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## Letter sent to CEOs of participating firms

Dear CEO

### General Insurance Stress Test 2015 Feedback

We would like to thank you and your stress testing team for participating in last year's General Insurance Stress Test exercise. We recognise that in the run-up to Solvency II, 2015 was an exceptionally busy year.

For us, stress testing is one of the ways in which we proactively pursue a forward-looking and judgment based approach to supervision.

This letter sets out the results of that exercise, including a summary of the potential for market-wide impacts and learnings related to difficult-to-assess scenarios such as Cyber losses.

The results of the exercise will help inform the on-going development of future insurance stress test exercises, with the next exercise likely to be in 2017. In addition, the results help inform supervision, for instance where firms are identified as outliers or have results which appear inconsistent with their stated risk-appetite.

### Headline results

63% of the general insurance market (by premium) participated in the test. The main findings were:

- in aggregate, the sample insurers were resilient against specific market-wide stresses;
- the economic scenario results in the largest adverse impact, which arises mainly from a fall in the value of corporate bonds as credit spreads are assumed to widen;
- there was a wide range in views on the plausibility of each scenario;
- results from the complex stress tests (eg liability, cyber stresses) indicate that common terminology and a common framework for the assessment of exposure is required before a wider assessment of firm and sector resilience can be determined on a consistent basis; and
- no systemic risks or common cause of a market-wide catastrophe were identified through firms' own defined stresses.

Detailed results are contained in the Annex to this letter.

We hope you find the results of interest. If you wish to discuss these in further detail, or have any additional insights you want to share, please contact your regular supervisor to arrange a meeting.

Yours sincerely

## ANNEX: STRESS TEST RESULTS

### Executive summary

#### Market-wide stress test

The 26 largest general insurers (including Lloyd's syndicates) were asked to run five market-wide stress tests to assess market resilience as well as reliance on reinsurance. The stress tests covered natural and man-made catastrophes as well as an economic shock consistent with the Financial Policy Committee banking stress test developed in 2015<sup>1</sup>. For full details of each stress see the Stress Test Design on page 5.

The main findings from the market-wide stress tests were:

- at an aggregate level, general insurers in our sample were resilient to the PRA market-wide stress tests, with only a handful of insurers likely to breach SCR;
- the economic scenario results in the largest adverse impact, which arises mainly from a fall in the value of corporate bonds as credit spreads are assumed to widen;
- results of the market-wide insurance scenarios (such as US hurricane) show that the largest insurers are in general able to withstand these types of events reflecting their diversification and improvements in managing concentrations. It should be noted that, although spanning multiple events, the scenario design was limited in focussing on a single geographic region, a single product or a single industry;
- the results also highlight significant reliance on reinsurance and that these counterparties are well-diversified at an industry level; and
- insurers had a wide range of views on the likelihood of the market-wide stress tests demonstrating the challenges in reaching consistency. This was possibly driven by differing views of correlation between multiple events in the scenario, different approaches or differing interpretations.

#### Difficult-to-assess scenarios

Insurers were requested to provide results for a further four scenarios to understand how different firms were assessing complex scenarios that covered a supply chain disturbance, liability stresses, impacts of a solar flare and a serious cyber attack across multiple firms. The main finding was:

- Emerging and complex risks require common terminology and a common framework for the assessment of exposure before a wider assessment of firm and sector resilience can be determined on a consistent basis. Nonetheless, the feedback provided the PRA with an insight into the ability of firms to quantify their exposures to these difficult-to-assess risks.

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<sup>1</sup>Bank of England (2015), 'The Bank of England's approach to stress testing the UK banking system', available at <http://www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf>

## Horizon scanning

The final two scenarios were by definition firm specific, requesting that insurers identify their extreme scenarios and the scenario that would make their business plan unviable.

- There was little commonality in the risks identified by general insurers as representing their 1-in-200 year event or events that would result in their business plan becoming unviable. Events identified ranged from different types of natural catastrophes across various territories, man-made catastrophes and hyper claims inflation through to operational and counterparty reinsurance credit risk.
- In general, firm feedback on the 1-in-200 year event did not provide sufficient narrative to assist in the identification of future stresses. In particular, scenarios identified were largely taken from internal model outputs rather than considering and describing the real-world events that would cause these impacts.
- There is limited consistency as to how (re)insurers are assessing their reverse stress test. The PRA suspects that in many cases this is due to differences of interpretation; with some insurers targeting recovery (ie the point at which the existing business plan is no longer viable) while others assume the point at which the firm goes into run-off (ie resolution).

## Next steps for the PRA

- The conclusions rely on the ability of insurers to maintain a robust process for exposure measurement and management whether on property or liability risks. This will be an area of increased focus for PRA supervision, particularly in light of continued rate reductions and widening of terms and conditions in the London market.
- The results of this stress test exercise will be used to inform the design and implementation of future stress test exercises.
- The PRA will consider whether, in future general insurance stress testing exercises, there would be merit in increasing the number of participating insurers, which would enable the PRA to assess whether the conclusions of this exercise are valid for the smaller and typically less diversified insurers.

## Introduction

### Background

In 2015 the PRA conducted a stress testing exercise for all Category 1 and 2 UK regulated general insurers, covering 26 insurance groups across 39 legal entities. The proportion of the PRA regulated general insurance industry captured under the stress test exercise was as follows:

	Proportion captured	
	By Gross Premium	By Gross Reserves
Syndicates	46%	48%
Firms	72%	68%
Overall	63%	61%

### Purpose

Regulatory insurance capital requirements are already calculated on the basis of a stressed balance sheet (set at the 1-in-200 year scenario for each firm). As a result, cross-firm stress testing exercises for insurers are not used to inform the setting of capital requirements as they are for banks. Instead, the PRA uses cross-firm stress tests of insurance firms to assess the market-wide impact of specific scenarios, to assess how these losses would be borne by different firms and reinsurers, and to explore individual firms' vulnerabilities.

Six specific benefits were identified for this exercise, in that it provided the PRA the ability or opportunity to:

- 1) Gain a market-consistent view of aggregate losses net of reinsurance protections across the industry to the specified scenarios.
- 2) Rank UK general insurers by vulnerability following specified events. This should assist the PRA in adopting a more targeted response should events of a similar nature occur in the future.
- 3) Identify the level of interconnectedness of the insurance sector. For instance, the extent to which, under stressed scenarios, UK insurers are reliant on specific reinsurers, specific types of reinsurance and other jurisdictions.
- 4) Ensure consistency in its approach when reviewing an insurer's internal capital model. For instance, results from the PRA-specified stress can be used to compare against stress events from the firm's internal model.
- 5) Raise awareness, and assist in the future design, of specific scenarios and/or risks that are evolving or where PRA supervision feel additional analysis is warranted – for example cyber risk, solar flares, or consideration of contingent business interruption losses following catastrophe events.
- 6) Perform horizon scanning to assist the identification and development of scenarios that can be used to stress the general insurance sector in future stress test exercises.

Stress test responses are also typically used to complement supervision's view on the capabilities of risk management and horizon scanning within individual firms. However, given the desk-based nature of this exercise, this has not been an area of focus in this exercise.

## Stress Test Design

Insurers were asked to consider 11 stress tests. These stress tests can be broadly segmented into three distinct types designed to capture the specific benefits identified above:

*Type A scenarios are those scenarios that could reasonably be expected to impact a number of insurers simultaneously and for which the PRA has been able to define the scenario in sufficient depth to ensure broad consistency.*

- a) European windstorm and flood set of events: two windstorm events (analogous to the severe 1999 winter season – although with greater intensity around south east England) followed by a severe UK Flood event.
- b) US hurricane event: three US hurricanes analogous to those experienced in 2005 but with different storm tracks.
- c) Synchronised terrorism events: three terrorism events in London, New York and a third location of a firm's choice. Assumes a 2-ton truck bomb is detonated in a highly populated location.
- d) Motor liability (periodic payment orders): impact on changes in the settlement cost of large personal injury claims in the UK motor market.
- e) Economic shock: this stress test follows the Bank's recent economic scenario for the 2015 banks' stress test (and is the only stress test not exclusively related to insurance risks). To ensure consistency with the other stress tests, participants were only required to consider the one-year shock assumptions.

It should be noted that these scenarios were not intended to represent nor provide the PRA's view on a 1-in-200 year scenario.

*Type B: Industry ability to assess emerging and difficult-to-assess risks that have potential for systemic risk*

Type B scenario definitions were not specified in detail. Instead, insurers had some flexibility on the intensity of the event and how it could apply to their business. These scenarios were principally designed to assess how different insurers are tackling some of these complex topics, with the expectation that firm feedback will assist future stress test development.

- a) Supply chain disturbance: impact on insurers if a leading supplier to one of the main sectors insured by the firm suffers significant disruption.
- b) Liability stress scenario: impact of a liability stress scenario that reflects an insurer's exposure and concentrations to individual sectors (ie not including property damage). An example of a liability stress could be the emergence of a link between mobile phone usage and brain tumours. Any employer requiring their employees to use mobile phones could be at risk of being sued for negligence.
- c) Solar flare: a coronal mass ejection that results in power outage for one month in both the United States and the United Kingdom.
- d) Cyber loss: a series of simultaneous cyber-attacks launched on large multinational organisations.

*Type C: Identification of risks to be included in future stress tests. The purpose of these scenarios was to assist in the identification of potential systemic risks that can be used to inform the development of future stress tests.*

- a) Own 1-in-200 scenario: insurers were requested to provide details of what they consider to be their 1-in-200 year insurance event scenario.
- b) Reverse stress test: insurers were requested to provide details of the scenario which would result in their business plan no longer being viable. Note: this scenario is a broader test in scope

than the 'Own 1-in-200 scenario' as it considers the point at which the business model becomes unviable and required insurers to also consider non-insurance related risks, for example market risk and counterparty credit risk.

### **Approach and limitations**

In 2015 the priority for the relevant areas within the PRA, and for many insurers, was the successful implementation of Solvency II that came into effect on 1 January 2016. As market-wide stress testing was not core to the implementation of Solvency II, the PRA adopted a proportionate approach. In practice, this meant that it reduced the level of information requested, the intensity of review and the level of individual firm engagement. For example this means that the PRA:

- did not require firms to report their balance sheet after the event – firms were only required to provide loss amounts (thereby avoiding additional calculations in assessing second order impacts such as movements in risk margins and tax on the Solvency II balance sheet);
- requested that insurers consider each scenario as an instantaneous event recognising their full loss immediately; this may overstate the actual account impact that could be expected following these scenarios;
- review was entirely desk based – the only interaction with firms was via email to clarify some data anomalies;
- did not validate or challenge whether insurers had correctly interpreted the stress test definition and whether they had appropriately applied their exposure to obtain the insurance and/or operational losses arising from this; and
- requested firms only provide results where the scenario was deemed material. The PRA did not assess or challenge the firm's own assessment.

As a consequence, the results presented in this report are likely to reflect both differences due to differing risk profiles and differences in interpretation. Nevertheless, the PRA believes the results of this exercise can help inform its approach to future stress test exercises.

To ensure anonymity of results by individual insurer the results are provided at the aggregate market level. An indication of the range of individual responses is provided by box-whisker charts which show the inter-quartile ranges. Figures in square brackets indicate the sample size – noting that only scenarios which were deemed material by the insurers were required to be completed.

## Results: Type A scenarios – Market-wide stresses

In aggregate, the sample general insurers are resilient to the stresses defined in this exercise.

**Table 1: Aggregate market level impact**

	All figures in £ billion			
	Basic own funds	Solvency Capital Requirement (SCR)	Gross loss	Net loss
European windstorm and floods [31]	35.3	20.3	14.6	5.0
US hurricanes [20]	17.4	11.0	5.0	2.4
Synchronised terrorism events [25]	26.1	15.4	5.7	1.5
Motor liability stress event [13]	25.6	14.6	3.9	2.9
Economic Shock [33]	38.8	22.0	7.5	6.5

*Note: Only those insurers for which the scenario was deemed material are included [number of insurers in brackets]. This explains differences in aggregate basic own funds and SCR between scenarios.*

**Table 2: Key ratios for stress event impact**

	Impact after stress event		
	Net loss as % of Basic own funds	Estimated SCR coverage ratio	Proportion ceded to reinsurers
European windstorm and floods	14%	149%	65%
US hurricanes	14%	137%	53%
Synchronised terrorism events	6%	160%	74%
Motor liability stress event	11%	155%	25%
Economic Shock	17%	147%	14%

Tables 1 and 2 indicate that the net loss arising from each scenario is less than 20% of aggregate basic own funds.

### Economic scenario: results and implications

The most material scenario is the economic shock, which results in a net loss equivalent to almost 17% of opening basic own funds. The losses under this scenario are primarily driven by credit spreads widening, accounting for £4.2 billion of loss from the total impact of £7.5 billion before reinsurance.

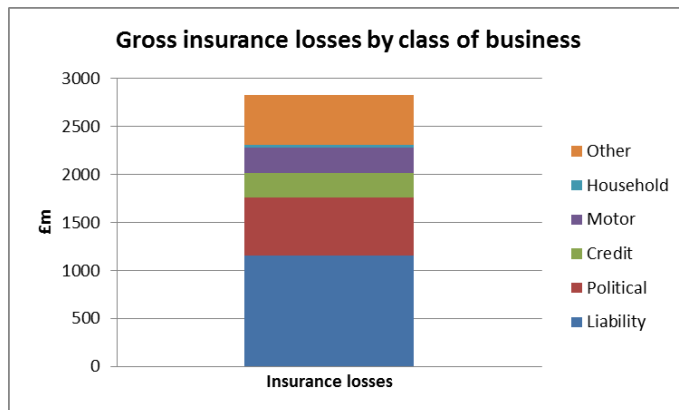
The fact that the economic stress test is the largest (in terms of impact on industry basic own funds) is perhaps counterintuitive given the nature of the participants. The PRA considers that this is explained by the following three reasons:

- 1) Insurers are heavy investors in highly rated corporate debt securities as these are deemed to be a good match against their liabilities. Consequently, a credit spread shock would have a material impact – albeit that we would expect this to be an economic shock (rather than a liquidity issue) on the basis that most insurers hold their assets to maturity.
- 2) Insurance risk, on the other hand, is generally hedged and well diversified. The sampled insurers are the largest and typically the most diversified with regards to insurance exposure (by product / geography / industry). A consequence is that any stress test that simply impacts a specific territory or a specific line of business is unlikely to cause a significant impact (assuming the firm has adequate exposure monitoring in place). Further, those aspects of the portfolio which result in concentrated losses are typically reinsured so that only a manageable net loss is retained by the firm. As such, the insurance risks can be viewed as more hedged (ie with the reinsurance providing the hedge) than investments – and as a result, market risk becomes an increasing proportion of the overall driver of capital requirements.
- 3) Scenario design proved too narrow to test fundamentally the resilience of the insurer business models. This is for two reasons:
  - i. Improvement in aggregation management: the increase in the availability of data and sophistication of analytics in the insurance industry (and particularly for the larger insurers) is such that its ability to monitor and manage aggregate exposures according to geographical or industry concentrations has considerably improved. While the market-wide insurance events were designed to be extreme in terms of impact, they did not consider the occurrence of independent extreme events occurring across different geographies or industries. As a consequence, the majority of the risks were hedged (ie reinsured).
  - ii. General insurance business models are typically more diverse within and across firms than other sectors: the participants of this exercise ranged from primarily UK domestic insurers through to international London market insurers, as well as insurers that are increasingly diversifying and providing both international and retail products. This diversity in product, geography and industry exposure is such that any large loss events concentrated on a single geographic location or industry is unlikely to cause a systemic impact.

As part of the economic scenario, insurers were also requested to consider the impact on insurance-related claims. Given the limited guidance it was not surprising that there was little commonality as to how insurers reflected additional insurance claims as a result of the economic scenario.

Table 3 provides a breakdown of the insurance losses by line of business.

**Table 3: Insurance losses following the economic scenario**

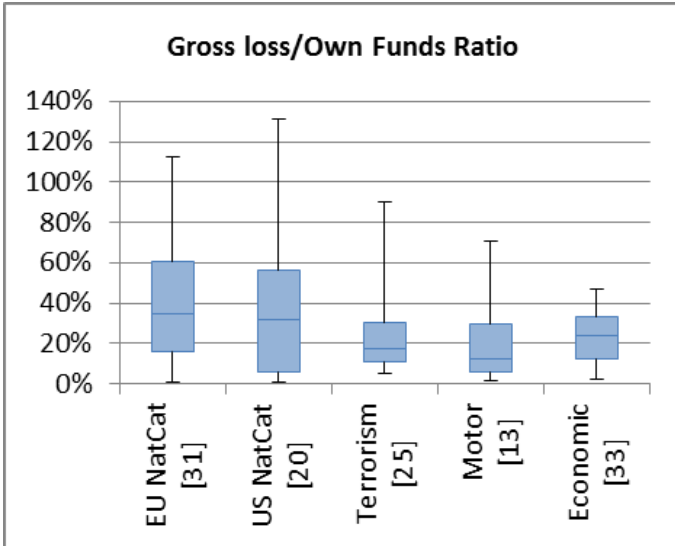




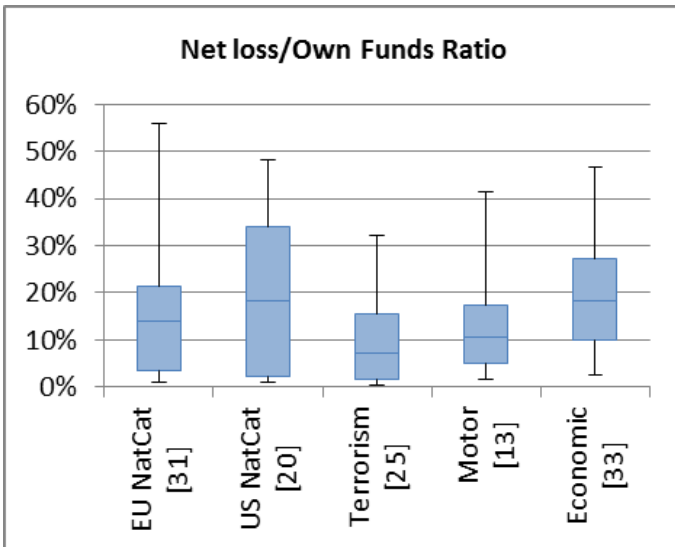
**Impact of Reinsurance**

Reinsurance is an important mitigant for all but the economic stress test. This is best illustrated by providing details of the impact before reinsurance (Table 4) and the impact on own funds after reinsurance (Table 5).

**Table 4: Gross loss as a percentage of own funds<sup>2</sup>**



**Table 5: Net loss as a percentage of own funds<sup>2</sup>**



Tables 4 and 5 illustrate the impact of reinsurance in reducing both the variability and absolute level of gross loss, as well ensuring that none of the participants had a loss greater than their basic own funds after reinsurance.

<sup>2</sup> The number in [square brackets] refers to the number of firms in the distribution.

## Reinsurance Diversification

To ensure anonymity of reinsurer exposure the PRA provides details of reinsurance recoveries allocated by jurisdiction.

**Table 6: Jurisdiction of reinsurance recoveries**

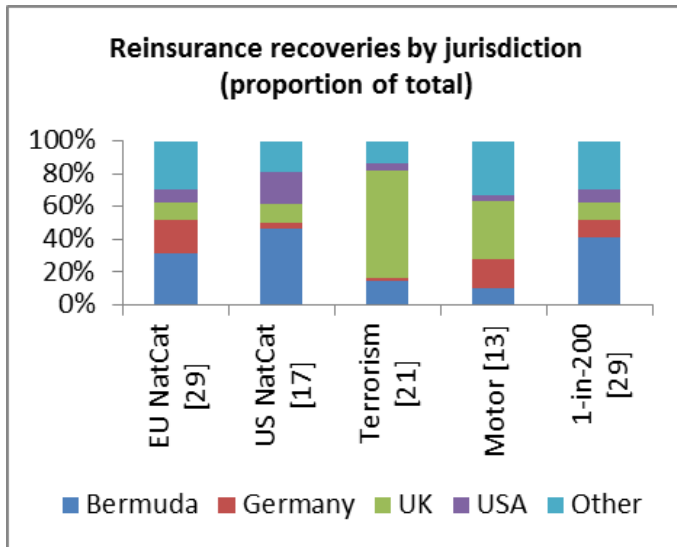
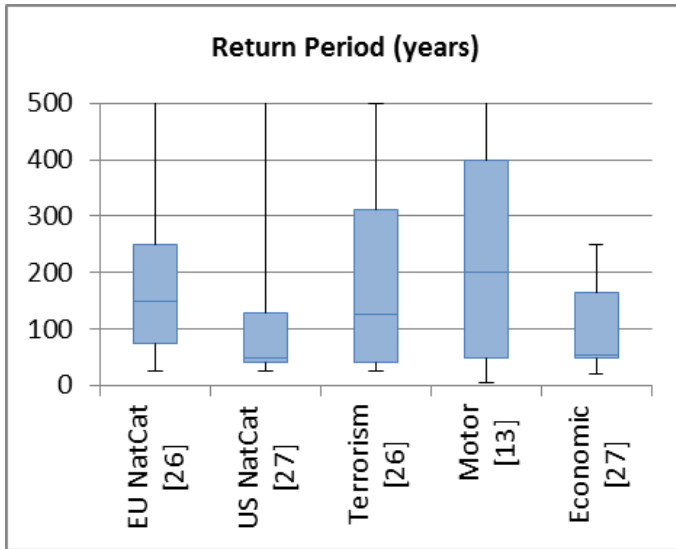


Table 6 illustrates that reinsurance recoveries are generally well diversified. Differences in the jurisdictional breakdown of reinsurance recoveries between stress tests primarily reflect differences between the London market and domestic UK insurers' business models, including the split between those insurers providing reinsurance and retrocession cover.

Approximately 30% of the expected recoveries for the European windstorm and floods stress are ceded to group-related reinsurers. For the US hurricane stress the percentage ceded to group-related reinsurers was 20%. For the terrorism event, the single largest reinsurer is the UK Government-backed reinsurer Pool Re which is projected to be liable for around 65% of the expected reinsurance recoveries.

### *Plausibility of the market wide stresses*

Table 7 illustrates the different market views on the likelihood of the stress events occurring. The higher the return period the more remote the perception of the event occurring. The chart indicates that the industry believes the US Hurricane event to be the most likely to occur.

**Table 7: Plausibility of the market wide stresses<sup>3</sup>**

The wide divergence on the plausibility of the motor scenario is in part explained by the scenario definition which was split in two parts. Feedback provided by insurers suggested that part 1 was considered more plausible, while part 2 was considered far more remote (beyond the 1-in-200 year event).

### **Results: Type B scenarios - Emerging / difficult-to-assess risks**

The results of these scenarios indicated that seemingly similar firms interpreted the potential impact on their business in fundamentally different ways. The varying responses illustrate the difficulties in defining and assessing scenarios for which the industry has yet to adopt common and universally understood terminology or a common framework to capture exposure. At this stage, as there is no broad comparability between insurers, a view on market resilience is not possible.

The PRA provides the results of these scenarios not to demonstrate resilience or capital strength, rather to illustrate the extent to which differing interpretations have led to different views on the potential loss amount.

<sup>3</sup> The number in [square brackets] refers to the number of firms in the distribution.

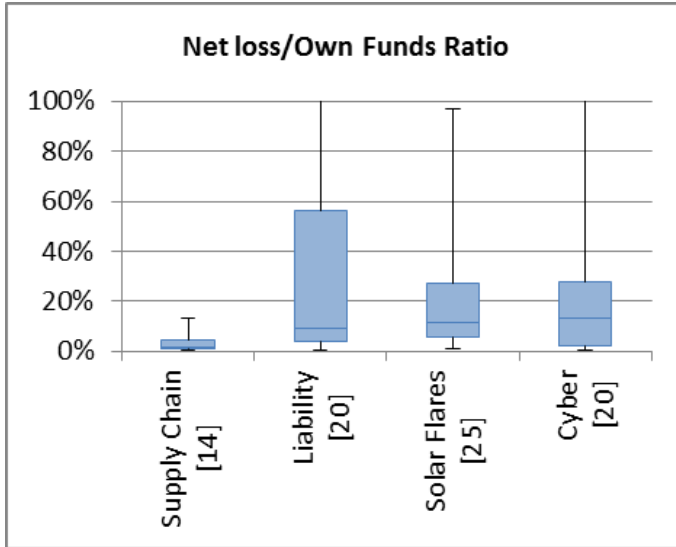
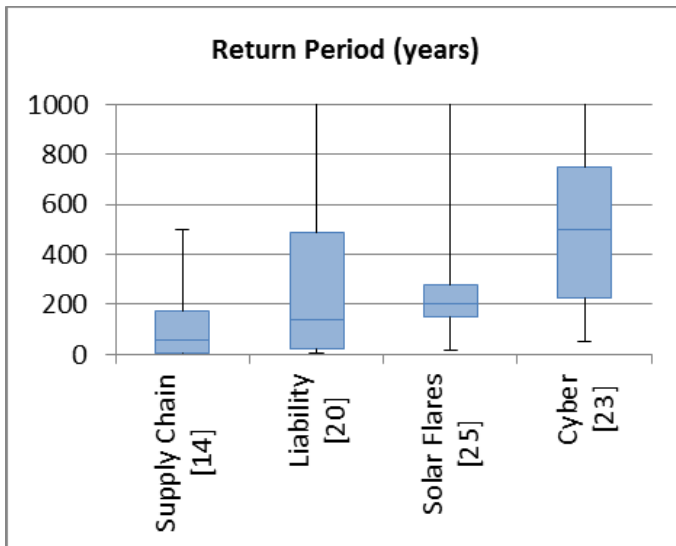
**Table 8: Net loss as a percentage of own funds<sup>2</sup>*****Plausibility of the Type B stresses***

Table 9 provides details on the expected return period for each of the events. While acknowledging that requesting a view on the return period of a given event is fraught with difficulty, the PRA notes that the range of views is varied. In particular, the plausibility of the cyber event was contentious with several insurers unable to provide an estimate of likelihood given the inherent uncertainty in such an event.

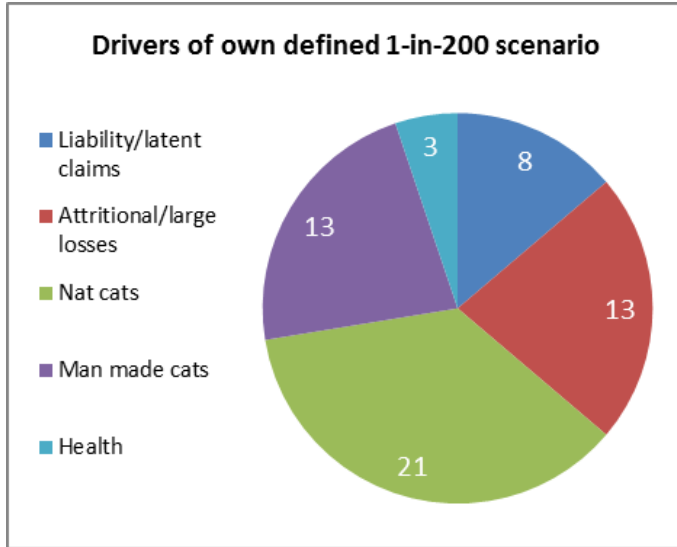
**Table 9: Plausibility of emerging risks<sup>2</sup>**

Several firms provided qualitative feedback on the plausibility and design of each of these stresses, including suggestions for improvement. The PRA thanks firms for this feedback and will be using this to assist in improving the stress test definitions in future.

## Results: Type C scenarios – Identification of risks to be included in future stress tests

There was limited commonality between insurers on the causes of the stressed scenario. This was the case when comparing results between primarily London market insurers as well as between primarily retail insurers. Table 10 provides details of the most common causes identified by insurers.

**Table 10: Drivers of own defined 1-in-200 scenario**



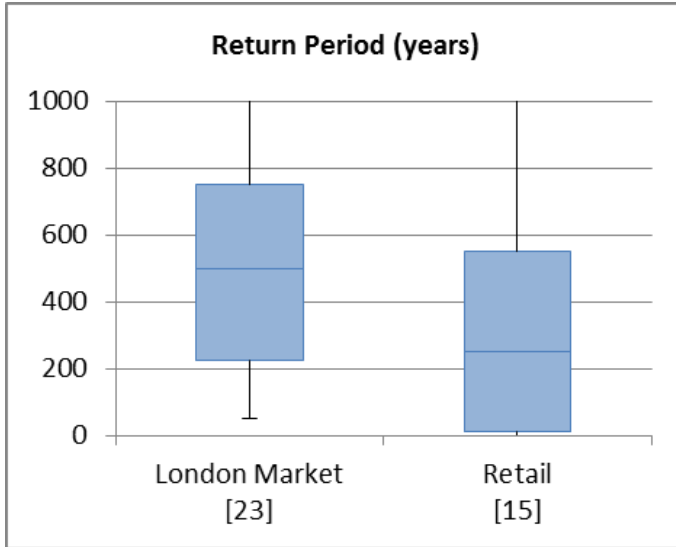
It should be recognised that the categories shown above are very broad. Typically, even two insurers providing natural catastrophe as a common cause of failure will be subject to two very different scenarios that will cause failure (eg a natural catastrophe in the United States or one in the United Kingdom).

In addition, a number of insurers included claims inflation and the possibility of rate (price) reductions within their extreme scenarios. This is perhaps not surprising as it reflects in part the risk that cannot easily be hedged (ie reinsured), and one which can impact multiple lines of business at the same time. These two risks (claims inflation and rate reduction) were not explicitly considered within this stress test exercise.

### Reserve Stress Test Results

There is limited consistency as to how insurers are assessing their reverse stress test, and this is best illustrated in Table 11.

The box-whisker chart illustrates the expected likelihood of a reverse stress test. This illustrates considerable variation in view within each of the London market and retail sectors as well as across all insurers.

**Table 11: Return period of reverse stress tests<sup>4</sup>**

The PRA suspects that in many cases this is due to differences of interpretation; with some insurers targeting recovery (ie the point at which the existing business plan is no longer viable) while others assume the point at which the firm goes into run-off (ie resolution).

<sup>4</sup> The number in [square brackets] refers to the number of firms in the distribution.