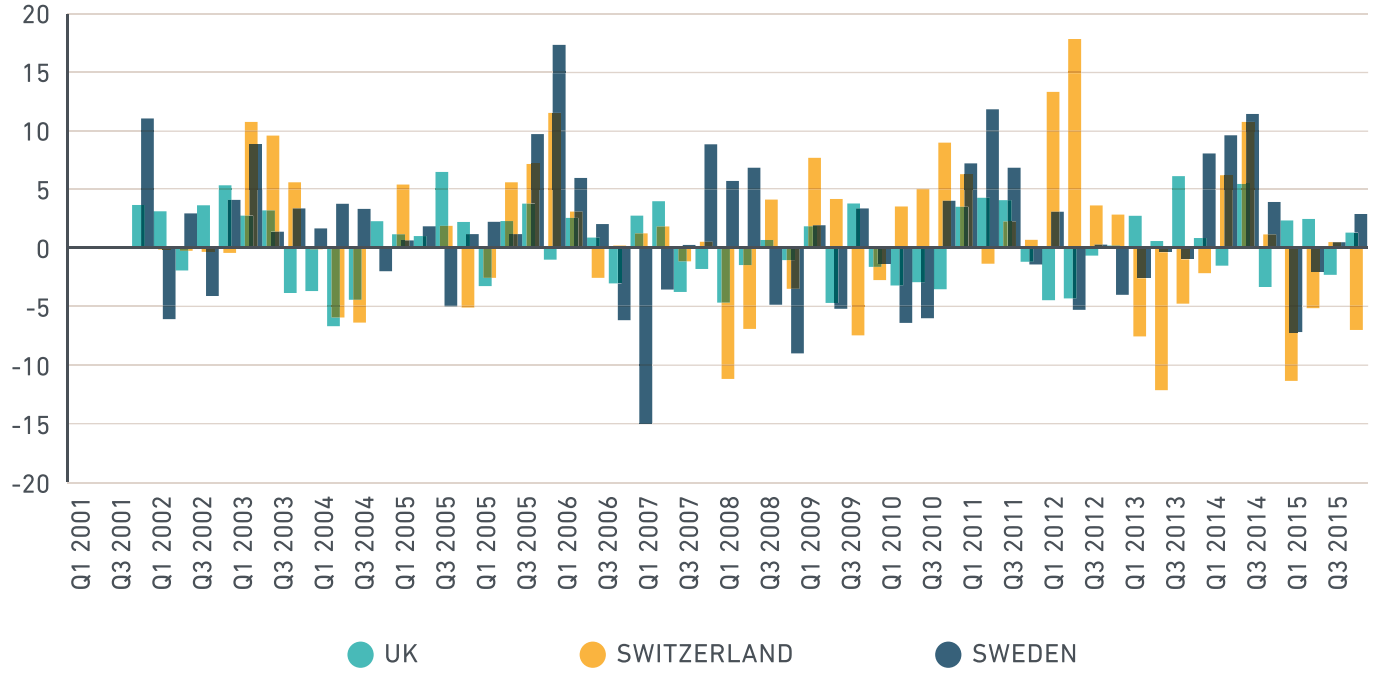


Exhibit 4 underlines this point. Comparing the three largest non-euro denominated markets – the U.K., Sweden and Switzerland – the U.K.'s much lower profile of excess trading-linked volatility can be clearly seen. The much greater upside and downside volatilities relative to their valuation index baselines in both Sweden and Switzerland appear to persist throughout the measurement period.

Finally, in Exhibit 5, the three major Eurozone markets – France, Germany and the Netherlands – are compared in a similar way. Germany stands out very clearly as a market which, like Switzerland and Sweden, has – at least over the first 10 years of the overall 15 year analysis period – demonstrated very strong transaction-linked departures from the recorded valuation-driven market profile.

This is hardly surprising in the context of the way in which this key, and in many ways unique, investment market has been understood to operate over the past 15 or 20 years.

In this context it is therefore interesting to note that since 2010 the overall pattern of excess trading-driven volatility in Germany has fallen back very noticeably, bringing it much more closely into line with the profiles exhibited in the U.K., France and the Netherlands.

So, we now appear to be approaching a position in Europe in which the four largest and most mature real estate investment markets are displaying similar patterns of trading-linked excess volatility – all in the region of +/-3% – whilst the smaller and/or less mature markets are still exhibiting excess volatility levels closer to or above +/-5%.

EXHIBIT 5

Excess TLI over VBI 12-month Return Instability for Eurozone Markets

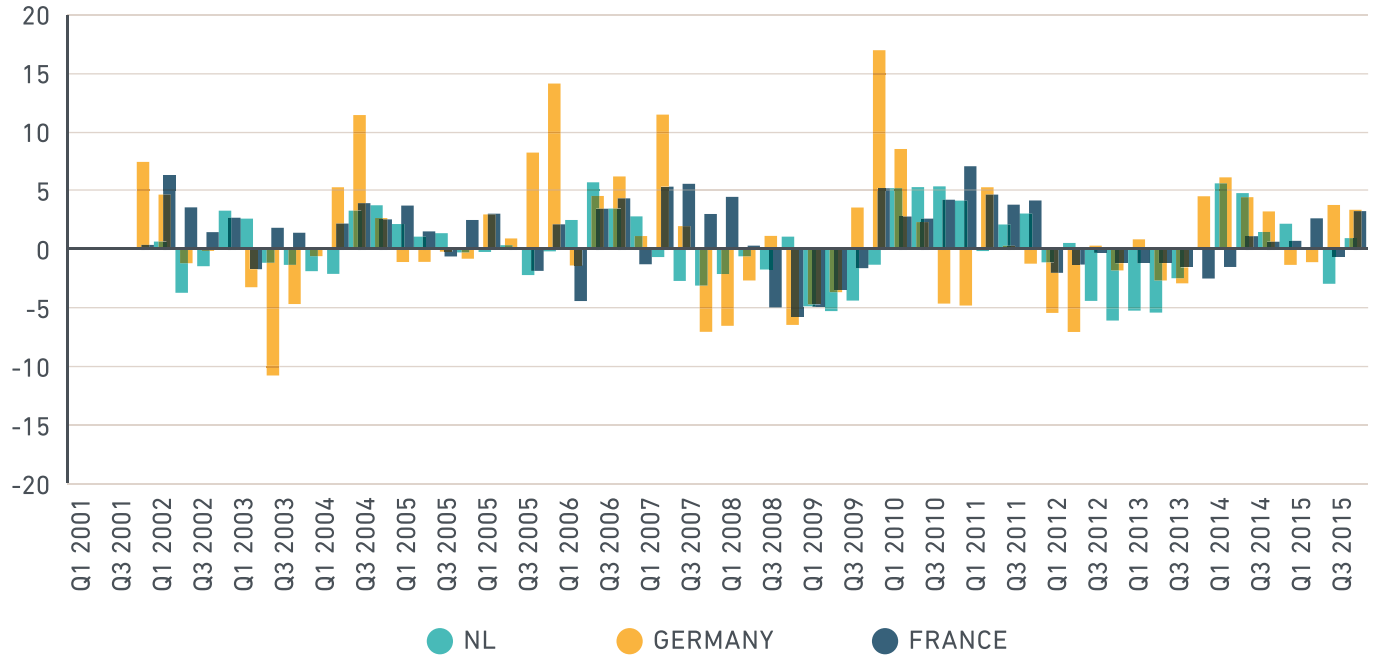


Exhibit 6 summarizes the above results. The red and green bars report respectively the 15 and (most recent) 5-year absolute averages of the rolling 12-month return differences. So this set quantifies the long term distinction noted above between the French, Dutch and British markets – where the full period 12-month return discrepancies between TLI and VBI results average just under 3% per annum – and the Swiss, Swedish and German markets – where the equivalent divergences rise closer to 5%. It also highlights (green bars) the more recent and interesting shift in the German market in the direction of a lower profile for its trading-linked volatility.

The TLI/VBI average absolute differences within the larger composites are typically at or below the levels identified in the major individual markets included within each one. So, by simply removing the U.K. from the main European composite, the long run average absolute spread is shifted up from 2% to 3%.

The further reduction to a Eurozone specification does little to impact this spread over the 15-year period, but clearly reflects the reduced German volatility through the last five years.

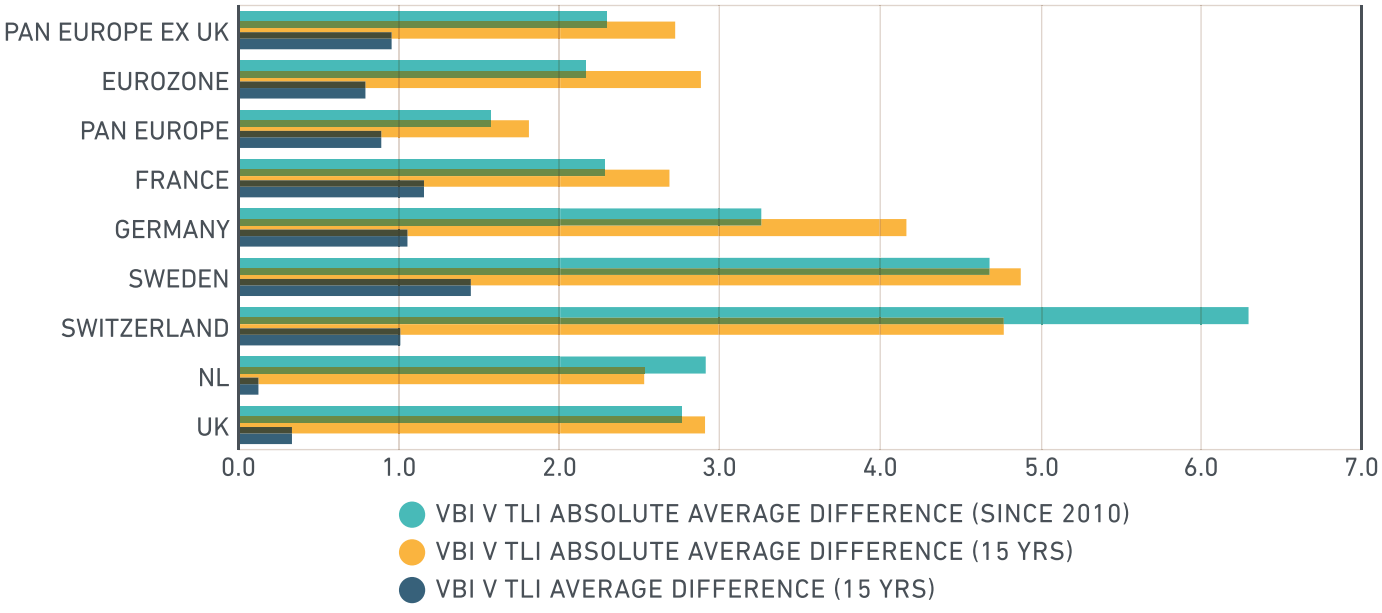
Finally, the blue bars detail the simple average differences between the VBI and TLI results, to reveal any consistent biases to the volatility profiles.

The striking thing to note immediately is that for all major national markets and composites the bottom-line figures are all positive. If the consistently wider distributions of transaction-driven measures were normally distributed about the cyclical paths of the VBI results, then each of these scores would have been at or very close to zero.

The fact that they are in practice all positive indicates that over this 15-year period and across this mix of markets and composites, there has been a consistent, if small, tendency for transaction-driven evidence to overshoot more on the upside than the downside.

EXHIBIT 6

Excess TLI over VBI 12-month Return Instability – 15 Year Summary



This probably means no more than that, across Europe, most fund mandates still offer managers a significant degree of medium-term trading discretion. They are not forced to sell and thus crystallize losses in a falling market but will be rewarded for delivering tangible gains through profitable sales when the climate improves.

Whatever the truth or otherwise of this account, the overall picture remains clear. For every market and mix of markets, the total risk, as evidenced by the rolling 12-month shifts in total returns up or down, would have invariably been understated without the explicit addition of transaction as well as valuation evidence.

However, and irrespective of their sources, the long-term average excess losses associated with trading activity were relatively small.

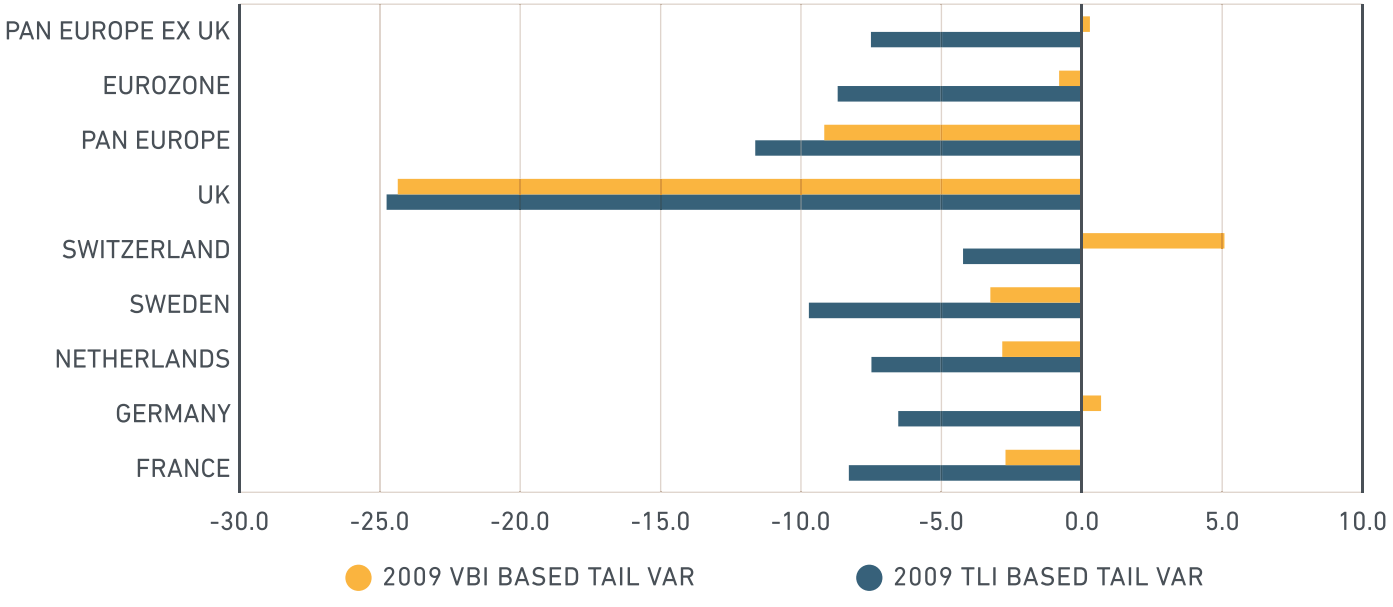
None of the major European composites suffered an average transaction-linked spread of returns which was more than 3% greater than that coming from corresponding VBI evidence, and the 15-year additional spread of returns peaked at less than 5% in individual markets like Sweden and Switzerland.

PATTERNS OF EXTREME DOWNSIDE RISK

The long-term patterns of volatility do, however, become far more dramatic at the extreme tails of the risk distributions, as demonstrated in Exhibit 7. This describes the 0.5% tail values at risk in the rolling 12-month total returns over the past 15 years, as evidenced through the parallel analyses of the valuation-based and transaction-linked index series.

EXHIBIT 7

TLI and VBI-driven 12-month 0.5% Tail Values at Risk – to Dec 2015



A persistent result in this update, as in the original 2011 study, has been that, once again, the worst major market 12-month losses of return – those suffered in the U.K. – are captured almost equally in both the valuation and transaction evidence.

This remains, however, the exception that proves the rule. For the mainland markets the reverse is nearly always true, with the Dutch, French and Swedish market valuations catching only about one third of the depth of fall represented by the transaction-defined low points. Even more starkly, the Swiss and German valuations succeeded in trapping no parts whatsoever of their respective value at risk low points.

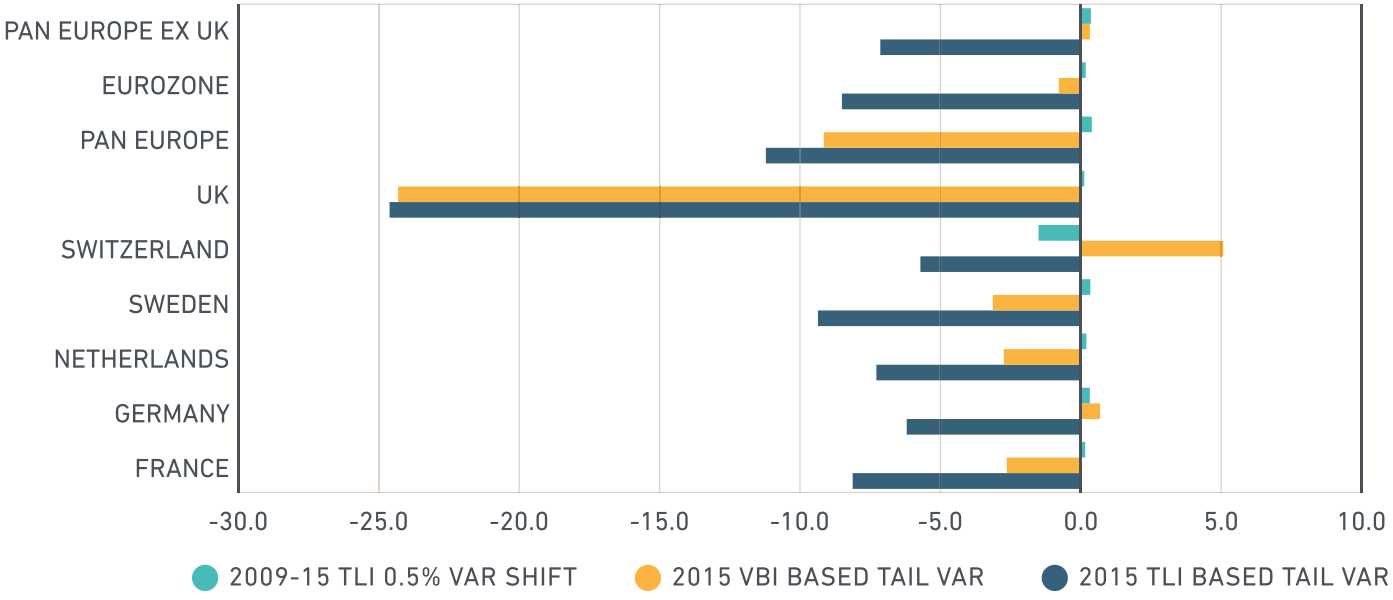
So, for the Eurozone, and largely as a result of the large scale presence of Germany and an equally large scale absence of the U.K., less than 10% of the 12-month 0.5% tail risk to returns over the last 15 years was reflected in the valuation data.

Due to the re-inclusion of the U.K., for the whole of Europe this figure jumps very dramatically, up to 80%. And for the obverse reason, the proportion falls to zero once the U.K. is excluded from the full European composite, in which of course both Germany and Switzerland are both there and playing very large value-weighted roles.

From the narrower perspective of this update study, however, perhaps the more important findings are that these relationships have all remained fairly stable across European markets since 2009; that the 0.5% 12-month tail risk levels still exhibit significant variation across markets and between composites; and that despite the breadth of this variation and the painful processes and upheavals of the European reaction to the financial crisis, these tail risks have not risen above the levels first reported in 2011.

EXHIBIT 8

TLI and VBI-driven 12-month 0.5% Tail Values at Risk –2015 v 2009 Results



In fact, for all markets (except Switzerland) and for all composites, the 0.5% tail risk figures describing worst case 12-month losses have actually fallen, as indicated by the green bars in Exhibit 8. These consistently small drops are almost certainly due in part to the fuller and better data now available for some of the larger mainland markets, including Germany and Switzerland, neither of which could be separately covered in 2011.

In addition, as with any statistical analysis designed to target the most extreme results over long periods of time, whilst the initial shock itself remains a constant, it is very modestly diluted over any lengthening period during which there is no further shock of a scale to match or exacerbate the initial one.

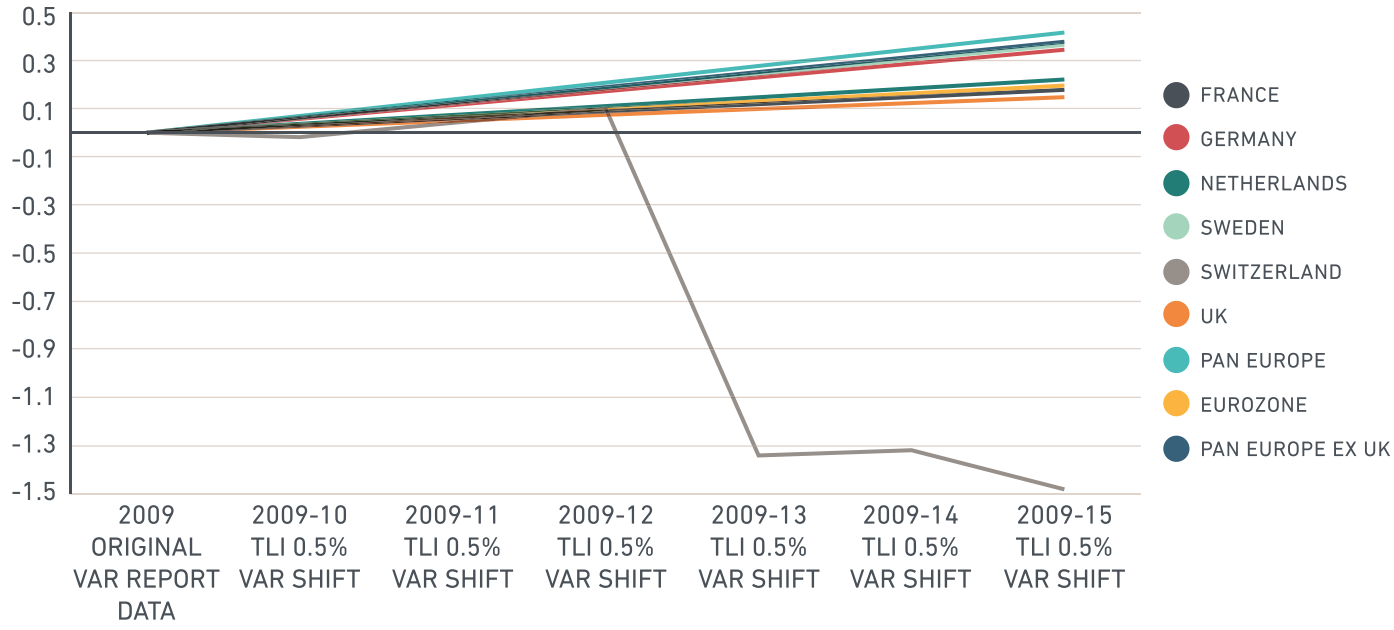
Exhibit 9 demonstrates this point very clearly. Taking the measured tail values at risk, derived exclusively from the TLI return series as at 2009 (the reporting year for the original study) as the baseline position, and describing the movements in these scores over the subsequent six years of emerging total return histories, an almost totally consistent pattern of slow incremental improvement is revealed.

This is because, whilst the timings of the 2007-09 shocks were not perfectly synchronized across markets, all of those markets took a significant hit at some point within that time frame. Many markets also suffered "aftershocks" – subsequent hits which slowed and roughened their recovery paths.

In all cases, however, except that of Switzerland, these aftershocks were smaller than the initial (2008-09) markdown, and so had a negligible impact upon the 0.5% tail values at risk. Switzerland actually did take an (at that time unprecedented) 5% total return hit in the 12-month period to Q3 2008, but unlike any other European market, it also suffered two subsequent and larger aftershocks, both around the 6% mark, in 2013 and 2014, doing serious damage to the 0.5% tail value at risk score, if not to the market itself.

EXHIBIT 9

Movement in TLI-driven 12-month 0.5% Tail Values at Risk: 2009 – 2015



THE 2017 CONCLUSIONS

The headline findings of this Solvency II update study are all effectively contained in the numbers that have been derived by reapplying the EIOPA-defined test for European real estate extreme Values at Risk to the enhanced dataset assembled by the MSCI team to provide the fullest picture of total property return risk available. Exhibit 10 summarizes those numbers and reveals the patterns in their evolution since the crisis which precipitated the regulation they are designed to inform.

Model refinement, further data capture and updated market reporting all continue at MSCI in this critical area of real estate performance research. Pausing now, however, to reflect upon the numbers through to the end of 2015, some of the highlights of our 2017 Solvency II update are as follows:

1. In all markets and composites reviewed, the most extreme (0.5%) tail values at risk could again be identified only by using methods which measure trading risk in excess of that revealed through the open-market appraisal of retained real estate investments.

2. The most volatile of the large European markets re-analyzed, the U.K., demonstrated negligible movement in its 12-month total return tail value at risk – which still stands at around -24% – over the past six years.

3. There were small but noteworthy movements in the equivalent tail values for the next five best documented mainland European markets – France, Germany, Netherlands, Sweden and Switzerland – when similarly updated, with tail risk values dropping by around 30bps in all cases, except for Switzerland where they rose by 1.5%.

4. The 0.5% tail values recorded for Pan-European (with and without the U.K.) and Eurozone composites have also fallen since 2009, and by similar (20-40bps) margins.

5. A broadly unchanged spread of extreme risk scores was recorded across these major composites, ranging from the full Pan-European figure of -11.2%, through a Eurozone score of -8.5% to a Pan-European (ex U.K.) number of -7.5%.

None of this additional analysis, exploiting longer and more up-to-date data series, therefore warrants any significant revision of IPD's original bottom line conclusion. If the broadest single pan-European property shock factor is sought from the evidence of tail values at risk available now to the end of 2015, whether driven by trading results or professionally supplied valuations or both, nothing new has emerged to call into question the 15% overall threshold identified in 2011.

Moreover, the additional analysis undertaken for the first time for this update indicates that such a shock factor might be further reduced to 12% for any broadly balanced European composites that exclude the U.K.

EXHIBIT 10

VBI and TLI-driven 12-month 0.5% Tail Values at Risk: 2007 – 2015

TLI BASED TAIL VAR	2007	2008	2009	2010	2011	2012	2013	2014	2015
FRANCE	6.9	0.5	-8.3	-8.3	-8.2	-8.2	-8.2	-8.1	-8.1
GERMANY	-6.3	-6.4	-6.5	-6.5	-6.4	-6.4	-6.3	-6.2	-6.2
NETHERLANDS	5.3	2.7	-7.5	-7.5	-7.4	-7.4	-7.3	-7.3	-7.3
SWEDEN	-1.9	-1.9	-9.7	-9.7	-9.6	-9.5	-9.5	-9.4	-9.3
SWITZERLAND	-1.1	-4.3	-4.2	-4.2	-4.2	-4.1	-5.6	-5.5	-5.8
UK	1.4	-22.9	-24.8	-24.7	-24.7	-24.7	-24.7	-24.6	-24.6
PAN EUROPE	6.0	-6.1	-11.6	-11.6	-11.5	-11.4	-11.3	-11.3	-11.2
EUROZONE	3.0	0.4	-8.7	-8.7	-8.6	-8.6	-8.6	-8.5	-8.5
PAN EUROPE EX UK	4.6	0.9	-7.5	-7.4	-7.4	-7.3	-7.3	-7.2	-7.1

VBI BASED TAIL VAR									
FRANCE	8.0	-0.2	-2.7	-2.7	-2.7	-2.7	-2.6	-2.6	-2.6
GERMANY	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
NETHERLANDS	7.1	3.4	-2.8	-2.8	-2.8	-2.8	-2.8	-2.7	-2.7
SWEDEN	0.9	-2.8	-3.2	-3.2	-3.2	-3.2	-3.2	-3.1	-3.1
SWITZERLAND	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
UK	-2.0	-21.0	-24.4	-24.4	-24.4	-24.3	-24.3	-24.3	-24.3
PAN EUROPE	5.3	-7.8	-9.2	-9.2	-9.2	-9.1	-9.1	-9.1	-9.1
EUROZONE	6.4	1.0	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
PAN EUROPE EX UK	5.8	1.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3

TLI VAR MARGIN OVER VBI									
FRANCE	-1.1	0.7	-5.6	-5.6	-5.6	-5.5	-5.5	-5.5	-5.5
GERMANY	-7.0	-7.1	-7.2	-7.2	-7.1	-7.1	-7.0	-6.9	-6.9
NETHERLANDS	-1.7	-0.7	-4.7	-4.6	-4.6	-4.6	-4.6	-4.6	-4.5
SWEDEN	-2.9	0.9	-6.5	-6.4	-6.4	-6.4	-6.3	-6.3	-6.2
SWITZERLAND	-6.2	-9.4	-9.3	-9.3	-9.3	-9.2	-10.7	-10.6	-10.9
UK	3.4	-1.9	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
PAN EUROPE	0.8	1.7	-2.5	-2.4	-2.3	-2.3	-2.2	-2.1	-2.1
EUROZONE	-3.4	-0.6	-7.9	-7.9	-7.8	-7.8	-7.8	-7.8	-7.7
PAN EUROPE EX UK	-1.2	-0.6	-7.8	-7.8	-7.7	-7.6	-7.6	-7.5	-7.5

APPENDIX

APPENDIX 1: SOLVENCY II UPDATE DATASET

Solvency 2 Update: MSCI/IPD European Quarterly Research Dataset

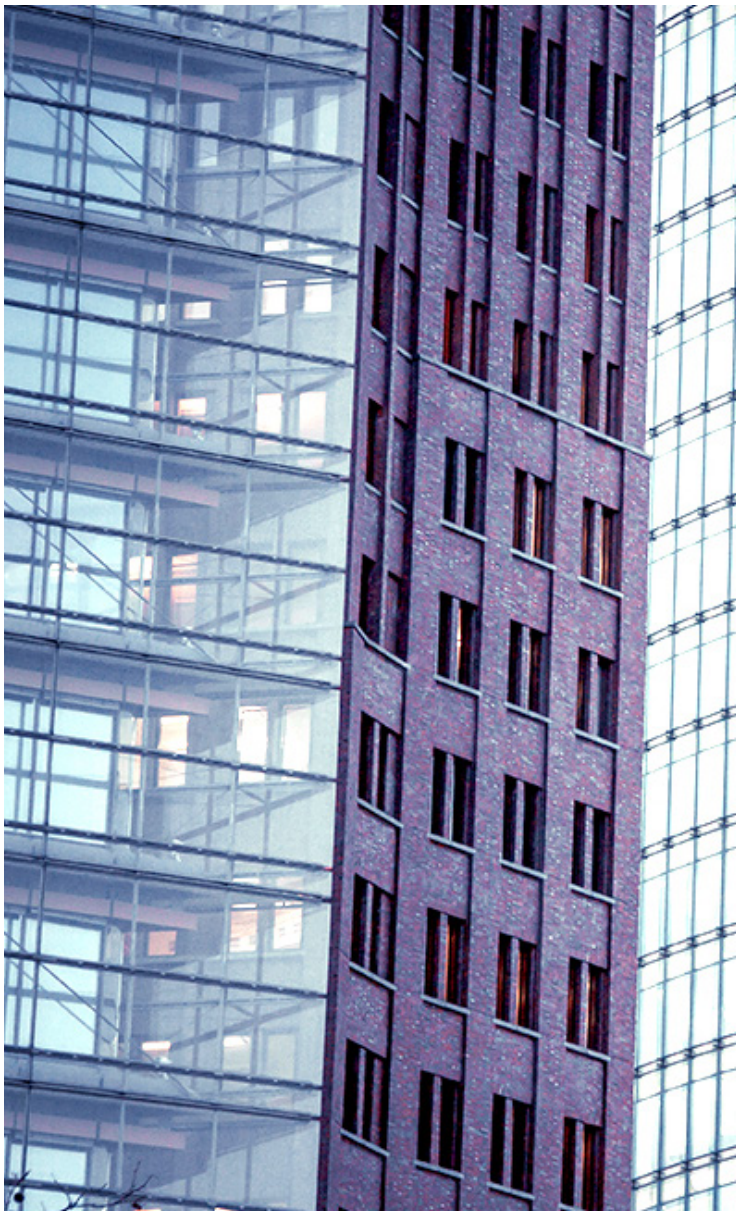
Country Specifics	Quarterly Valuation Based Indexes	Quarterly Transaction Linked Indexes
Austria	Annual Index 2003-2015. Annual data interpolated to give 4 quarters.	
Belgium	Annual Index 2004-2015. Annual data interpolated to give 4 quarters.	
Czech Republic	Annual Index 2005-2015. Annual data interpolated to give 4 quarters.	
Denmark	Annual Index 1999-2015. Annual data interpolated to give 4 quarters.	2001-2015, Pan-Europe model
France	Annual Index 1998-2007. Annual data interpolated to give 4 quarters. Annual & Biannual Indices 2008-2015.	2001-2015, Pan-Europe model
Germany	Annual Index 1996-2015. Annual Data interpolated to give 4 quarters. Interpolated data then smoothed to remove effects of held down valuations and unsynchronised valuation regime.	2001-2015, Pan-Europe model
Hungary	Annual Index 2005-2015. Annual data interpolated to give 4 quarters.	
Ireland	Quarterly Index 1994-2015	2001-2015, Pan-Europe model
Italy	Annual Index 2002-2006. Annual data interpolated to give 4 quarters. Annual & Biannual Index 2007-2015	2001-2015, Pan-Europe model
Netherlands	Annual Index 1995. Annual data interpolated to give 4 quarters. Annual Index / Quarterly Indicator 2000-2007. Annual Index de-smoothed using the Quarterly Indicator shape. The Quarterly sample ranges from 20% to 70% of the Annual sample Quarterly Index 2008-2015. Pure Quarterly Index data.	2001-2015, Pan-Europe model
Norway	Annual Index 2000-2015. Annual data interpolated to give 4 quarters.	2001-2015, Pan-Europe model
Poland	Annual Index 2005-2015. Annual data interpolated to give 4 quarters.	
Portugal	Annual Index 2000-2015. Annual data interpolated to give 4 quarters.	2001-2015, Pan-Europe model
Spain	Annual Index 2000-2015. Annual data interpolated to give 4 quarters.	2001-2015, Pan-Europe model
Sweden	Annual Index 1984-2015. Annual data interpolated to give 4 quarters.	2001-2015, Pan-Europe model
Switzerland	Annual Index 2002-2015. Annual data interpolated to give 4 quarters.	2003-2015, Pan-Europe model
UK	Monthly Index 2000. Monthly data compounded to give Quarterly data. The Monthly sample ranges from 35 to 50% of the Quarterly sample. Quarterly Index 2001-2015. Pure Quarterly Index data.	2001-2015, National model

NOTES

NOTES

ABOUT MSCI

For more than 40 years, MSCI's research-based indexes and analytics have helped the world's leading investors build and manage better portfolios. Clients rely on our offerings for deeper insights into the drivers of performance and risk in their portfolios, broad asset class coverage and innovative research. Our line of products and services includes indexes, analytical models, data, real estate benchmarks and ESG research. MSCI serves 97 of the top 100 largest money managers, according to the most recent P&I ranking. For more information, visit us at **www.msci.com**.



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