

## SUMMARY

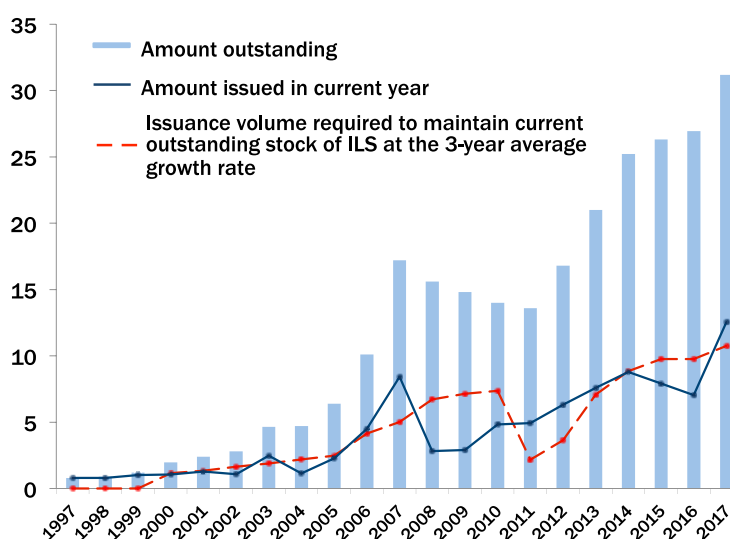
**Despite \$1.92 billion of new risk capital issued via 13 deals,** issuance volume in the fourth quarter of 2017 declined year over year.

**Full year issuance in 2017 was approximately \$12.6 billion with \$8.1 billion maturing.** This brought the total amount of outstanding ILS coverage to approximately \$31.2 billion, which was over \$4.0 billion higher than the total outstanding ILS coverage at the end of 2016.

**Bermuda remains the leading jurisdiction for the issuance of catastrophe (cat) bonds.** ILS issued from Bermuda represents 72.9% (\$23.3 of \$31.1 billion) of total outstanding capacity at the end of Q4-2017. Since 2010, 198 Bermuda-based Special Purpose Insurers (SPIs) have been registered and have issued 203 ILS deals.

**Bermuda is also host to foreign ILS listings on the Bermuda Stock Exchange (BSX) which augments the depth of the secondary market.\*** A total of 99 foreign ILS (comprising 168 tranches) are listed on the BSX with an aggregate nominal value of \$24.2 billion. Approximately \$1.4 billion (6.0%) of these deals were issued by vehicles domiciled in Ireland and the United States. Ten new ILS deals totaling \$1.5 billion were listed on the BSX during the quarter while three deals in the amount of \$509.6 million matured.

Figure 1. Global Capacity Issued and Outstanding by Year (In US\$ bln)



Source: Swiss Re, Artemis, and Bermuda Monetary Authority (Authority) staff calculations.

\* Notes programmes are excluded from the number of BSX listings. Moreover, the aggregate nominal value of listed ILS does not include ordinary shares issued by (re)insurance funds or participatory notes issued by sidecars.

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## PRIMARY MARKET: GLOBAL MARKET OVERVIEW

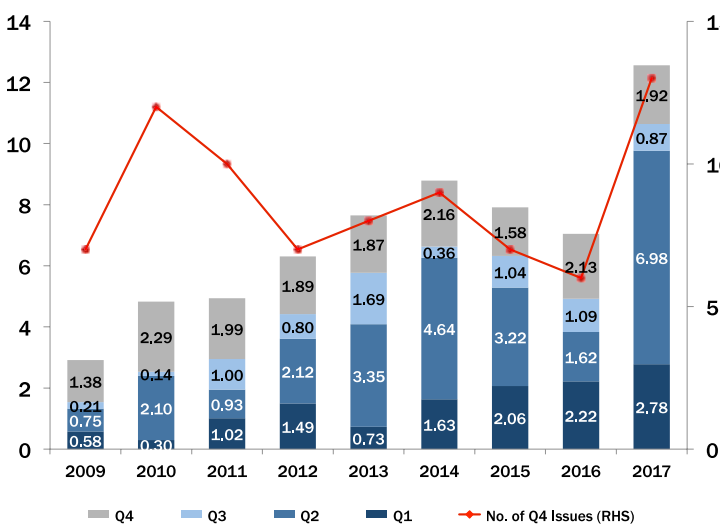
**Fourth quarter issuance activity declined 9.9% year over year.** There were 13 new bonds issued, totaling \$1.9 billion compared to six deals and \$2.1 billion in Q-4 2016. During Q-4 2017, four deals matured with a notional value of \$659.6 million resulting in net issuance of \$1.3 billion. Strong investor interest and sponsor appetite throughout the year helped drive the ILS market to new highs. Full year issuance exceeded \$12.6 billion with 62 transactions making 2017 the biggest year for issuance volume since at least 2009 when Bermuda entered the market (Figure 2).

**The average deal size for Q4-2017 transactions was lower relative to the same quarter last year.** The average deal size during the quarter was \$148.0 million, down from \$354.2 million

in Q4-2016 (Figure 3). The largest deals of the quarter were issued by the California Earthquake Authority and Validus Holdings, each in the amount of \$400.0 million. At the lower end, the smallest deal was a private placement in the amount of \$10.0 million.

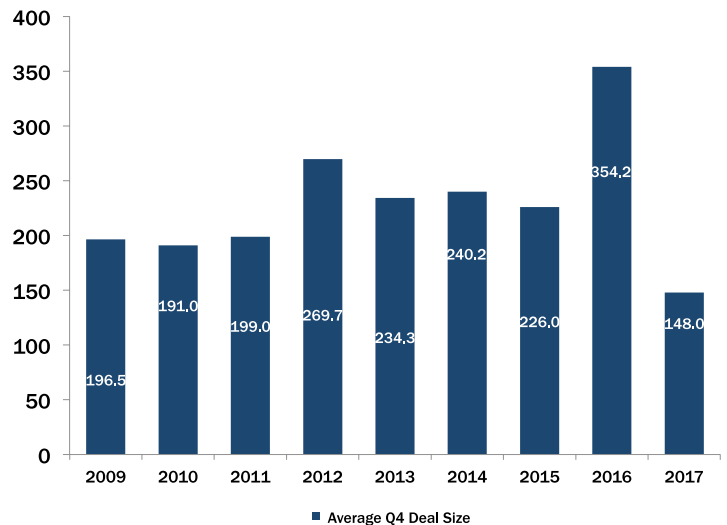
**Indemnity triggers continued to be the most popular trigger-type used in ILS deals.** ILS deals with an indemnity trigger represented 58.3% (\$18.2 billion of \$31.2 billion) of total outstanding volume in the ILS market. This was followed by the industry loss index trigger type which accounts for 28.1% (\$8.8 billion) of the outstanding volume (Table IV).

**Figure 2. Quarterly ILS Issuance by Deal Volume (In US\$ bln) and Number of Q4 Deals — Global Market, 2009 to Q4-2017**



Source: Artemis and Authority staff calculations.

**Figure 3. Global Q4 ILS Issuance (Average Deal Volume), 2009 to 2017 (In US\$ mln)**



Source: Artemis and Authority staff calculations.

**Table I: Summary ILS Issuance in Selected Jurisdictions (Total Issued Deal Volume in US\$ bln)**

ILS Issuance by Country of Risk (In US\$ bln)						
Country	2012	2013	2014	2015	2016	2017
Bermuda	2.5	4.7	7.7	5.6	5.1	10.1
Cayman Islands	3.5	1.9	0.7	1.1	1.2	1.4
Ireland	0.2	1.0	0.4	0.6	0.8	0.3
United States	0.1	—	—	0.3	—	—
Other	—	—	0.03	0.3	—	0.7

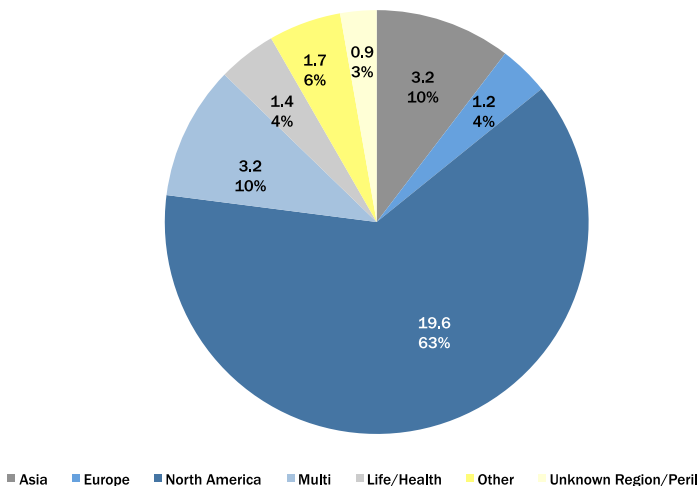
**Table III: Triggers in ILS Issuance in Selected Jurisdictions (Total Issued Deal Volume, 2009 to Q4-2017 in US\$ bln)**

Trigger (In US\$ bln)	Bermuda	Cayman Islands	Ireland	United States & Other
Indemnity	22.9	9.6	1.1	—
Industry Loss Index	11.3	2.6	3.5	0.5
Longevity Index	—	0.1	—	—
Medical benefit ratio index	—	1.4	—	—
Modelled Loss	0.9	0.6	—	—
Mortality Index	—	0.8	0.2	0.3
Multiple	0.2	0.6	0.3	0.2
Parametric	1.5	0.6	—	1.0
Parametric Index	—	0.7	0.2	—
Unknown	1.8	0.1	—	—

The ILS market remains small relative to traditional (re)insurance business. The \$31.2 billion of risk covered by ILS represents 5.3% of global reinsurer capital which is estimated to be \$605.0 billion. Since 2009, 325 ILS bonds have been issued of which 203 were issued by Bermuda domiciled SPVs. Bermuda continued to maintain its position as the leading jurisdiction in ILS over the past quarter, accounting for 74.8% (\$23.3 billion of \$31.2 billion) of the outstanding volume in the market. Other countries with significant insurance securitisation activity in this area include the Cayman Islands and Ireland which represent 14.2% (\$4.4 billion) and 7.4% (\$2.3 billion), respectively.

The majority of ILS covers North American perils which account for 62.8% (\$19.6 billion) of total outstanding volume (Figures 4

**Figure 4. Total Outstanding Volume of ILS by Region/Peril, end Q4-2017 (In US\$ bln)**



Source: Artemis and Authority staff calculations.

1 AON Benfield January 2017, "Reinsurance Market Outlook"

2 The proportion of coverage for this region relative to the total market is actually higher given that most multi-regional bonds include US events.

**Table II: Summary ILS Issuance in Selected Jurisdictions (Number of Deals)**

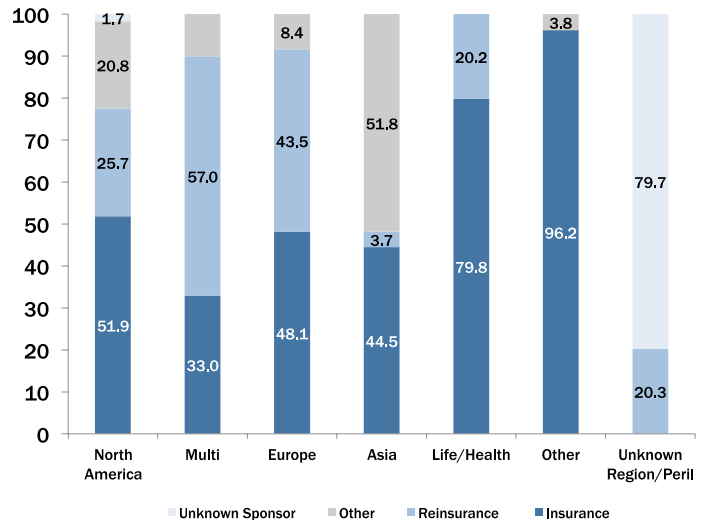
Number of Issuances by Country of Risk (SPV)						
Country	2012	2013	2014	2015	2016	2017
Bermuda	11	25	36	36	30	52
Cayman Islands	15	9	4	6	5	5
Ireland	1	3	2	4	3	2
United States	1	—	—	1	—	—
Other	—	—	1	1	—	3

**Table IV: Triggers in ILS Issuance in Selected Jurisdictions (Outstanding Deal Volume, end Q4-2017 in US\$ bln)**

Trigger (In US\$ bln)	Bermuda	Cayman Islands	Ireland	United States & Other
Indemnity	13.8	3.5	0.8	—
Industry Loss Index	7.5	—	1.3	—
Longevity Index	—	—	—	—
Medical benefit ratio index	—	0.8	—	—
Modelled Loss	0.3	—	—	—
Mortality Index	—	0.1	0.2	0.3
Multiple	0.2	—	—	—
Parametric	0.5	—	—	0.8
Parametric Index	—	—	—	—
Unknown	1.1	—	—	—

and 5).<sup>2</sup> Asian and multi-regional perils account for 10.4% (\$3.2 billion) and 10.2% (\$3.2 billion) of the market, respectively, while the remaining four categories are each less than 6.0% and account for the remainder. Unknown sponsors and private deals played a larger role in terms of the number of transactions although their individual issue values were relatively low when compared to traditional insurers and reinsurers. Primary insurers sponsored 51.9% of total coverage for North American perils (\$10.2 billion of \$19.6 billion). 57.0% (\$1.8 billion) of perils are sponsored by reinsurers. Following the increase in privately placed deals, for which information is sometimes limited, the region of coverage is unknown for 2.8% (\$0.9 billion) of the market.

**Figure 5. Outstanding Coverage per Region/Peril by ILS Sponsor Type, 2009 to Q4-2017 (In %)**



Source: Artemis and Authority staff calculations.

## PRIMARY MARKET: DOMESTIC ISSUANCE

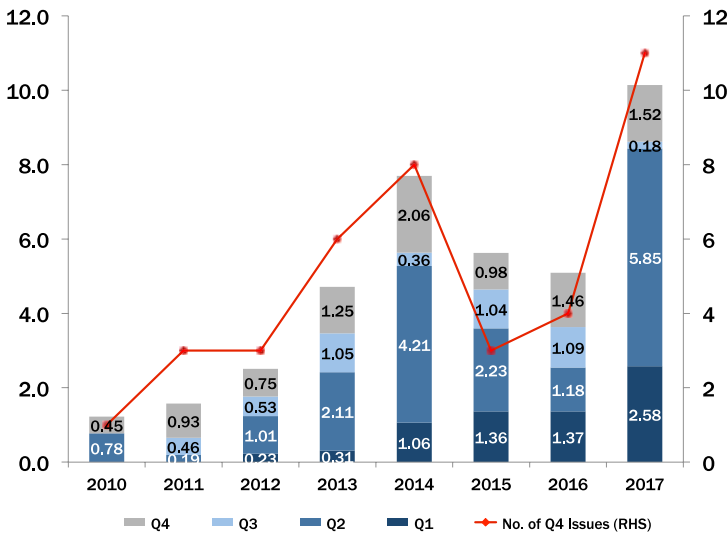
**Bermuda remains the leading jurisdiction for the issuance of ILS.** Bermuda-based SPIs accounted for 79.1% (\$1.5 billion of \$1.9 billion) of issuance volume during the quarter. In Q4-2017, Bermuda-based SPIs underwrote ten ILS transactions (Figure 6) covering natural catastrophes in North America and Asia along with unknown perils. Overall, Bermuda-issued ILS represents 74.8% (\$23.3 billion of \$31.2 billion) of total outstanding capacity at the end of Q4-2017.

**The average deal size for Bermuda-issued ILS in Q4-2017 was \$138.5 million.** This represents an average decrease of \$226.5 million per deal compared to Q4-2016 level (Figure 7). The fall in average size was due to a number of smaller privately placed deals, they accounted for five of the 11 deals issued out of Bermuda and

their average size was \$31.0 million. The largest Bermuda-based deals issued during the quarter were from the California Earthquake Authority and Validus holdings, each was valued at \$400.0 million.

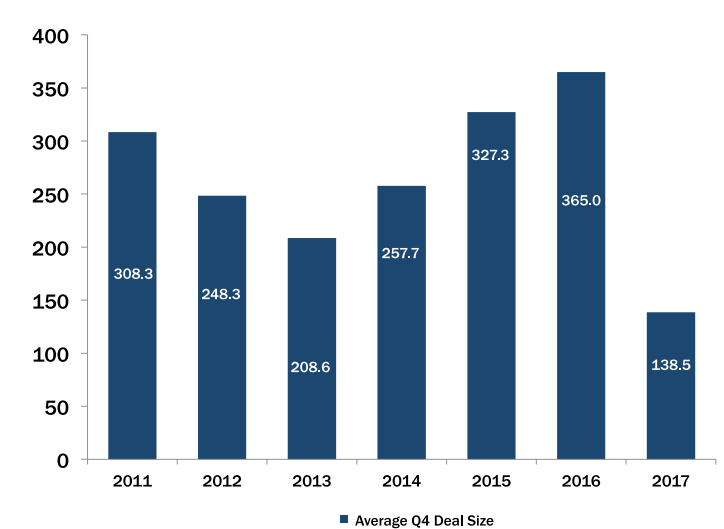
**The BSX accounted for 77.6% of the global market capitalisation of ILS at the end of Q4-2017.** A total of 99 ILS deals (comprising 168 tranches) are listed on the BSX with an aggregate nominal value of approximately \$24.2 billion,<sup>3</sup> of which \$1.4 billion (6.0%) are issued by vehicles domiciled in Ireland and the United States. Ten (18 tranches) of the 13 deals issued during the quarter were listed on the BSX, with a notional value of \$1.5 billion. Over the same period, three deals (four tranches) previously listed on the exchange worth \$509.6 million matured.

**Figure 6. Quarterly ILS Issuance by Volume (In US\$ bln) and Number of Q4 Deals - Bermuda only, 2010 to Q4-2017**



Source: Artemis and Authority staff calculations.

**Figure 7. Domestic Q4 ILS Issuance (Average Deal Volume), 2011 to 2017 (In US\$ mln)**



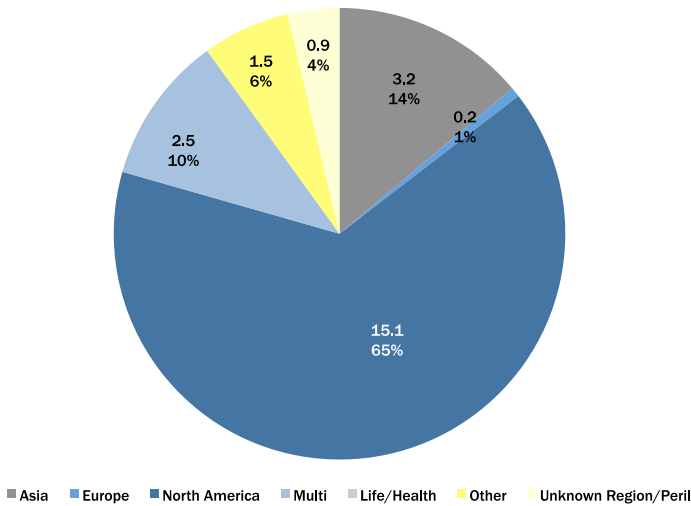
Source: Artemis and Authority staff calculations.

<sup>3</sup> This does not include notes programmes, ordinary shares issued by (re)insurance funds and participating notes issued by sidecar vehicles.

The Bermuda market is a leader in the specialisation of cat bonds, with the majority of transactions based on indemnity triggers (Table IV). Since the first Bermuda ILS deal was issued in 2010, an indemnity trigger has accounted for 59.2% (\$13.8 billion of \$23.3 billion) of outstanding deal volume for transactions issued by Bermuda-based SPIs. This was followed by the industry loss index trigger type which accounts for 32.0% (\$7.4 billion) of the outstanding volume for Bermuda-issued deals. During the quarter, 39.9% (\$768.0 million) of the Bermuda-issued deal volume had an indemnity trigger while 8.2% (\$157 million) had an unknown trigger type.

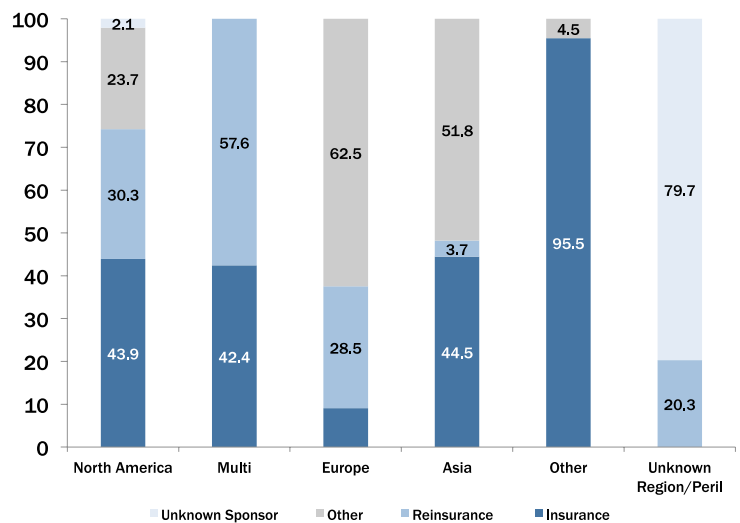
North American perils by direct underwriters account for the largest share of outstanding volume for Bermuda-issued ILS (Figures 8 and 9). Primary insurers sponsored 43.9% of total coverage for those bonds (\$6.6 billion of \$15.1 billion) while reinsurers sponsored 30.2% (\$4.6 billion). Primary insurers also ceded 42.4% (\$1.1 billion) and 44.5% (\$1.4 billion) of multi-region and Asian risks, respectively. Tables I-IV provide a summary of ILS issuance by volume and number of deals in key jurisdictions, as well as the distribution of trigger types.

Figure 8. Total Outstanding Volume of Domestic Deals by Region/Peril, end Q4-2017 (In US\$ bin)



Source: Artemis and Authority staff calculations.

Figure 9. Outstanding Coverage per Region/Peril by ILS Sponsor Type for Domestic Deals, end Q4-2017 (In %)



Source: Artemis and Authority staff calculations.

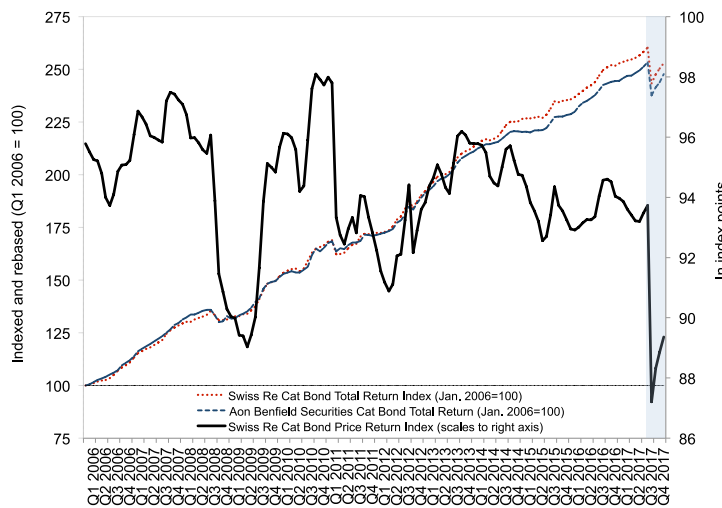
## SECONDARY MARKET: PRICE INDICES

Given the large footprint of P&C insurance risk in the ILS market, this section reviews the overall market performance of outstanding cat bonds based on three of the most commonly used benchmark indices (Swiss Re Cat Bond Total Return Index, Aon Benfield Securities Cat Bond Total Return, Swiss Re Cat Bond Price Return Index).

**The risk-return trade-off for cat bonds was negative following an active Hurricane season and an earthquake off the coast of Mexico.** Table V provides a summary of selected indicators of market performance over the last six quarters (Q3-2016 to Q4-2017) comparing the recent development of the *Swiss Re Cat Bond Total Return Index* and the *Aon Benfield Securities Cat Bond Total Return Index* as the global market benchmarks.<sup>4</sup> During the third quarter, the two indices recorded a positive return of 1.31% (up from negative -1.71% during the previous quarter) and positive 0.82% (up from positive 2.13%) respectively. The annualised return volatility of each index saw a significant spike in comparison to the previous quarter, up to 2.16% (from 0.91%)

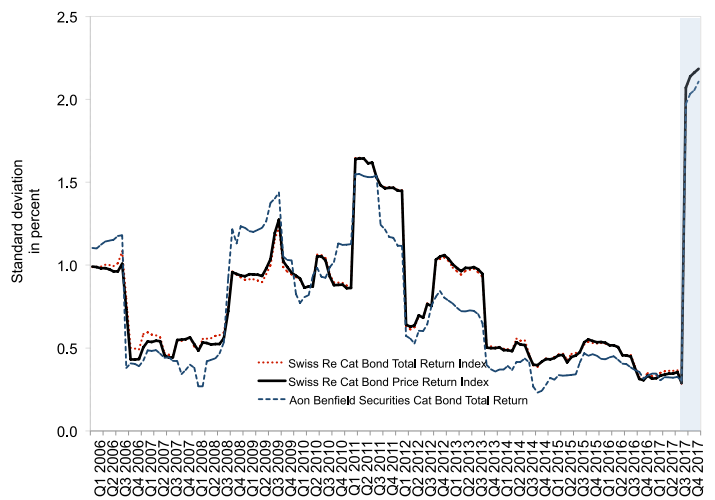
and 2.16% (from 0.9%) respectively, during the quarter. Figure 10 shows the quarterly closing levels of the two total return indices by Swiss Re and Aon Benfield and illustrates the valuation gain of a broad cat portfolio since Q1-2006 (as base year) and the corresponding price return index as suitable relative benchmarks to other investments. Figure 11 shows the normalised return volatility over a 12-month rolling window. Figure 10 shows that while capital gains have been mostly positive since 2006, prices fell sharply in Q3-2017 and continue to persist beneath the peak levels achieved in early 2011. Figure 11 highlights that during the same period, the annualised return volatility (as a measure of risk) dropped significantly until a dramatic spike in Q3-2017.

**Figure 10. ILS Total Return and Price Return Benchmark Indices, Q1-2006 – Q4-2017 (In index points)**



Source: Artemis and Authority staff calculations.

**Figure 11. ILS Total Return and Price Return Benchmark Indices: Annualised Return Volatility, Q1-2006 – Q4-2017 (In %)**



Source: Artemis and Authority staff calculations.

<sup>4</sup> The Swiss Re indices were launched in June 2007 and comprise a series of performance indices constructed to track the price return and total rate of return of performance of all outstanding dollar-denominated Cat bonds. The main index is divided into 18 different sub-indices, of which the most important ones are "Single-Peril U.S. Wind Cat Bonds", "Single-Peril California Earthquake Cat Bonds" and "BB Cat Bonds" (Standard & Poor's-rated). The index is based on Swiss Re pricing indications only and base-weighted back to January 2002. Three years after Swiss Re, Aon Benfield Securities, the securities and investment banking operation of Aon Benfield, launched its own ILS indices in 2010. These indices are base-weighted back to December 2000 and track the performance of Cat bonds in four different baskets: "All Bond", "BB-rated Bond", "U.S. Hurricane Bond", and "US Earthquake Bond".

Table V. Selected ILS Market Performance Indicators, Q3-2016 to Q4-2017

Selected ILS Market Performance Indicators <i>In % unless indicated otherwise</i>	2016		2017			
	Q3	Q4	Q1	Q2	Q3	Q4
<b>Price Return 1/</b>						
Swiss Re Cat Bond Total Return Index	0.97	0.29	0.31	0.32	-1.71	1.31
Swiss Re Cat Bond Price Return Index (scales to right axis)	0.47	-0.19	-0.15	-0.15	-2.13	0.82
Aon Benfield Securities Cat Bond Total Return	0.87	0.24	0.34	0.35	-1.56	1.41
<b>Return Volatility</b>						
<i>Annualised Standard Deviation 2/</i>						
Swiss Re Cat Bond Total Return Index	0.44	0.33	0.34	0.36	0.91	2.16
Swiss Re Cat Bond Price Return Index (scales to right axis)	0.43	0.32	0.32	0.34	0.90	2.16
Aon Benfield Securities Cat Bond Total Return	0.38	0.34	0.33	0.32	0.87	2.07
<i>Normalised Squared Returns (In standard deviations) 3/</i>						
Swiss Re Cat Bond Total Return Index	0.96	-0.59	-0.68	-0.50	1.42	-0.18
Swiss Re Cat Bond Price Return Index (scales to right axis)	0.51	-0.06	-0.41	-0.47	0.99	-0.25
Aon Benfield Securities Cat Bond Total Return	0.82	-0.86	-0.58	-0.35	1.61	-0.15

**Notes:**

1/ quarterly average of month-on-month change of last prices.

2/ quarterly average of the 12-month standard deviation of the logarithmic returns of last prices.

3/ quarterly average of the 12-month moving average of squared month-on-month changes of last prices, normalised over a rolling window of 12 months; a positive (negative) value indicates above (below) average performance conditional on return volatility.

Source: Bloomberg LP and Authority staff calculations.

Table VI. Transaction Overview of Global ILS Issuance, Q1-2017 to Q4-2017

Q1-2017	Q2-2017	Q3-2017	Q4-2017					
Sponsor	Short Name	Issue Date	Maturity Date	Amount Issued (\$ min)	Region/Peril Covered	Trigger	Country of Issuance (SPI)	BSX Listings
Unknown cedant	RESILIENCE RE LTD (1712)	3-Jan-17	8-Jan-19	187	Unknown Region/Peril	Unknown	Bermuda	✓
Unknown cedant	SEASIDE RE 2017-1	5-Jan-17	15-Jan-18	87	Unknown Region/Peril	Unknown	Bermuda	✓
Unknown cedant	DODEKA XI	5-Jan-17	5-Jan-18	19	North America	Industry Loss Index	Bermuda	✓
Unknown cedant	RESILIENCE RE LTD (1711A)	8-Jan-17	8-Jan-18	63	Unknown Region/Peril	Unknown	Bermuda	✓
Unknown cedant	ARTEX SAC LTD - SERIES DX NOTES	10-Jan-17	6-Apr-18	50	Unknown Region/Peril	Unknown	Bermuda	✓
XL Bermuda Ltd.	GALILEI RE LTD 2017-1	11-Jan-17	8-Jan-21	525	Multi	Industry Loss Index	Bermuda	✓
Aetna	VITALITY RE VII 2017-1	25-Jan-17	8-Jan-21	200	Life/Health	Medical benefit ratio index	Cayman Islands	✓
Terra Brasis Re	ALPHA TERRA VALIDUS I	6-Feb-17	15-Jan-18	5	North America	Indemnity	Bermuda	✓
Cincinnati Insurance Company	SKYLINE RE LTD 2017-1	7-Feb-17	6-Jan-20	180	North America	Indemnity	Bermuda	✓
ICAT Syndicate 4242	BUFFALO RE LTD 2017-1	10-Mar-17	7-Apr-20	165	North America	Indemnity	Bermuda	✓
Heritage P&C Ins. Co.	CITRUS RE LTD 2017-1	13-Mar-17	18-Mar-20	125	North America	Indemnity	Bermuda	✓
Sompo Japan & Nipponkoa Ins. Co.	AOZORA RE LTD 2017-1	29-Mar-17	7-Apr-21	480	Asia	Indemnity	Bermuda	✓
Allstate	SANDERS RE LTD 2017-1	30-Mar-17	6-Dec-21	375	North America	Indemnity	Bermuda	✓
Slate Farm	MERNA RE LTD 2017-1	31-Mar-17	8-Apr-20	300	North America	Indemnity	Bermuda	✓
Unknown cedant	ECLIPSE RE LTD 2017-01A	31-Mar-17	1-Apr-19	20	Unknown Region/Peril	Unknown	Bermuda	✓
Everest Re	KILIMANJARO II RE LTD 2017-1	13-Apr-17	20-Apr-21	950	North America	Industry Loss Index	Bermuda	✓
Everest Re	KILIMANJARO II RE LTD 2017-1	13-Apr-17	21-Apr-22	300	North America	Industry Loss Index	Bermuda	✓
Unknown cedant	RESILIENCE RE LTD (1741A)	19-Apr-17	6-Apr-18	173	Unknown Region/Peril	Unknown	Bermuda	✓
Louisiana Citizens	PELICAN IV RE LTD 2017-1	19-Apr-17	5-May-20	100	North America	Indemnity	Bermuda	✓
Security First Insurance Company	FIRST COAST RE LTD 2017-1	25-Apr-17	7-Jun-21	175	North America	Indemnity	Bermuda	✓
Unknown cedant	DODEKA XII	28-Apr-17	22-Dec-17	10	North America	Industry Loss Index	Bermuda	✓
American Integrity Insurance Company of Florida	INTEGRITY RE LTD 2017-1	2-May-17	10-Jun-20	210	North America	Indemnity	Bermuda	✓
National Mortgage Insurance Corporation	OAKTOWN RE LTD 2017-1	2-May-17	25-Apr-27	211	Other	Indemnity	Bermuda	✓
USAA	RESIDENTIAL REINS 2017 LTD 2017-1	3-May-17	6-Jun-21	425	North America	Indemnity	Cayman Islands	✓
Nationwide Mutual Insurance Co.	CAELUS RE V LTD 2017-1	4-May-17	5-Jun-20	375	North America	Indemnity	Cayman Islands	✓
Palomar Specialty Insurance Company	TORREY PINES RE LTD 2017-1	8-May-17	9-Jun-20	166	North America	Indemnity	Bermuda	✓
Citizens Property Insurance	EVERGLADES RE II LTD 2017-1	9-May-17	8-May-20	300	North America	Indemnity	Bermuda	✓
Heritage Property & Casualty Insurance Company	CITRUS RE LTD 2017-2	11-May-17	18-Mar-20	35	North America	Indemnity	Bermuda	✓
California Earthquake Authority	URSA RE LTD 2017-1	16-May-17	27-May-20	925	North America	Indemnity	Bermuda	✓
First Mutual Transportation Assurance Co	METROCAT RE LTD	22-May-17	8-May-20	125	North America	Parametric	Bermuda	✓
Texas Windstorm Insurance Association	ALAMO RE LTD 2017-1	30-May-17	8-Jun-20	400	North America	Indemnity	Bermuda	✓
Unknown cedant	ECLIPSE RE LTD 2017-01A	31-May-17	1-Jun-18	53	Unknown Region/Peril	Unknown	Bermuda	✓
Allstate subsidiaries	SANDERS RE LTD 2017-2	31-May-17	5-Jun-20	200	North America	Indemnity	Bermuda	✓
Great American Insurance Group	RIVERFRONT RE LTD 2017-1	31-May-17	15-Jan-21	190	North America	Indemnity	Bermuda	✓
Avalar Property & Casualty Insurance Company	CASABLANCA RE LTD 2017-1	1-Jun-17	4-Jun-20	100	North America	Indemnity	Cayman Islands	✓
Unknown cedant	MARKET RE LTD 2017-1	8-Jun-17	8-Jun-18	65	North America	Indemnity	Bermuda	✓
Southern Oak Insurance Company	OAK LEAF RE LTD 2017-1	9-Jun-17	9-Jun-18	54	North America	Indemnity	Bermuda	✓
Massachusetts Property IUA	CRANBERRY RE LTD 2017-1	12-Jun-17	13-Jul-20	350	North America	Indemnity	Bermuda	✓
Unknown cedant	RESILIENCE RE LTD (1761A)	13-Jun-17	4-Jun-08	37	Unknown Region/Peril	Unknown	Bermuda	✓
Tokio Millennium Re (Bermuda)	SPECTRUM CAPITAL LTD 2017-1	19-Jun-17	8-Jun-21	430	North America	Industry Loss Index	Bermuda	✓
Assicurazioni Generali S.p.A.	LION II RE DAC	28-Jun-17	15-Jul-21	228	Europe	Indemnity	Ireland	✓
AXIS Capital Holdings Ltd. subsidiaries	NORTHSHORE RE II LTD 2017-1	29-Jun-17	6-Jul-20	350	North America	Industry Loss Index	Bermuda	✓
Achmea Re Company N.V.	WINDMILL RE LTD 2017-1	30-Jun-17	5-Jul-20	46	Europe	Indemnity	Bermuda	✓
Tokio Millennium Re AG	HOTARU 2	3-Jul-17	7-Aug-19	71	Asia	Unknown	Bermuda	✓
Pandemic Emergency Financing Facility (PEF)	IBRD CAR 111-112	7-Jul-17	15-Jul-20	320	Multi	Parametric	Other	✓
Am Trust Financial Services	FORTIUS RE II LTD (2017-1)	19-Jul-17	7-Jul-21	100	North America	Indemnity	Bermuda	✓
Unknown cedant	ARTEX SAC LTD - SERIES EX NOTES	20-Jul-17	8-Jun-18	8	Unknown Region/Peril	Unknown	Bermuda	✓
FONDEN / Agrosemex S.A.	IBRD / FONDEN 2017	4-Aug-17	11-Aug-20	360	North America	Parametric	Other	✓
Unknown cedant	DOM RE IC LTD 2017	4-Aug-17	4-Aug-23	15	North America	Indemnity	Other	✓
Arch Capital Group Ltd.	BELLEMEADE RE 2017-1 LTD	1-Oct-17	25-Oct-27	368	Other	Indemnity	Bermuda	✓
XL Bermuda Ltd.	GALILEO RE LTD (2017-1)	3-Nov-17	6-Jan-20	150	North America	Industry Loss Index	Bermuda	✓
USAA	RESIDENTIAL REINSURANCE	17-Nov-17	6-Dec-21	295	North America	Indemnity	Cayman Islands	✓
California Earthquake Authority	URSA RE. LTD (2017-2)	30-Nov-17	10-Dec-20	400	North America	Indemnity	Bermuda	✓
Unknown cedant	ARTEX SAC LTD SERIES GX NOTES	1-Dec-17	5-Apr-19	50	North America	Unknown	Bermuda	✓
Unknown cedant	LI RE (2017-1)	12-Dec-17	10-Apr-19	10	North America	Unknown	Bermuda	✓
Allianz Risk Transfer	MARKET RE LTD(2017-2)	14-Dec-17	30-May-18	15	Europe	Parametric	Bermuda	✓
Covea Group	HEXAGON REINSURANCE DAC (2017-1)	15-Dec-17	19-Jan-22	106	Europe	Indemnity	Ireland	✓
Unknown cedant	SEASIDE RE 2018-1	19-Dec-17	15-Jan-19	20	North America	Unknown	Bermuda	✓
Unknown cedant	SEASIDE RE 2018-3	22-Dec-17	15-Jan-19	27	North America	Unknown	Bermuda	✓
Validus Holdings	TAILWIND RE LTD (2017-1)	27-Dec-17	8-Jan-22	400	Multi	Industry Loss Index	Bermuda	✓
Unknown cedant	SEASIDE RE 2018-2	29-Dec-17	15-Jan-19	50	North America	Unknown	Bermuda	✓
Unknown cedant	DODEKA XIV	29-Dec-17	8-Jan-19	34	North America	Industry Loss Index	Bermuda	✓

Source: Artemis, Bermuda Stock Exchange, AON Bentfield and Authority staff calculations.



## BERMUDA: OVERVIEW OF ILS LISTINGS AT THE BERMUDA STOCK EXCHANGE (BSX)

Table VII. Transaction Overview of BSX-listed ILS Issuance, 2015 to 2017

	Short Name	Issue Date	Maturity Date	Amount Issued (\$ mln)	Region/Peril Covered	Trigger Type	Country of Issuance (SPI)
2015	GALILEO RE LTD 2015-1	4-Feb-15	8-Jan-18	300	Multi	Industry Loss Index	Bermuda
	KIZUNA RE II LTD 2015-1	26-Mar-15	5-Apr-19	293	Asia	Indemnity	Bermuda
	QUEEN STREET X RE LTD	30-Mar-15	8-Jun-18	100	Multi	Industry Loss Index	Ireland
	MERNA RE LTD 2015-1	31-Mar-15	9-Apr-18	300	North America	Indemnity	Bermuda
	CITRUS RE 2015-1	8-Apr-15	9-Apr-18	278	North America	Indemnity	Bermuda
	PELICAN II RE LTD	14-Apr-15	16-Apr-18	100	North America	Indemnity	Bermuda
	CRANBERRY RE LTD 2015-1	30-Apr-15	6-Jul-18	300	North America	Indemnity	Bermuda
	EVERGLADES RE II LTD 2015-1	7-May-15	3-May-18	300	North America	Indemnity	Bermuda
	ALAMO RE LTD	13-May-15	7-Jun-19	700	North America	Indemnity	Bermuda
	AZZURRO RE I LTD	17-Jun-15	16-Jan-19	225	Europe	Indemnity	Ireland
	PANDA RE LTD 2015-1	29-Jun-15	9-Jul-18	50	Asia	Indemnity	Bermuda
	ACORN RE LTD 2015-1	10-Jul-15	7-Jul-18	300	North America	Parametric	Bermuda
	BELLEMEADE RE LTD 2015-1	29-Jul-15	25-Jul-25	299	Other	Indemnity	Bermuda
	BOSPHORUS LTD 2015-1	17-Aug-15	17-Aug-18	100	Europe	Parametric	Bermuda
	URSA RE LTD 2015-1	15-Sep-15	21-Sep-18	250	North America	Indemnity	Bermuda
	PENN UNION RE LTD 2015-1	8-Oct-15	7-Dec-18	275	North America	Parametric	United States
KILIMANJARO RE LTD 2015-1	1-Dec-15	6-Dec-19	625	North America	Industry Loss Index	Bermuda	
QUEEN STREET XI RE	18-Dec-15	7-Jun-19	100	Multi	Industry Loss Index	Ireland	
NAKAMA RE LTD 2015-1	29-Dec-15	14-Jan-21	300	Asia	Indemnity	Bermuda	
2016	GALILEO RE LTD 2016-1	27-Jan-16	8-Jan-19	300	Multi	Industry Loss Index	Bermuda
	CITRUS RE LTD 2016-1	24-Feb-16	25-Feb-19	250	North America	Indemnity	Bermuda
	MERNA RE LTD 2016-1	3-Mar-16	8-Apr-19	300	North America	Indemnity	Bermuda
	MANATEE RE LTD 2016-1	10-Mar-16	13-Mar-19	75	North America	Indemnity	Bermuda
	AKIBARE II LTD 2016-1	14-Mar-16	7-Apr-20	200	Asia	Indemnity	Bermuda
	AOZORA RE LTD 2016-1	29-Mar-16	7-Apr-20	220	Asia	Indemnity	Bermuda
	BELLEMEADE RE II LTD 2016-1	9-May-16	25-Apr-26	299	Other	Indemnity	Bermuda
	QUEEN STREET XIII RE	20-May-16	8-Apr-20	190	Multi	Industry Loss Index	Ireland
	OPERATIONAL RE LTD	26-May-16	8-Apr-21	218	Other	Indemnity	Bermuda
	FIRST COAST RE LTD 2016-1	31-May-16	7-Jun-19	75	North America	Indemnity	Bermuda
	BLUE HALO RE LTD 2016-1	16-Jun-16	21-Jun-19	185	North America	Industry Loss Index	Bermuda
	BLUE HALO RE LTD 2016-2	21-Jul-16	26-Jul-19	225	North America	Industry Loss Index	Bermuda
	NAKAMA RE LTD 2016-1	29-Sep-16	13-Oct-21	700	Asia	Indemnity	Bermuda
	URSA RE LTD 2016-1	30-Nov-16	10-Dec-19	500	North America	Indemnity	Bermuda
	BONANZA RE LTD 2016-1	1-Dec-16	3-Dec-19	200	North America	Indemnity	Bermuda
	HORSE CAPITAL I DAC	19-Dec-16	15-Jun-20	265	Other	Indemnity	Ireland
GALILEI RE LTD 2016-1	28-Dec-16	8-Jan-20	750	Multi	Industry Loss Index	Bermuda	
LI RE LTD 2016-2	30-Dec-16	10-Apr-18	10	Unknown Region/Peril	Unknown	Bermuda	
2017	RESILIENCE RE LTD (1712)	3-Jan-17	8-Jan-19	187	Unknown Region/Peril	Unknown	Bermuda
	DODEKA XI	5-Jan-17	5-Jan-18	19	North America	Industry Loss Index	Bermuda
	SEASIDE RE 2017-1	5-Jan-17	15-Jan-18	87	Unknown Region/Peril	Unknown	Bermuda
	RESILIENCE RE LTD (1711A)	8-Jan-17	8-Jan-18	63	Unknown Region/Peril	Unknown	Bermuda
	ARTEX SAC LTD - SERIES DX NOTES	10-Jan-17	6-Apr-18	50	Unknown Region/Peril	Unknown	Bermuda
	GALILEI RE LTD 2017-1	11-Jan-17	8-Jan-21	525	Multi	Industry Loss Index	Bermuda
	ALPHA TERRA VALIDUS I	6-Feb-17	15-Jan-18	5	North America	Indemnity	Bermuda
	BUFFALO RE LTD 2017-1	10-Mar-17	7-Apr-20	165	North America	Indemnity	Bermuda
	CITRUS RE LTD 2017-1	13-Mar-17	18-Mar-20	125	North America	Indemnity	Bermuda
	AOZORA RE LTD 2017-1	29-Mar-17	7-Apr-21	480	Asia	Indemnity	Bermuda
	SANDERS RE LTD 2017-1	30-Mar-17	6-Dec-21	375	North America	Indemnity	Bermuda
	ECLIPSE RE LTD 2017-01A	31-Mar-17	1-Apr-19	20	Unknown Region/Peril	Unknown	Bermuda
	MERNA RE LTD 2017-1	31-Mar-17	8-Apr-20	300	North America	Indemnity	Bermuda
	KILIMANJARO II RE LTD 2017-1	13-Apr-17	20-Apr-21	950	North America	Industry Loss Index	Bermuda
	KILIMANJARO II RE LTD 2017-1	13-Apr-17	21-Apr-22	300	North America	Industry Loss Index	Bermuda
	RESILIENCE RE LTD (1741A)	19-Apr-17	6-Apr-18	173	Unknown Region/Peril	Unknown	Bermuda
	PELICAN IV RE LTD 2017-1	19-Apr-17	5-May-20	100	North America	Indemnity	Bermuda
	FIRST COAST RE LTD 2017-1	25-Apr-17	7-Jun-21	175	North America	Indemnity	Bermuda
	INTEGRITY RE LTD 2017-1	2-May-17	10-Jun-20	210	North America	Indemnity	Bermuda
	OAKTOWN RE LTD 2017-1	2-May-17	25-Apr-27	211	Other	Indemnity	Bermuda
	TORREY PINES RE LTD 2017-1	8-May-17	9-Jun-20	166	North America	Indemnity	Bermuda
	EVERGLADES RE II LTD 2017-1	9-May-17	8-May-20	300	North America	Indemnity	Bermuda
	CITRUS RE LTD 2017-2	11-May-17	18-Mar-20	35	North America	Indemnity	Bermuda
	URSA RE LTD 2017-1	16-May-17	27-May-20	925	North America	Indemnity	Bermuda
	METROCAT RE LTD	22-May-17	8-May-20	125	North America	Parametric	Bermuda
	ALAMO RE LTD 2017-1	30-May-17	8-Jun-20	400	North America	Indemnity	Bermuda
	ECLIPSE RE LTD 2017-01A	31-May-17	1-Jun-18	53	Unknown Region/Peril	Unknown	Bermuda
	SANDERS RE LTD 2017-2	31-May-17	5-Jun-20	200	North America	Indemnity	Bermuda
	RIVERFRONT RE LTD 2017-1	31-May-17	15-Jan-21	190	North America	Indemnity	Bermuda
	OAK LEAF RE LTD 2017-1	9-Jun-17	9-Jun-18	53	North America	Indemnity	Bermuda
	CRANBERRY RE LTD 2017-1	12-Jun-17	13-Jul-20	350	North America	Indemnity	Bermuda
	RESILIENCE RE LTD (1761A)	13-Jun-17	4-Jun-18	37	Unknown Region/Peril	Unknown	Bermuda
SPECTRUM CAPITAL LTD 2017-1	19-Jun-17	8-Jun-21	430	North America	Industry Loss Index	Bermuda	
LION II RE DAC	28-Jun-17	15-Jul-21	228	Europe	Indemnity	Ireland	
NORTHSHORE RE II LTD 2017-1	29-Jun-17	6-Jul-20	350	North America	Industry Loss Index	Bermuda	
WINDMILL I RE LTD 2017-1	30-Jun-17	5-Jul-20	46	Europe	Indemnity	Bermuda	
Tokio Millenium Re AG	3-Jul-17	7-Aug-19	71	Asia	Unknown	Bermuda	
AmTrust Financial Services	19-Jul-17	7-Jul-21	100	North America	Indemnity	Bermuda	
Unknown cedant	20-Jul-17	8-Jun-18	8	Unknown Region/Peril	Unknown	Bermuda	
BELLEMEADE RE 2017-1 LTD	1-Oct-17	25-Oct-27	368	Other	Indemnity	Bermuda	
GALILEO RE LTD (2017 -1)	3-Nov-17	6-Jan-20	150	North America	Industry Loss Index	Bermuda	
URSA RE LTD (2017 -2)	30-Nov-17	10-Dec-20	400	North America	Indemnity	Bermuda	
ARTEX SAC LTD SERIES GX NOTES	1-Dec-17	5-Apr-19	50	North America	Unknown	Bermuda	
LI RE (2017 -1)	12-Dec-17	10-Apr-19	10	North America	Unknown	Bermuda	
SEASIDE RE 2018-1	19-Dec-17	15-Jan-19	20	North America	Unknown	Bermuda	
SEASIDE RE 2018-3	22-Dec-17	15-Jan-19	27	North America	Unknown	Bermuda	
TAILWIND RE LTD (2017 -1)	27-Dec-17	8-Jan-22	400	Multi	Industry Loss Index	Bermuda	
SEASIDE RE 2018-2	29-Dec-17	15-Jan-19	50	North America	Unknown	Bermuda	
DODEKA XIV	29-Dec-17	8-Jan-19	34	North America	Industry Loss Index	Bermuda	

### BERMUDA: REGISTRATION OF SPECIAL PURPOSE INSURERS (SPIs) AND NUMBER OF ILS ISSUED

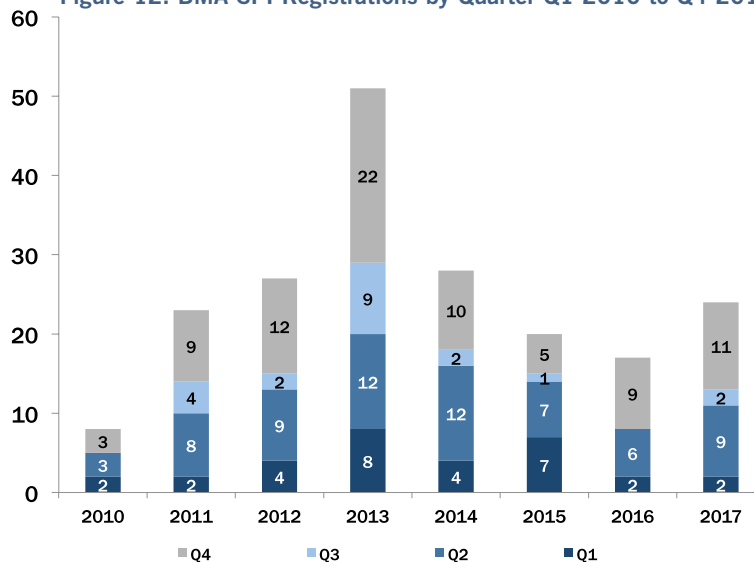
The number of SPI registrations during the quarter increased year-over-year (Figure 12). The BMA licensed 11 SPIs during Q4-2017 compared to nine registrations during the same period last year.

Table VIII. SPI Registrations and ILS issuance in Bermuda, 2011 to Q4-2017

		SPI Registrations	Bermuda-based ILS
2011	Q1	2	—
	Q2	8	1
	Q3	4	4
	Q4	9	3
	Annual Total	23	8
2012	Q1	4	2
	Q2	9	3
	Q3	2	3
	Q4	12	3
	Annual Total	27	11
2013	Q1	8	2
	Q2	12	10
	Q3	9	7
	Q4	22	6
	Annual Total	51	25
2014	Q1	4	9
	Q2	12	14
	Q3	2	5
	Q4	10	8
	Annual Total	28	36
2015	Q1	7	11
	Q2	7	14
	Q3	1	8
	Q4	5	3
	Annual Total	20	36
2016	Q1	2	6
	Q2	6	12
	Q3	0	8
	Q4	9	4
	Annual Total	17	30
2017	Q1	2	14
	Q2	9	24
	Q3	2	3
	Q4	11	13
	Annual Total	24	54

Source: Authority

Figure 12. BMA SPI Registrations by Quarter Q1-2010 to Q4-2017



Source: Authority

## BERMUDA: STRUCTURAL FACTORS AND SUPERVISORY REGIME

**A sophisticated legal system, a strong regulatory framework, a developed infrastructure, as well as the local availability of highly-skilled human capital, underpin Bermuda's reputation as a quality jurisdiction and domicile of choice for insurance, reinsurance and financial services' companies.** Bermuda is known for its innovative (re)insurance industry which has shown resilience during the financial crisis.

**Bermuda has emerged as a leader in the global ILS market after implementing a specific regulatory framework to facilitate the formation of such instruments through a new licence class for**

**insurers.** In 2009, the Bermuda Monetary Authority introduced the concept of a Special Purpose Insurer (SPI), following passage of the Insurance Amendment Act 2008. Bermuda's regulatory and supervisory framework also provides for the creation of sidecars, Industry Loss Warranties (ILWs) and collateralised reinsurance vehicles. The ILS market has benefitted from a large investor base and the existing (re)insurance expertise in Bermuda which hosts one of the world's largest reinsurance markets. The global reinsurance market had total assets of approximately \$605.0 billion at end Q2-2017.

### BOX 1: REGULATORY FRAMEWORK FOR ILS IN BERMUDA

The following information provides a brief overview of the legislation governing the process of forming SPIs as issuers of ILS in Bermuda.<sup>5</sup> For this purpose, SPIs are structured as "bankruptcy remote" entities which are required to be fully-funded and independent companies that accept pre-specified insurance risk from sophisticated (re)insurers. The regulatory focus during the licensing process of SPIs is on the assessment of the certainty of the contractual arrangements governing the SPI and the complete collateralisation of the policy limits of insurance risk ceded to the SPI. The SPI must have access to a sound infrastructure for underwriting and servicing claims, including sound governance surrounding the custody of collateral assets. Moreover, policyholders and investors are restricted to sophisticated participants.

#### *Incorporation and Registration Process*

The process of establishing an SPI is substantially similar to that of "conventional" commercial insurers. Key elements of the "Licensing Application" include: (i) a business plan, which outlines the fundamental elements of the proposed transaction and, importantly, demonstrates both the fully collateralised nature of the business and sophisticated participants; (ii) a completed "SPI Checklist" (a standard BMA form); (iii) drafts of relevant transaction documents (such as reinsurance agreements, collateral trust agreements, etc.); and (iv) service provider agreements.

#### *Supervision of SPIs*

To ensure effective and prudent supervision of SPIs, the Authority has established a supervisory regime that reflects the unique characteristics of the SPI structures as well the evolving aspects of the SPI business model. The key pillars of the SPI supervisory program include: (i) Risk profiling; (ii) Review of annual and quarterly filings and closing documents; and (iii) On-site Review which involves supervisory teams conducting additional assessment work at the premises of the SPI.

<sup>5</sup> The material presented is not intended to be a substitute for professional legal advice.

## REFERENCES

### Main Data Sources

Artemis Deal Directory ([http://www.artemis.bm/deal\\_directory/](http://www.artemis.bm/deal_directory/))

Bermuda Stock Exchange (BSX): Insurance-Linked Securities and Programmes (<http://www.bsx.com/Comp-InsLinkSec.asp>)

Bloomberg L.P.

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