Risk-Based Capital (RBC) Reserve Risk Charges – Improvements to Current Calibration Method

Report 7 of the CAS Risk-based Capital (RBC) Research Working Parties

Issued by the RBC Dependencies and Calibration Working Party (DCWP)

Abstract: The purpose of this paper is to describe the results of research on methods to improve the Current Calibration Method (CCM) for reserve risk charges for use in the NAIC RBC Formula. The paper shows how it is possible to construct risk charges that might be both more reflective of underlying risk and more stable over time than the CCM.

This paper shows the extent to which calibration of reserve risk charges is affected by issues identified, but not measured, in prior research – reserve size by line of business (**LOB-size), pooling, and movement over time**. The paper also identifies and measures the extent to which risk charges are affected by (a) the **"minor line"** effect, which appears to distort risk charges for specialty lines of business (LOBs), and (b) the effect of data **maturity**.

This is one of several papers being issued by the Risk-based Capital (RBC) Dependencies and Calibration Working Party. The approach to calibrating reserve risk charges described in this paper is analogous to the calibration approach for premium risk described in DCWP Report 6.

Keywords. Risk-Based Capital, Capital Requirements, underwriting risk, reserve risk, premium risk, Analyzing/Quantifying Risks, Assess/Prioritizing Risks, Integrating Risks.

1. Introduction

1.1 Background and Purpose

The NAIC RBC Formula ("Formula") has six main risk categories, R0 – R5. The underwriting risk is represented into two of these categories, R4 and R5, reserve risk and written premium risk, respectively. This paper relates to the reserve risk portion of R4.[1]

For each Schedule P line of business (LOB), reserve risk is determined using an "Industry Loss and Expense %"on PR016 Line 4, a value applicable to all companies. We refer to this as the Reserve Risk Factor (RRF). It is also sometimes referred to as the reserve risk charge.

For each LOB the reserve risk charge is produced using the RRF, LOB net loss reserves,[2] and adjustments for investment income, differences between the company reserve development and industry reserve development, and the company proportion of loss

[1] In the application of the RBC formula a portion of Reinsurance Credit Risk is combined with Reserve Risk to produce a charge called R4. This paper discusses the Reserve Risk component of that combined R4.

[2] Loss and all loss adjustment expenses reserves net of reinsurance, Schedule P part 1 column 24.

sensitive contracts.

This paper provides a framework for deriving the RRFs by LOB.

1.2 Terminology, Assumed Reader Background, and Disclaimer

This paper assumes the reader is generally familiar with the property/casualty RBC formula.[3]

In this paper, references to "we" and "our" refer to the principal authors of this paper. "The working party" and "DCWP" refer to the CAS RBC Dependencies and Calibration Working Party.

The analysis and opinions expressed in this report are solely those of the authors, the Working Party members, and in particular are not those of the members' employers, the Casualty Actuarial Society, or the American Academy of Actuaries.

DCWP makes no recommendations to the NAIC or any other body. DCWP material is for the information of CAS members, policy makers, actuaries, and others who might make recommendations regarding the future of the property/casualty RBC formula. In particular, we expect that the material will be used by the American Academy of Actuaries RBC Committee.

In Section 3 we define a "baseline filtering" approach to selecting data for use in our analysis. The purpose of the baseline is to simplify comparison among a number of analyses; it is not presented as a recommendation.

This paper is one of a series of articles prepared under the direction of the CAS RBC Dependency and Calibration Working Party.

Special terms and acronyms are defined in the Glossary.

1.3 Prior Research

The RRFs in the Formula were first set in 1993.[4] Research reports on the RRFs and comparable reserve risk charges were most recently prepared by the American Academy of

[3] For a more detailed description of the formula and its initial basis, see Feldblum, Sholom, NAIC Property/Casualty Insurance Company Risk-Based Capital Requirements, Proceedings of the Casualty Actuarial Society, 1996 and NAIC, Risk-Based Capital Forecasting & Instructions, Property Casualty, 2010.
[4] Academy (2007)

Actuaries (Academy) in 2007[5] with updates in 2009[6] and 2010[7], and by the Underwriting Risk Working Party (URWP) of the Casualty Actuarial society (CAS) in 2012.[8] In this paper we refer to the method described in the 2007 Academy Report as the "Current Calibration Method" (CCM).

This paper describes new research addressing a number of the issues raised by those prior papers, particularly those identified by URWP, as follows:

1. The current data sources — the most recently available confidential company RBC filings for short-tailed lines of business and the most recently available Schedule P for long-tailed lines of business —yield too few observations for stable estimates of RBC factors from one calibration cycle to the next. Additional data sources should be investigated.

2. Filtering eliminates a significant amount of company experience from the Current Calibration Method. For many lines of business the majority of the companies in the industry are eliminated; for two lines, all companies are eliminated. New ways to filter out questionable data should be investigated. Possible alternatives are discussed in the report. [9]

URWP identified potential improvements to the Current Calibration Method that could be researched within the framework of the current RBC formula (including the following):

Data

1. Filtering strategies.

2. Additional or extended (number of years) data sources.

3. Improved treatment of data from pooled companies.

[5] Academy (2007)
[6] Academy(2009)
[7]Academy (2010)
[8] CAS *E-Forum*, URWP report, Winter 2012
[9] CAS *E-Forum*, URWP report, Winter 2012– page 2

4. Analysis of the extent to which alternative filtering is affected by run-off and startup companies, and including procedures mitigate that effect, if any. [10]

1.4 Working Party Approach

To address the opportunities for improvements identified by that prior research, DCWP proceeded as described below.

1. Using information provided by the NAIC we compiled the Schedule P information necessary to construct reserve runoff ratios from 14 Annual Statements (1997-2010) from all individual companies and DCWP-defined pools,[11] for long-tailed LOBs and 14 RBC filings (1997-2010) from all individual companies and DCWP-defined pools for short-tailed LOBs. The data produces up to 22[12] reserve runoff ratios. By comparison, CCM uses only one Annual Statement with a maximum of 9[13] reserve runoff ratios. In both the method described here and in the CCM "reserve" means the reserve for loss and defense and cost containment expenses (DCCE).[14]
2. The reserve runoff ratio is described in more detail in Appendix H.
3. We applied less restrictive approaches to filtering data, and thereby retained more data for analysis.

In this DCWP research we continued to apply the CCM framework of measuring the RRF as the 87.5th percentile of observed reserve runoff ratios across companies and initial reserve dates.

The intended time horizon for risk charge assessment, as is the case for the CCM, is the

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[10] CAS *E-Forum*, URWP report, Winter 2012,– page 26
[11] Details in DCWP Premium Risk, Report 6, Appendix G
[12] There is runoff data for 22 initial reserve dates, 1988 to 2009. As the most recent annual statement for this research is 2010, there is an initial reserve, but there is no runoff on initial reserves for initial reserve date 2010.
[13] In the 2010 Annual Statement, for example, there is runoff data for initial reserve dates 2001 to 2009. There is also runoff data in the "Prior" Annual Statement row, but the initial reserve value in that row is the reserve for AY 2000 and prior at December 2001, rather than December 2000. Therefore, the initial reserve for runoff from December 2000 needs data from the 2009 Annual Statement.
[14] The RRFs are applied to unpaid loss and loss expenses reserves including the adjusting and other expenses (A&O). The RRFs are calibrated based on loss and DCCE only, as Schedule P runoff is provided for loss and DCCE only.

claim runoff time period. The data can be used for one-year or other time horizons, but that was not explored by the working party.

1.5 Findings

The main findings from this research are the following, organized by section in this paper:

Section 2 – RRFs calibrated based on the CCM (using 9 initial reserve dates from a single Annual Statement) vary, often widely, from Annual Statement to Annual Statement. This variation seems to be driven by the underwriting cycle and other industry-wide effects. Longer-term data appears necessary to achieve stable indicated RRFs.

Section 3 – We identified certain data points as "minor lines" data points if the Net Earned Premium (NEP) for the LOB for all accident years (AYs) combined represents less than 5% of the company's total premium for that LOB for all AYs combined. For certain specialty LOBs the indicated RRFs excluding the minor lines data points are significantly lower, and more relevant, than the RRFs based on all data points. For those LOBs, failure to exclude the minor lines data points appears to result in RRFs that are not representative of risk for data points representing the bulk of the industry LOB reserves.

Section 3 – Pooling can distort the RRFs. The distortion can be at least partially removed.

Section 3 – We define a baseline filtering approach to selecting data for use in our analysis. This baseline is not a recommendation. Rather, it is a practical way to evaluate a variety of alternatives. This baseline is the starting point for the analyses described in Sections 4-8.

Section 4 – Looking at all 22 initial reserve dates and the 'even-year/odd-year' test suggests that the 22-year data set will produce RRFs that are more stable than the CCM across calibrations from year-to-year.

Section 5 – We demonstrate that indicated RRFs vary with LOB-size; i.e., net loss and

DCCE reserve, size by LOB.[15] To the extent that the RBC formula is not intended to have risk charges that vary by LOB-size, we identify two approaches to treating that issue in the context of the RBC Formula: RRFs based on the median LOB-size and RRFs based on LOB-size above a threshold. There may be other suitable approaches.

Section 6 – RRFs are affected by the maturity of the data to an extent that varies by LOB.

Section 7 – For most LOBs, RRFs are lowest for data points from companies with the longest experience period, 20 or more AYs of Net Earned Premium (NEP) > 0.

While maturity adjustments are not included in the baseline that we used for comparative purposes, it would be reasonable to include them in a final RBC calibration.

2. RRFs Based on CCM

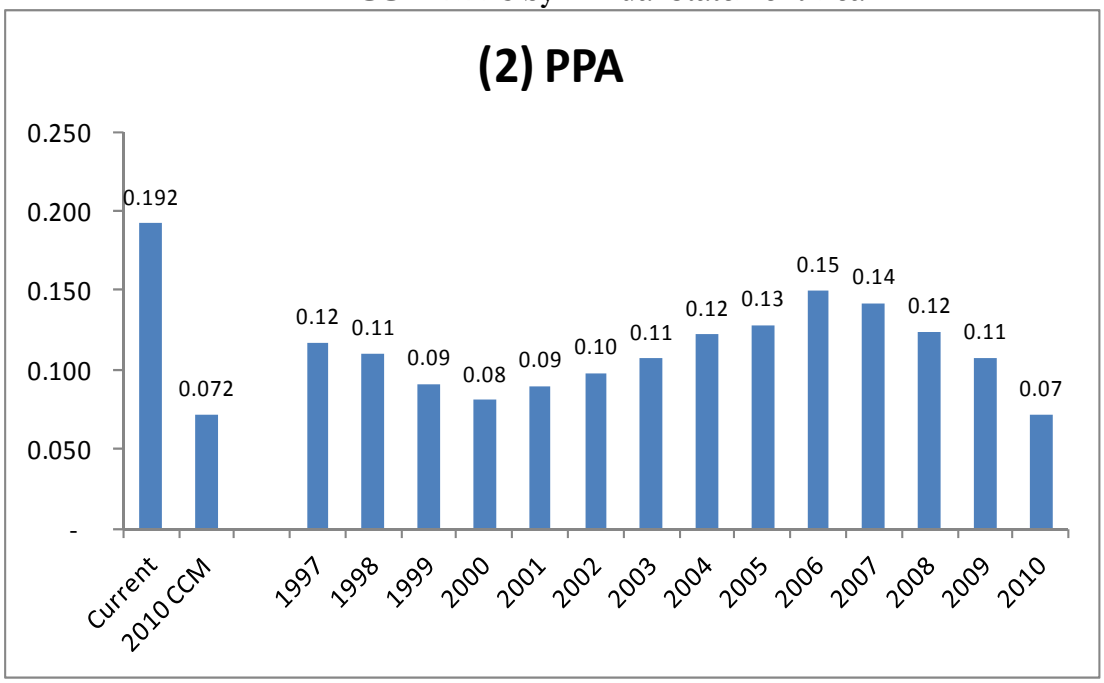
In 2011, the URWP observed that CCM indicated RRFs, based on data from a single Annual Statement, vary widely from year to year and recommended that more data be used in determining the risk charges. In this section we provide a more detailed illustration of the year-to-year variability exhibited by the RRFs indicated by the CCM.

The RRFs indicated by the CCM are based on the empirical 87.5th percentile of the 9 years of reserve development data from all companies at a single Annual Statement date, with filtering described in section 3.2.1.

Table 2.1 shows these values as would be determined from successive Annual Statements from 1997 to 2010, for the Private Passenger Auto (PPA) LOB.

[15] We use the term LOB-size to clearly distinguish between the reserve size of the company and the reserve size for the LOB.

Table 2.1
PPA – CCM RRFs by Annual Statement Year



For this LOB, the RRF varies from 0.07 to 0.15 over the 14 years shown: a swing of eight percentage points RRF with an apparent cycle in the values.

For comparative purposes, the current RRF in the 2010 Formula, 0.192, is shown at the left side of the table. This is the "Industry Loss and Expense %" appearing in Line 04 of 2010 RBC report PR016. The RRF indicated using the CCM and 2010 Annual Statement data, 0.072, is also shown on the left side of the chart. The actual factors were updated over the 2008-2010 period, based on the CCM but subject to limitations ("caps") in year-over-year movements. The caps were ±15% in each of 2008 and 2009, and ±5% in 2010.[16]

Table 2.2 shows the indicated RRFs for workers compensation. Here we see a swing of 24 percentage points of runoff ratio, from 0.10 related to experience in 2000 Annual Statements to 0.34 related to experience in 2008 Annual Statements. The values also show a pattern over time typical of the underwriting cycle.

[16] URWP, page 5

Table 2.2
WC – CCM RRFs by Annual Statement Year

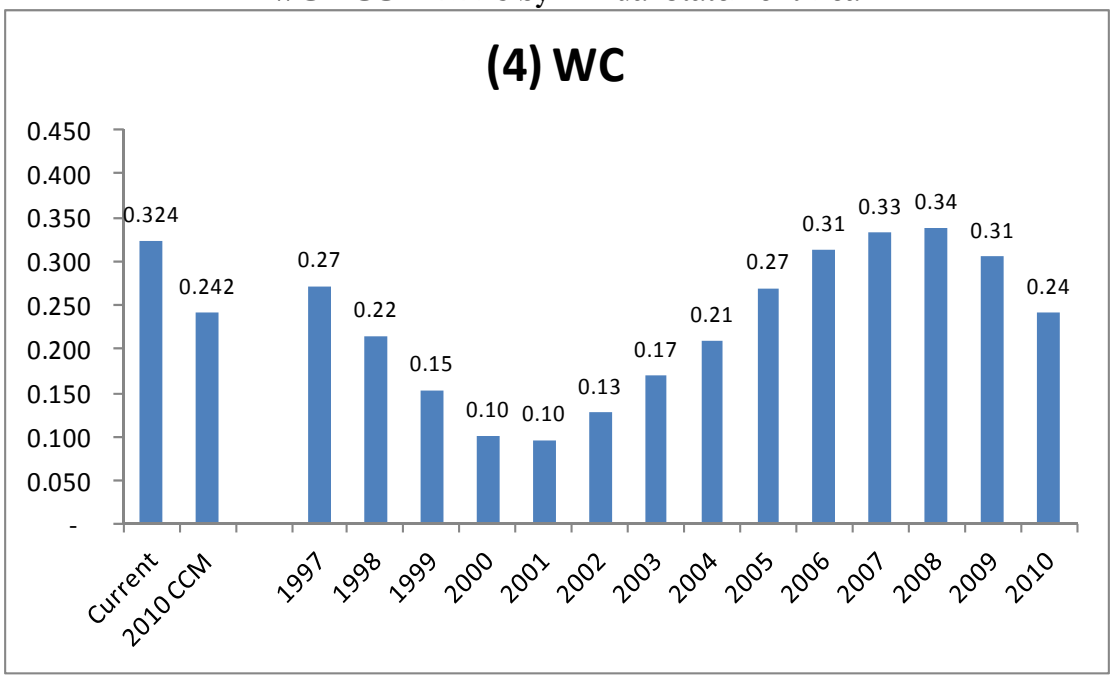
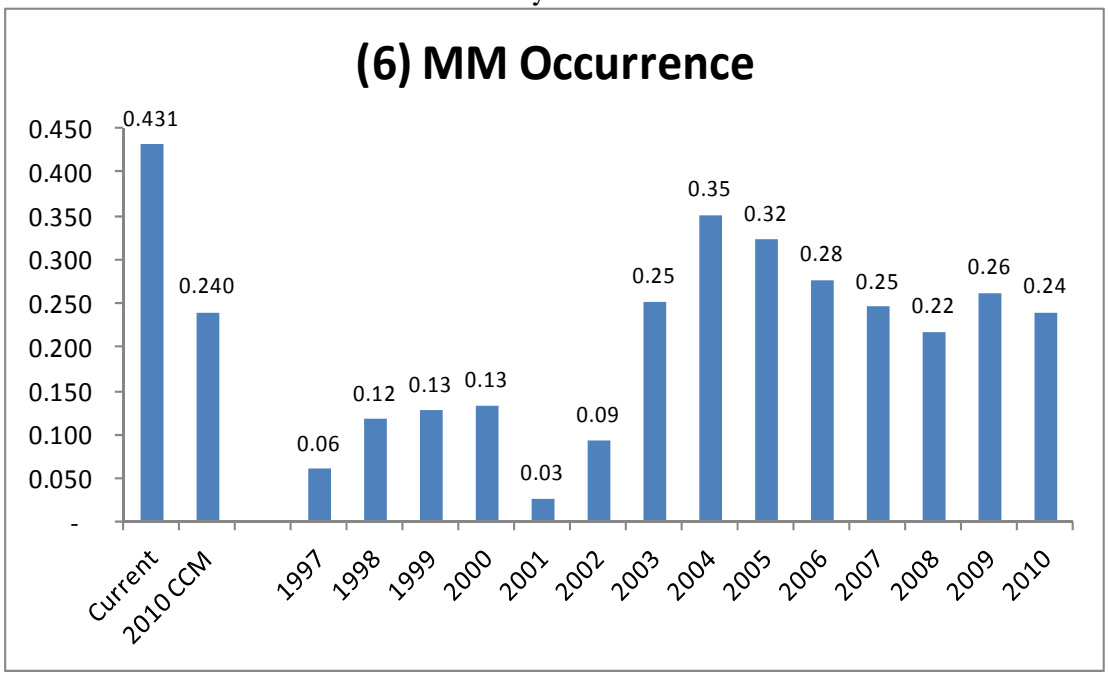


Table 2.3 shows the RRFs for the Medical Professional Liability (MM) – Occurrence LOB. Here the swing is 32 runoff ratio percentage points, from 0.03 to 0.35, from Annual Statement year 2001 to Annual Statement year 2004.

Table 2.3
MM Occ. – CCM RRFs by Annual Statement Year



Similar year-by-year RRF graphs for all LOBs[17] are shown in Appendix A.

It seems clear that the CCM approach of using the most recent Annual Statement will not produce stable RRF indications.

3. Data and Filtering

3.1 Data

Using information provided by the NAIC we compiled Schedule P – Part 2 and Part 3 information from 14 Annual Statements (1997-2010)[18] from all individual companies and DWCP-defined group pools (pools). That provides over 200,000 data points, covering 22 initial reserve dates many of them developed to 9 years maturity. The CCM uses only one Annual Statement with a maximum of 9 initial reserve dates and only one initial reserve date

[17] Appendices A-C and E-F do not include LOBs (14) Financial and Mortgage or (19) Warranty as the number of data points for these LOBs is very limited (see Appendix D and G-Part 2 for data point counts).
[18] For companies that did not file a statement in 2010 or companies that did not begin filing statement until after 1997, there were fewer than 14 Annual Statements.

at 9 years maturity.

Each data point is an initial reserve date-LOB, for a single company or pool, at the latest available maturity. For each data point we have the following information:

- Loss and DCCE reserves at the initial reserve date (initial reserve)
- Reserve runoff at the latest available maturity
- Runoff ratio – the ratio (2)/ (1)
- Age at the latest maturity: 12 months (initial reserve), 24 months (12 months after initial reserve), etc.
- The data point LOB premium and LOB reserve amounts as percentages of all-line premium and all-line reserves, to identify minor lines described under Section 3.2.2.

3.2 Filtering Methodologies

We use the term "filtering" to describe the manner in which we treat data features that might affect the indicated RRFs, such as data errors, LOB-size, maturity of loss experience, etc. In the sections below we discuss the CCM filtering and DCWP filtering approaches.

3.2.1 CCM Filtering

CCM uses data from only one Annual Statement for the calibration. In the CCM all data associated with a LOB for a company is removed if, for the ten years of data included in the latest Annual Statement the company "fails" any of the following tests:

- The company has negative paid values in any AY at any reserve date; or
- The company has negative reserves in any AY at any reserve date (used -$5K to account for rounding errors of Part 2 less Part 3 data); or
- The company has negative incurred amounts in any AY at any reserve date; or,
- The company does not have sufficient (10) years of AY data (determined from the premium risk data filtering).

For each remaining company, the reserve runoff ratio is calculated for each LOB and each initial reserve date by dividing incurred loss and DCCE development (reserve movement) by the initial reserve.

Reserve runoff ratios are capped in the range of -100% to +400%.

3.2.2 Alternative Filtering Methods

In this analysis, we use a less restrictive filtering process.

Positive Values Where Expected

All data associated with a LOB for a company is removed if, for the ten years of data included in an Annual Statement, the company "fails" any of the following tests

- The company has negative paid values for all AYs combined at any reserve date; or
- The company has negative reserves for all AYs combined at any reserve date;[19] or
- The company has negative incurred amounts for all AYs combined at any reserve date.

Consistency Between Annual Statements – "Prior" Annual Statement line

In addition, for this analysis we need to match data from one Annual Statement to the next to maximize the use of the "Prior" data row in Schedule P. Therefore, we applied a consistency test as follows:

Test 1: Reserve in Prior line of the first reserve date (Prior_1) is compared to the reserve for the same group of AYs at the same evaluation date from the prior year's statement (Prior_2). As these values should represent the same information at the same evaluation dates, the values should be the same.

As this is not always the case[20] we say the test fails if the difference is greater or equal to 5%. If the Test 1 difference is small enough, the data point is retained. If the Test 1 difference is too large, Test 2 will be performed.

Test 2: Prior_2 is compared to the reserve for the same group of AYs at the same evaluation date from the second prior year's statement. The test fails if the difference is greater or equal to 5%. If Test 2 fails, data point Prior_1 is removed; otherwise Prior_1 is replaced with Prior_2.

Appendix H shows examples of the consistency tests.

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[19] We use minus 5 thousand dollars (-5k) as a weaker threshold rather $0 to avoid discarding data due to rounding errors in using differences between Schedule P Part 2 and Schedule P Part 3, each if which is rounded to thousands.

[20] For example, changes in pooling arrangements from year to year might cause the values to be inconsistent.

Test for Outliers

During the analysis, we observed 210 data points with very high runoff ratios ("outliers"). Reviewing the data showed that a significant portion of those outliers appear to have been caused by inconsistent reporting of paid and incurred loss and DCC triangles in Schedule P Part 2 and Part 3, not connected with inconsistencies between statements on the "Prior" line. This outlier problem is worse for short-tailed LOBs, which are from RBC filings, than for long-tailed LOBs, which are from Schedule P. We excluded data points with runoff ratios greater or equal to 500% from our baseline data set.[21] The effect by LOB of this filter is shown in Appendix G Part 1.

In the rest of this section we discuss four other data filtering issues: pooling, minor lines, LOB-size, and years of NEP greater than zero (NEP>0).

Pooling – For companies with intergroup pooling arrangements the Schedule P reserve runoff ratio for each LOB-AY is the same for each pool member; the common reserve runoff ratio is the weighted average reserve runoff for that LOB-AY across all pool members rather than the individual pool member runoff ratio before pooling.

That feature of the data would distort the results of our analysis in that:

- The same reserve runoff ratio would appear multiple times, reducing the apparent variability in the reserve runoff across companies;
- Companies that appear small based on their pooling percentages would show the lower year-to-year variability associated with the larger size of the overall pool rather than the higher year-to-year variability associated with a company of its apparently smaller size.

To mitigate these effects, we would like to combine the separate pool participants into a single group-wide data point for each LOB-initial reserve date. If that were done, the data would reflect the correct variability between companies and the proper data point LOB-size.

[21] Excluding the data point from the data set has more effect than using the data point and limiting the value assigned to it. Limiting data point values to 500% will have no effect on the 87.5th percentile calculation if the 87.5th percentile level is below 500%. Removing the data point will reduce the 87.5th percentile level by reducing the number of data points above any level. We believe removing the data points is a reasonable adjustment because we believe the data points are erroneous and not an indication an actual high data runoff value.

We use information in the Annual Statements to identify individual companies that appear to be part of a larger pooled entity. There are 3,730 NAIC legal entities in the initial data set. Of these, 2,695 are not part of any pool and 1,035 entities are mapped into 206 DCWP-constructed pooled entities. Thus the total data set includes 3,730 – 1,035 + 206 = 2,901 entities in total.[22] Our approach to identifying relevant pools is discussed in Appendix G of DCWP Report 6, RBC Premium Risk Charges.[23]

LOB-Size – Indicated RRFs vary by LOB-size, and in Section 5 we evaluate RRFs by LOB-size. In the sub sections below, we test the effect on indicated RRFs of excluding a data point if the LOB reserve is below a threshold which varies by LOB. The selected thresholds are listed in at the end of Appendix B.

Minor Line Filtering – In the premium risk charge analysis in DCWP Report 6 we defined minor lines data points (each data point is a specific AY/LOB) as data points for which the AY NEP for the LOB was less than 5% of the AY NEP for all LOBs combined, separately for each AY.

The straightforward analogue for reserves is to define minor lines data points (each data point is a specific initial reserve date/LOB) as data points for which the initial reserve for the LOB is less than 5% of the initial reserve for all LOBs combined, for the same initial reserve date. We refer to this as a 'reserve-based-definition". However, the reserve-based definition is problematic because (a) short tail lines were too often categorized as minor lines because reserves were low, even though premium was significant; and (b) while certain aspects of management attention reflect reserve size, other aspects of management attention would relate to premium size.

Therefore, we also consider a premium-based, definition that uses premium but recognizes that reserves reflect premium for multiple years. In this premium-based definition, a minor lines data point is a data point where the LOB NEP for all AYs combined is less than 5% of the all-lines total NEP for all AYs combined. We refer to this as an "all-year-premium-based definition." With this definition, for a given company, minor lines is a characteristic of all initial reserve date/LOB data points, regardless of the initial

[22] For each LOB, the number of entities is smaller, as not all companies have written business in each LOB.
[23] As described in Appendix G of Report 6, our approach is approximate as it does not necessarily identify all pools and it may combine some LOB/companies that are not actually pooled.

reserve date.

In section 3.3, Sensitivity Testing, we compare the indicated RRFs using (1) data including minor line data points, (2) data excluding minor line data points based on the reserve-based definition and (3) data excluding minor line data points based on the all-year-premium-based definition.

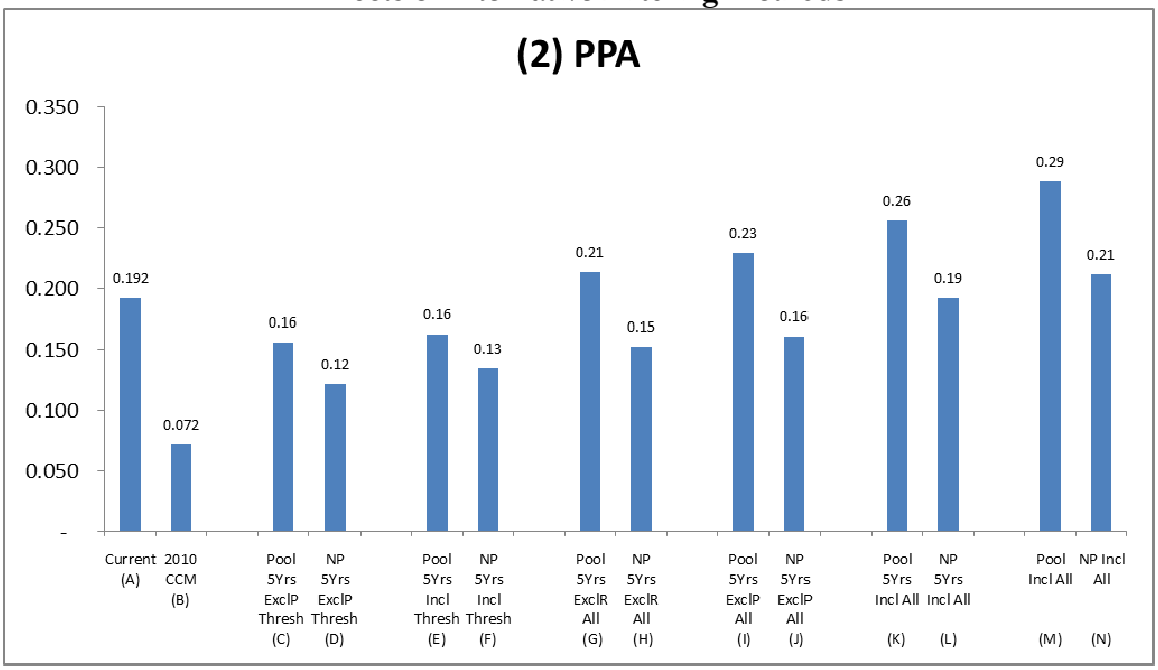
Years NEP>0 - The baseline filtering excludes data from LOBs where the company has had less than five years of positive NEP in that LOB. The five year trigger was selected given that some minimum seemed appropriate, and we wanted to test a criterion that was less strict than the 10 year requirement in the CCM.

3.3 Sensitivity Testing

In this section we describe how we tested the extent to which pooling, minor lines, LOB-size, and years of NEP>0 affect the indicated RRFs.

Table 3.1 shows the results of our filtering sensitivity analysis for the PPA LOB.

Table 3.1
PPA – Effects of Alternative Filtering Methods



The following table explains the legend used in Table 3.1 and will be useful as we discuss the various columns in Table 3.1:

Pool	Pooled data points replace individual company data points, where appropriate
NP	"Un-pooled" data points, using data points before consolidation to reflect pooling arrangements.
5Yrs	Data points from companies/pools with at least five years of premium data
ExclP	Excluding minor line data points – all-year-premium-based definition
ExclR	Excluding minor line data points – reserve-based definition
Incl	Including minor LOB data points
Threshold	LOB-size threshold applied (Thresholds shown at the end of Appendix B)
All	LOB-size threshold not applied

The "Current" and "2010 CCM" values shown in columns A and B at the left of the graph are unchanged from Section 2. We now focus on the pairs of values from right to left.

A comparison of the values in columns M and N at the far right shows the effect on indicated RRFs of pooling adjustments; the "Pool" and "NP" labels designate "Pooling"

adjustment applied and "No Pooling" adjustment applied, respectively, with no other filtering. Comparing columns M and N, we see an increase in the indicated RRF using pooled data, from 0.21 to 0.29.

The values in columns K and L show the indicated RRFs excluding data points from companies with less than five years of NEP>0. Comparing columns K and L to M and N, respectively, we observe a decrease in the indicated RRFs by excluding the data points from companies with less than five years of NEP>0; from 0.29 to 0.26 for pooled data and a decrease from 0.21 to 0.19 for unpooled data.

The values in columns G, H, I, and J show the indicated RRFs excluding minor lines filtering based on two definitions of minor lines.

The label "ExclP" used in Columns I and J, indicates that we use the all-year-premium-based minor lines definition; i.e., minor lines data points are excluded if the all-year[24] premium for data point LOB represents less than 5% of the all-year premium for all LOBs combined. The RRFs based on data excluding all-year-premium-based minor lines are shown in Columns I and J, for pooled and unpooled data points respectively. Comparing columns I and J to columns K and L, respectively, we observe a decrease in the indicated RRFs from 0.26 to 0.23 for pooled data and a decrease from 0.19 to 0.16 for unpooled data when minor lines data points are excluded based on premium.

The label "ExclR," in Columns G and H, indicates the use of a reserve-based minor lines definition; i.e., minor lines data points are excluded if the reserve initial reserve for the data point LOB represents less than 5% of the total of the initial reserves for all LOBs combined. The RRF based on data excluding reserve-based minor lines are shown in Column G and H for pooled and unpooled data points respectively. Comparing columns G and H to columns K and L, we observe a decrease in the indicated RRFs from 0.26 to 0.21 for pooled data and a decrease from 0.19 to 0.15 for unpooled data when minor lines data points are excluded based on reserves.

The label "Thresh" in columns C, D E and F indicates the use of the LOB-size threshold.

[24] As discussed in Section 3.2.2, we used the all-year premium rather than a single AY of premium in that the reserve at the initial reserve date represents the risk remaining for all AYs prior to the initial reserve date. We selected all-year premium because of its simplicity. We considered, but did not using more complex premium relationships.

The label "All" in columns G – M indicates that data points of all LOB-sizes are included. Comparing columns E to K and F to L, we again see decreases in the indicated RRFs, from 0.26 to 0.16 and from 0.19 to 0.13.

We observe that the decrease in indicated RRF is larger based on LOB-size threshold than the decrease based on exclusion of minor lines; i.e., that the RRF in Column E is less than the RRF in columns G or I, and similarly for Column F compared with columns H or J. We characterize this as "LOB-size filter is more significant than minor lines filter" for PPA. This general pattern appears in many of the LOBs.

Finally, the values in columns C and D show the indicated RRFs with the 5 year premium requirement, LOB-size, and premium-based minor line filters combined. Comparing columns C and D against the other pooled/not-pooled pairs, there is a further decrease in indicated RRF by applying both the minor line and LOB-size filters.

Table 3.2 displays the filtering sensitivity results for the Homeowners/Farmowners LOB. As with PPA, the Homeowners/Farmowners data shows the following:

- The RRF based on pooled data is higher than the RRF based on unpooled data.
- The RRF excluding minor lines data points is lower than the RRF including minor lines data points.
- The RRF excluding LOB-size below the threshold is lower than the RRF across all LOB-sizes.
- The LOB-size filter is more significant than minor lines filter.

Table 3.2
Homeowners/Farmowners – Effects of Alternative Filtering Methods

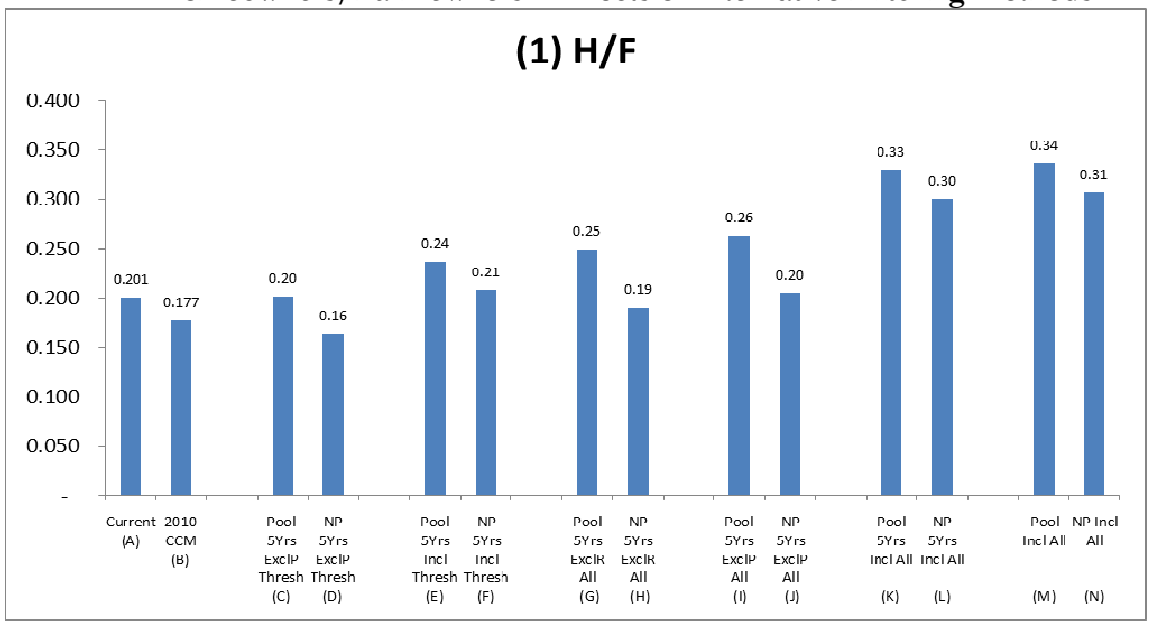
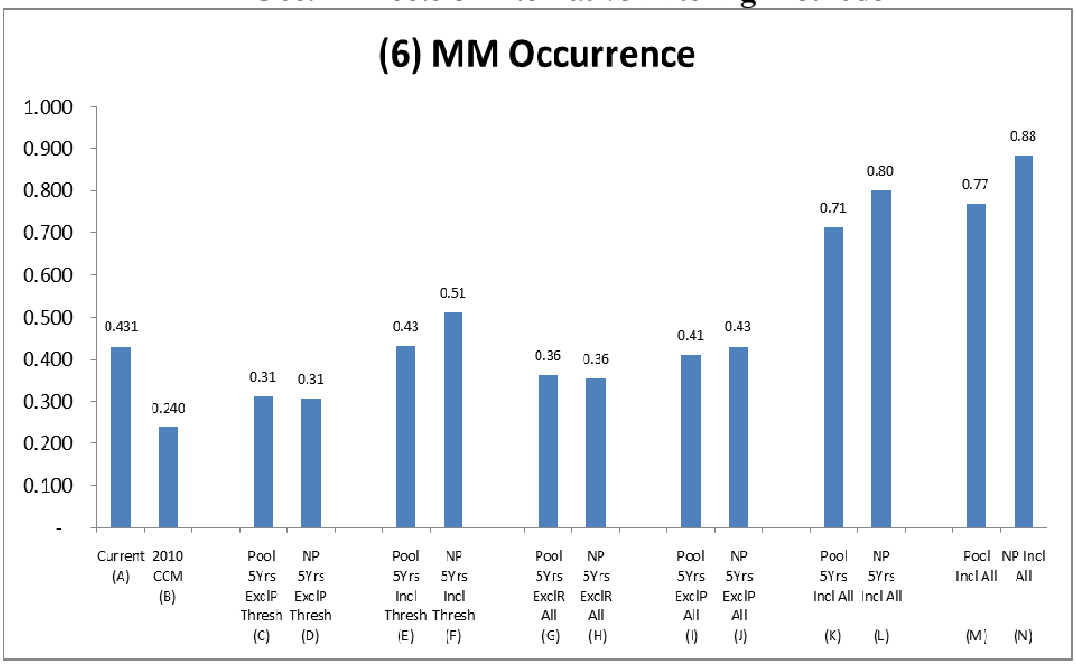


Table 3.3 shows indicated RRFs for the MM – Occurrence LOB with the various filter combinations.

Table 3.3
MM Occ. – Effects of Alternative Filtering Methods



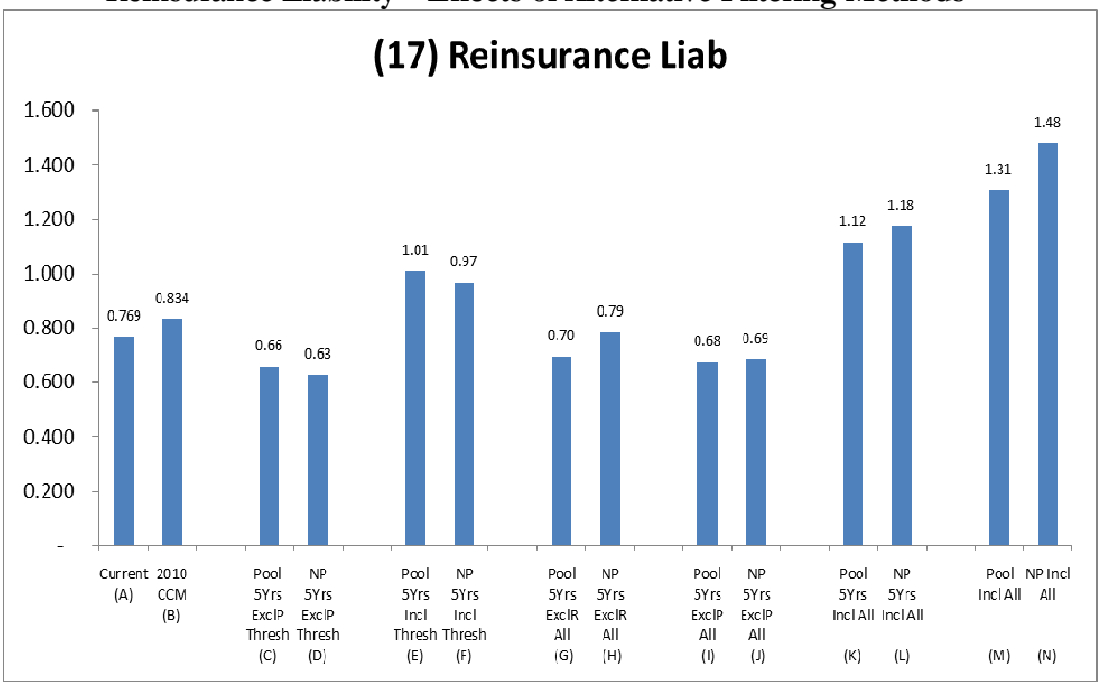
In many respects, the pattern for this MM – Occurrence LOB is similar to the pattern for PPA and Homeowners/Farmowners. However, the pair of columns I and J (or G and H) are lower than the columns E and F, showing that the minor lines filter has a larger effect than the LOB-size filter. This result demonstrates what might be called a "specialist effect," i.e., RRFs are larger for many insurers who write MM – Occurrence coverage but for whom MM – Occurrence is not a significant part of the overall business.

Also, for MM Occurrence, the RRF based on pooled data is lower than the RRF based on data not adjusted for pooling. That is the reverse of the pattern observed for PPA and Homeowners/Farmowners, and most other lines. This indicates that the data points for companies in pools include more of the extreme runoff ratios than data points from companies not in pools. This may relate to the specialist effect, as there may be less pooling for specialist companies.

The pattern of the RRFs for Reinsurance – Liability LOB in Table 3.4 is similar to the pattern of RRFs for MM-OCC. In fact, for Reinsurance – Liability the "specialist" effect is so significant that the minor lines filter alone produces almost the same effect as minor lines plus LOB-size filters; compare columns I and J (or G and H) to columns C and D. Also, as

with MM, the unpooled data indicates a higher RRF than the data adjusted for pooling.

Table 3.4
Reinsurance Liability – Effects of Alternative Filtering Methods



Corresponding graphs for all LOBs are shown in Appendix B.

Baseline Filtering

In the following sections, unless otherwise indicated we use data

- on a pooled basis,
- excluding minor lines data points (all-year-premium-based definition),
- excluding data points with LOB-size below the selected LOB-size threshold shown at the end of Appendix B, and
- excluding data points from companies with less than five years NEP for the LOB.

For convenience, we refer to this as the "baseline filtering".

Note that notwithstanding the fact that this analysis relates to reserves, in our further work we use the all-year-premium-based minor line definition. Based on reserves, we observed that short-tail lines tend to become minor lines even for companies where the LOBs are far from minor with respect to premium volume. By using premium for the

definition, we include more data and better distinguish minor from non-minor within the short tail lines.

Column C in Tables 3.1-3.5 and Appendix B show the RRFs indicated from baseline filtering for each LOB.

Table 3.5 shows the all-lines number of data points and amount of reserves remaining after each component of the baseline filtering.

Table 3.5
Number of data points and amount of reserve after each step of the baseline filtering
All LOBs Combined

	Reserves ($000,000s)[25]	Data Points
Un-Pooled	8,793,420	229,753
Pooled	8,732,076	128,439
Five year NEP >0	8,702,192	119,509
Excluding Minor LOBs	7,682,622	71,352
Size Threshold	7,678,135	56,127
Outliers[26]	7,676,003	55,917

Appendix G Part 2 shows the proportion of data points and reserve amount by LOB that remain in the data set after filtering, by LOB.

4. Indicated RRF by Initial Reserve Date

In this section we show indicated RRFs by initial reserve date using the baseline filtering. The indicated RRF at each initial reserve date is the 87.5th percentile runoff ratio across data points, after baseline filtering, for all data points with the selected initial reserve date.

Table 4.1 shows these RRF values for the PPA LOB.

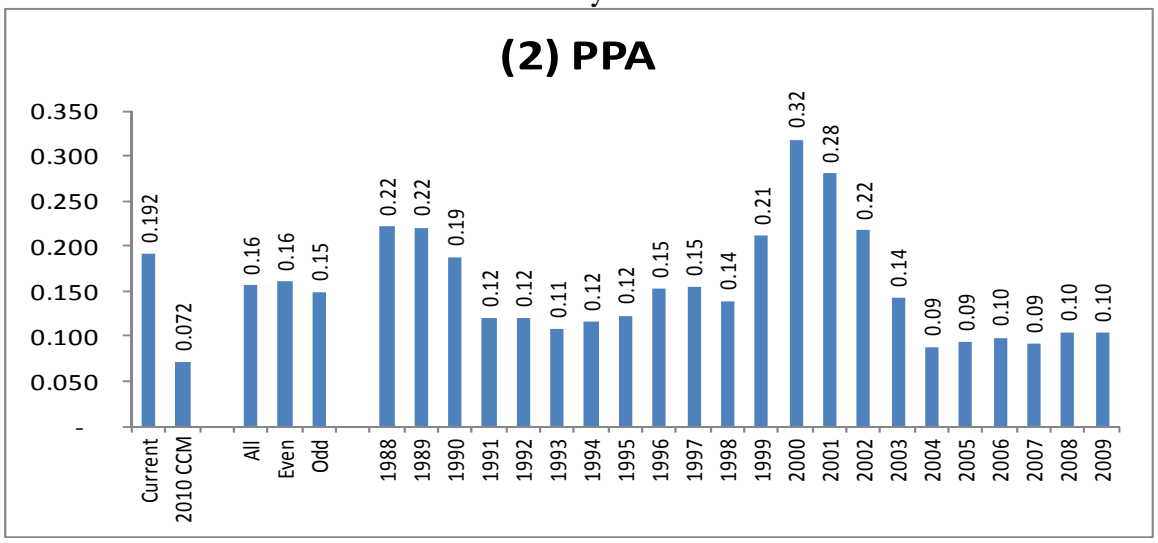
In Table 4.1 the "Current" and "2010 CCM" values on the left side of the chart are

[25] These aggregate reserve amounts are large numbers because they represent the sum of reserves over 23 initial reserve dates. $8.793 million millions (i.e., $ 8.8 trillion) of initial reserves over 23 years is an average initial reserve of about $400 billion, consistent with 2009 initial reserves of approximately $500 billion

[26] After the baseline filtering, there are 159 data points with runoff ratio greater or equal to 500% for 2-year Schedule P lines combined; these 159 points represent reserve amount of 1,011 million, less than 0.1% of the total reserves in the data set. For all 10-year Schedule P lines combined, there are 51 data points with runoff ratio greater or equal to 500%; they represent a reserve amount of 1,122 million.

unchanged from the values in the corresponding graphs in Sections 2 and 3. The column "All" on the left shows the indicated RRF combining all initial reserve dates, again with baseline filtering.[27] The "Odd" and "Even" values represent the results using odd and even initial reserve dates, and give one perspective on whether the results will change significantly if additional years were added to the data set.

Table 4.1
PPA – Indicated RRFs by Initial Reserve Date



Not surprisingly, the individual year-to-year results exhibit more variability than the 10-year average CCM values shown in Section 2. However, the comparison of the "Odd" and "Even" results, 0.16 and 0.15, to the "All" result, 0.16, suggests that the random variation from year-to-year is significantly smoothed over twelve years if spread over sufficient underwriting cycles and other systemic effects.

We also tested variability across every fourth data point (sets of 4 or 5 data points). This is a smaller set, and we expect that the correlation across four years is much less than the correlation between adjacent years. The results of that test, presented at the end of Appendix C, show more variability than the even/odd test, but still much less than the year-to-year variation in the CCM.

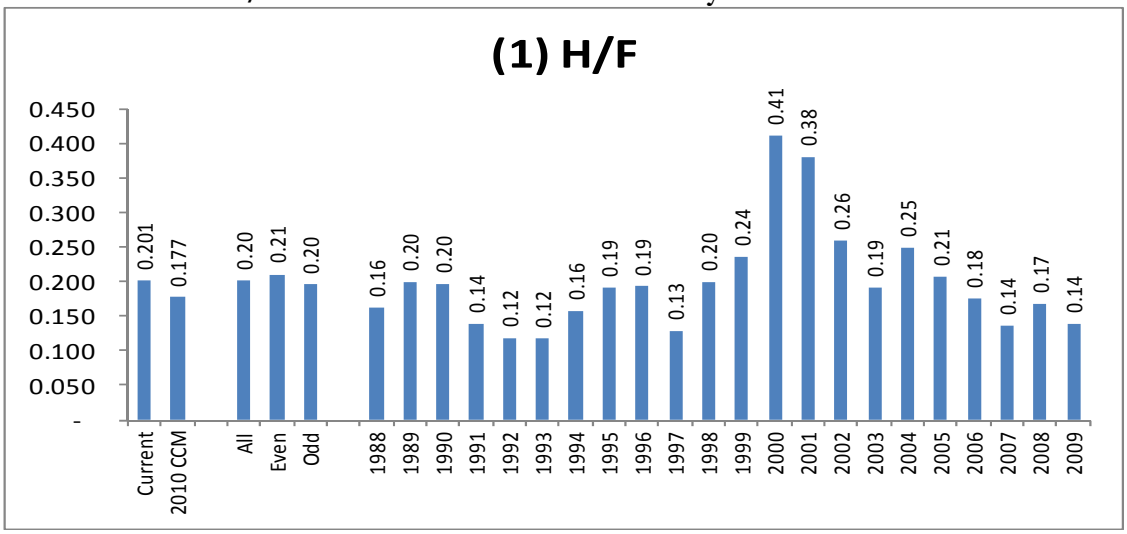
[27] The "all year" indicated RRF is not the average of the year-by-year RRFs. The "all year" RRF is the 87.5th percentile reserve runoff ratio among all reserve runoff ratios, after baseline filtering, regardless of reserve date.

In examining year-by-year data, note that the oldest initial reserve dates shown are 9 years mature, and the more recent years are between one and eight years mature. In Section 6 we observe that for initial reserve dates 1998-2001, RRFs increase with increasing maturity. To the extent that recent year RRFs change with increasing maturity, then the more recent initial reserve date RRFs should be used with caution.[28]

Also note that as RRFs are the 87.5th percentile of runoff ratios in each year, they will vary (a) as average runoff ratio varies and (b) to the extent that variability (e.g., as measured by standard deviation) changes from year to year. We have not studied the components separately.

Table 4.2 shows the indicated RRFs for the Homeowners/Farmowners LOB.

Table 4.2
Homeowners/Farmowners – Indicated RRFs by Initial Reserve Date

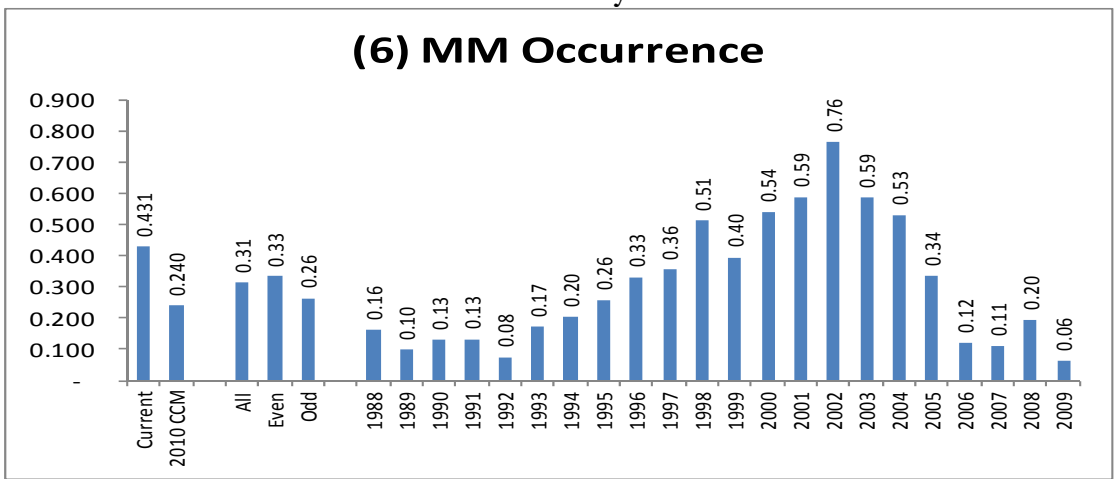


In this case the "Odd" and "Even" values are stable, a difference of 0.01 from 0.20 to 0.21. Unlike the situation for PRFs discussed in Report 6, the catastrophe years 1994, 1996 and 2008, which are high for premium risk factors, are not high for RRFs.

[28] This maturity pattern may not apply for all reserve years. For example reserve years 1998-2001 might have been affected by the adverse side of the underwriting cycle for a LOB like reinsurance. Initial reserve dates on the favorable side cycle might (possibly) develop less unfavorably or even develop favorably. The working party did not test these hypotheses.

Table 4.3 shows the indicated RRFs for the MM – Occurrence LOB.

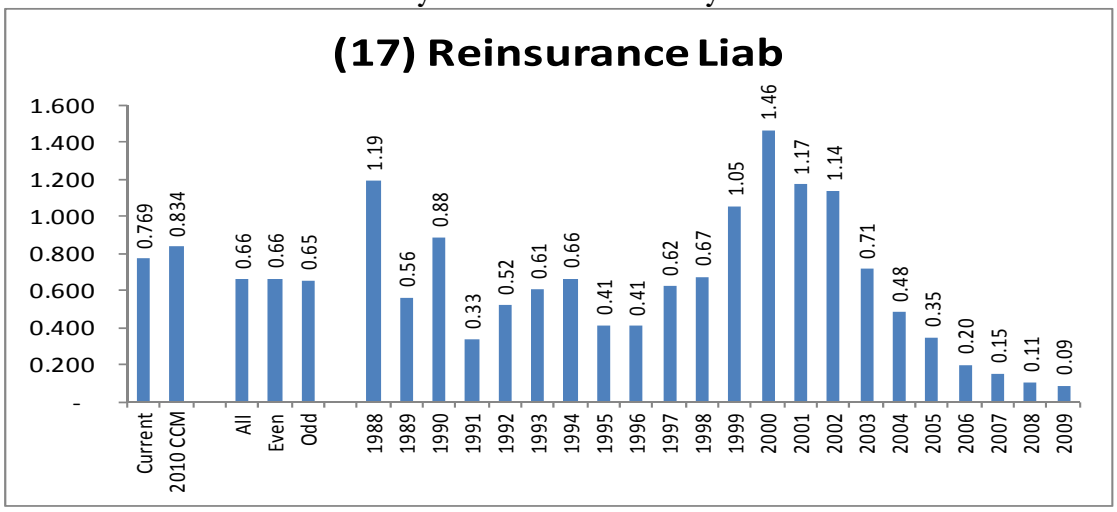
Table 4.3
MM Occ. – Indicated RRFs by Initial Reserve Date



The odd year and even year indicated RRFs vary from 0.26 to 0.33, less variation than in the year-by-year data, but not insignificant relative to the all-year indicated RRF.

Finally, Table 4.4 shows the indicated RRFs for the Reinsurance – Liability LOB.

Table 4.4
Reinsurance Liability – Indicated RRFs by Initial Reserve Date



Again, although the year to year variability is large the odd/even test again indicates the stability resulting from use of additional years of data.

Corresponding graphs for all LOBs are shown in Appendix C.

5. Analysis of LOB-size

In this section we examine the effect of LOB-size on indicated RRF.

To do this, we group LOB results into percentile LOB-size bands and calculate RRFs for the runoff data points in each band.[29] LOB-size bands refer to the LOB-size, regardless of the company size.

Table 5.1 displays the results for the PPA LOB. The row labels in column A refer to the upper-size end of the LOB-size band, so the first row, labeled 15%, refers to data points with reserve amounts in percentiles 0%-15%. The second LOB-size band covers the next 10% of data points, up to the 25th percentile in reserve LOB-size. In the final two rows of the table we show the largest 5% of data points, split between the "95% to largest 100" data points[30] (penultimate row) and the largest 100 data points (final row)

Columns B and C show the lower and upper reserve LOB-sizes corresponding to the percentile levels.

Column D shows the number of data points included in each row.[31]

Column E shows the RRF based on data within the LOB-size band. As expected, we observe in column E that the indicated RRFs are highest in the smallest LOB-size band, and generally decrease in value as we progress through the larger LOB-size bands.

Column F shows the RRF based on all LOB-size bands at or above the LOB-size for that row. For example, the first row in Column F is the RRF for all data points, regardless of LOB-size. The second row in Column F is the indicated RRF for all data points in the top 85% of LOB-sizes; the third row is the indicated PRF for data points in the top 75% of LOB-sizes, and so on. The row called "100%" shows the RRF for the largest 100 data points alone. In this row column E = column F.

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[29] The RRF for a size band is the 87.5th percentile of the runoff ratios for reserve runoff points in the LOB-size band, potentially a small data set.

[30] For some LOBs, the largest 5% of data points constitutes less than 200 data points. For those LOBs, the 'largest l00' means the top 2.5% of data points, even if that is less than 100 data points.
Also, as a single company can have as many as 22 data points, one for each initial reserve year, the top 100 data points might represent only 5 or 6 companies.

[31] The number of data points in Column D is not quite the expected percentage of the total number of points in each cell because, as reserve amounts are rounded to thousand, and multiple years have the same LOB- size when rounded to thousands.

We show the RRF in the 2010 Formula, 19.2%, at the bottom row of the Table.

Table 5.1
PPA – RRFs by LOB-size

(2) PPA					
(A)	(B)	(C)	(D)	(E)	(F)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio	
Endpoint			Data	all points	all points
Percentile	from	to	Points	in band	>"from"
15%	0	812	1,351	79.4%	23.0%
25%	812	1,953	903	41.0%	**17.9%**
35%	1,953	4,004	898	31.3%	15.6%
45%	4,004	7,446	901	26.0%	13.9%
55%	7,446	12,522	901	**19.3%**	12.0%
65%	12,522	20,740	901	13.5%	10.2%
75%	20,740	42,864	902	15.7%	9.2%
85%	42,864	105,325	899	8.7%	7.4%
95%	105,325	540,618	901	5.2%	6.2%
largest 100	540,618	3,466,207	351	10.6%	8.0%
100%	3,466,207	17,069,357	100	2.2%	2.2%
	Current Risk Charge Runoff Ratio (PR016, Line 4)				19.2%

There are various ways we might use this information to select the RRF for an RBC formula. One approach is to use the RRF indicated based on data points with LOB-size above a threshold that varies by LOB (threshold approach). The threshold might be selected based on judgment, to maximize the number of data points used while minimizing distortions in the indicated RRF. For the PPA LOB we selected a LOB-size threshold of $1.95 million (Appendix B, PPA, Column C), and Table 3.1 showed that the RRF based on that size threshold is 0.16 (15.6% before rounding).

Alternatively, the threshold might be based on a particular percentile of data points; e.g., excluding the smallest 15% of LOB-size data points. The item marked in bold and underline in the "25%" row of column F indicates the value obtained by setting the threshold to exclude the smallest 15% LOB data points. The RRF based on excluding the smallest 15% LOB-size data points (LOB-size $812,000 or less) is 17.9%.

The second approach is to identify the RRF associated with the median LOB-size, or range of data points around the median LOB-size (median approach). The item marked in bold and underline in column E of the "55%" row, i.e., the value included between the 45th and 55th LOB-size percentiles, is the indicated median value. In Table 5.1 above, we note that the 87.5th percentile reserve runoff ratio for the median LOB-sizes, 19.3%, is quite close

to the 19.2% value used in the 2010 RBC Formula for this LOB. This is not the case for all LOBs.

Another approach is to have RRFs vary by LOB-size. Currently, none of the standard formulas vary RRFs in this way; however, Table 5.1 shows that the indicated RRFs for the largest data points (2.2%) is only a fraction as large as the RRF indicated by the median or 15% threshold approaches (19.3% or 17.9%). Thus, using the median or threshold approach to setting RRFs means that the safety margin for the larger data points is higher, perhaps much higher, than the 87.5th percentile.

Table 5.2 displays the results for the Homeowners/Farmowners LOB; the pattern of variation by LOB-size is similar to that of the PPA LOB. The RRFs based on median and threshold approaches are similar, but not as close to each other as they were for PPA. The decrease in RRF from the median to the largest data points, from 27.7% to 5.6%, is a decrease of nearly 80%.

Table 5.2
Homeowners/Farmowners – RRFs by LOB-Size

(1) H/F

(A)	(B)	(C)	(D)	(E)	(F)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio	
Endpoint Percentile	from	to	Data Points	all points in band	all points >"from"
15%	0	169	1,398	83.3%	26.3%
25%	169	357	926	41.1%	**22.5%**
35%	357	672	931	33.6%	20.1%
45%	672	1,274	927	28.8%	18.0%
55%	1,274	2,500	932	**27.7%**	16.5%
65%	2,500	4,819	927	27.5%	14.2%
75%	4,819	9,742	930	14.2%	11.7%
85%	9,742	19,775	929	8.3%	10.4%
95%	19,775	74,324	930	12.2%	11.5%
largest 100	74,324	521,808	365	11.2%	10.4%
100%	521,808	27,109,142	100	5.6%	5.6%
	Current Risk Charge Runoff Ratio (PR016, Line 4)				20.1%

Table 5.3 displays the results for the MM – Occurrence LOB. The RRFs by LOB-size are more erratic for this line than for the two lines discussed above. The indicated RRFs have a 'local minimum' near the median LOB-size level and have lower values for some of the largest LOB-sizes. This pattern may be due to the relative low number of data points or

differences in types of business (primary vs. excess or institutions vs. health care providers) among the smaller, medium, and larger LOB-sizes.

The RRFs for the median and threshold approaches in Table 5.3, 17.5% and 30.5% respectively, are both lower than the RRF in the 2010 Formula, 43.1%. One factor contributing to this difference is the years of data used. As shown in Table 4.3, the RRFs for MM – Occurrence vary by initial reserve date. The RRF in the 2010 RBC formula may not fully reflect the effects of the more favorable 2006-2009 years included in data underlying Table 5.3.[32]

Another factor contributing to the difference between the RRF in the 2010 Formula and Table 5.3 indicated RRFs may be that data in Table 5.3 excludes minor lines data points while data underlying the RRFs in the 2010 Formula was not adjusted in that way. Table 3.3 showed that excluding minor lines data points has a significant effect on the indicated MM – Occurrence RRF.

[32] While 23 years might be considered a long period, to the extent that the 23 years in this data set, 1988-2010, had more favorable runoff experience than the prior decades, an RBC charge based on the past two decades alone might not be reflective of the long-term future experience.

Table 5.3
MM Occ. – RRFs by LOB-Size

(6) MM Occurrence					
(A)	(B)	(C)	(D)	(E)	(F)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio	
Endpoint Percentile	from	to	Data Points	all points in band	all points >"from"
15%	0	1,923	183	196.0%	41.1%
25%	1,923	5,289	122	67.8%	**30.5%**
35%	5,289	11,711	123	33.2%	24.8%
45%	11,711	19,746	122	31.4%	23.7%
55%	19,746	37,357	122	**17.5%**	22.5%
65%	37,357	73,248	122	58.4%	24.9%
75%	73,248	113,195	123	40.1%	19.7%
85%	113,195	245,022	122	12.2%	8.7%
95%	245,022	727,276	122	7.6%	7.4%
largest 100	727,276	1,397,205	31	-4.8%	7.1%
100%	1,397,205	3,130,491	31	9.0%	9.0%
	Current Risk Charge Runoff Ratio (PR016, Line 4)				43.1%

Table 5.4 displays the results for the Reinsurance – Liability LOB.

Table 5.4
Reinsurance Liability – RRFs by LOB-Size

(17) Reinsurance Liab					
(A)	(B)	(C)	(D)	(E)	(F)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio	
Endpoint Percentile	from	to	Data Points	all points in band	all points >"from"
15%	0	3,688	202	114.2%	67.6%
25%	3,688	8,712	135	55.2%	**65.0%**
35%	8,712	18,749	135	78.7%	65.6%
45%	18,749	34,829	135	58.3%	63.3%
55%	34,829	69,801	136	**93.9%**	63.9%
65%	69,801	136,546	135	43.8%	61.2%
75%	136,546	251,973	135	46.4%	65.3%
85%	251,973	582,726	135	68.8%	69.6%
95%	582,726	2,170,556	135	66.4%	70.8%
largest 100	2,170,556	4,502,562	34	122.8%	104.2%
100%	4,502,562	11,516,723	34	4.8%	4.8%
	Current Risk Charge Runoff Ratio (PR016, Line 4)				76.9%

The RRFs for this line generally decline with size, but the pattern is erratic, perhaps due

to the small number of data points and/or the long-tail nature and related volatility of the reinsurance-liability LOB.

Corresponding tables for all LOBs are shown in Appendix D.

The tables in Appendix D also include the average, standard deviation, and coefficient of variation of the runoff ratios by LOB-size.

6. Maturity

The DCWP data set includes data points of varying development maturities. The most recent initial reserve date (2009) reflects one year of development. Initial reserve date 2008 reflects two years of development, etc. Initial reserve dates 1988-2001 are the most mature, and reflect reserve development to 9[33] years from the initial reserve date. The CCM and the baseline filtering in this paper treat all data points as equivalent, regardless of the maturity of the data.

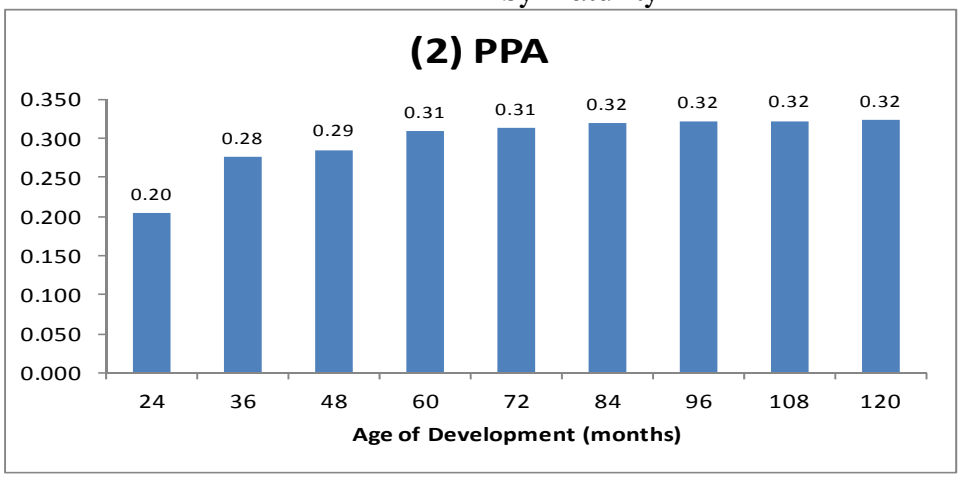
In this section we test whether such equivalent treatment is appropriate. To do so, we examined data from initial reserve dates 1988-2001. These are the initial reserve dates for which we have data points at every maturity from age 24 months to age 120 months. We use the same initial reserve dates for each maturity level to avoid bias that might arise from differences in RRF by initial reserve date shown in Section 4 above.

We calculated RRFs for each maturity level separately using the baseline filtering. The results are discussed below.

Table 6.1 shows the RRFs, for 1988-2001 initial reserve dates combined, grouped by maturity for the PPA LOB.

[33] This applies when 2010 is the most recent Annual Statement. If the most recent Annual Statement is 2009 or prior, then there are fewer runoff ratios at a maturity of 9 years.

Table 6.1
PPA – RRF by Maturity



By 60 months the RRF reaches a value within three percentage points[34] of the ultimate value, reached at 84 months.

Table 6.2 shows the corresponding RRFs for the Homeowners/Farmowners LOB; the pattern is similar to the PPA pattern.

Table 6.2
Homeowners/Farmowners – RRF by Maturity

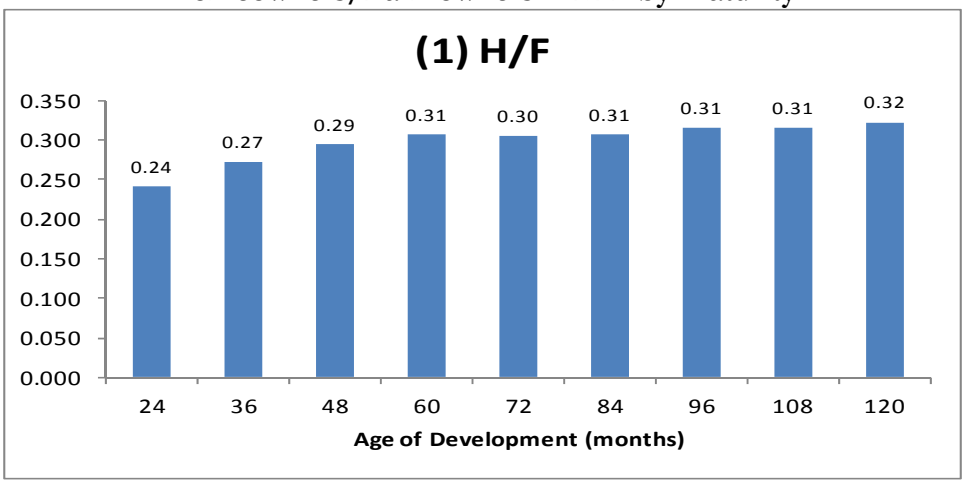
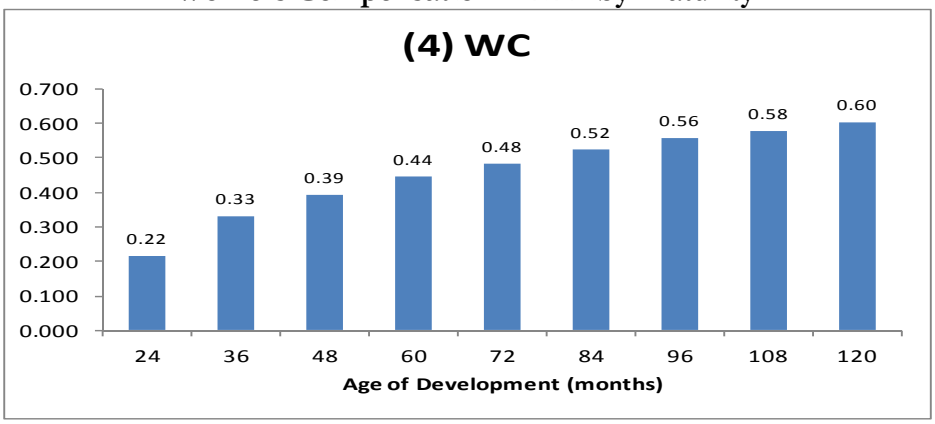


Table 6.3 shows the RRFs grouped by maturity for the workers compensation LOB.

[34] Three percentage points is an arbitrary, but we think reasonable, target for 'mature' for purposes of this paper.

Table 6.3
Workers Compensation – RRF by Maturity



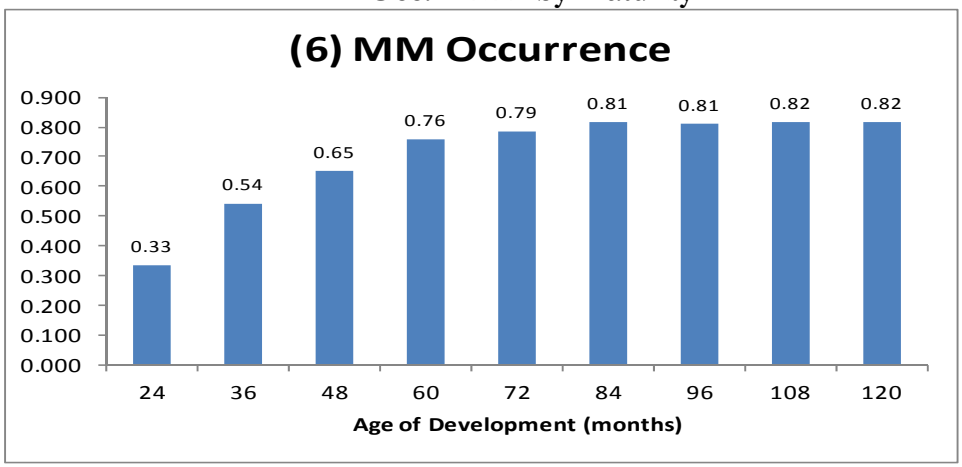
The development period for workers compensation is much longer than for the PPA and Homeowners/Farmowners LOBs.

Some of the development in workers compensation RRF[35] might be due to emergence of tabular reserve. This working party did not analyze that effect.

Table 6.4, below, for the MM – Occurrence LOB shows RRFs that are within 3% of ultimate values by 72 months. Non-tabular reserve, which might appear for medical professional liability lines, does not affect the RRFs because the Schedule P data used in our analysis are gross of non-tabular discount.

[35] The RRF should be designed with data gross of all interest discount, to the extent possible, in that Investment Income Offset in the RBC formula separately reflects the value of investment income for risk-based capital adequacy purpose.

Table 6.4
MM Occ. – RRF by Maturity



Corresponding tables for all LOBs are shown in Appendix E.

Table 6.5 displays the number of years of maturity required for the RRF to be within three percentage points of the mature RRF for the 1998-2001 initial reserve date experience period.

It is possible that the 1998-2001 time period reflected in Table 6.5 is not typical, at least for some lines, and further research is warranted to examine that. Even given that uncertainty, the simplest way to reflect the maturity issue in calibration of RRFs would be to discard data points that are not sufficiently mature.

A more complex method would be to adjust the RRFs for expected development and use the adjusted data in an all-year RRF calculation. That would require more analysis of the extent to which the RRF 'development' observed for initial reserve dates 1998-2001 is typical.

The working party has not tested the effect of either of the possible maturity adjustments.

Table 6.5
Development Years Needed to Reach Maturity

LOB	Years to Reach Maturity
(1) H/F	4
(2) PPA	5
(3) CA	5
(4) WC	9
(5) CMP	9
(6) MM Occurrence	7
(7) MM CM	8
(8) SL	*
(9) OL	9
(10) Fidelity & Surety	8
(11) Spec Prop *	9
(12) Auto Phys Damage *	9
(13) Other *	*
(15) International	*
(16) Rein Property & Financial	*
(17) Reinsurance Liab	*
(18) Products Liability	9

*The Two-Year LOBs show apparently very long time periods to reach maturity. The reserve risk analysis, unlike the premium risk analysis, requires matching data across Annual Statement years.

For 2-year lines we believe this analysis is not meaningful, as it is too distorted by inconsistent reporting of paid and incurred loss and DCCE triangles in Schedule P Part 2 and Part 3.

7. Years of NEP > 0

The baseline filtering excludes data from LOBs where the company has had less than five years of positive NEP in that LOB. The five year trigger was selected given that some minimum seemed appropriate, and we wanted to test a criterion that was less strict than the 10 year requirement in the CCM.

To test whether the five years was appropriate and evaluate the extent to which RRFs vary by years of NEP, we grouped the data points based on the number of years of positive NEP for the LOB-company/pool and calculated the RRFs for each of the groups.

Table 7.1 shows the reserves and number of data points in each of the NEP>0 year groupings. We see that the 20 and over group is a significant proportion of the total: approximately 90% of the reserves and approximately 62% of the data points. There is

relatively little data in the category 0-4 years of NEP>0.[36]

Table 7.1
Reserve and Data Points by Number of Years

	Reserve ($000,000s)					Data Point				
LOB	0-4	5-9	10-19	>=20	Total	0-4	5-9	10-19	>=20	Total
(1) H/F	259	2,710	25,151	239,181	267,300	85	382	1,631	4,992	7,090
(2) PPA	364	3,621	75,989	1,346,589	1,426,562	68	230	1,904	4,625	6,827
(3) CA	128	4,957	29,545	351,104	385,734	27	268	1,322	3,379	4,996
(4) WC	749	26,324	190,318	1,991,671	2,209,062	45	622	2,330	3,384	6,381
(5) CMP	258	2,337	46,048	517,353	565,996	40	203	1,649	3,879	5,771
(6) MM Occurrence	784	1,207	56,234	142,037	200,263	35	81	333	644	1,093
(7) MM CM	78	8,939	29,876	159,837	198,730	19	607	561	1,011	2,198
(8) SL	51	1,156	3,270	32,829	37,306	27	97	339	606	1,069
(9) OL	3,920	6,742	126,499	1,347,227	1,484,389	92	530	1,982	4,688	7,292
(11) Spec Prop	73	992	21,767	75,815	98,647	50	267	1,687	3,481	5,485
(12) Auto Phys Damage	150	244	3,478	54,175	58,048	41	158	1,076	2,186	3,461
(10) Fidelity & Surety	93	16	1,573	10,232	11,914	12	23	320	572	927
(13) Other	913	480	21,201	7,437	30,032	20	75	625	424	1,144
(15) International	7	95	2,047	845	2,993	11	17	40	22	90
(16) Rein Property & Financial	15	1,603	18,404	80,781	100,803	11	89	388	562	1,050
(17) Reinsurance Liab	621	5,212	45,339	532,242	583,415	20	163	424	627	1,234
(18) Products Liability	644	53	4,901	20,282	25,879	38	16	216	350	620
Total	9,106	66,690	701,638	6,909,638	7,687,072	641	3,828	16,827	35,432	56,728
	0%	1%	9%	90%	100%	1%	7%	30%	62%	100%

Tables 7.2 – 7.5 shows the RRFs grouped in bands by "number of years of NEP>0" for the PPA, Homeowners/Farmowners, workers compensation and MM – Occurrence LOBs. In these four cases, and for nearly all lines of business, the RRFs are lowest for the data points in the group with longest NEP>0 for >=20 years, i.e., for the most long-lived companies.

[36] The data points considered here are those that remain after minor and size filters. Those filters will have removed some of the data points in the category of NEP>0 for less than five years. The data set before filtering likely includes more data points with NEP>0 for less than five years.

Table 7.2
PPA – RRF by Number of Years

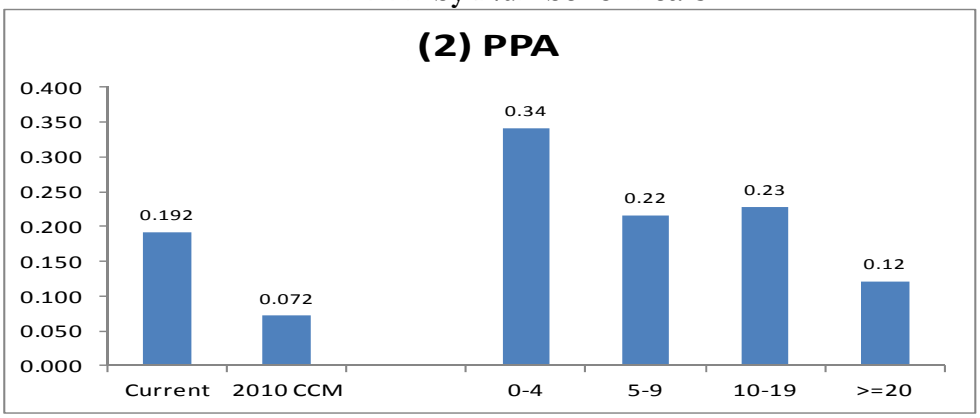


Table 7.3
Homeowners/Farmowners – RRF by Number of Years

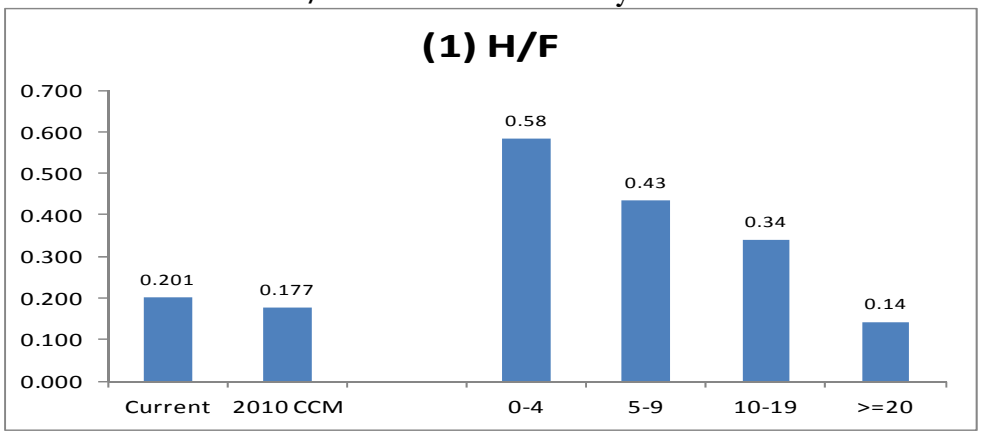


Table 7.4
Workers Compensation – RRF by Number of Years

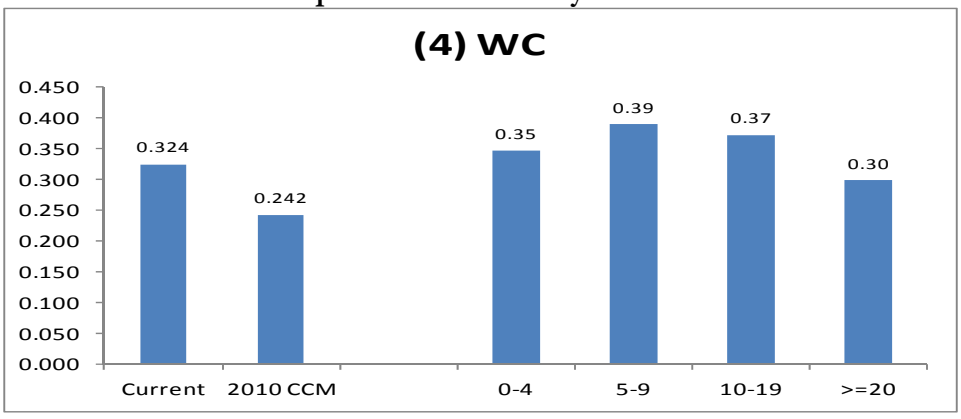
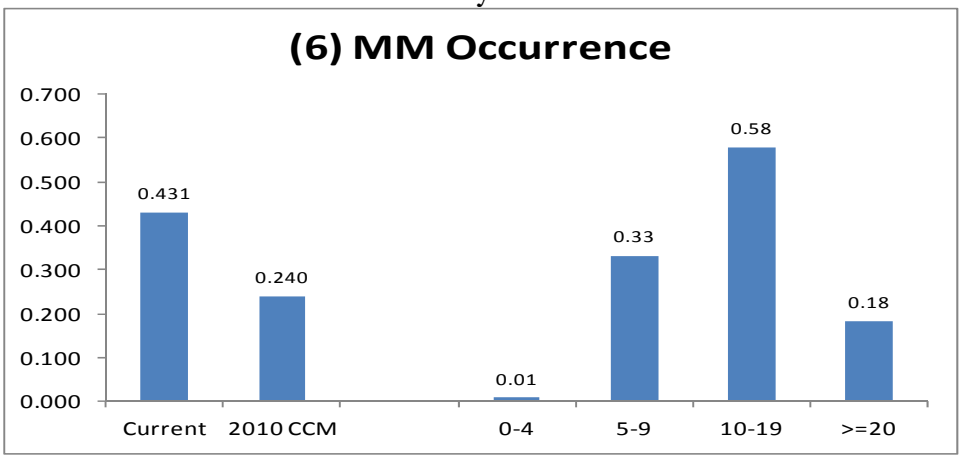


Table 7.5
MM Occ. – RRF by Number of Years



Corresponding tables for all LOBs are shown in Appendix F.

8. Further Research

DCWP is conducting research in the following areas, and reports will be published in due course.

1. Variation in RRFs by type of company; e.g., personal lines, professional reinsurer, etc.
2. Solvency II modeling approach vs. the "empirical approach" used in the research.
3. Comparison of RRFs developed as described in this paper to RRFs obtained by company specific methods such as Mack, stochastic reserving, and the like.

There are a number of other interesting issues, but DCWP is not now conducting research on those areas. These include the following:

A. Issues identified in the report:

4. Effect of maturity for experience periods other than 1998-2001.
5. Effect of workers compensation tabular reserve on observed maturity effect.
6. Interactions between RRF calibration and own-company adjustment and other

aspects of the filtering used in final calibration.

It seems logical that industry average reserve development ratios used in the own company adjustment process should be based on industry average from companies that are consistent with the filtering used to calibrate the RRFs; e.g., excluding minor lines and LOB-size above the size threshold. This report does not examine the impact of that issue, but it may be significant.

7. Investment Income offset – The investment income offset might best be determined considering the years used to calibrate the RRF, as higher interest rates might produce higher reserve runoff ratios and higher RRFs in the past.
8. Risk metrics

   Higher confidence levels, e.g., 90%, 95%... vs. 87.5%

   TVaR vs. VaR vs. Butsic (risk adjusted VaR, DCWP Report 5).
9. Risk metric – Currently it is based on a percentile over all data points all years. Alternatives include percentile determined:

   within years, or

   within companies.
10. Alternative time horizons

9. Authors

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Other work stream members:
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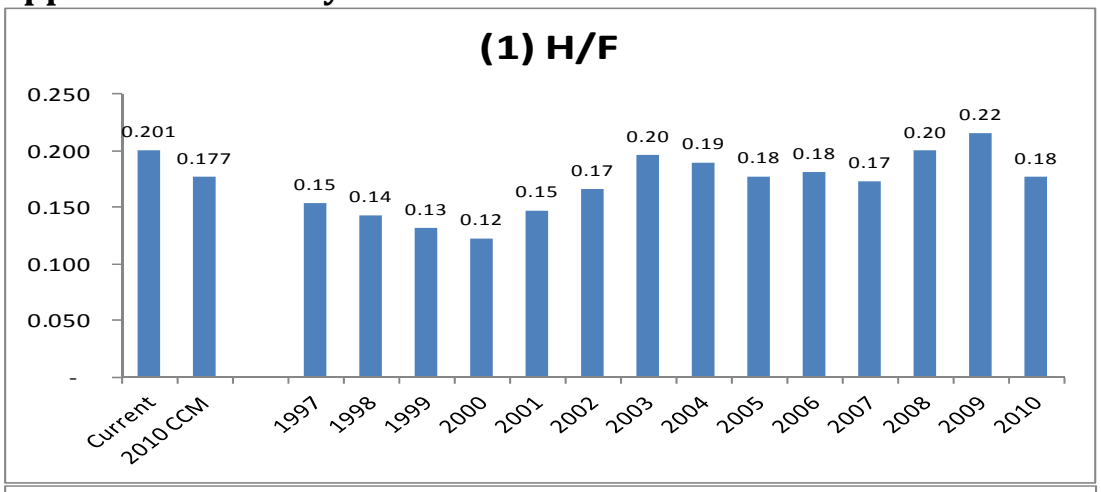
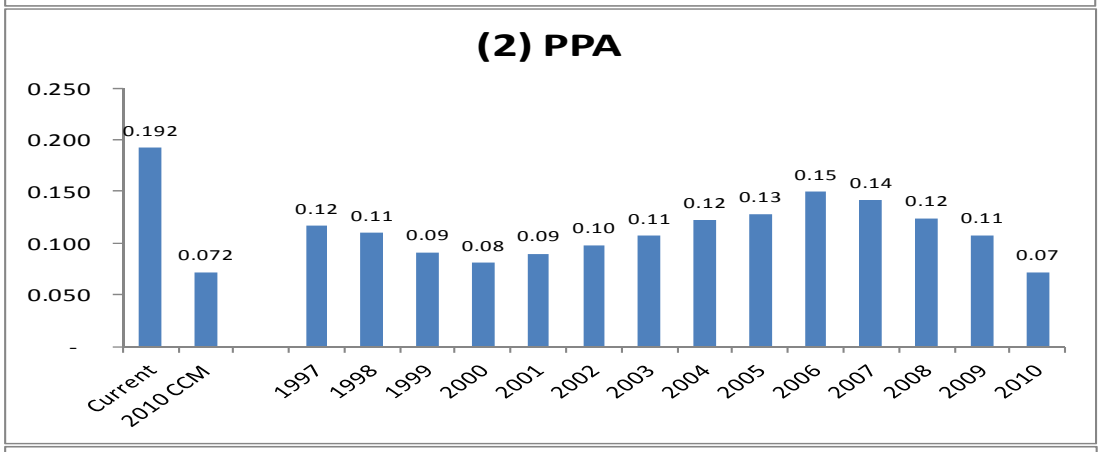
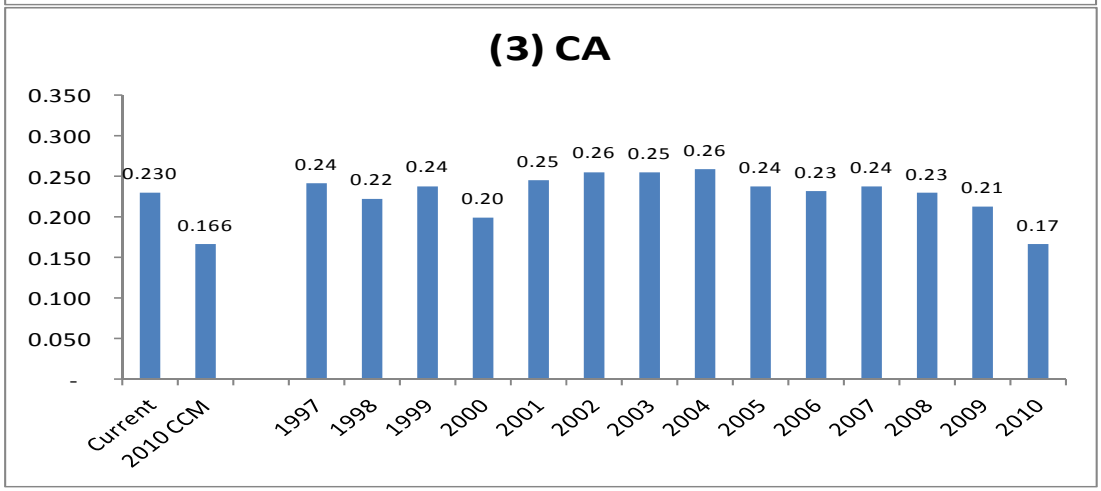
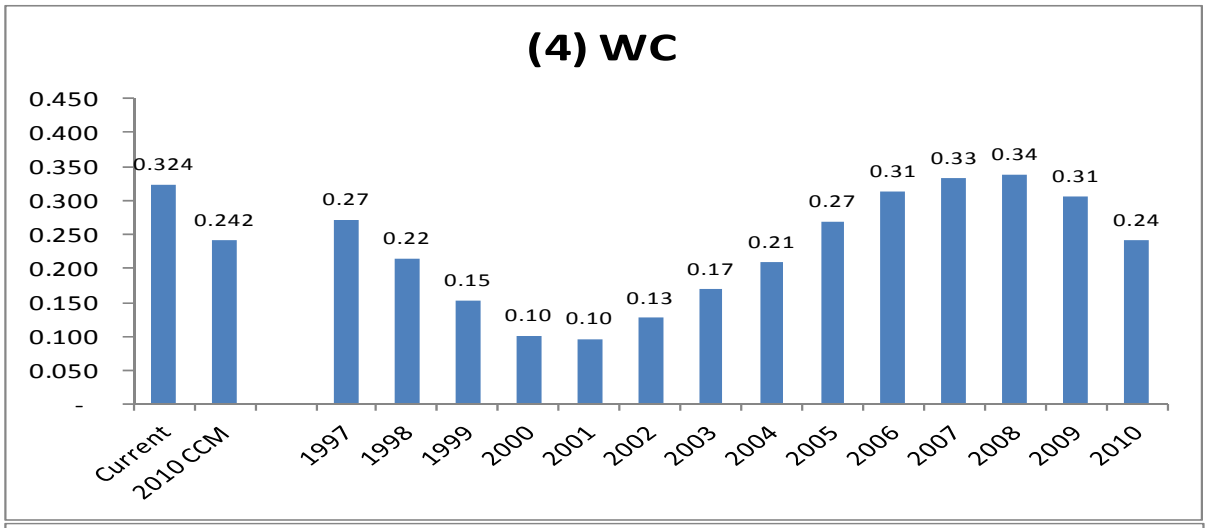
Appendix A –RRF by Annual Statement Year based on CCM

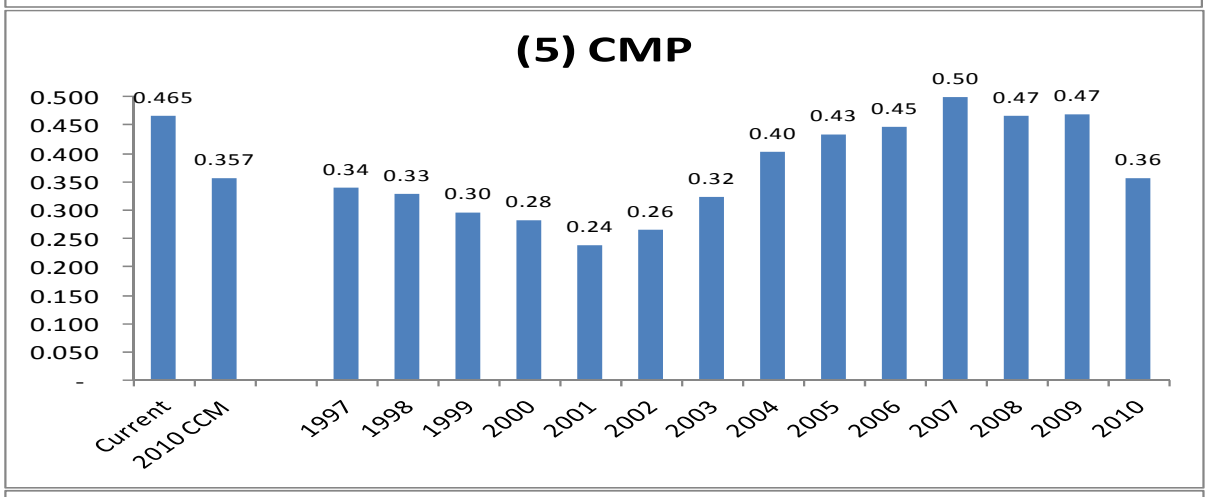


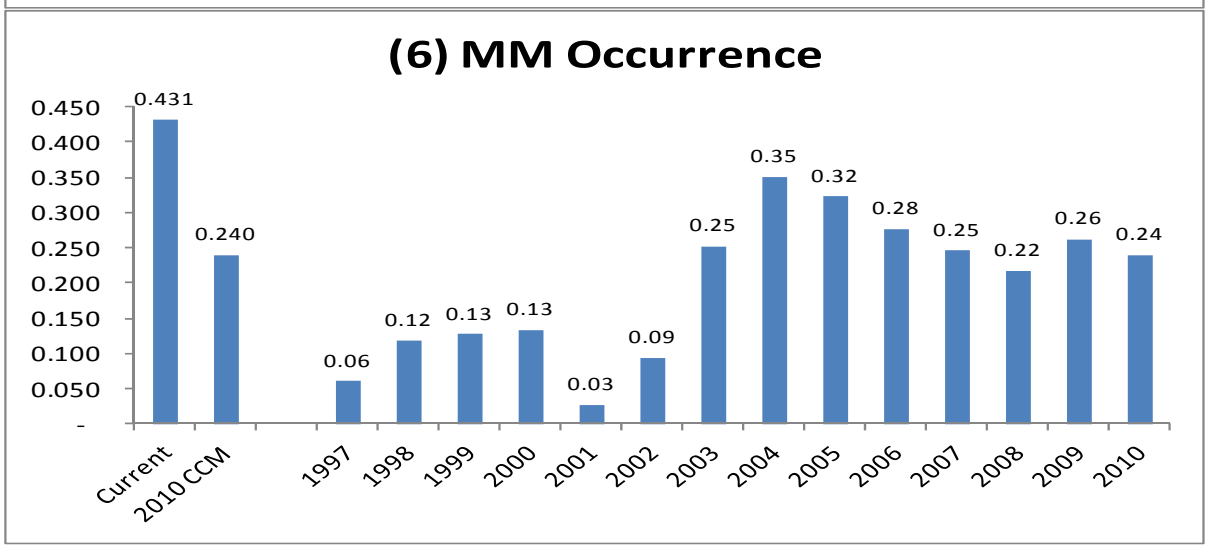




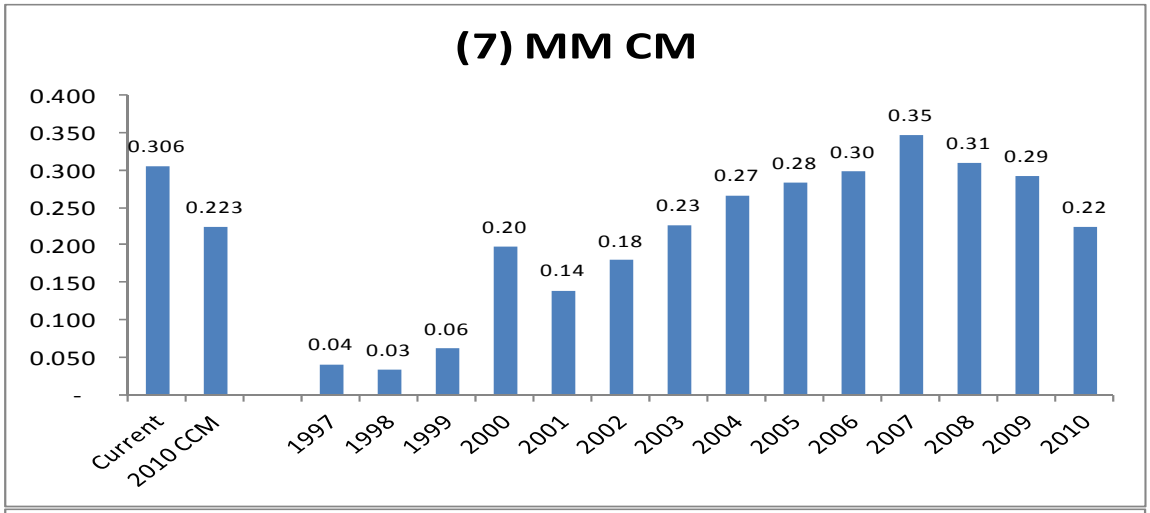
Appendix A – RRF by Annual Statement Year based on CCM

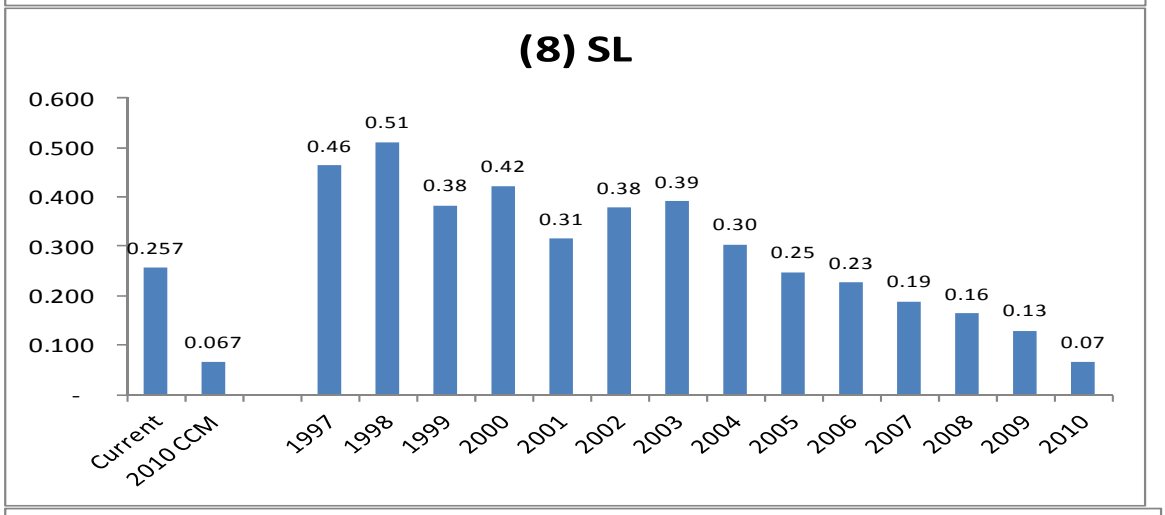


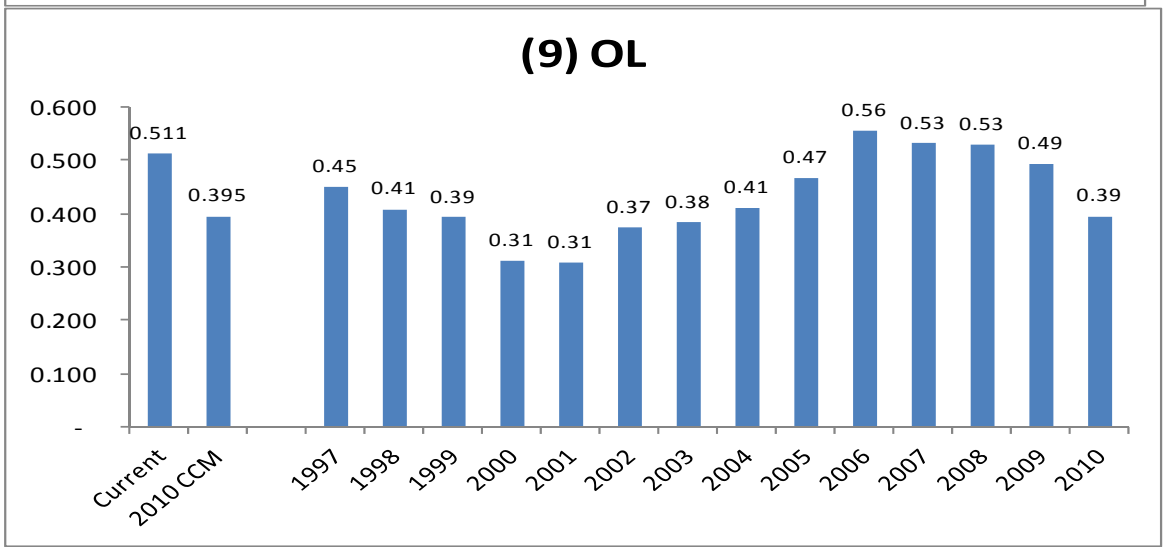


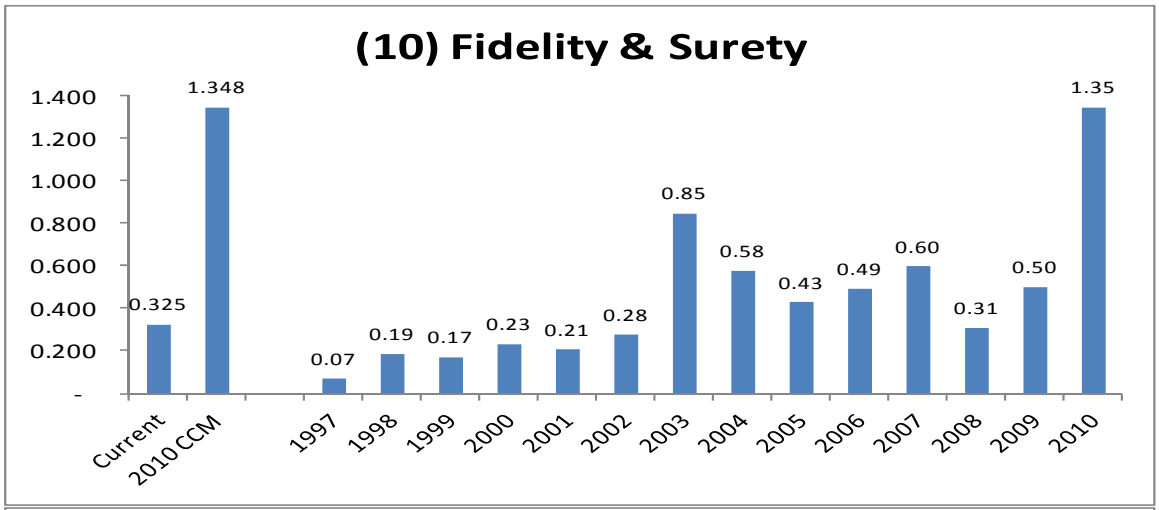


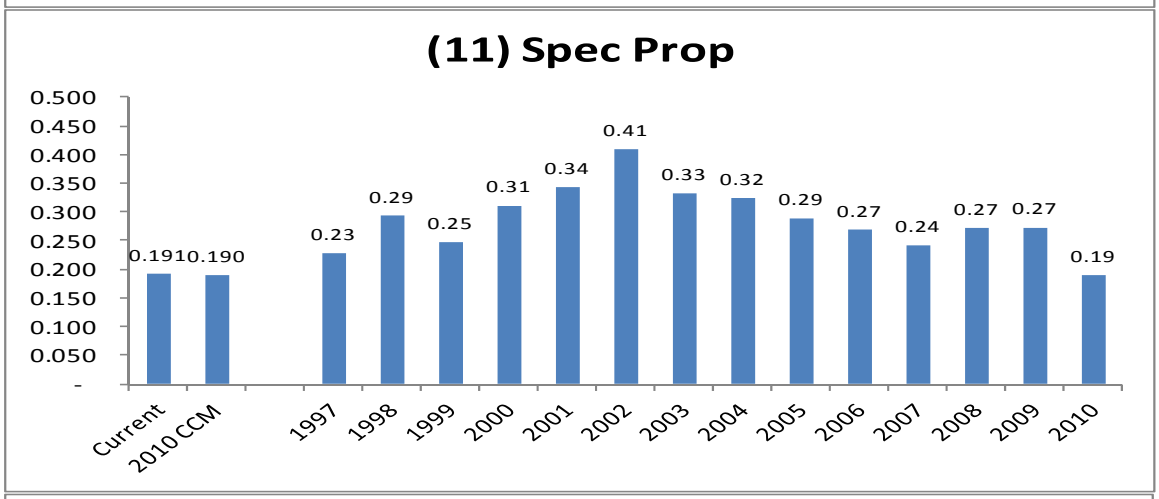
Appendix A – RRF by Annual Statement Year based on CCM

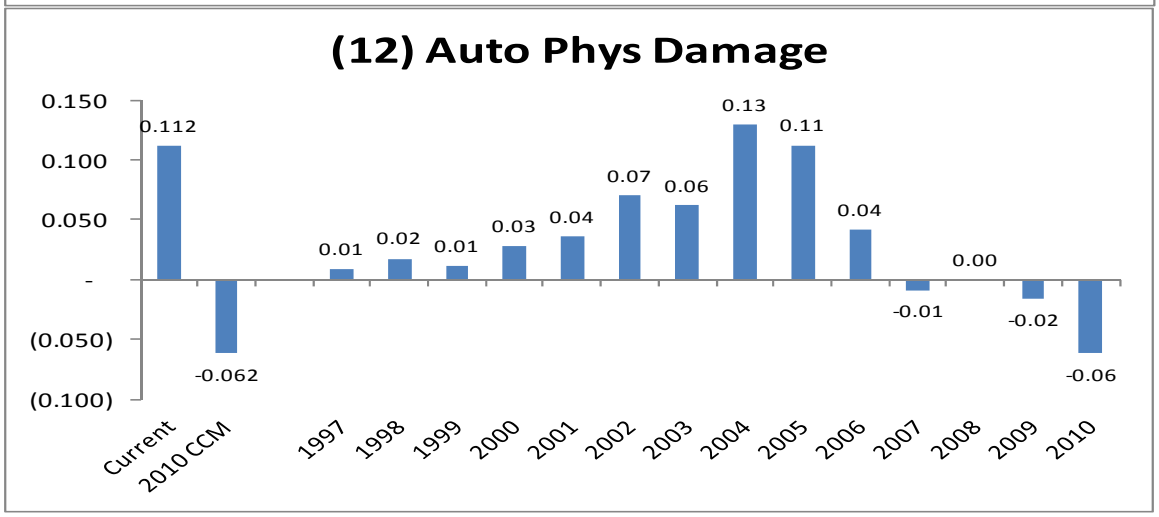


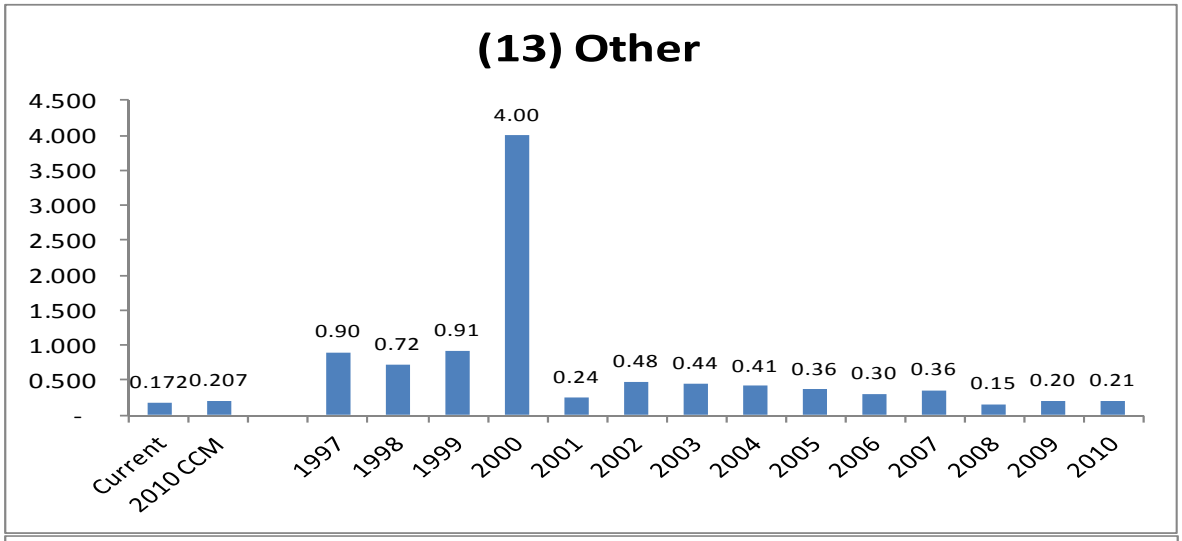


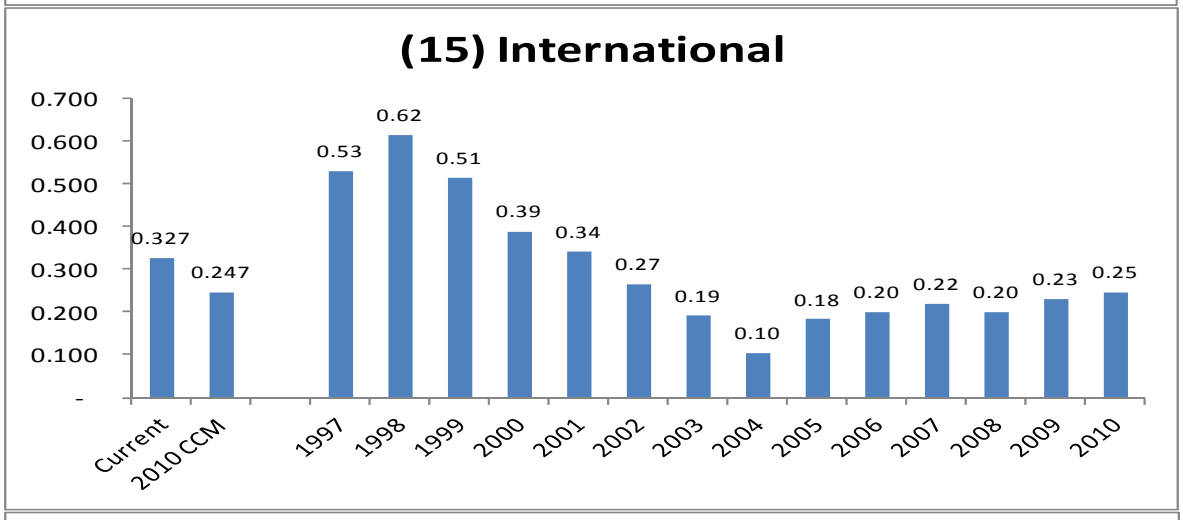


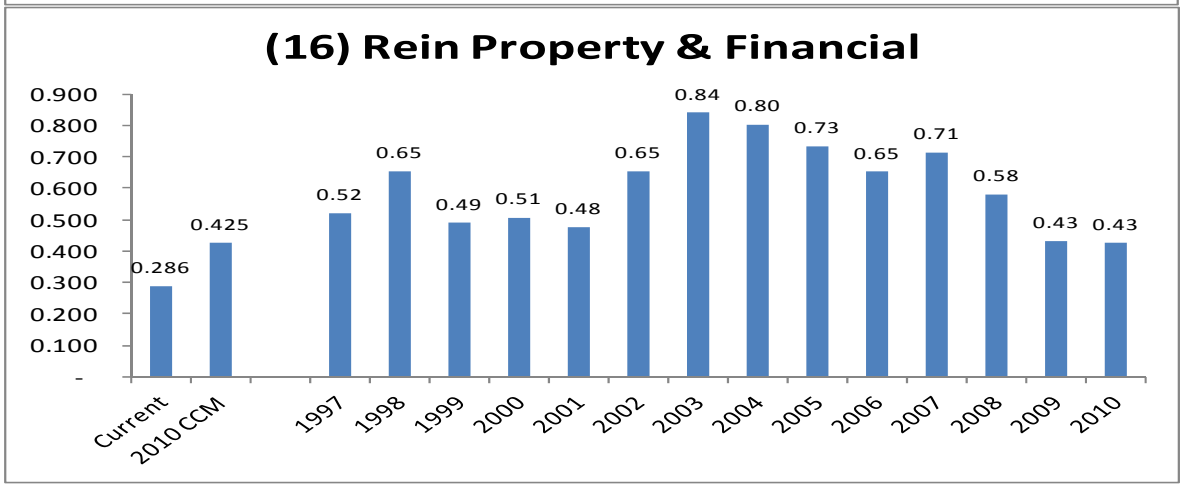

(10) Fidelity & Surety
1.400
1.200
1.000
0.800
0.600
0.400
0.200
-
0.325
1.348
0.07
0.19
0.17
0.23
0.21
0.28
0.85
0.58
0.43
0.49
0.60
0.31
0.50
1.35
Current
2010 CCM
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

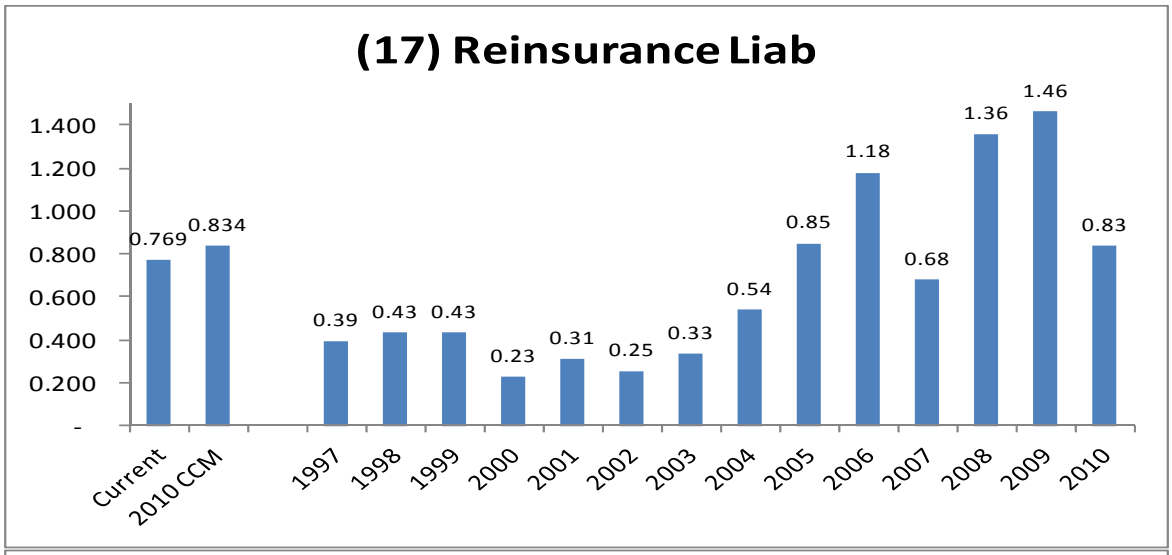

(11) Spec Prop
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-
0.191
0.190
0.23
0.29
0.25
0.31
0.34
0.41
0.33
0.32
0.29
0.27
0.24
0.27
0.27
0.19
Current
2010 CCM
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

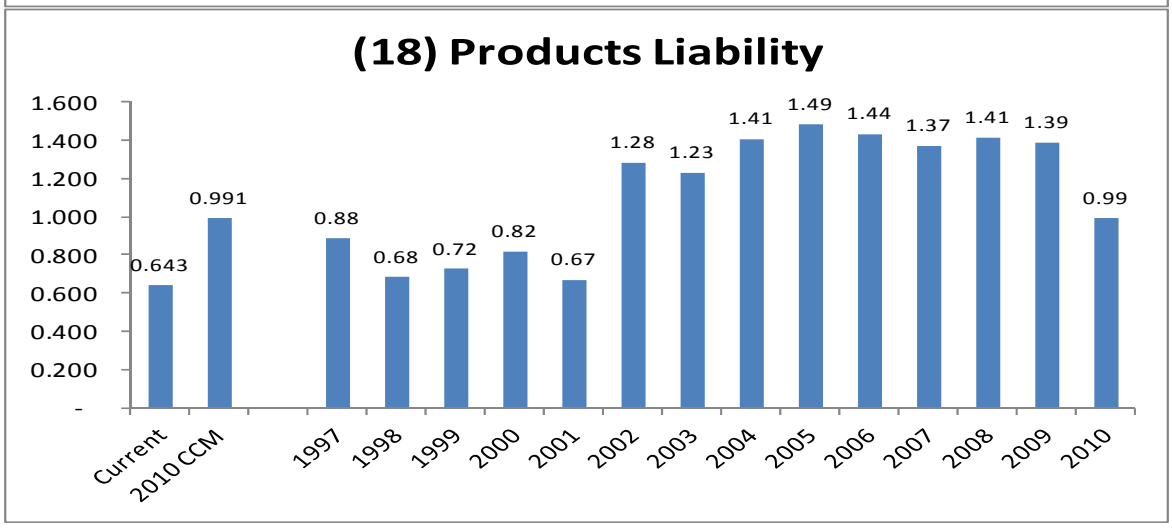

(12) Auto Phys Damage
0.150
0.100
0.050
-
(0.050)
(0.100)
0.112
-0.062
0.01
0.02
0.01
0.03
0.04
0.07
0.06
0.13
0.11
0.04
-0.01
0.00
-0.02
-0.06
Current
2010 CCM
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


(13) Other
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
-
0.172
0.207
0.90
0.72
0.91
4.00
0.24
0.48
0.44
0.41
0.36
0.30
0.36
0.15
0.20
0.21
Current
2010 CCM
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


(15) International
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.327
0.247
0.53
0.62
0.51
0.39
0.34
0.27
0.19
0.10
0.18
0.20
0.22
0.20
0.23
0.25
Current
2010 CCM
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

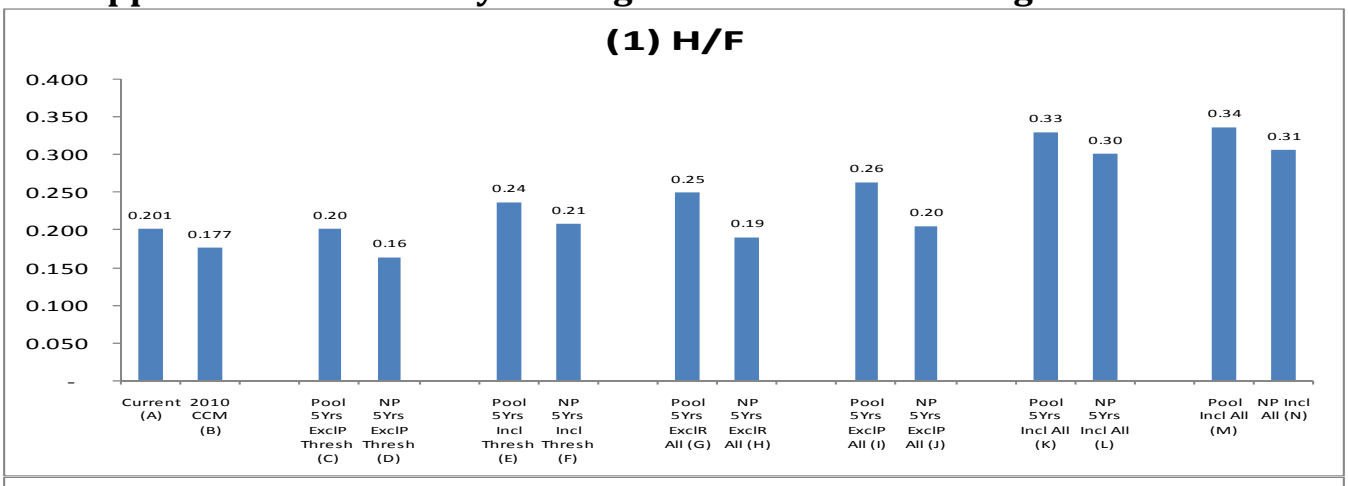

(16) Rein Property & Financial
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.286
0.425
0.52
0.65
0.49
0.51
0.48
0.65
0.84
0.80
0.73
0.65
0.71
0.58
0.43
0.43
Current
2010 CCM
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

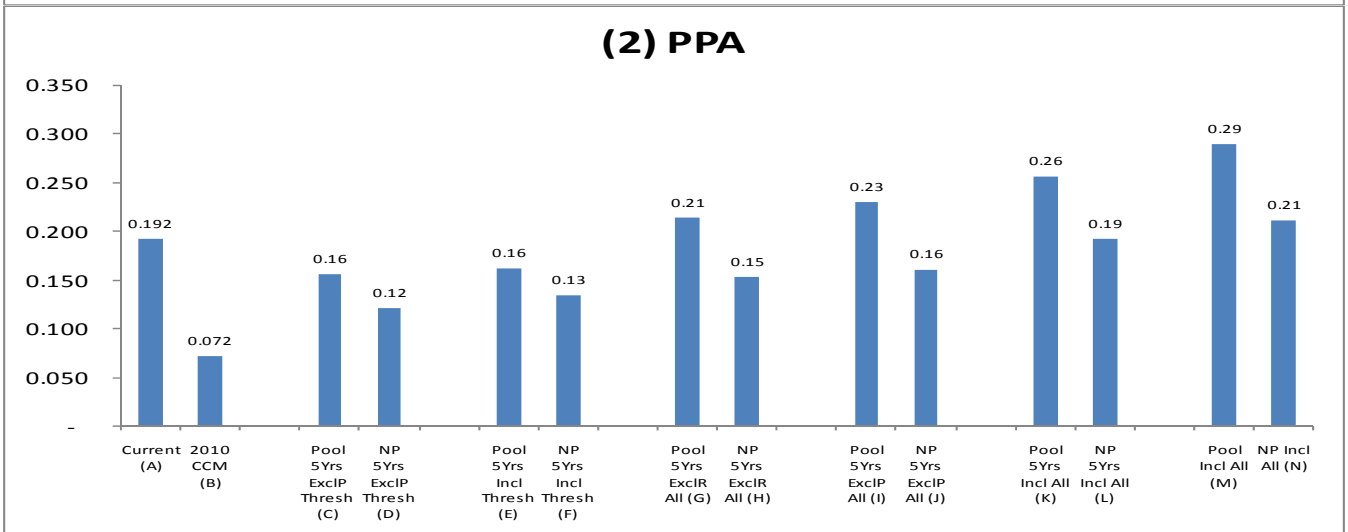


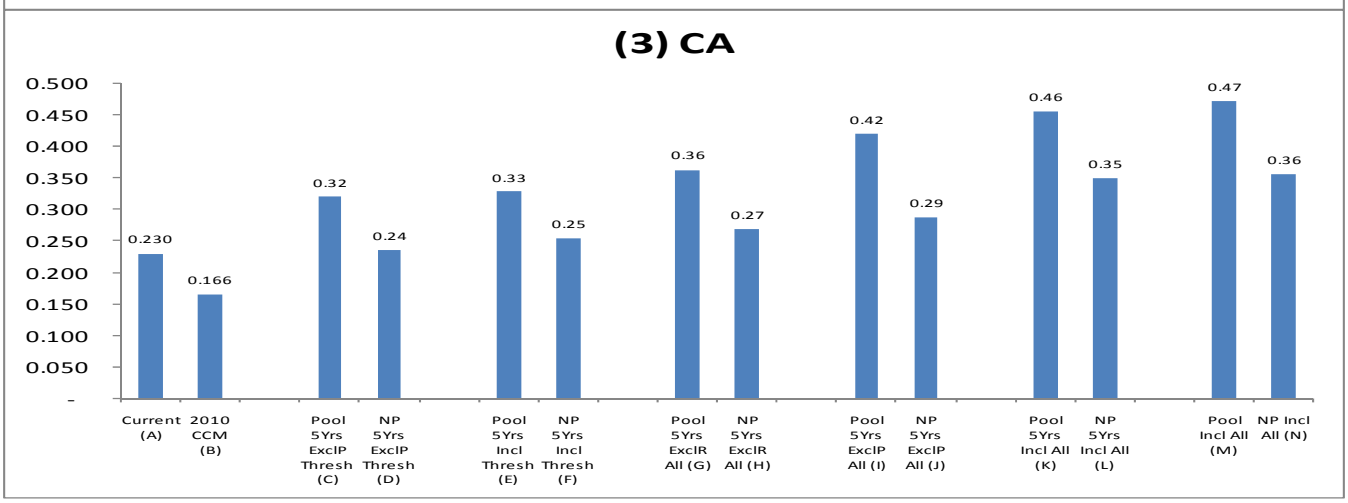


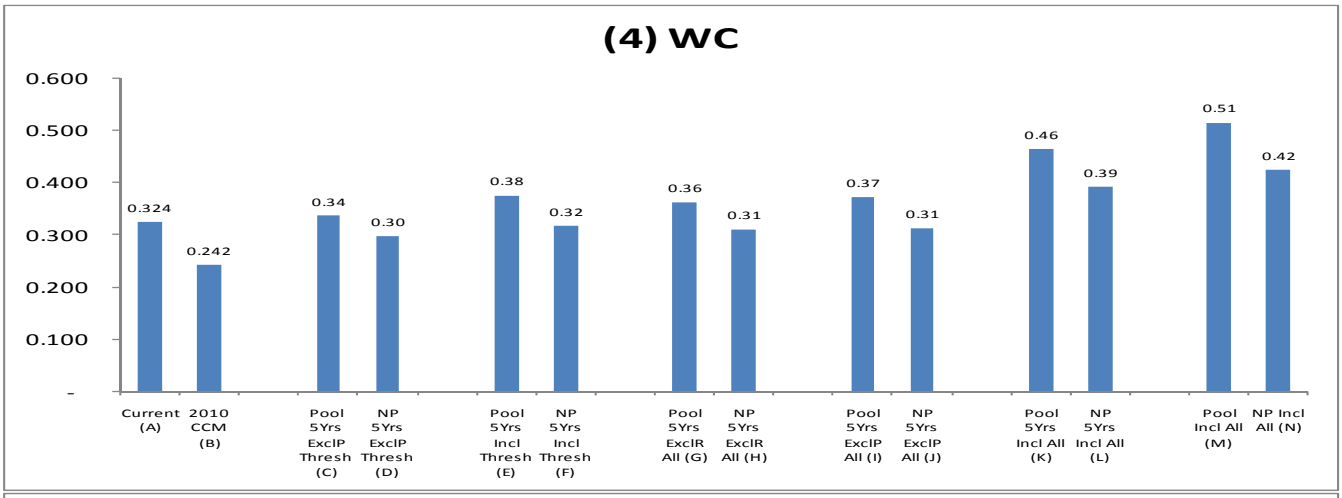
Note: (14) Financial/Mortgage and (19) Warranty are not shown as data for those lines is so new and sparse that charts are not meaningful.

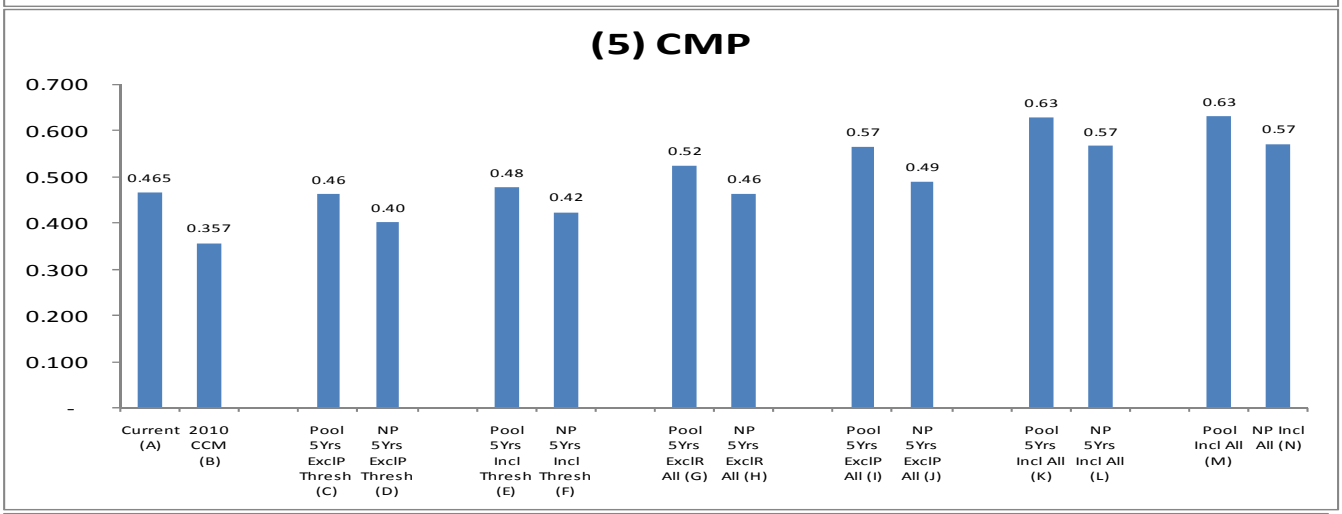
Appendix B – Sensitivity Testing of Alternative Filtering Methods

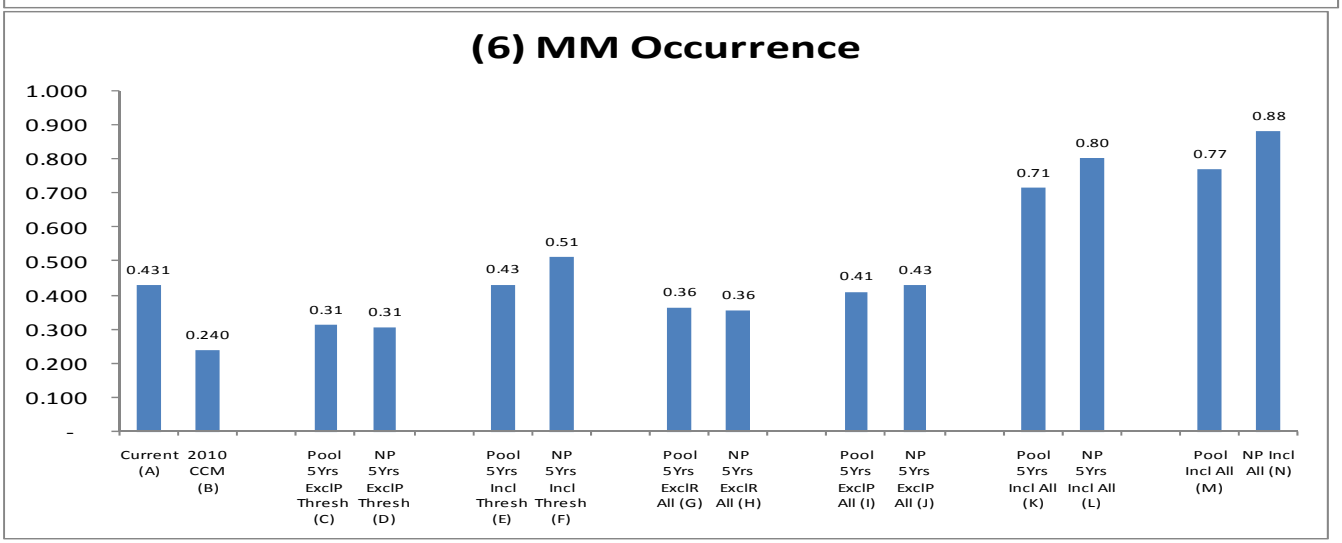


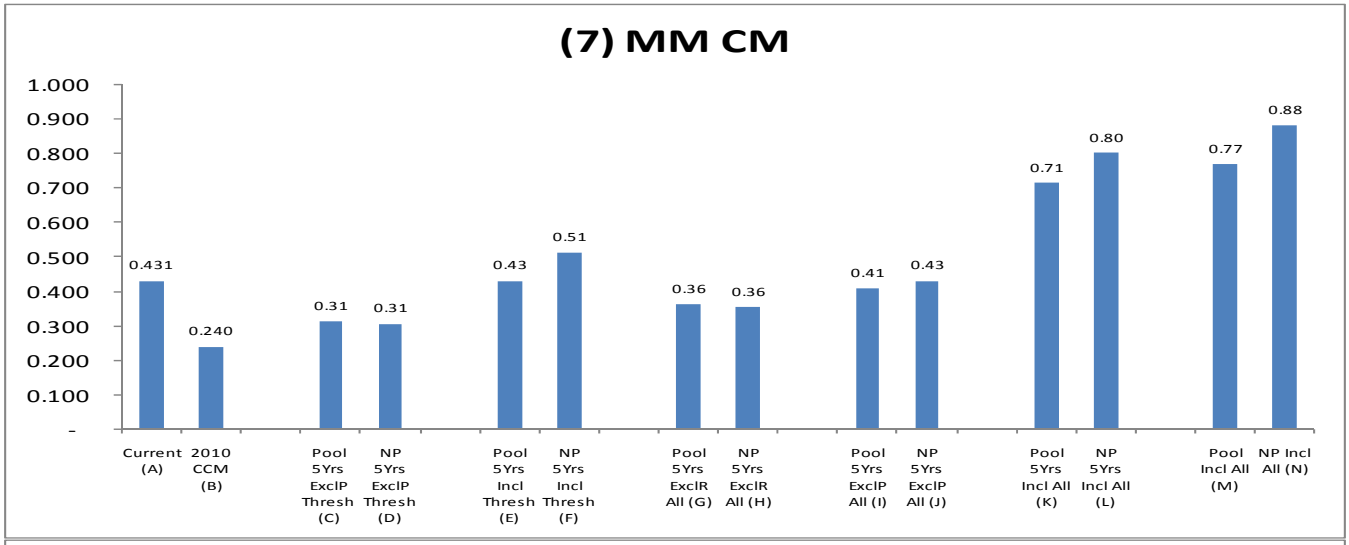


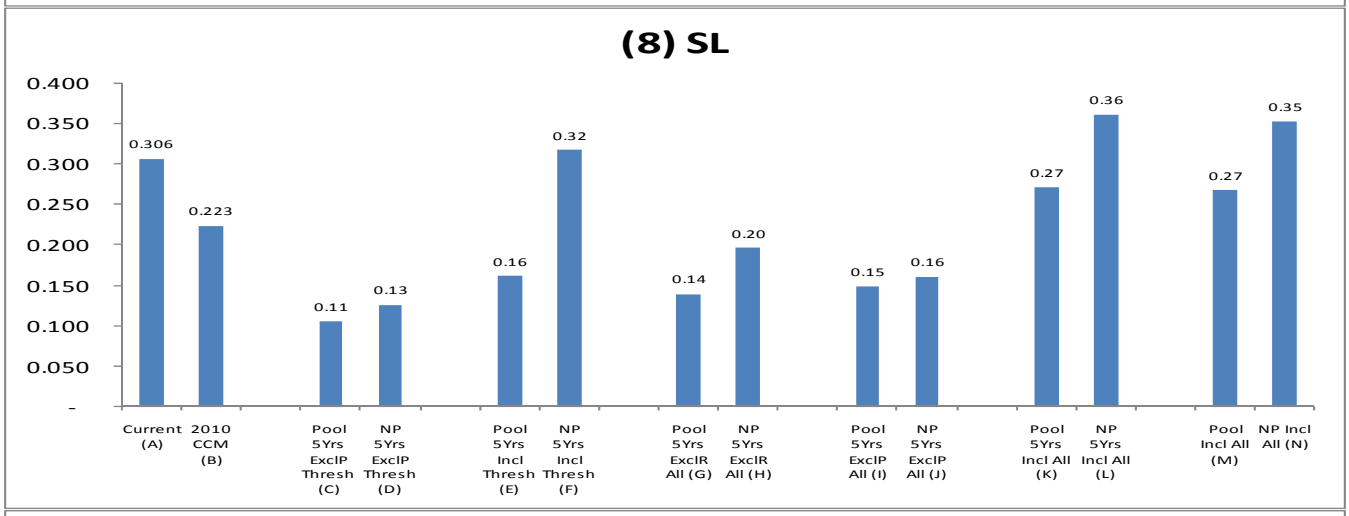


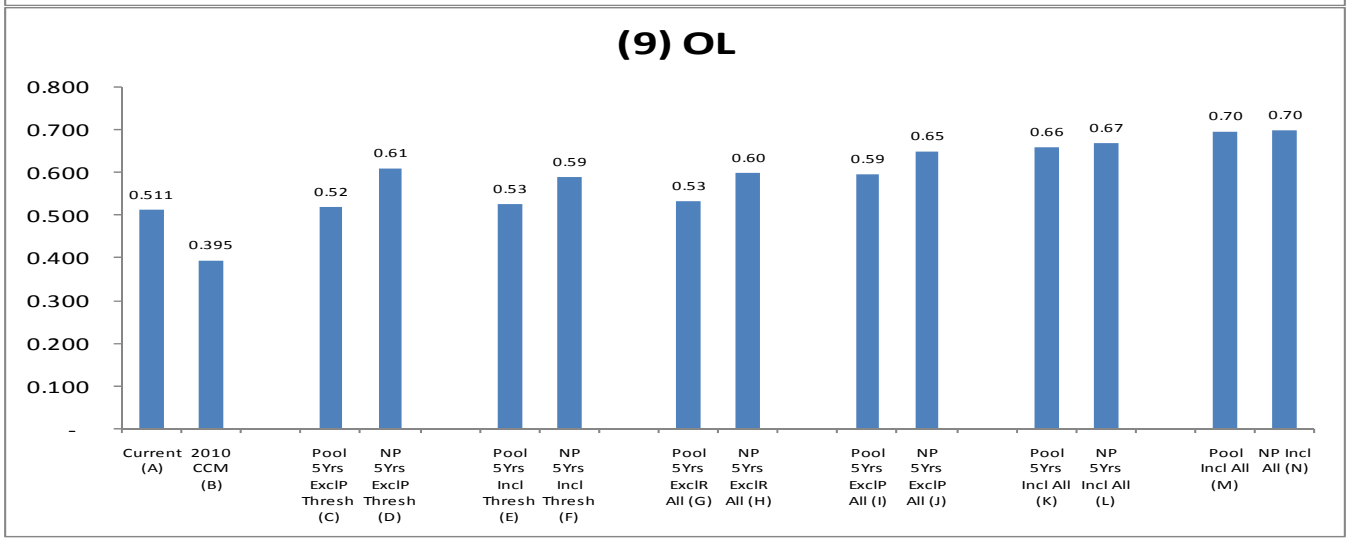

(4) WC
0.600
0.500
0.400
0.300
0.200
0.100
-
0.324
0.242
0.34
0.30
0.38
0.32
0.36
0.31
0.37
0.31
0.46
0.39
0.51
0.42
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

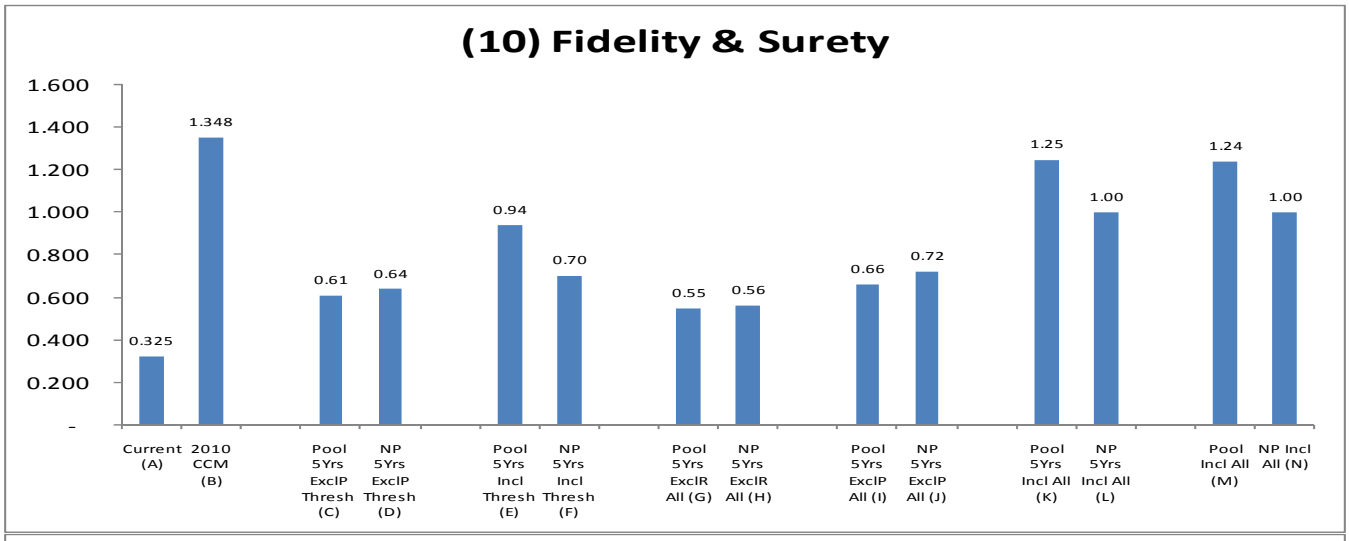

(5) CMP
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.465
0.357
0.46
0.40
0.48
0.42
0.52
0.46
0.57
0.49
0.63
0.57
0.63
0.57
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

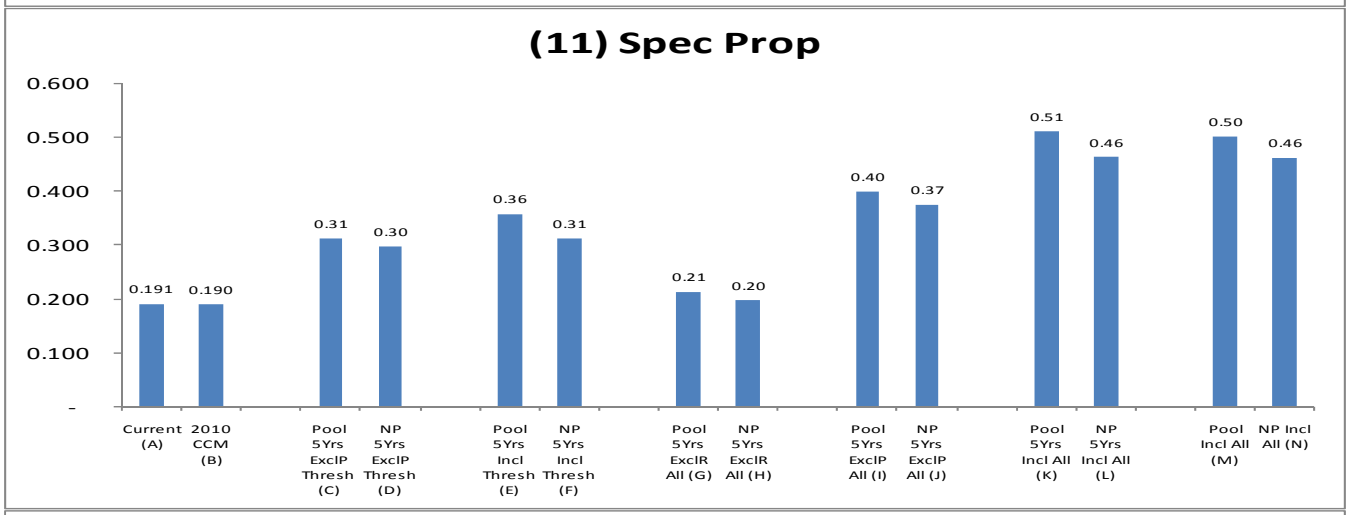

(6) MM Occurrence
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.431
0.240
0.31
0.31
0.43
0.51
0.36
0.36
0.41
0.43
0.71
0.80
0.77
0.88
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

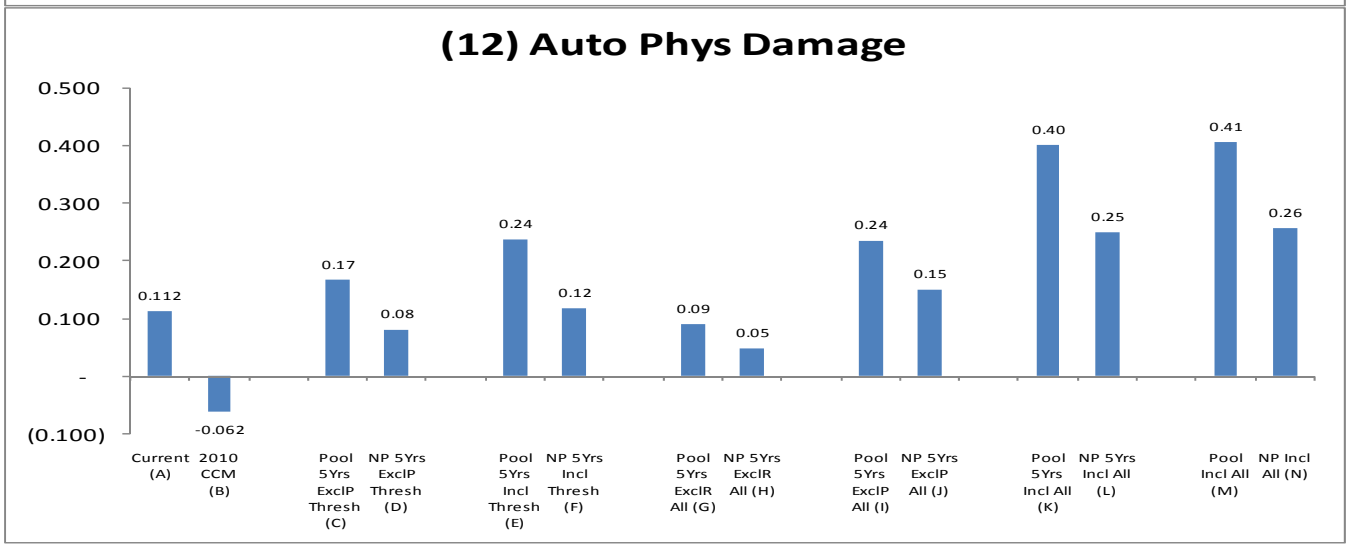

(7) MM CM
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.431
0.240
0.31
0.31
0.43
0.51
0.36
0.36
0.41
0.43
0.71
0.80
0.77
0.88
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

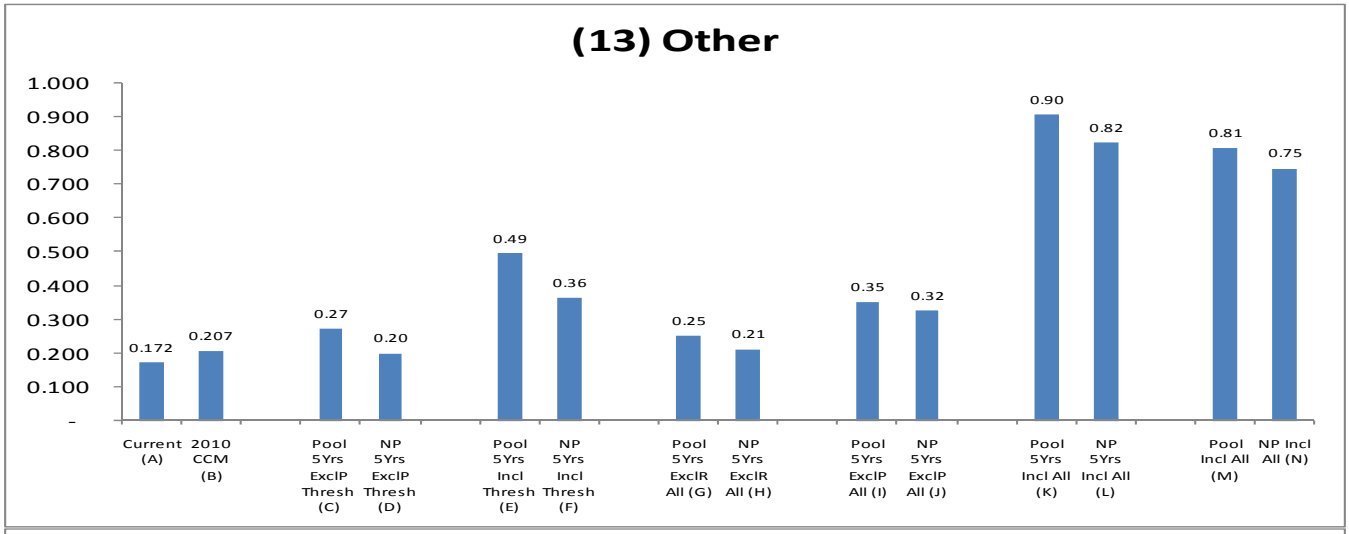

(8) SL
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-
0.306
0.223
0.11
0.13
0.16
0.32
0.14
0.20
0.15
0.16
0.27
0.36
0.27
0.35
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

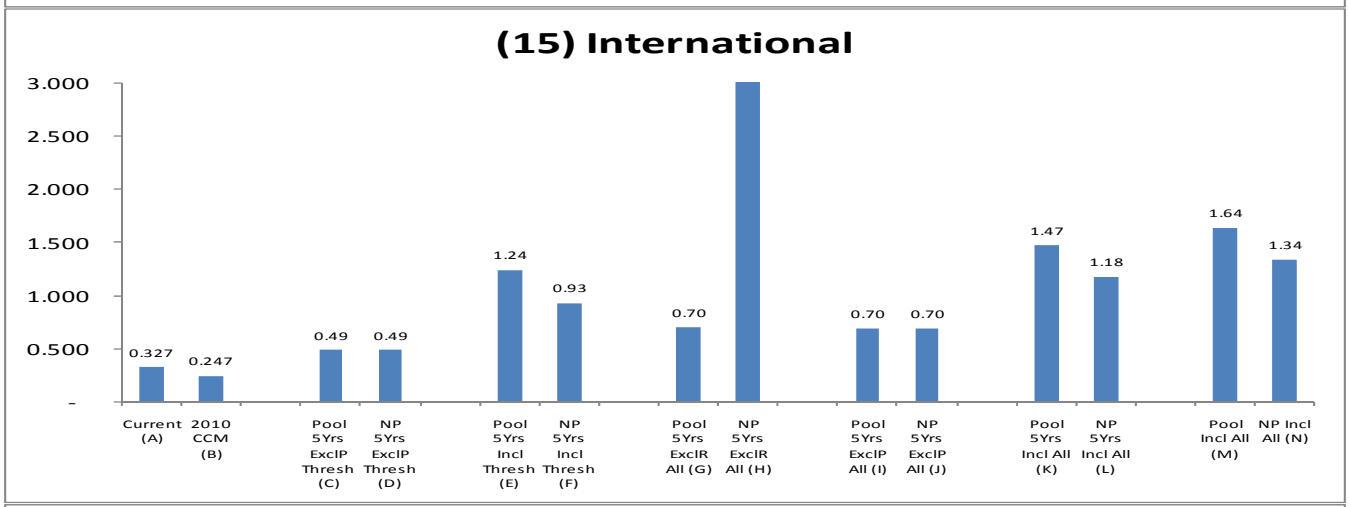

(9) OL
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.511
0.395
0.52
0.61
0.53
0.59
0.53
0.60
0.59
0.65
0.66
0.67
0.70
0.70
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

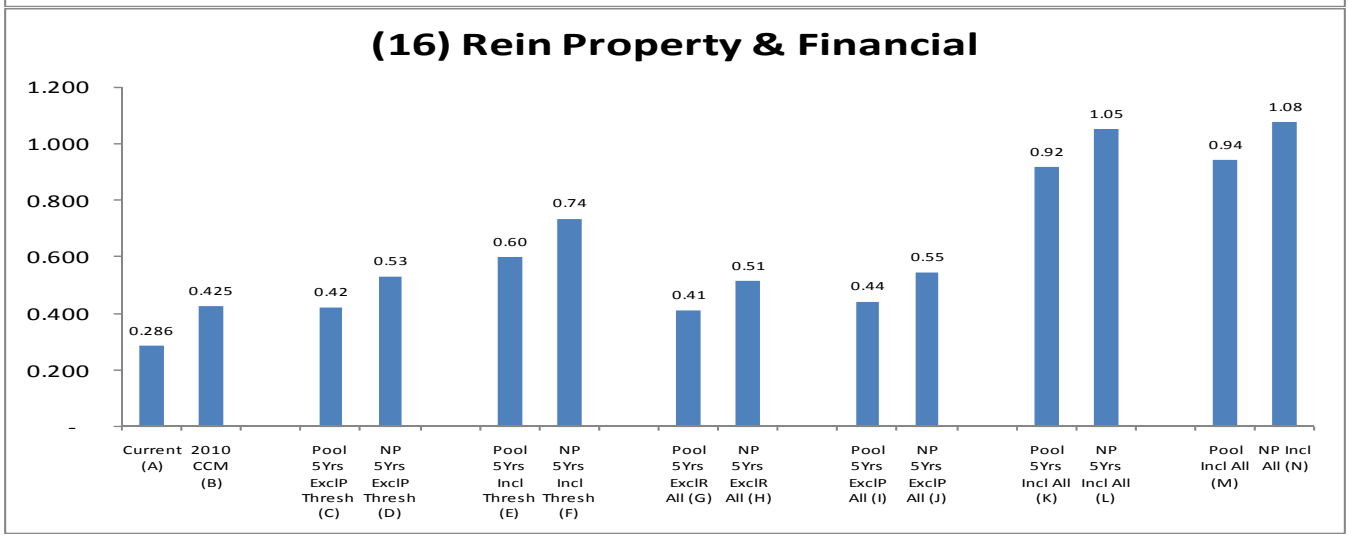

(10) Fidelity & Surety
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
-
0.325
1.348
0.61
0.64
0.94
0.70
0.55
0.56
0.66
0.72
1.25
1.00
1.24
1.00
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

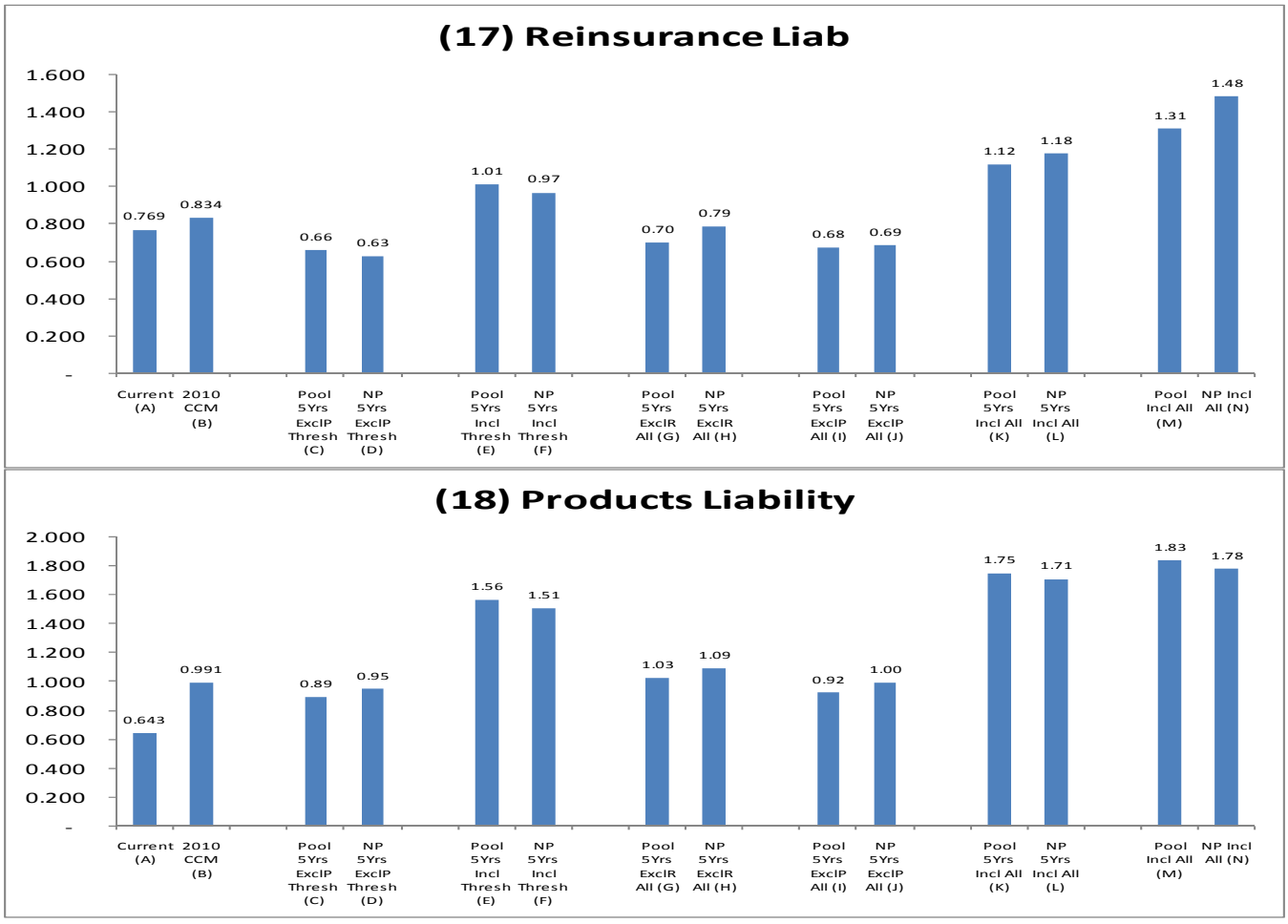

(11) Spec Prop
0.600
0.500
0.400
0.300
0.200
0.100
-
0.191
0.190
0.31
0.30
0.36
0.31
0.21
0.20
0.40
0.37
0.51
0.46
0.50
0.46
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)


(12) Auto Phys Damage
0.500
0.400
0.300
0.200
0.100
-
(0.100)
0.112
-0.062
0.17
0.08
0.24
0.12
0.09
0.05
0.24
0.15
0.40
0.25
0.41
0.26
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)


(13) Other
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
-
0.172
0.207
0.27
0.20
0.49
0.36
0.25
0.21
0.35
0.32
0.90
0.82
0.81
0.75
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)


(15) International
3.000
2.500
2.000
1.500
1.000
0.500
-
0.327
0.247
0.49
0.49
1.24
0.93
0.70
0.70
0.70
1.47
1.18
1.64
1.34
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

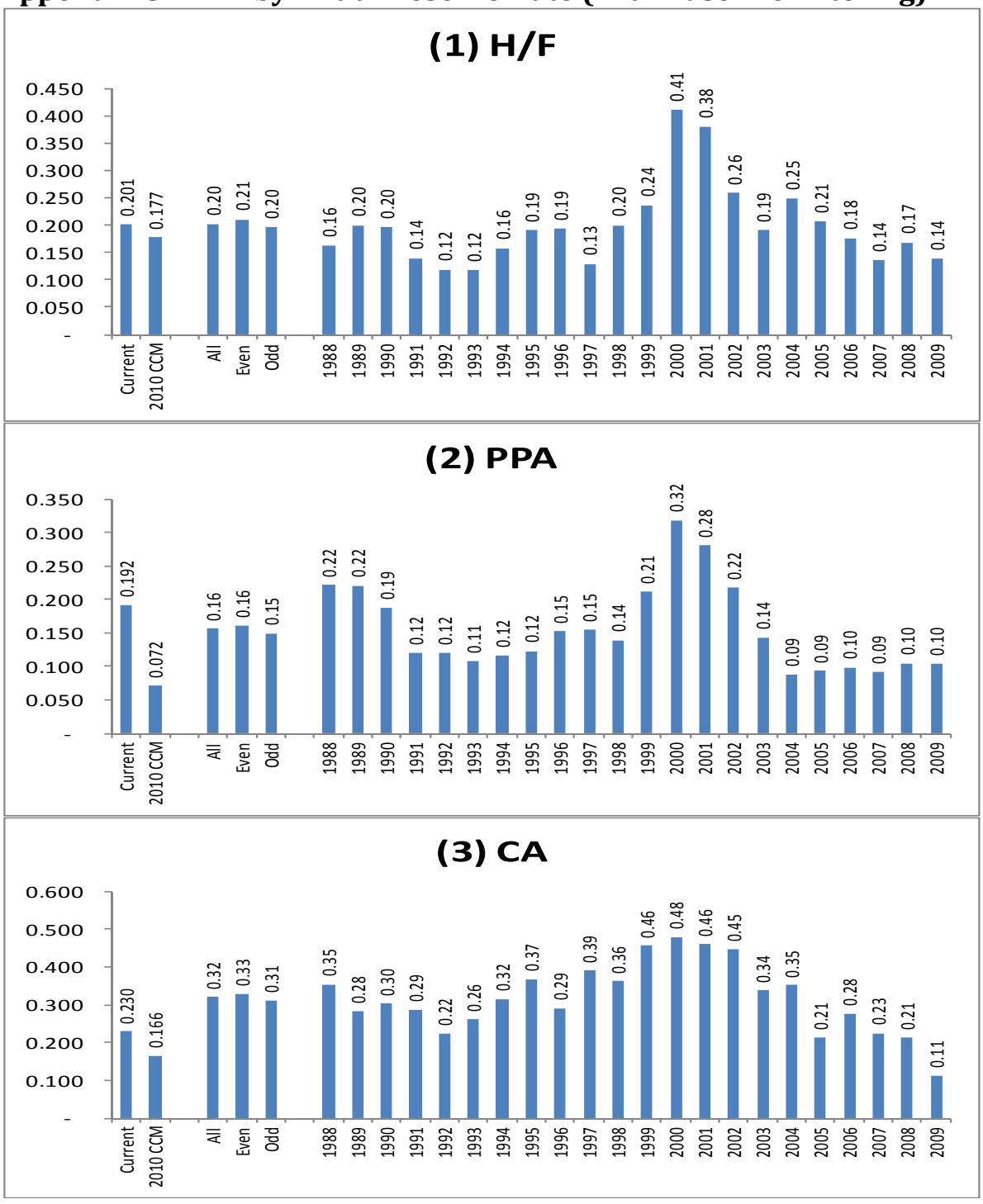

(16) Rein Property & Financial
1.200
1.000
0.800
0.600
0.400
0.200
-
0.286
0.425
0.42
0.53
0.60
0.74
0.41
0.51
0.44
0.55
0.92
1.05
0.94
1.08
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)


(17) Reinsurance Liab
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
-
0.769
0.834
0.66
0.63
1.01
0.97
0.70
0.79
0.68
0.69
1.12
1.18
1.31
1.48
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)
(18) Products Liability
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
-
0.643
0.991
0.89
0.95
1.56
1.51
1.03
1.09
0.92
1.00
1.75
1.71
1.83
1.78
Current (A)
2010 CCM (B)
Pool 5Yrs ExclP Thresh (C)
NP 5Yrs ExclP Thresh (D)
Pool 5Yrs Incl Thresh (E)
NP 5Yrs Incl Thresh (F)
Pool 5Yrs ExclR All (G)
NP 5Yrs ExclR All (H)
Pool 5Yrs ExclP All (I)
NP 5Yrs ExclP All (J)
Pool 5Yrs Incl All (K)
NP 5Yrs Incl All (L)
Pool Incl All (M)
NP Incl All (N)

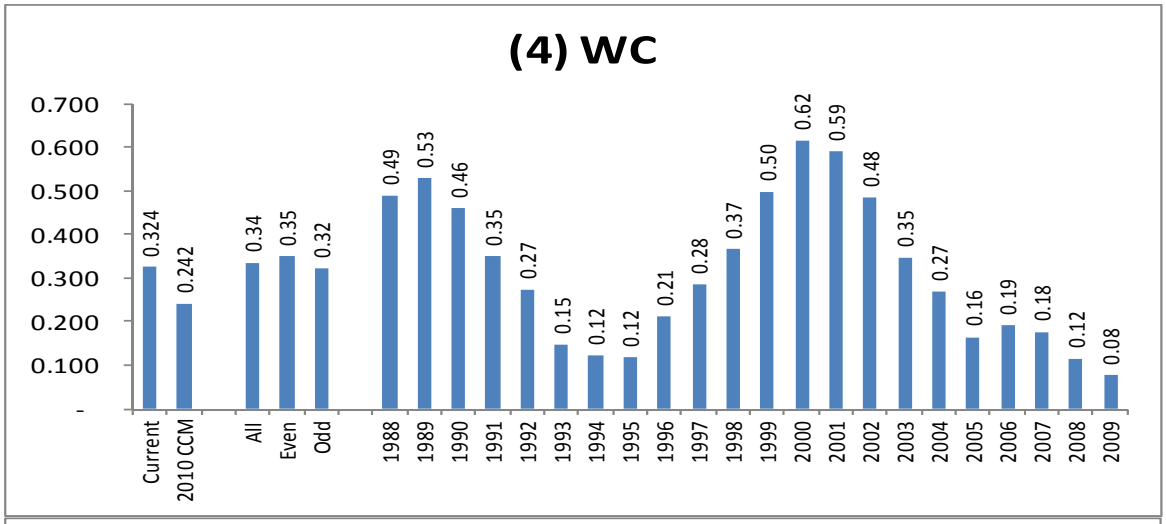
Appendix B – Table 1 Selected Baseline LOB-size Thresholds

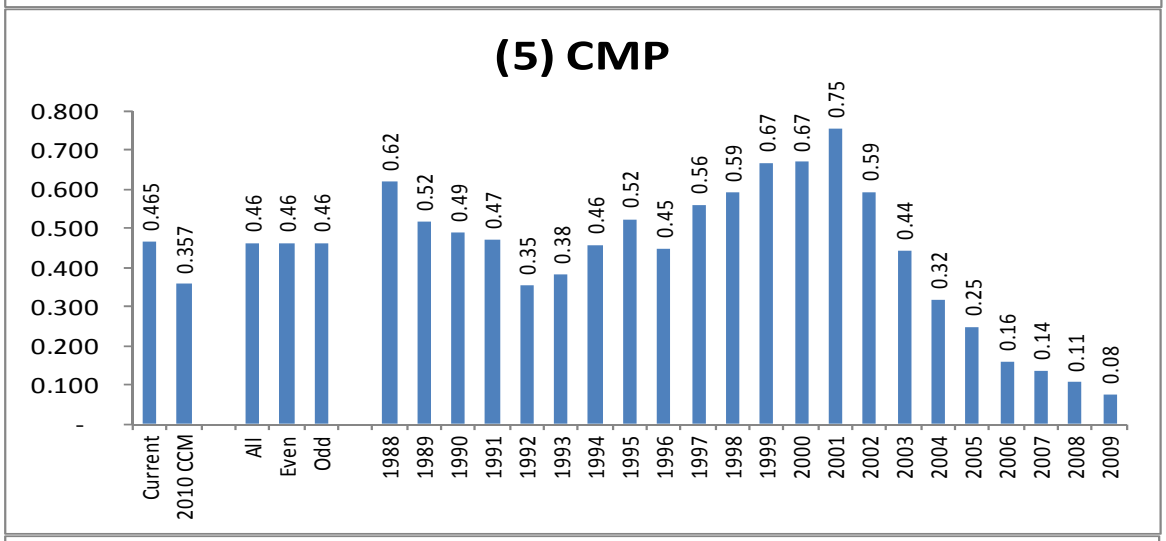
Selected Reserve-Size Threshold by LOB	
Line of Business	**Reserve (000's)**
A Homeowners/Farmowners	350
B Priv. Passenger Auto Liability	1,950
C Commercial Auto Liability.	1,250
D Workers Compensation	1,000
E Commercial Multiperil	700
F1 Medical Malpractice – Occurrence	1,650
F2 Medical Malpractice - Claims made	1,350
G Special Liability	350
H Other Liability	800
I Special Property	100
J Auto Physical Damage	150
K Fidelity & Surety	150
L Other	300
M International	100
N&P Reinsurance A &C (property and financial)	500
O Reinsurance B (liability)	1,000
R Products Liability	500
S Financial Guarantee	100
T Warranty	100

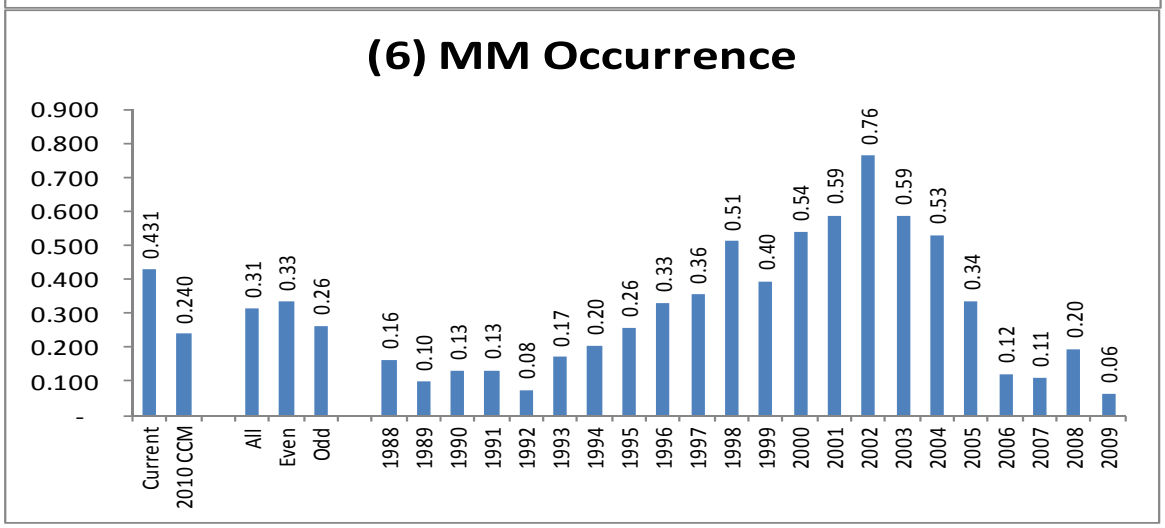
Appendix C – RRF by Initial Reserve Date (with Baseline Filtering)



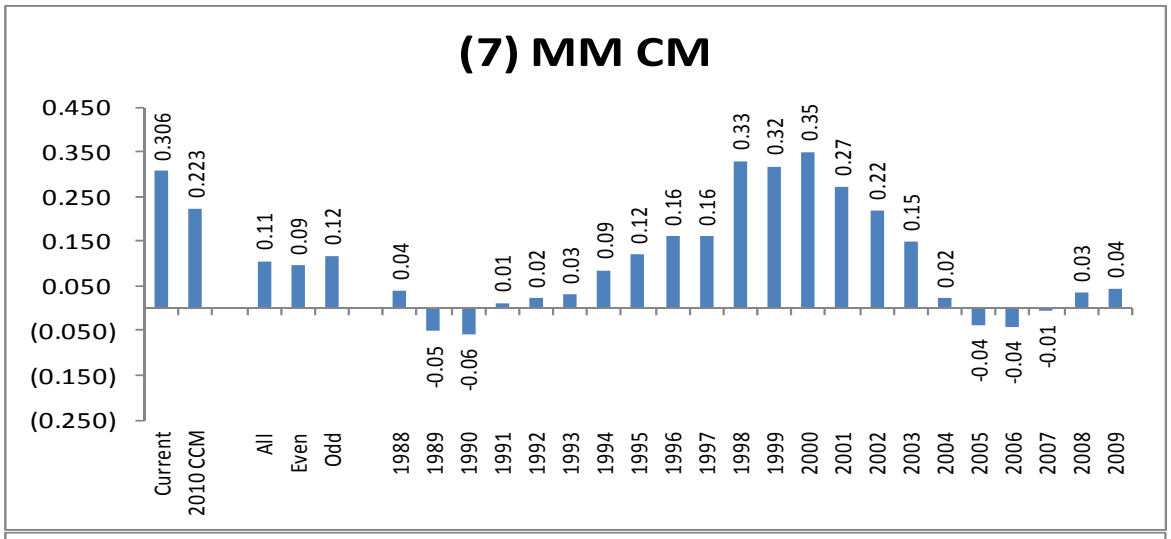
Appendix C – RRF by Initial Reserve Date

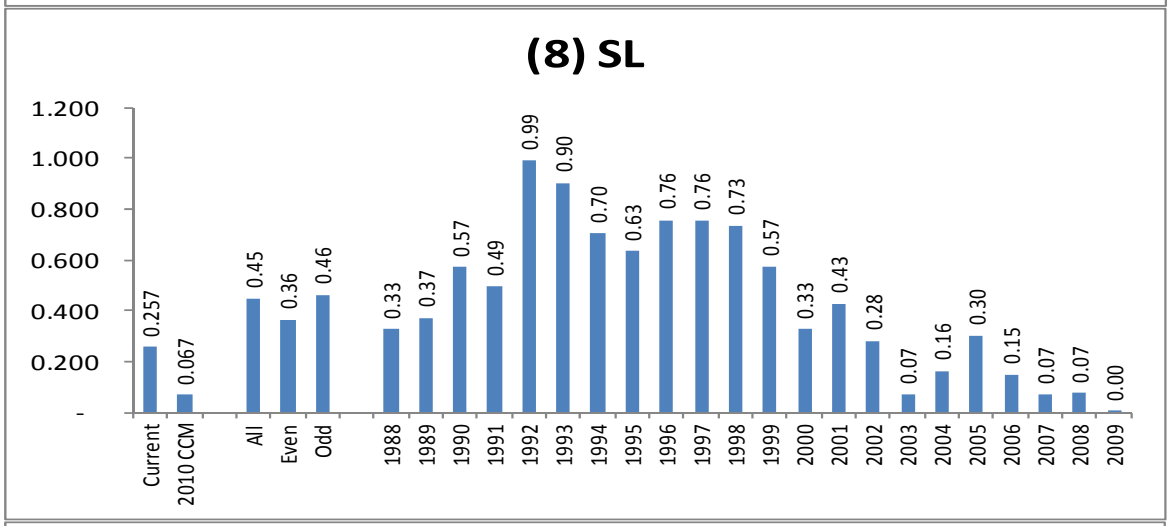


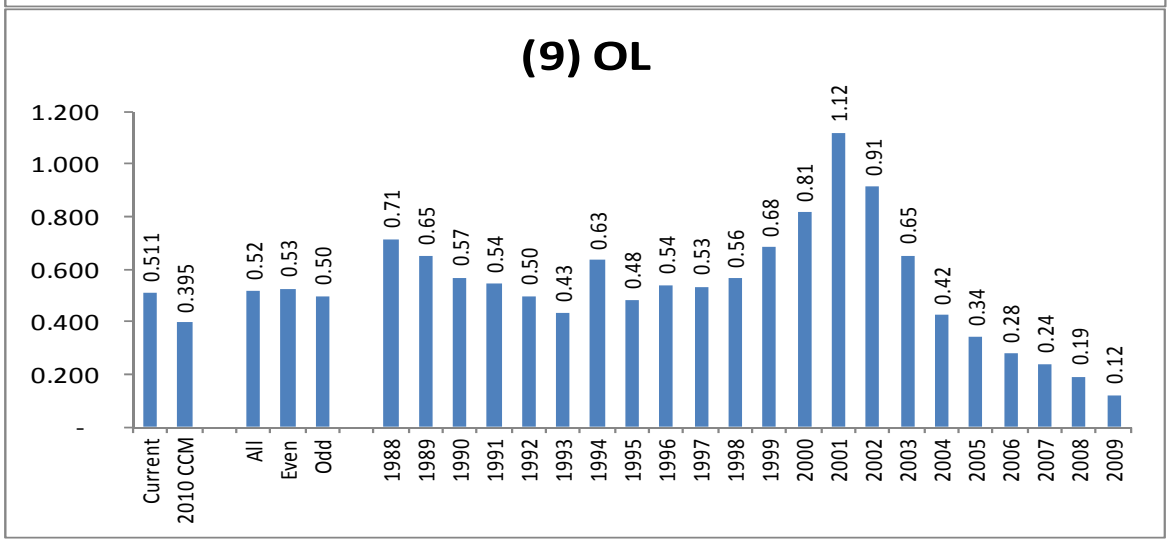




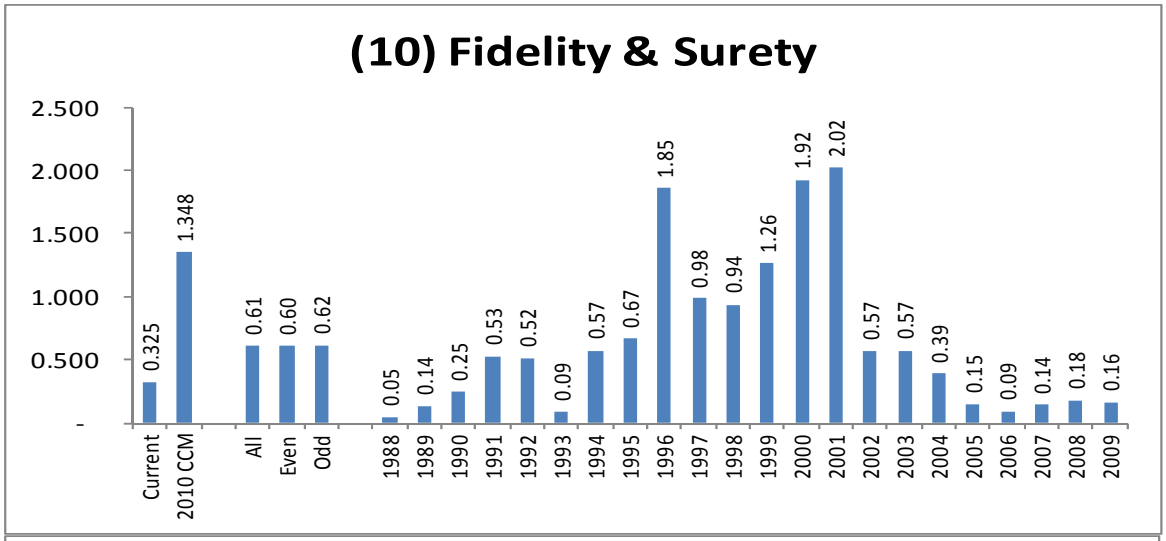
Appendix C – RRF by Initial Reserve Date

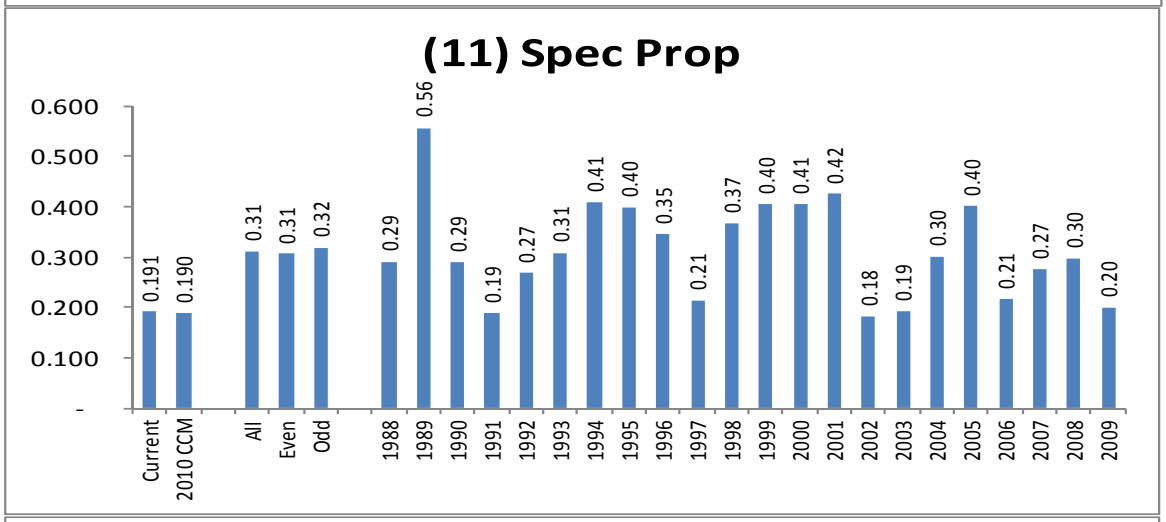


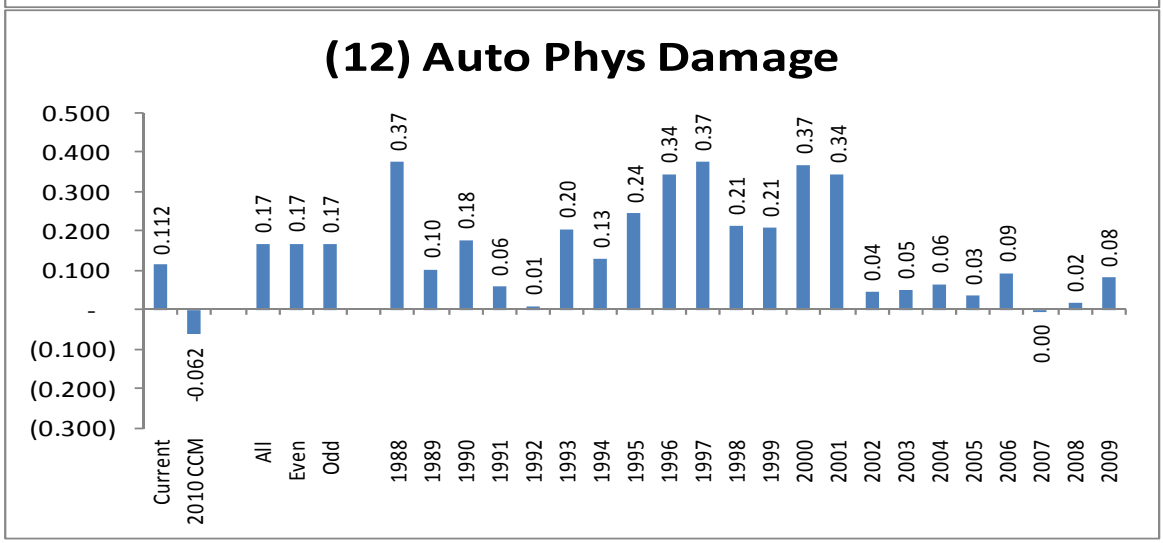


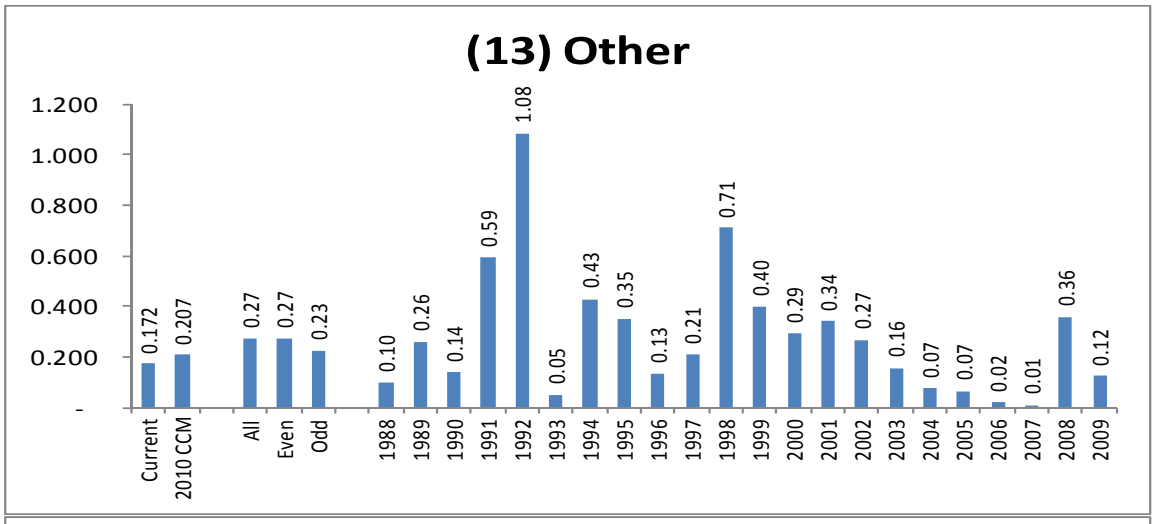


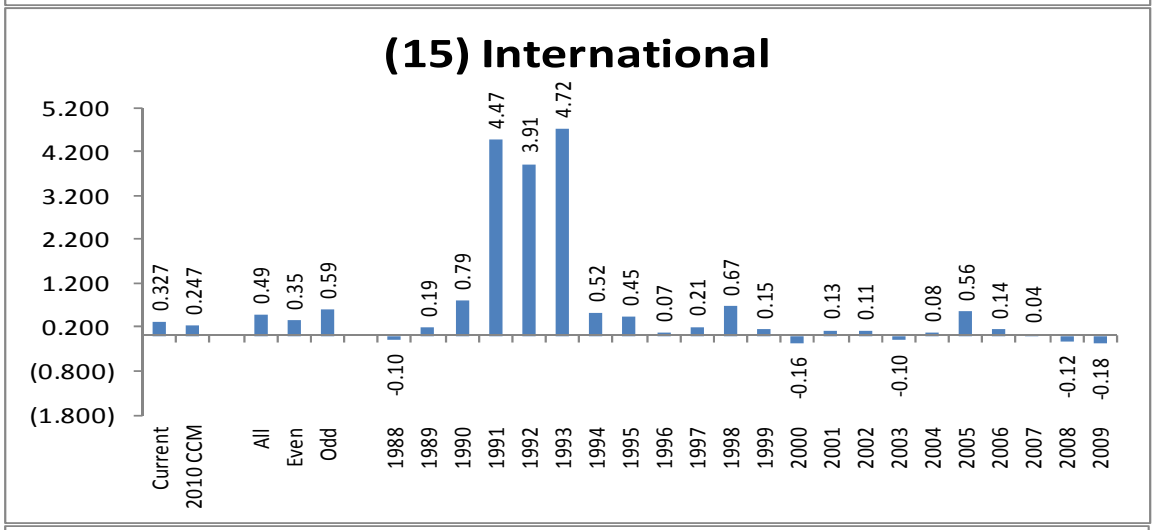
Appendix C – RRF by Initial Reserve Date

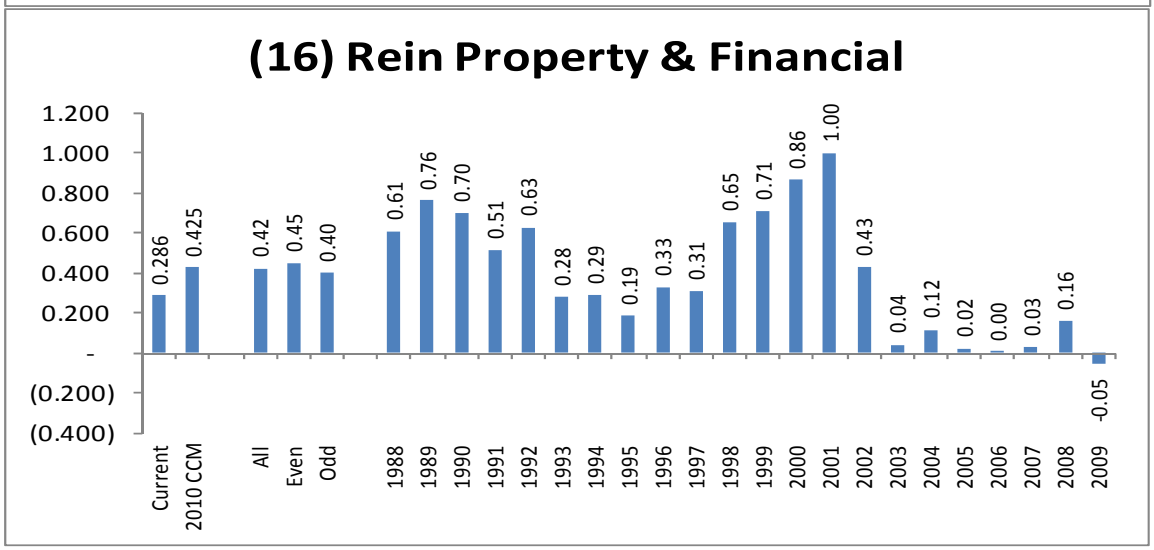




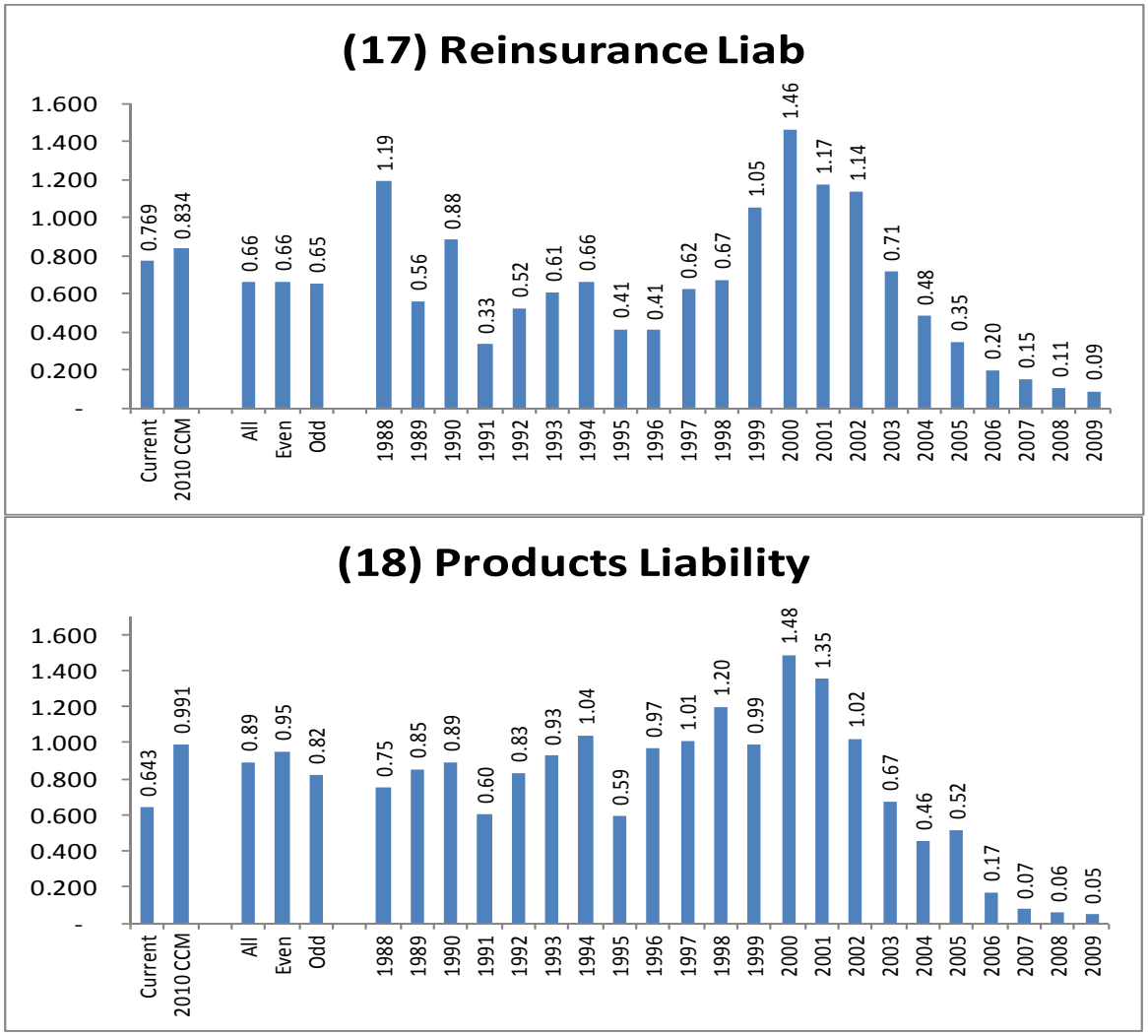



(13) Other
1.200
1.000
0.800
0.600
0.400
0.200
-
0.172
0.207
0.27
0.27
0.23
0.10
0.26
0.14
0.59
1.08
0.05
0.43
0.35
0.13
0.21
0.71
0.40
0.29
0.34
0.27
0.16
0.07
0.07
0.02
0.01
0.36
0.12
Current
2010 CCM
All
Even
Odd
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009


(15) International
5.200
4.200
3.200
2.200
1.200
0.200
(0.800)
(1.800)
0.327
0.247
0.49
0.35
0.59
-0.10
0.19
0.79
4.47
3.91
4.72
0.52
0.45
0.07
0.21
0.67
0.15
-0.16
0.13
0.11
-0.10
0.08
0.56
0.14
0.04
-0.12
-0.18
Current
2010 CCM
All
Even
Odd
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009


(16) Rein Property & Financial
1.200
1.000
0.800
0.600
0.400
0.200
-
(0.200)
(0.400)
0.286
0.425
0.42
0.45
0.40
0.61
0.76
0.70
0.51
0.63
0.28
0.29
0.19
0.33
0.31
0.65
0.71
0.86
1.00
0.43
0.04
0.12
0.02
0.00
0.03
0.16
-0.05
Current
2010 CCM
All
Even
Odd
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

Appendix C – RRF by Initial Reserve Date



						Even/Odd Test and Every Fourth Year Test										
Reserve Risk - Runoff Ratio																
Baseline Filterting										Differences: Segment minus All						
			Segment			Segment (in fourths)										
Acident Year		All	Even	Odd		0_Mod4	1_Mod4	2_Mod4	3_Mod4	Even	Odd		0_Mod4	1_Mod4	2_Mod4	3_Mod4
(1) H/F	A	0.202	0.211	0.195		0.222	0.202	0.203	0.173	0.009	-0.006		0.021	0.000	0.001	-0.028
(2) PPA	B	0.156	0.160	0.149		0.158	0.157	0.163	0.142	0.004	-0.007		0.001	0.001	0.006	-0.014
(3) CA	C	0.320	0.329	0.311		0.322	0.288	0.334	0.345	0.009	-0.008		0.002	-0.032	0.014	0.026
(4) WC	D	0.336	0.348	0.321		0.337	0.338	0.361	0.313	0.013	-0.015		0.001	0.002	0.025	-0.023
(5) CMP	E	0.462	0.462	0.463		0.423	0.463	0.495	0.460	-0.001	0.001		-0.039	0.001	0.032	-0.003
(6) MM Occurrence	F1	0.314	0.333	0.264		0.329	0.264	0.344	0.264	0.020	**-0.050**		0.016	**-0.050**	0.030	**-0.050**
(7) MM CM	F2	0.106	0.095	0.116		0.070	0.098	0.125	0.122	-0.011	0.011		-0.035	-0.008	0.019	0.017
(8) SL	G	0.449	0.363	0.464		0.330	0.467	0.480	0.405	**-0.085**	0.015		**-0.118**	0.018	0.031	**-0.044**
(9) OL	H	0.518	0.527	0.499		0.494	0.464	0.574	0.522	0.009	-0.019		-0.024	**-0.054**	**0.056**	0.004
(11) Spec Prop	I	0.311	0.306	0.318		0.332	0.336	0.286	0.299	-0.006	0.006		0.020	0.024	-0.025	-0.013
(12) Auto Phys Damage	J	0.167	0.167	0.165		0.200	0.206	0.111	0.119	0.000	-0.002		0.033	0.039	**-0.056**	**-0.048**
(10) Fidelity & Surety	K	0.611	0.605	0.616		0.716	0.473	0.493	0.779	-0.006	0.006		**0.105**	**-0.138**	**-0.118**	**0.169**
(13) Other	L	0.271	0.273	0.227		0.276	0.222	0.270	0.263	0.002	**-0.045**		0.005	**-0.050**	-0.001	-0.009
(15) International	M	0.490	0.354	0.593		0.267	0.520	0.514	0.558	**-0.136**	**0.103**		**-0.223**	0.030	0.024	**0.068**
(16) Rein Property & Financial	N&P	0.422	0.448	0.400		0.512	0.356	0.421	0.413	0.026	-0.022		**0.090**	**-0.066**	-0.001	-0.009
(17) Reinsurance Liab	O	0.657	0.662	0.653		0.618	0.605	0.711	0.679	0.005	-0.004		-0.039	**-0.052**	**0.053**	0.021
(18) Products Liability	R	0.894	0.950	0.823		0.881	0.969	1.017	0.679	**0.056**	**-0.071**		-0.013	**0.074**	**0.123**	**-0.215**
(14) Fin & Mort	S	0.000	0.200	0.000		0.778	-0.218	0.125	0.000	**0.200**	0.000		**0.778**	**-0.218**	**0.125**	0.000
(19) Warranty	T	0.032	0.043	-0.001		-0.024	-0.026	0.071	0.015	0.011	-0.033		**-0.056**	**-0.058**	0.039	-0.017

Differences over .040 shown with highlight and bold.

Appendix D –RRFs by LOB-size

(1) H/F

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	169	1,398	83.3%	26.3%	0.34	-0.01	6.37	2.55	18.7	-463.3
25%	169	357	926	41.1%	**22.5%**	-0.04	-0.07	1.15	0.65	-31.0	-9.8
35%	357	672	931	33.6%	20.1%	-0.04	-0.07	0.75	0.55	-19.0	-7.8
45%	672	1,274	927	28.8%	18.0%	-0.04	-0.08	0.98	0.51	-25.2	-6.8
55%	1,274	2,500	932	**27.7%**	16.5%	-0.07	-0.08	0.41	0.37	-6.1	-4.5
65%	2,500	4,819	927	27.5%	14.2%	-0.02	-0.09	0.59	0.36	-25.3	-4.2
A	4,819	9,742	930	14.2%	11.7%	-0.11	-0.10	0.32	0.26	-3.0	-2.5
85%	9,742	19,775	929	8.3%	10.4%	-0.11	-0.10	0.24	0.23	-2.1	-2.3
95%	19,775	74,324	930	12.2%	11.5%	-0.11	-0.09	0.24	0.23	-2.1	-2.4
largest 100	74,324	521,808	365	11.2%	10.4%	-0.06	-0.06	0.21	0.20	-3.5	-3.2
100%	521,808	27,109,142	100	5.6%	5.6%	-0.07	-0.07	0.16	0.16	-2.4	-2.4

Current Risk Charge Runoff Ratio (PR016, Line 4) 20.1%

(2) PPA

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	812	1,351	79.4%	23.0%	3.42	0.47	74.33	28.81	21.7	60.7
25%	812	1,953	903	41.0%	**17.9%**	0.00	-0.05	0.47	0.33	121.8	-7.2
35%	1,953	4,004	898	31.3%	15.6%	-0.04	-0.05	0.53	0.30	-13.7	-5.8
45%	4,004	7,446	901	26.0%	13.9%	-0.02	-0.05	0.34	0.25	-21.0	-4.7
55%	7,446	12,522	901	**19.3%**	12.0%	-0.03	-0.06	0.28	0.23	-8.2	-3.8
65%	12,522	20,740	901	13.5%	10.2%	-0.07	-0.07	0.23	0.22	-3.4	-3.3
A	20,740	42,864	902	15.7%	9.2%	-0.05	-0.07	0.31	0.22	-5.8	-3.3
85%	42,864	105,325	899	8.7%	7.4%	-0.07	-0.07	0.18	0.17	-2.7	-2.3
95%	105,325	540,618	901	5.2%	6.2%	-0.08	-0.08	0.17	0.16	-2.0	-2.1
largest 100	540,618	3,466,207	351	10.6%	8.0%	-0.07	-0.06	0.16	0.15	-2.5	-2.3
100%	3,466,207	17,069,357	100	2.2%	2.2%	-0.06	-0.06	0.09	0.09	-1.5	-1.5

Current Risk Charge Runoff Ratio (PR016, Line 4) 19.2%

(3) CA

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	511	996	126.5%	41.9%	3.31	0.50	63.83	24.75	19.3	49.2
25%	511	1,238	665	69.8%	**35.2%**	0.04	0.01	0.77	0.51	20.0	67.2
35%	1,238	2,531	661	45.0%	32.0%	0.00	0.00	0.52	0.47	-127.2	133.3
45%	2,531	4,551	664	39.4%	30.2%	0.01	0.00	0.78	0.46	78.1	98.6
55%	4,551	8,242	665	**35.3%**	28.0%	0.01	0.00	0.42	0.38	33.4	101.1
65%	8,242	14,666	663	32.4%	26.7%	-0.02	0.00	0.42	0.37	-20.2	206.4
A	14,666	27,042	663	26.1%	25.4%	-0.01	0.01	0.45	0.35	-79.7	42.4
85%	27,042	62,524	664	34.0%	24.8%	0.05	0.01	0.37	0.30	7.7	21.8
95%	62,524	241,029	664	23.1%	18.8%	0.00	-0.01	0.27	0.24	153.9	-26.2
largest 100	241,029	674,172	232	14.0%	13.1%	-0.03	-0.03	0.16	0.15	-5.3	-4.8
100%	674,172	2,785,549	100	11.2%	11.2%	-0.03	-0.03	0.12	0.12	-3.8	-3.8

Current Risk Charge Runoff Ratio (PR016, Line 4) 23.0%

(4) WC

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	1,807	1,052	69.7%	37.2%	0.07	0.03	1.23	0.65	17.6	20.5
25%	1,807	3,833	702	36.4%	**33.3%**	-0.02	0.02	0.51	0.47	-29.8	19.2
35%	3,833	7,760	702	49.0%	32.4%	0.07	0.03	0.48	0.47	7.3	15.5
45%	7,760	14,372	702	41.7%	30.2%	0.02	0.02	0.59	0.47	24.5	18.8
55%	14,372	26,469	701	**44.3%**	28.8%	0.05	0.03	0.48	0.44	9.4	17.7
65%	26,469	48,157	702	29.3%	26.0%	0.03	0.02	0.67	0.43	26.4	22.6
A	48,157	93,226	702	30.7%	25.1%	0.02	0.02	0.52	0.34	24.2	19.4
85%	93,226	258,098	702	24.0%	24.2%	-0.01	0.02	0.25	0.23	-34.2	14.3
95%	258,098	1,256,615	702	22.8%	24.2%	0.01	0.03	0.21	0.21	15.5	6.7
largest 100	1,256,615	4,867,857	251	27.0%	27.3%	0.05	0.07	0.22	0.21	4.1	3.1
100%	4,867,857	16,176,596	100	27.2%	27.2%	0.10	0.10	0.17	0.17	1.8	1.8
	Current Risk Charge Runoff Ratio (PR016, Line 4)				32.4%						

(5) CMP

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	253	1,147	135.8%	56.5%	1.02	0.21	10.34	4.05	10.1	19.0
25%	253	695	765	76.4%	**48.8%**	0.12	0.07	0.87	0.54	7.3	7.7
35%	695	1,536	765	57.0%	46.2%	0.08	0.06	0.75	0.48	9.3	7.5
45%	1,536	3,298	765	52.4%	44.3%	0.04	0.06	0.57	0.42	14.9	6.9
55%	3,298	6,279	764	**58.1%**	42.7%	0.10	0.07	0.53	0.39	5.4	5.9
65%	6,279	11,577	765	54.2%	40.8%	0.10	0.06	0.41	0.35	4.1	6.0
A	11,577	22,523	765	41.1%	37.0%	0.04	0.05	0.38	0.33	10.3	7.1
85%	22,523	48,662	765	32.9%	35.8%	0.01	0.05	0.32	0.31	46.1	6.1
95%	48,662	323,105	765	41.2%	37.5%	0.08	0.08	0.32	0.30	3.9	3.7
largest 100	323,105	1,268,089	283	35.3%	31.5%	0.09	0.07	0.25	0.24	2.9	3.2
100%	1,268,089	4,184,264	100	25.4%	25.4%	0.04	0.04	0.20	0.20	5.6	5.6
	Current Risk Charge Runoff Ratio (PR016, Line 4)				46.5%						

(6) MM Occurrence

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	1,923	183	196.0%	41.1%	0.54	0.00	2.47	1.07	4.6	-351.6
25%	1,923	5,289	122	67.8%	**30.5%**	0.03	-0.10	0.64	0.47	24.5	-4.8
35%	5,289	11,711	123	33.2%	24.8%	-0.11	-0.12	0.39	0.44	-3.6	-3.8
45%	11,711	19,746	122	31.4%	23.7%	-0.03	-0.12	0.65	0.45	-25.2	-3.9
55%	19,746	37,357	122	**17.5%**	22.5%	-0.18	-0.13	0.36	0.40	-2.0	-3.0
65%	37,357	73,248	122	58.4%	24.9%	-0.01	-0.12	0.61	0.41	-87.3	-3.4
A	73,248	113,195	123	40.1%	19.7%	-0.07	-0.16	0.43	0.33	-6.2	-2.1
85%	113,195	245,022	122	12.2%	8.7%	-0.19	-0.19	0.29	0.27	-1.5	-1.4
95%	245,022	727,276	122	7.6%	7.4%	-0.16	-0.19	0.27	0.27	-1.7	-1.4
largest 100	727,276	1,397,205	31	-4.8%	7.1%	-0.27	-0.24	0.25	0.26	-0.9	-1.1
100%	1,397,205	3,130,491	31	9.0%	9.0%	-0.20	-0.20	0.27	0.27	-1.3	-1.3
	Current Risk Charge Runoff Ratio (PR016, Line 4)				43.1%						

Appendix D – RRF by LOB-size

(7) MM CM

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	1,334	385	67.5%	14.8%	0.14	-0.15	3.16	1.29	23.3	-8.6
25%	1,334	2,976	258	20.1%	**10.6%**	-0.19	-0.20	0.77	0.41	-4.1	-2.0
35%	2,976	5,439	255	21.0%	8.9%	-0.21	-0.20	0.37	0.33	-1.8	-1.7
45%	5,439	10,535	257	14.8%	7.4%	-0.20	-0.20	0.41	0.33	-2.0	-1.6
55%	10,535	18,979	257	**12.6%**	6.6%	-0.17	-0.20	0.36	0.31	-2.2	-1.6
65%	18,979	35,056	257	12.0%	5.3%	-0.17	-0.21	0.33	0.30	-1.9	-1.4
A	35,056	62,244	256	10.7%	3.5%	-0.22	-0.22	0.31	0.29	-1.4	-1.3
85%	62,244	135,194	257	-0.6%	-0.5%	-0.21	-0.22	0.32	0.28	-1.5	-1.3
95%	135,194	396,859	257	-1.4%	-0.4%	-0.23	-0.22	0.26	0.25	-1.1	-1.1
largest 100	396,859	612,328	65	8.8%	-0.4%	-0.16	-0.20	0.26	0.22	-1.6	-1.1
100%	612,328	1,478,669	64	-4.5%	-4.5%	-0.25	-0.25	0.17	0.17	-0.7	-0.7
	Current Risk Charge Runoff Ratio (PR016, Line 4)				30.6%						

(8) SL

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	348	183	173.9%	54.6%	0.89	0.21	5.85	2.64	6.6	12.4
25%	348	1,051	123	18.4%	**44.9%**	-0.07	0.09	1.06	1.45	-15.9	15.4
35%	1,051	2,151	122	78.9%	46.7%	-0.02	0.12	0.76	1.50	-34.7	12.9
45%	2,151	3,585	123	118.8%	45.7%	0.27	0.14	0.81	1.58	3.1	11.5
55%	3,585	5,872	122	**39.6%**	32.4%	-0.11	0.11	0.51	1.68	-4.4	14.8
65%	5,872	12,749	123	35.9%	32.0%	-0.04	0.16	0.52	1.84	-14.1	11.2
A	12,749	25,045	122	35.7%	30.2%	0.36	0.22	2.87	2.07	7.9	9.3
85%	25,045	72,988	123	31.8%	28.7%	0.46	0.16	2.56	1.64	5.6	10.0
95%	72,988	152,471	122	29.5%	24.0%	-0.01	-0.03	0.30	0.26	-42.8	-8.6
largest 100	152,471	206,621	31	9.8%	6.0%	-0.11	-0.08	0.19	0.18	-1.7	-2.3
100%	206,621	507,687	31	4.9%	4.9%	-0.04	-0.04	0.15	0.15	-3.6	-3.6
	Current Risk Charge Runoff Ratio (PR016, Line 4)				25.7%						

(9) OL

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	390	1,357	155.9%	59.5%	14.05	2.41	333.09	132.06	23.7	54.7
25%	390	1,226	906	80.9%	**52.5%**	2.97	0.36	88.61	30.42	29.8	84.4
35%	1,226	2,530	904	61.5%	50.3%	-0.06	0.01	0.79	0.60	-13.4	53.7
45%	2,530	4,697	904	44.8%	49.4%	-0.06	0.02	0.57	0.57	-9.1	25.8
55%	4,697	8,730	905	**37.6%**	50.3%	-0.10	0.04	0.58	0.57	-6.0	15.2
65%	8,730	17,870	905	35.4%	52.3%	-0.06	0.07	0.52	0.56	-8.8	8.4
A	17,870	36,465	904	36.7%	57.6%	-0.01	0.10	0.44	0.57	-35.6	5.5
85%	36,465	97,337	905	55.2%	64.0%	0.07	0.15	0.67	0.61	9.2	4.1
95%	97,337	525,378	905	71.3%	69.5%	0.18	0.20	0.60	0.56	3.4	2.8
largest 100	525,378	3,368,679	353	72.3%	67.2%	0.24	0.25	0.48	0.46	2.0	1.8
100%	3,368,679	23,638,870	100	59.1%	59.1%	0.25	0.25	0.34	0.34	1.3	1.3
	Current Risk Charge Runoff Ratio (PR016, Line 4)				51.1%						

(10) Fidelity & Surety

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	81	174	188.9%	66.3%	6.62	0.96	55.00	21.44	8.3	22.4
25%	81	209	116	44.2%	**55.8%**	-0.59	-0.04	1.05	1.92	-1.8	-49.9
35%	209	483	116	101.9%	61.4%	0.19	0.03	4.04	2.00	21.4	57.3
45%	483	1,064	116	71.4%	60.3%	-0.03	0.01	1.31	1.45	-45.7	130.5
55%	1,064	1,736	117	**127.3%**	54.4%	0.28	0.02	1.99	1.47	7.2	80.6
65%	1,736	2,834	116	112.4%	43.9%	0.14	-0.04	1.59	1.33	11.7	-33.6
A	2,834	4,630	116	33.5%	38.0%	-0.19	-0.09	1.39	1.24	-7.2	-13.9
85%	4,630	8,454	116	42.4%	38.4%	-0.02	-0.05	1.48	1.17	-65.9	-24.2
95%	8,454	36,650	116	26.2%	27.9%	-0.01	-0.07	1.10	0.93	-74.3	-14.1
largest 100	36,650	67,857	30	5.8%	30.8%	-0.18	-0.17	0.41	0.38	-2.3	-2.3
100%	67,857	756,697	29	41.0%	41.0%	-0.16	-0.16	0.35	0.35	-2.3	-2.3
	Current Risk Charge Runoff Ratio (PR016, Line 4)				32.5%						

(11) Spec Prop

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	46	1,076	120.0%	40.0%	2.06	2.34	39.41	126.88	19.1	54.2
25%	46	107	713	45.3%	**33.1%**	17.30	2.39	397.62	136.67	23.0	57.2
35%	107	216	713	35.2%	31.0%	0.83	0.40	14.78	10.02	17.7	24.9
45%	216	390	711	29.0%	30.5%	-0.16	0.34	1.18	9.06	-7.3	27.0
55%	390	782	716	**27.1%**	30.9%	0.27	0.43	4.52	9.84	16.9	23.1
65%	782	1,596	713	25.9%	32.7%	0.27	0.46	7.65	10.67	27.8	23.1
A	1,596	3,290	714	26.1%	34.7%	1.54	0.51	20.64	11.38	13.4	22.1
85%	3,290	8,717	714	34.1%	37.4%	0.24	0.10	5.02	3.24	21.3	31.7
95%	8,717	44,782	714	36.4%	39.5%	0.01	0.01	0.87	0.84	114.9	65.3
largest 100	44,782	190,412	258	51.6%	43.4%	0.06	0.02	0.90	0.80	14.7	33.6
100%	190,412	2,227,919	100	16.8%	16.8%	-0.07	-0.07	0.40	0.40	-5.4	-5.4
	Current Risk Charge Runoff Ratio (PR016, Line 4)				19.1%						

(12) Auto Phys Damage

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	73	683	62.8%	23.5%	11.26	3.86	238.97	100.45	21.2	26.0
25%	73	150	455	44.6%	**19.4%**	9.35	2.55	93.03	42.29	9.9	16.6
35%	150	268	454	18.4%	16.5%	4.13	1.64	55.85	29.46	13.5	17.9
45%	268	466	455	17.1%	15.8%	2.24	1.26	21.25	22.86	9.5	18.1
55%	466	822	455	**26.7%**	15.7%	1.74	1.09	27.33	23.14	15.7	21.3
65%	822	1,527	455	15.0%	13.5%	3.48	0.94	43.47	22.10	12.5	23.5
A	1,527	2,823	455	9.4%	12.6%	0.02	0.21	5.53	9.32	365.4	43.5
85%	2,823	7,139	455	10.3%	14.4%	0.82	0.29	16.31	10.46	19.8	35.6
95%	7,139	24,827	455	24.9%	16.2%	-0.01	-0.06	2.23	2.19	-199.5	-37.4
largest 100	24,827	54,011	128	17.6%	9.2%	-0.09	-0.15	2.66	2.11	-29.9	-13.8
100%	54,011	3,404,975	100	6.5%	6.5%	-0.24	-0.24	1.06	1.06	-4.5	-4.5
	Current Risk Charge Runoff Ratio (PR016, Line 4)				11.2%						

(13) Other

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	140	223	118.6%	35.1%	-0.40	-0.13	17.13	6.69	-43.0	-50.0
25%	140	324	147	39.1%	**27.4%**	-0.08	-0.09	1.12	0.94	-13.4	-10.8
35%	324	771	148	37.8%	27.2%	-0.20	-0.09	0.65	0.91	-3.3	-10.4
45%	771	1,837	148	12.9%	26.3%	-0.24	-0.07	0.75	0.94	-3.1	-13.4
55%	1,837	3,161	148	**19.3%**	27.1%	-0.20	-0.04	0.57	0.97	-2.8	-24.6
65%	3,161	5,117	148	12.8%	27.4%	-0.38	0.00	0.63	1.04	-1.7	-327.6
A	5,117	9,817	148	22.0%	36.4%	-0.14	0.10	0.47	1.10	-3.4	10.6
85%	9,817	22,489	148	91.3%	40.0%	0.43	0.20	1.76	1.26	4.1	6.3
95%	22,489	60,579	148	19.0%	25.9%	0.06	0.05	0.83	0.73	14.8	13.9
largest 100	60,579	115,862	38	3.1%	27.9%	-0.11	0.04	0.36	0.46	-3.4	10.5
100%	115,862	1,215,858	37	38.9%	38.9%	0.20	0.20	0.51	0.51	2.6	2.6
	Current Risk Charge Runoff Ratio (PR016, Line 4)				17.2%						

(14) Fin & Mort

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	22	6	290.7%	2.9%	0.63	-0.60	1.97	1.77	3.1	-3.0
25%	22	39	4	-2.3%	**0.0%**	-0.52	-0.81	0.56	1.67	-1.1	-2.1
35%	39	69	9	0.0%	0.0%	-0.18	-0.85	0.28	1.77	-1.6	-2.1
45%	69	69	0		0.0%		-1.12		2.04		-1.8
55%	69	96	3	**-73.1%**	0.0%	-0.86	-1.12	0.16	2.04	-0.2	-1.8
65%	96	490	4	-266.3%	0.0%	-4.46	-1.16	2.32	2.20	-0.5	-1.9
A	490	665	6	0.0%	5.0%	-0.07	-0.28	0.18	1.07	-2.4	-3.8
85%	665	758	2	-134.9%	20.0%	-2.33	-0.42	1.86	1.39	-0.8	-3.3
95%	758	5,145	4	104.7%	53.9%	0.31	0.13	0.86	0.65	2.8	5.2
largest 100	5,145	15,380	2	-4.1%	-4.6%	-0.06	-0.11	0.03	0.10	-0.5	-0.9
100%	15,380	17,015	1	-23.1%	-23.1%	-0.23	-0.23				
	Current Risk Charge Runoff Ratio (PR016, Line 4)				20.0%						

(15) International

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	950	12	14101.3%	69.5%	55.35	7.92	93.49	39.23	1.7	5.0
25%	950	2,022	9	440.7%	**47.4%**	0.64	0.02	2.70	1.04	4.2	66.2
35%	2,022	3,410	8	12.0%	43.4%	-0.28	-0.07	0.61	0.47	-2.2	-6.4
45%	3,410	5,760	8	108.7%	43.4%	0.06	-0.04	0.72	0.45	11.2	-10.2
55%	5,760	11,423	9	**58.6%**	37.6%	0.11	-0.06	0.40	0.39	3.7	-6.3
65%	11,423	19,071	8	47.7%	32.8%	0.12	-0.10	0.32	0.39	2.6	-3.8
A	19,071	26,576	8	36.8%	23.5%	0.11	-0.16	0.20	0.39	1.8	-2.4
85%	26,576	52,353	9	2.3%	10.2%	-0.18	-0.26	0.15	0.40	-0.8	-1.5
95%	52,353	173,784	8	35.0%	25.0%	-0.08	-0.32	0.50	0.50	-6.4	-1.6
largest 100	173,784	250,205	3	-69.7%	-57.7%	-0.78	-0.70	0.10	0.13	-0.1	-0.2
100%	250,205	315,299	2	-56.4%	-56.4%	-0.58	-0.58	0.02	0.02	0.0	0.0
	Current Risk Charge Runoff Ratio (PR016, Line 4)				32.7%						

(16) Rein Property & Financial

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	536	181	74.5%	44.3%	1.48	0.17	13.57	5.30	9.2	31.9
25%	536	1,752	121	39.1%	**42.2%**	-0.13	-0.06	0.57	0.62	-4.4	-9.6
35%	1,752	4,353	120	51.3%	42.2%	-0.11	-0.06	0.88	0.63	-7.8	-11.3
45%	4,353	7,972	121	34.5%	42.1%	-0.08	-0.05	0.89	0.58	-11.6	-12.4
55%	7,972	13,285	121	**71.9%**	42.2%	0.06	-0.04	0.67	0.51	10.5	-12.2
65%	13,285	23,879	121	53.1%	40.8%	-0.05	-0.07	0.60	0.47	-12.4	-7.1
A	23,879	41,855	120	40.2%	32.5%	-0.05	-0.07	0.47	0.42	-9.0	-6.0
85%	41,855	102,342	121	42.2%	31.0%	-0.04	-0.08	0.46	0.40	-11.7	-5.2
95%	102,342	443,957	121	31.3%	25.2%	-0.06	-0.10	0.39	0.36	-6.2	-3.5
largest 100	443,957	656,684	31	5.0%	6.5%	-0.18	-0.18	0.29	0.27	-1.6	-1.5
100%	656,684	3,896,952	30	6.2%	6.2%	-0.19	-0.19	0.25	0.25	-1.3	-1.3
	Current Risk Charge Runoff Ratio (PR016, Line 4)				28.6%						

(17) Reinsurance Liab

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	3,688	202	114.2%	67.6%	0.58	0.24	4.19	1.80	7.3	7.6
25%	3,688	8,712	135	55.2%	**65.0%**	0.14	0.18	1.48	0.84	10.3	4.7
35%	8,712	18,749	135	78.7%	65.6%	0.21	0.18	0.76	0.72	3.6	3.9
45%	18,749	34,829	135	58.3%	63.3%	0.13	0.18	0.65	0.71	5.2	4.0
55%	34,829	69,801	136	**93.9%**	63.9%	0.31	0.19	1.01	0.72	3.2	3.9
65%	69,801	136,546	135	43.8%	61.2%	0.09	0.16	0.47	0.64	5.2	4.0
A	136,546	251,973	135	46.4%	65.3%	0.17	0.18	0.95	0.68	5.6	3.8
85%	251,973	582,726	135	68.8%	69.6%	0.12	0.18	0.64	0.53	5.4	2.9
95%	582,726	2,170,556	135	66.4%	70.8%	0.23	0.22	0.40	0.44	1.7	2.0
largest 100	2,170,556	4,502,562	34	122.8%	104.2%	0.53	0.20	0.53	0.53	1.0	2.7
100%	4,502,562	11,516,723	34	4.8%	4.8%	-0.13	-0.13	0.25	0.25	-1.9	-1.9
	Current Risk Charge Runoff Ratio (PR016, Line 4)				76.9%						

(18) Products Liability

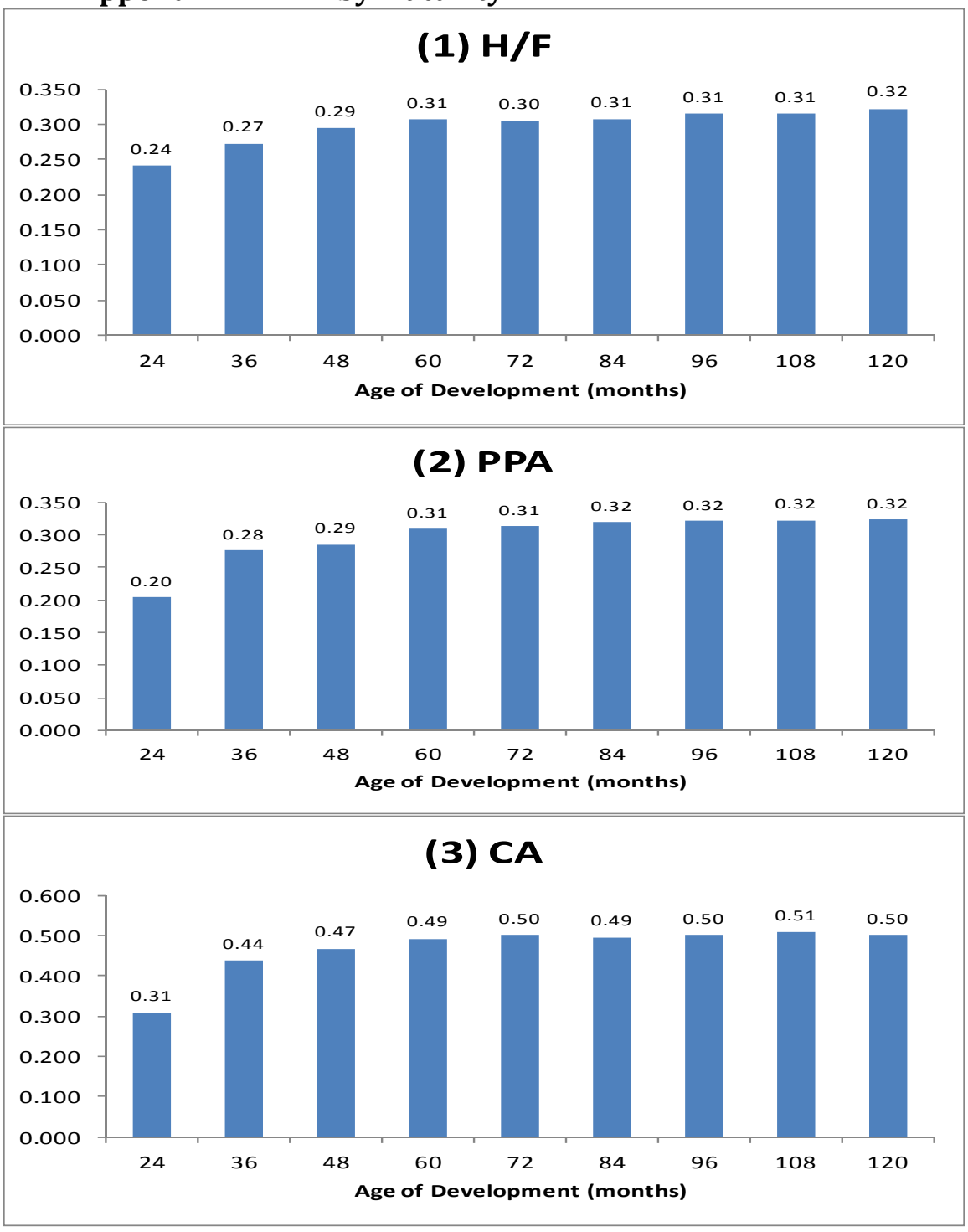
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	909	96	118.0%	92.4%	0.35	0.26	2.59	1.79	7.4	7.0
25%	909	1,854	64	74.7%	**89.4%**	0.77	0.24	3.76	1.61	4.9	6.7
35%	1,854	3,709	64	73.0%	90.8%	0.09	0.17	0.89	1.02	9.5	6.0
45%	3,709	7,228	64	137.1%	95.2%	0.51	0.18	1.81	1.04	3.5	5.8
55%	7,228	13,844	64	**68.1%**	74.1%	0.15	0.12	0.74	0.82	5.0	6.8
65%	13,844	23,054	64	29.7%	76.2%	0.05	0.11	1.10	0.83	23.6	7.3
A	23,054	38,020	64	180.3%	82.7%	0.37	0.13	1.12	0.74	3.1	5.6
85%	38,020	90,661	64	74.4%	50.3%	0.17	0.04	0.62	0.50	3.7	12.2
95%	90,661	188,445	64	23.5%	19.3%	0.00	-0.04	0.41	0.38	220.6	-9.0
largest 100	188,445	240,180	17	5.1%	-1.8%	-0.03	-0.13	0.34	0.28	-13.2	-2.2
100%	240,180	363,276	16	-9.9%	-9.9%	-0.23	-0.23	0.13	0.13	-0.6	-0.6
	Current Risk Charge Runoff Ratio (PR016, Line 4)				64.3%						

Appendix D – RRF by LOB-size

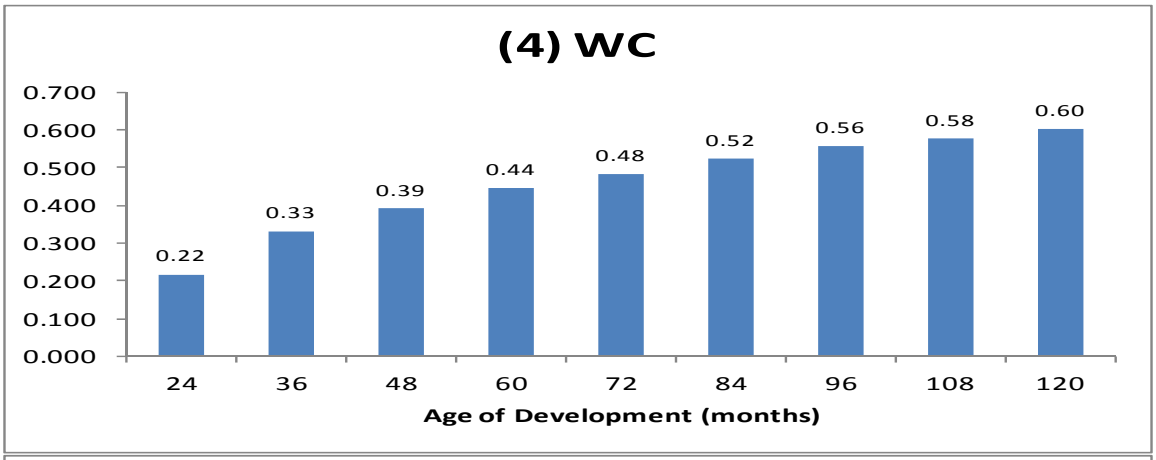
(19) Warranty

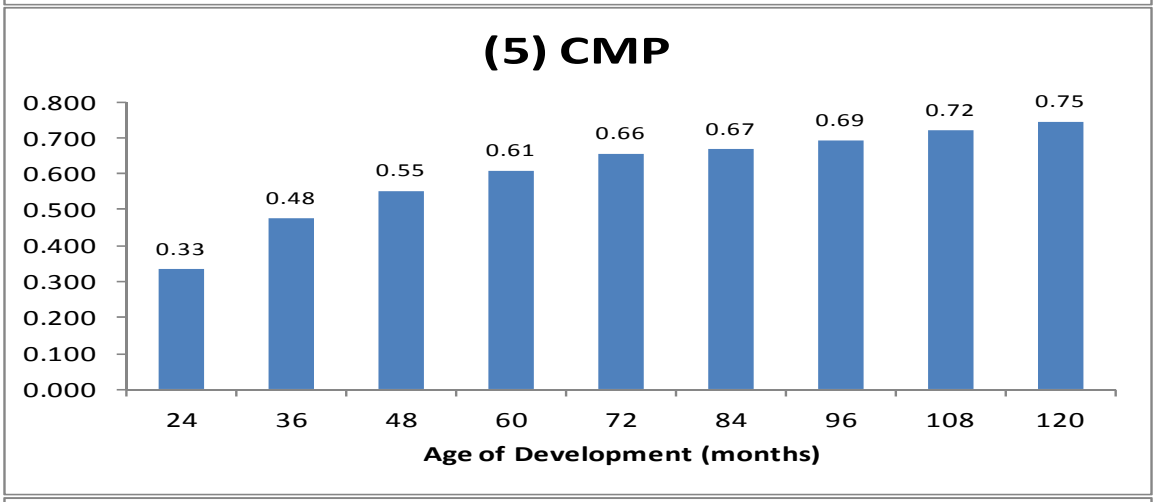
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Size Band	Reserve ($000s)			87.5th Percentile Runoff Ratio		Average Runoff Ratio		Runoff Ratio Std. Dev		Coeff. Var.	
Endpoint			Data	all points	all points	all points	all points	all points	all points	all points	all points
Percentile	from	to	Points	in band	>"from"	in band	>"from"	in band	>"from"	in band	>"from"
15%	0	1,242	3	-19.8%	3.2%	-0.24	-0.15	0.06	0.20	-0.2	-1.4
25%	1,242	1,550	2	-30.0%	**4.4%**	-0.54	-0.14	0.45	0.22	-0.8	-1.6
35%	1,550	2,131	2	-26.8%	5.5%	-0.30	-0.09	0.06	0.13	-0.2	-1.5
45%	2,131	2,584	2	-16.7%	6.8%	-0.18	-0.06	0.02	0.10	-0.1	-1.8
55%	2,584	2,720	2	**-6.3%**	8.0%	-0.10	-0.04	0.07	0.09	-0.7	-2.6
65%	2,720	2,841	2	3.4%	9.3%	-0.01	-0.02	0.08	0.09	-8.1	-4.2
A	2,841	8,331	2	-1.2%	10.1%	-0.07	-0.03	0.11	0.10	-1.6	-4.0
85%	8,331	9,897	2	7.6%	10.3%	-0.02	-0.01	0.19	0.11	-7.8	-9.6
95%	9,897	10,944	2	7.9%	6.8%	0.02	0.00	0.12	0.08	6.8	-18.3
largest 100	10,944	14,215	1	-6.7%	0.5%	-0.07	-0.03		0.06		-2.3
100%	14,215	14,256	1	1.6%	1.6%	0.02	0.02				
	Current Risk Charge Runoff Ratio (PR016, Line 4)				32.5%						

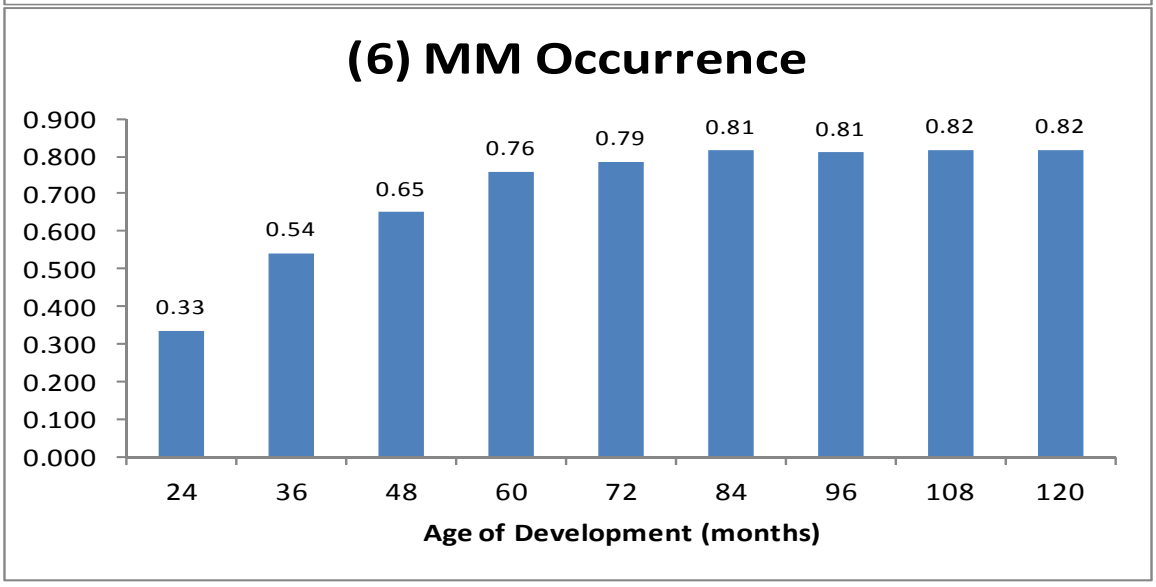
Appendix E – RRF by Maturity

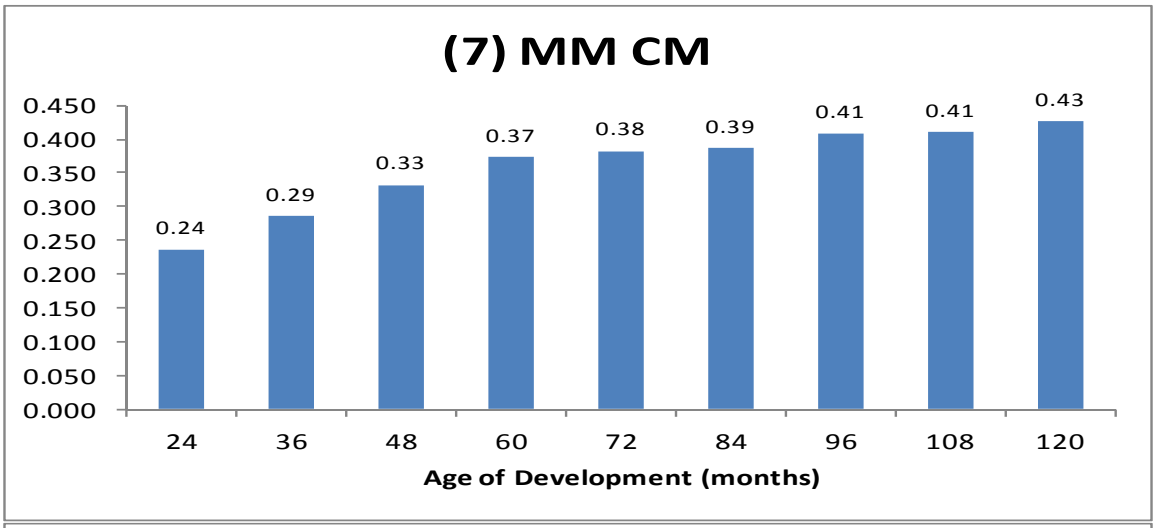


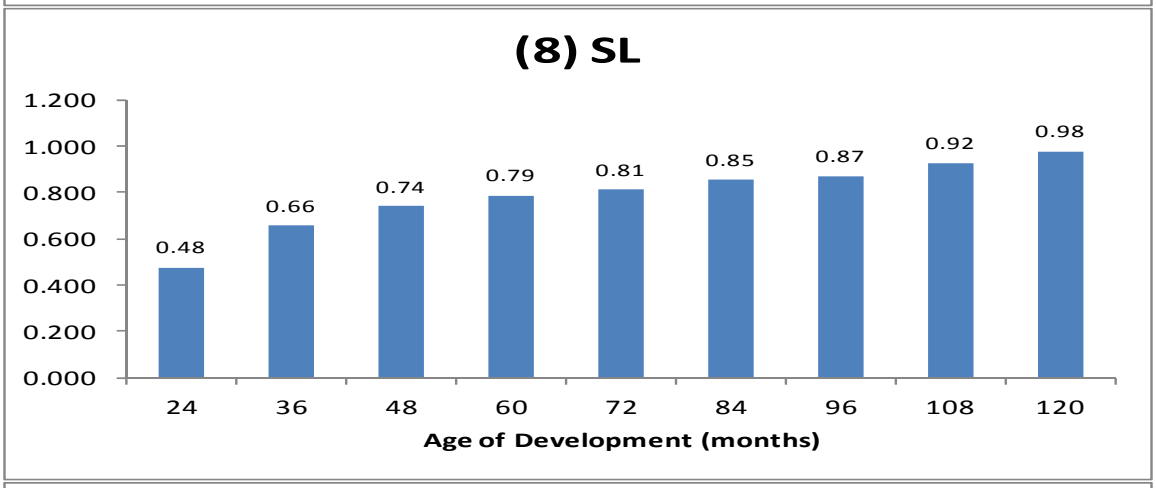
Appendix E – RRF by Maturity

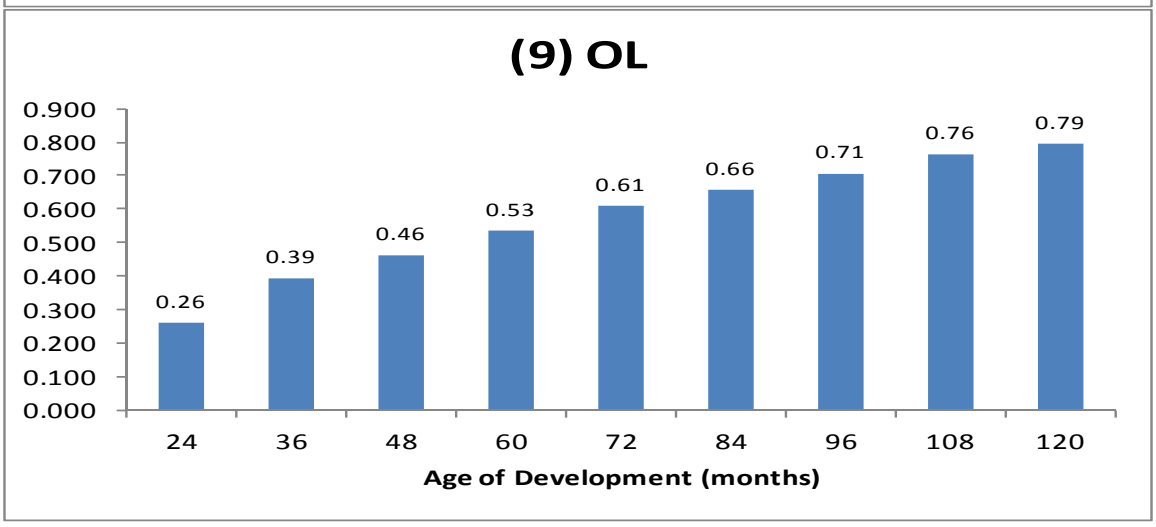


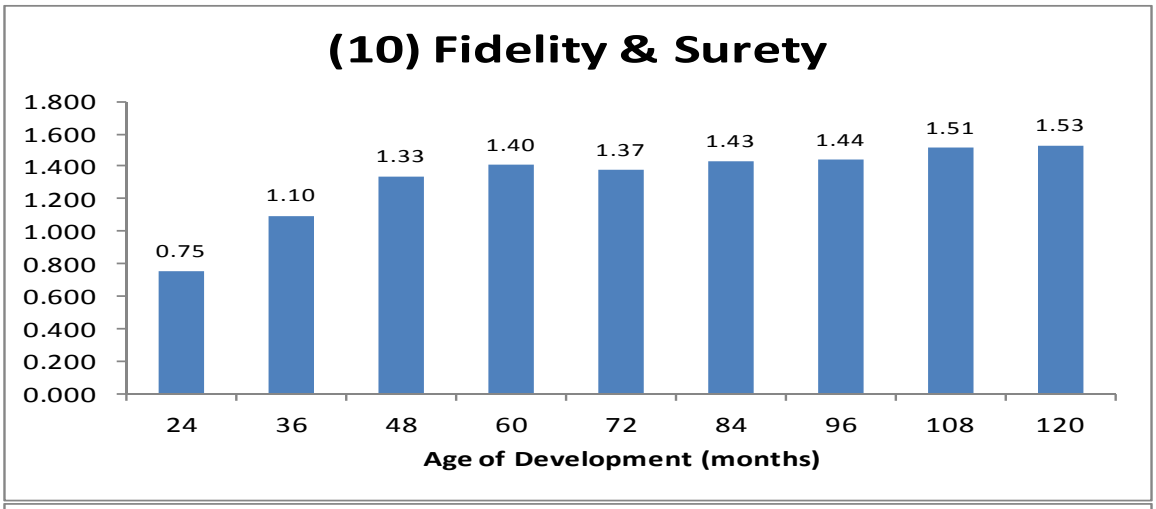


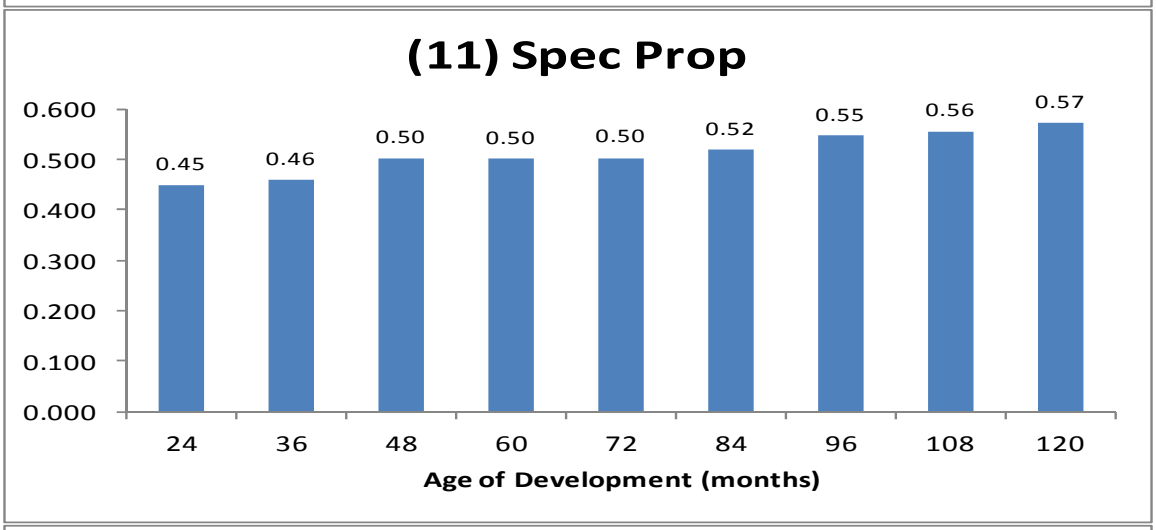


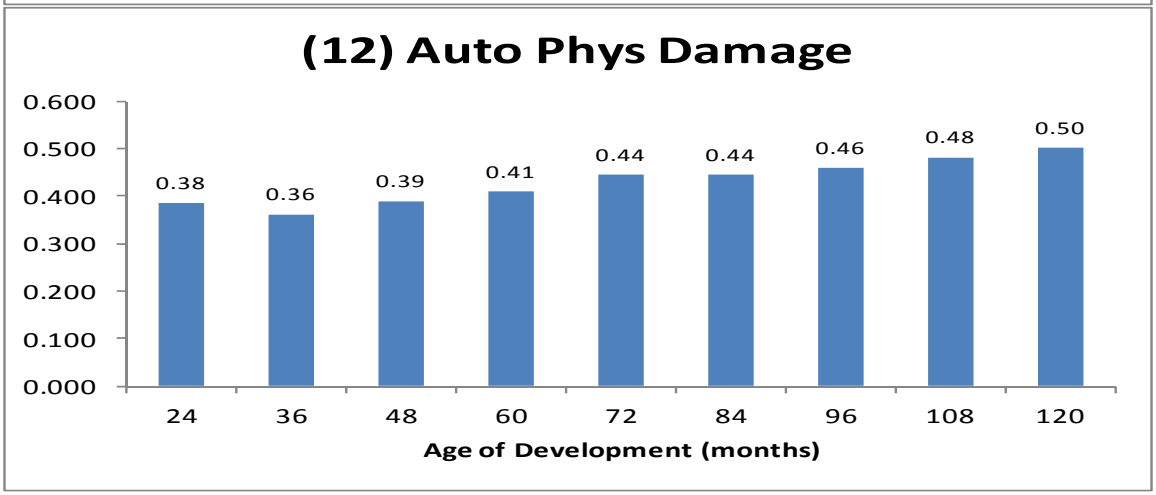

(7) MM CM
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.24
0.29
0.33
0.37
0.38
0.39
0.41
0.41
0.43
24
36
48
60
72
84
96
108
120
Age of Development (months)


(8) SL
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0.48
0.66
0.74
0.79
0.81
0.85
0.87
0.92
0.98
24
36
48
60
72
84
96
108
120
Age of Development (months)

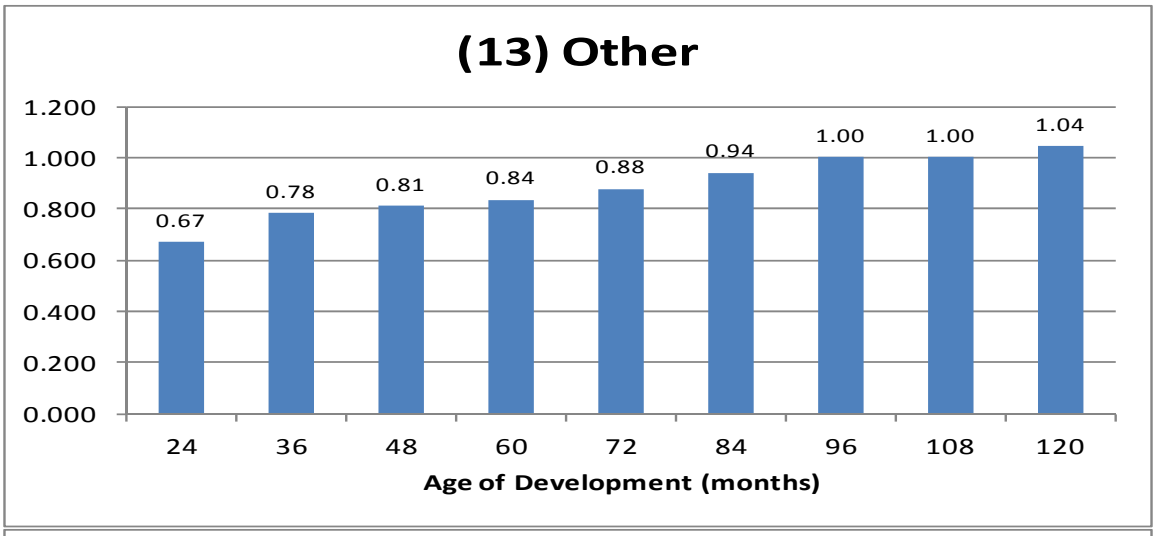

(9) OL
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.26
0.39
0.46
0.53
0.61
0.66
0.71
0.76
0.79
24
36
48
60
72
84
96
108
120
Age of Development (months)

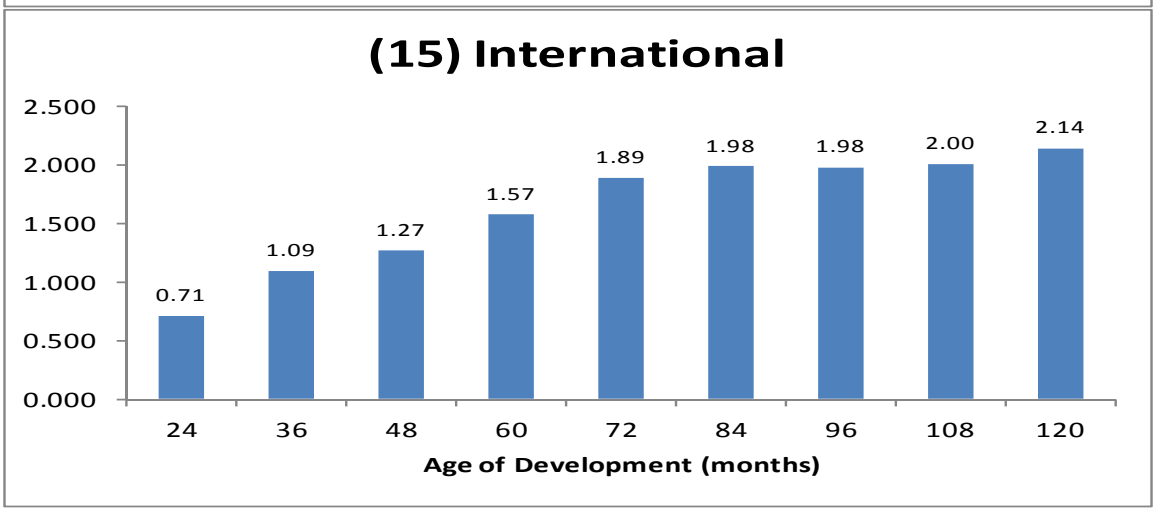

(10) Fidelity & Surety
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0.75
1.10
1.33
1.40
1.37
1.43
1.44
1.51
1.53
24
36
48
60
72
84
96
108
120
Age of Development (months)

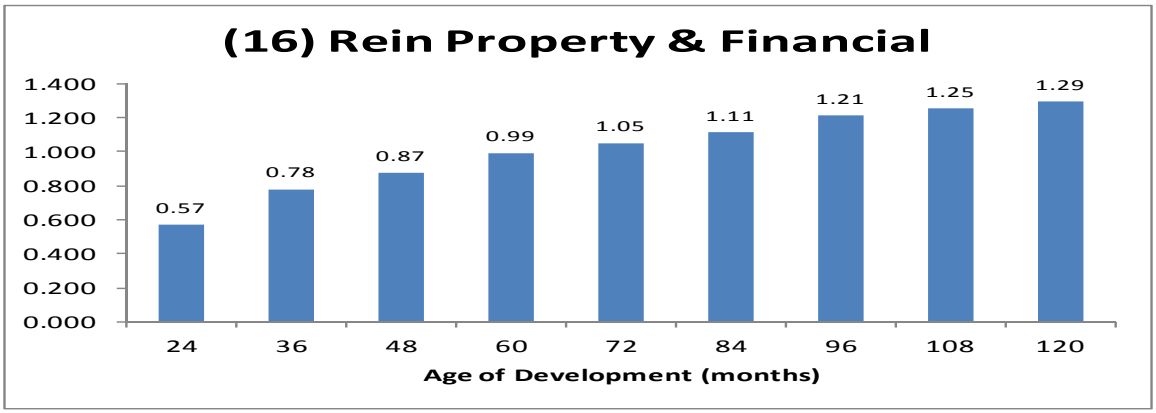

(11) Spec Prop
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.45
0.46
0.50
0.50
0.50
0.52
0.55
0.56
0.57
24
36
48
60
72
84
96
108
120
Age of Development (months)


(12) Auto Phys Damage
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.38
0.36
0.39
0.41
0.44
0.44
0.46
0.48
0.50
24
36
48
60
72
84
96
108
120
Age of Development (months)

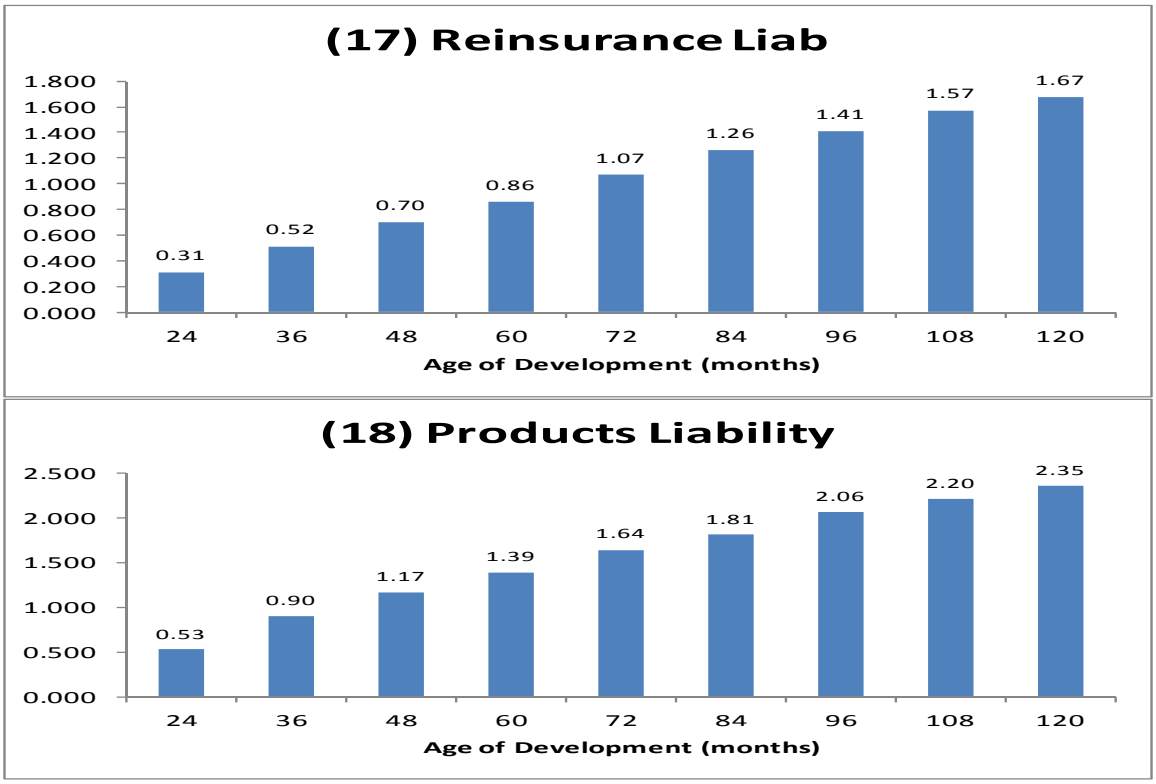
Appendix E – RRF by Maturity



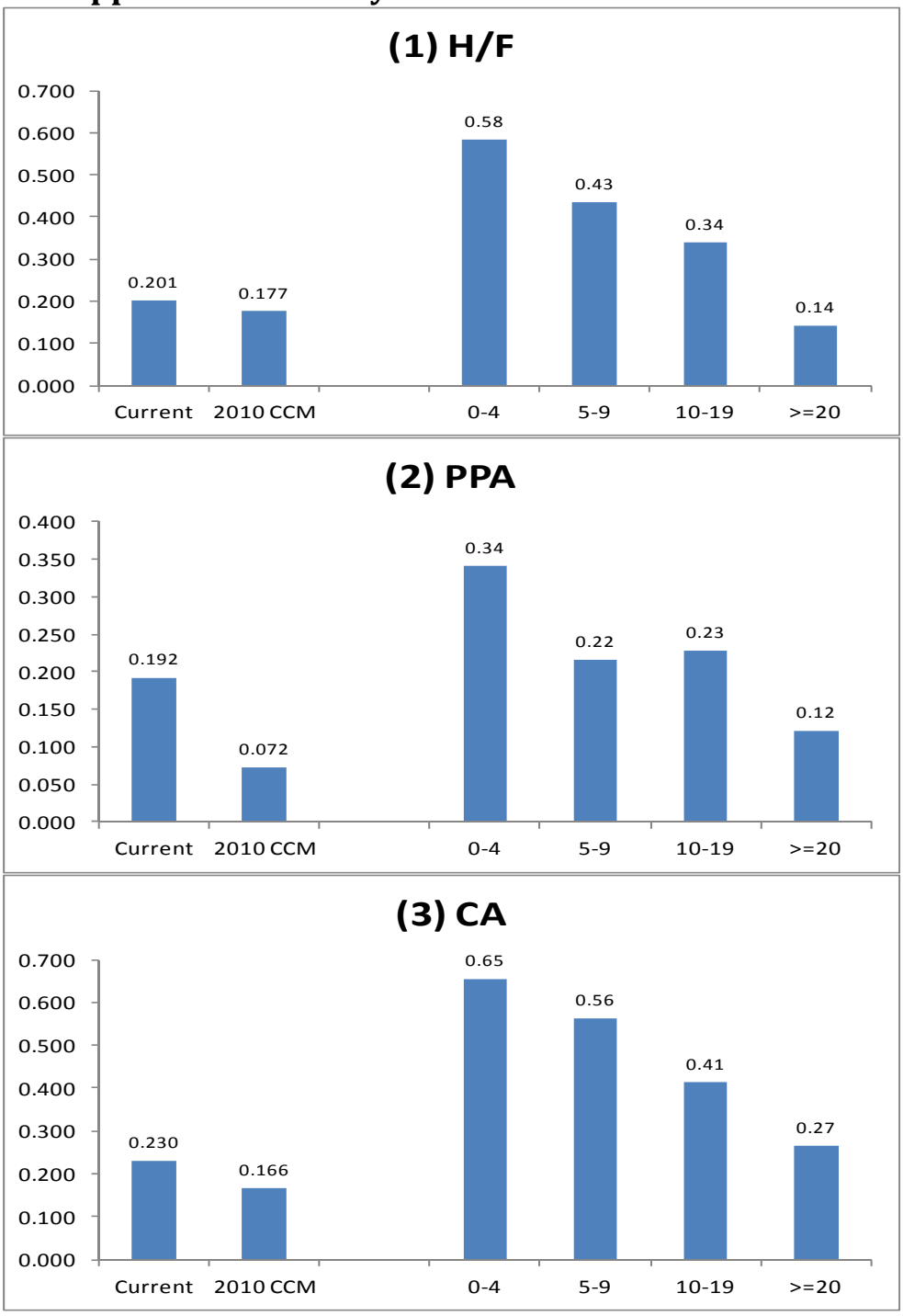




Appendix E – RRF by Maturity



Appendix F – RRF by Number of Years of NEP>0



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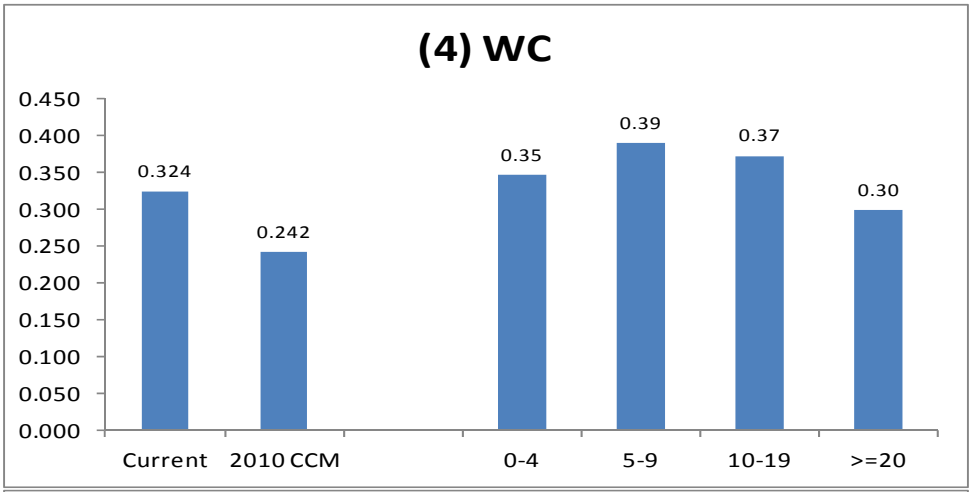

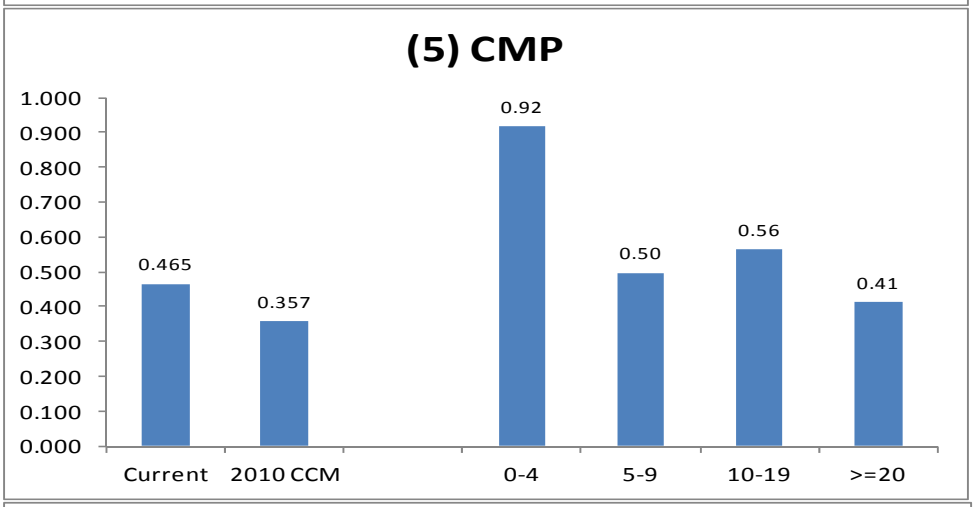

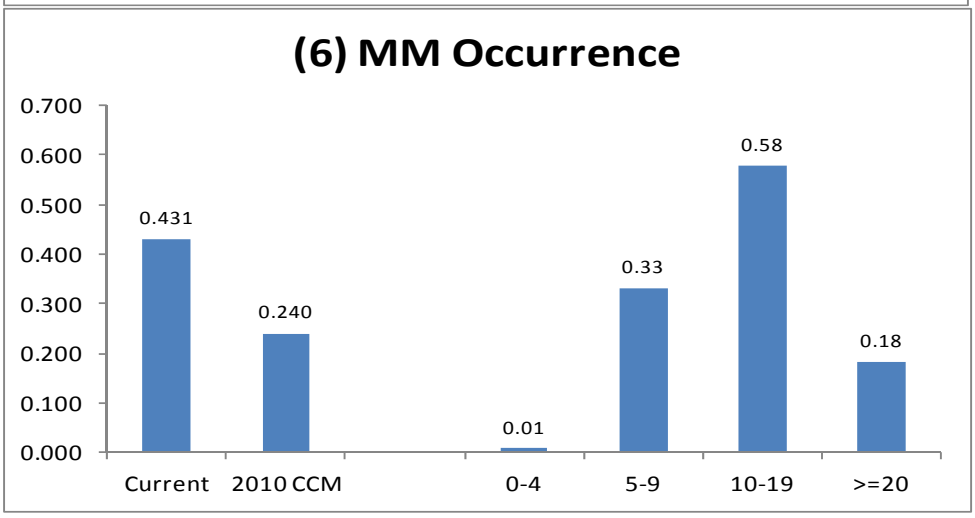

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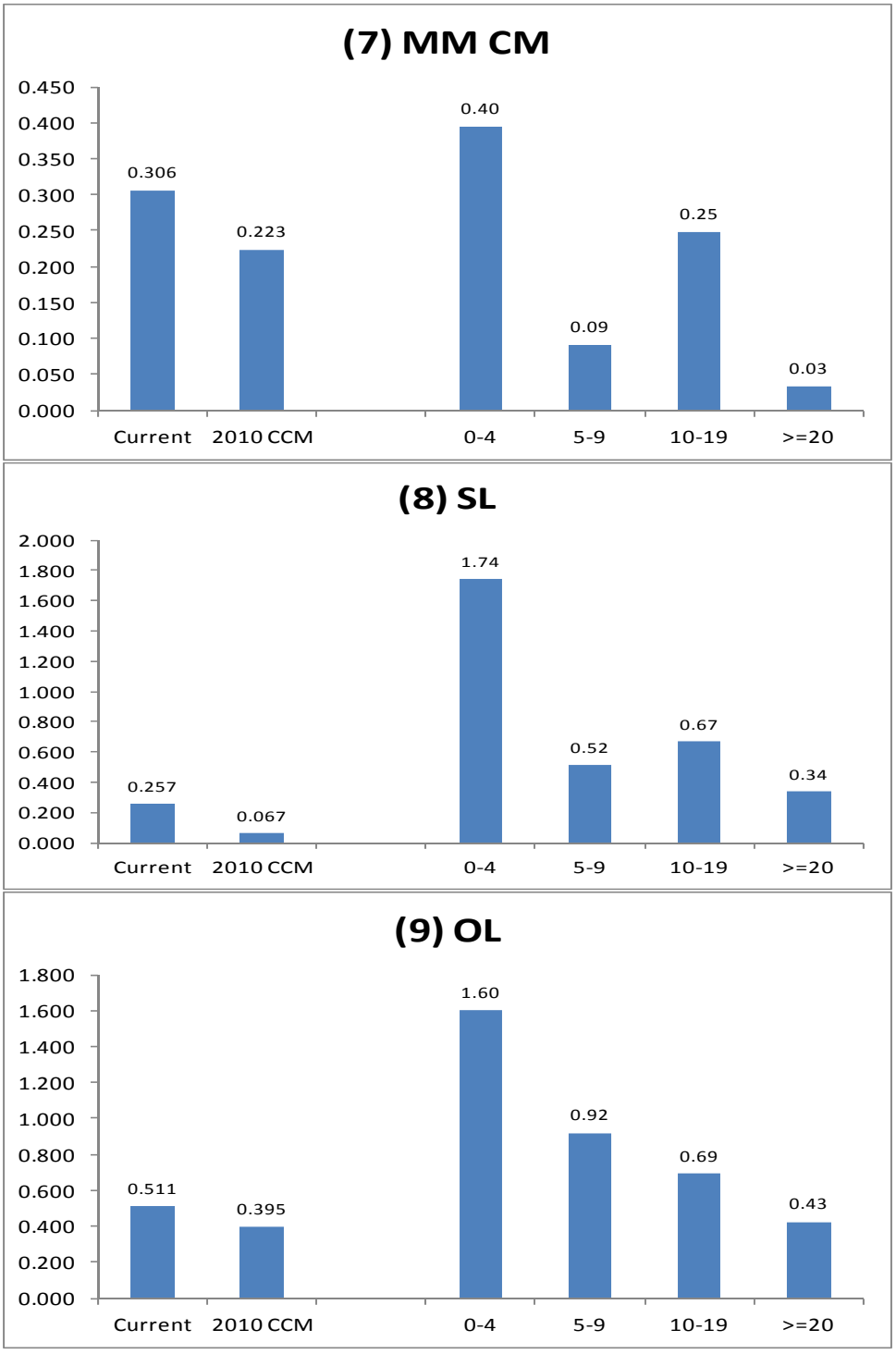

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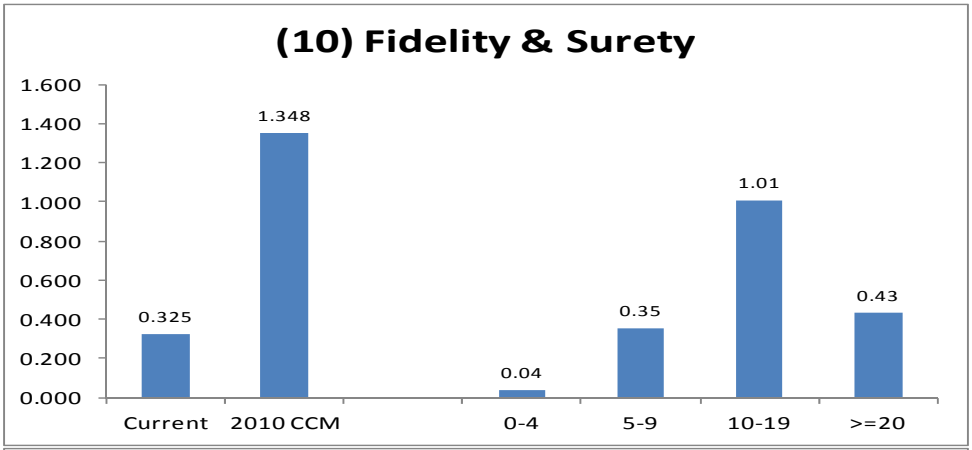
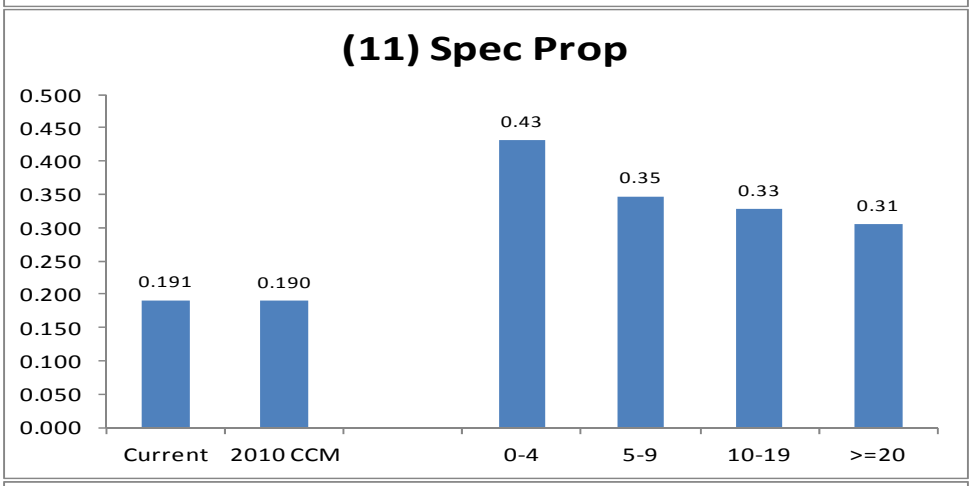
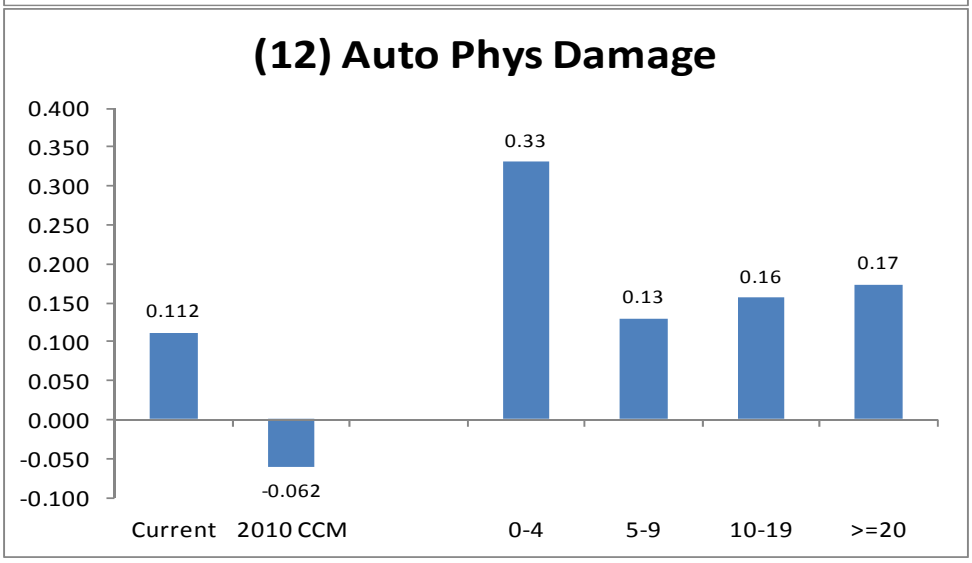
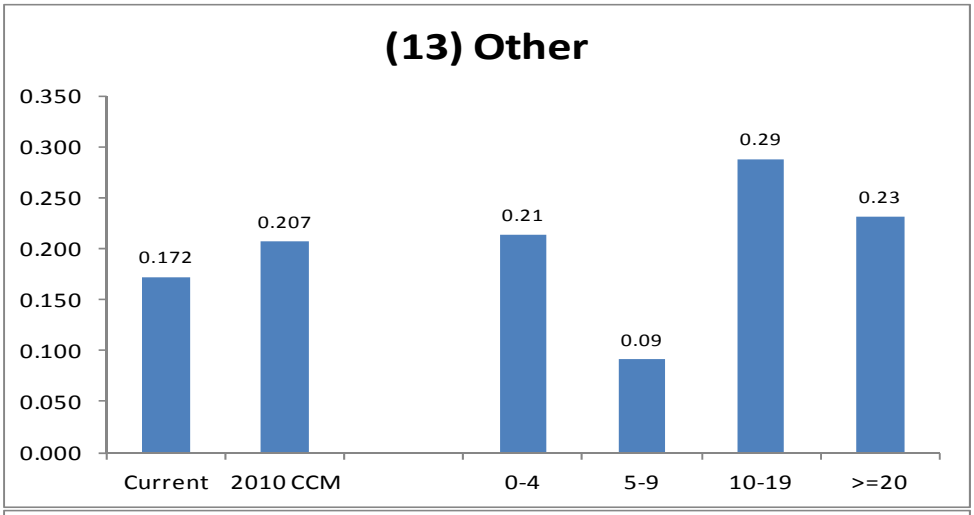
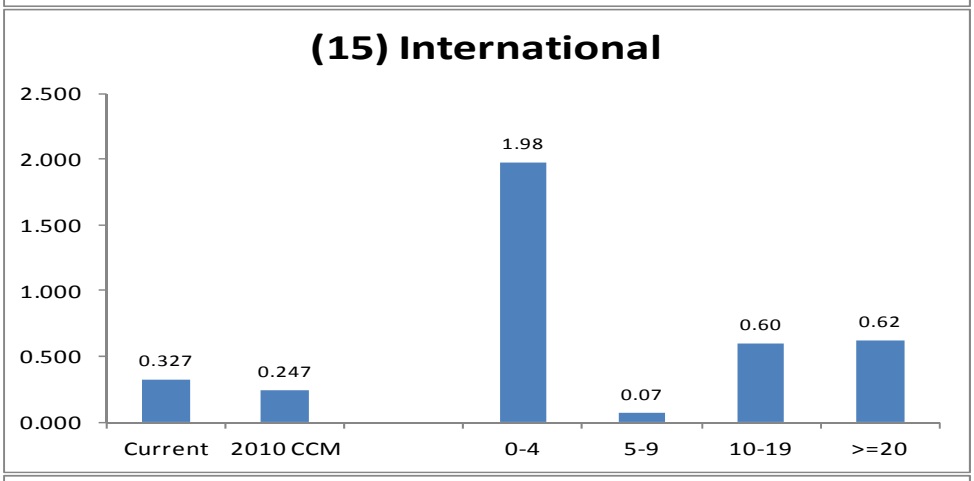


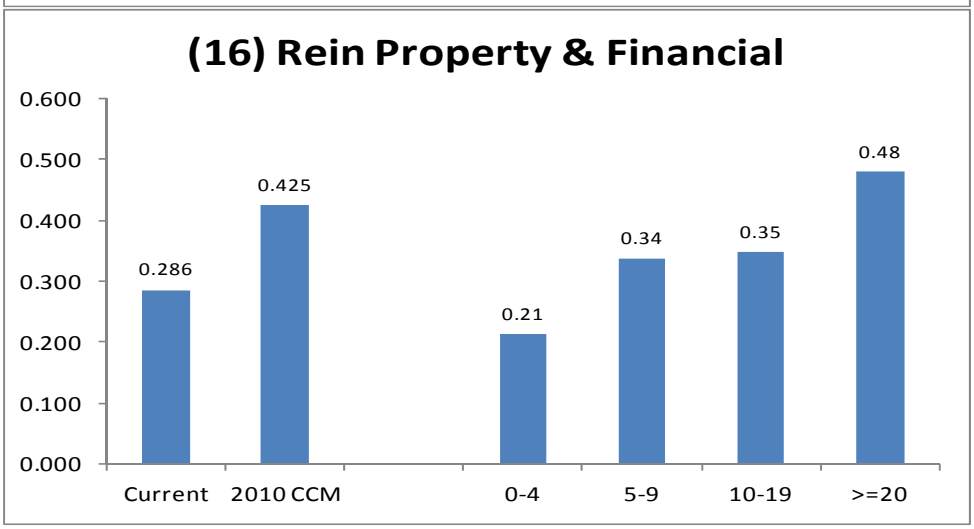




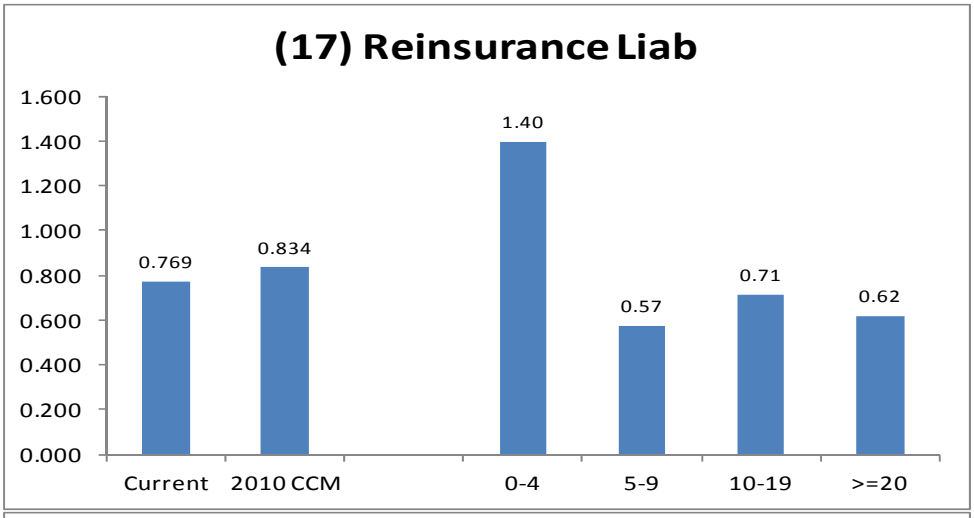
Appendix F - RRF by Number of Years of NEP>0

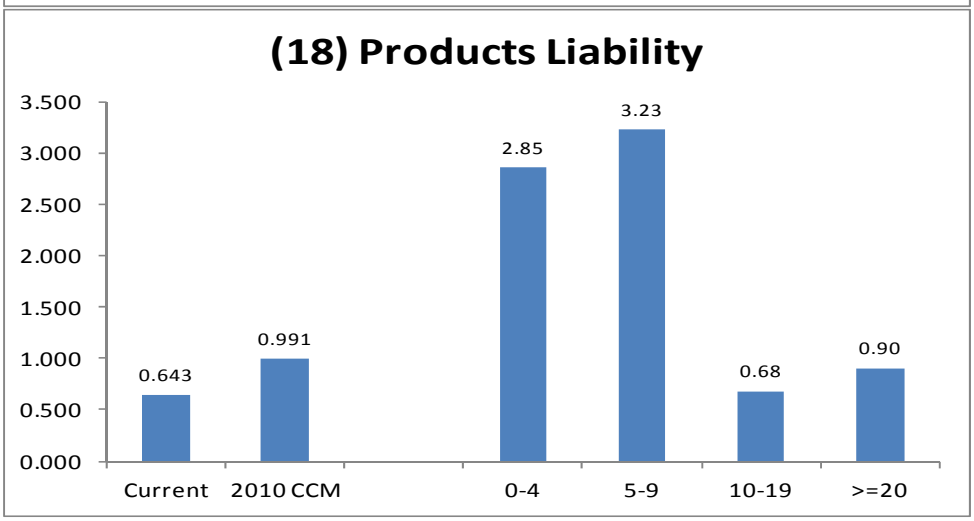






Appendix F - RRF by Number of Years of NEP>0





Appendix G

Part 1
Baseline RRFs - Effect of Excluding High Runoff Ratios

LOB	Baseline (1)	Baseline Excluding Runoff Ratio >=500% (2)	Difference (2) - (1)
(1) H/F	0.202	0.200	-0.001
(2) PPA	0.156	0.156	0.000
(3) CA	0.320	0.319	-0.001
(4) WC	0.336	0.334	-0.002
(5) CMP	0.462	0.461	-0.001
(6) MM Occurrence	0.314	0.314	0.000
(7) MM CM	0.106	0.104	-0.001
(8) SL	0.449	0.394	-0.055
(9) OL	0.518	0.513	-0.005
(11) Spec Prop	0.311	0.287	-0.025
(12) Auto Phys Damage	0.167	0.117	-0.050
(10) Fidelity & Surety	0.611	0.516	-0.095
(13) Other	0.271	0.260	-0.012
(15) International	0.490	0.438	-0.052
(16) Rein Property & Financial	0.422	0.422	0.000
(17) Reinsurance Liab	0.657	0.650	-0.007
(18) Products Liability	0.894	0.869	-0.025
(14) Fin & Mort	0.000	0.025	0.025
(19) Warranty	0.032	0.032	0.000

LOBs with effects greater than 0.05 in absolute value are marked.

Part 2
Number of data points and amount of reserve in the data set in total and after the Baseline filtering

	Reserve ($000,000s)			Data Points		
LOB	Total	Baseline	% of Total	Total	Baseline	% of Total
(1) H/F	283,744	267,042	94%	12,890	7,005	54%
(2) PPA	1,484,868	1,426,199	96%	11,825	6,759	57%
(3) CA	475,364	385,606	81%	11,725	4,969	42%
(4) WC	2,285,323	2,208,313	97%	10,767	6,336	59%
(5) CMP	606,805	565,739	93%	12,011	5,731	48%
(6) MM Occurrence	251,166	199,479	79%	3,922	1,058	27%
(7) MM CM	279,538	198,652	71%	3,695	2,179	59%
(8) SL	93,242	37,255	40%	4,559	1,042	23%
(9) OL	1,607,856	1,480,468	92%	17,557	7,200	41%
(11) Spec Prop	114,753	98,574	86%	10,970	5,435	50%
(12) Auto Phys Damage	63,697	57,898	91%	6,759	3,420	51%
(10) Fidelity & Surety	31,769	11,822	37%	3,505	915	26%
(13) Other	46,789	29,118	62%	3,758	1,124	30%
(15) International	11,818	2,986	25%	785	79	10%
(16) Rein Property & Financial	124,875	100,788	81%	3,659	1,039	28%
(17) Reinsurance Liab	713,339	582,794	82%	4,537	1,214	27%
(18) Products Liability	255,964	25,236	10%	5,235	582	11%
(14) Fin & Mort	848	59	7%	211	19	9%
(19) Warranty	319	109	34%	69	21	30%
Total	8,732,076	7,678,135	88%	128,439	56,127	44%

Appendix H- Runoff Ratios

Appendix H - Part 1 – Determining Reserve Runoff Ratios

The key statistic in the calibration of RRFs is the Reserve Runoff Ratio. The explanation below assumes that the 2010 Annual Statement has been filed.[37]

Reserve Movement – The Numerator of the Runoff Ratio

The numerator of the Reserve Runoff Ratio is the reserve movement, i.e., the change in the company's estimated ultimate incurred losses (including IBNR and DCCE) from the initial reserve date to the latest available valuation date. This Reserve Runoff Ratio is calculated from Schedule P, Part 2, an example of which is included in Part 3 of this Appendix.

For the most recent Annual Statement, e.g., 2010, the reserve movement for each of the most recent 9 initial reserve dates is the sum over all rows, (AYs) including the Prior row, of the incurred in the 2010 column (Schedule P column 10) minus the incurred in the column corresponding to the desired initial reserve date, 2009, 2008,…. 2001. The total row in the one year development and two year development columns in the Annual Statement Schedule P Part 2 (columns 11 and 12) are the reserve movements for initial reserve dates 2009 and 2008, respectively.

To obtain the movement for initial reserve date 2000, we use the 2009 Annual Statement.[38] The 2000 reserve movement is the sum of the AY 2000 row and Prior row (rows 1 and 2) of the incurred amounts in the 2009 column (column 10) minus the incurred amounts in the 2000 column (column 1) for the same rows.

Similarly to obtain the reserve movement for initial reserve date 1999, we use the 2008

[37] If the most recent Annual Statement is earlier than 2010, the same process is applied but the dates are stepped back one or more years, as necessary.

[38] We cannot use the Prior row in the 2010 Annual Statement to obtain the movement for AYs 2000 and prior. The Prior row in the 2010 statement begins with the outstanding at the end of 2001 for AYs 2000 and prior, and therefore does not include the movement of AYs 2000 and prior during calendar years 2000.

Annual Statement; the 1998 initial reserve date movement comes from the 2007 Annual Statement, and so on until the initial reserve date movement for 1988 comes from the 1997 Annual Statement, the earliest available Annual Statement.

Initial Reserve–The Denominator of the Runoff Ratio

The denominator is the total reserve, the case reserve and Incurred But Not Reported (IBNR) reserve, for loss and DCCE, at the initial reserve date, i.e., the end of each calendar year, for all AYs through that year-end.

Schedule P does not include a triangle of reserve amounts (Reserve Triangles) on that basis, but Reserve Triangles can be constructed by taking the difference between the incurred amounts in Schedule P Part 3[39] and cumulative paid amounts in Schedule P Part 2[40] in each Annual Statement. Appendix H Part 2 shows examples of Reserve Triangles constructed in this way.

For initial reserve dates 2001-2009, the initial reserve is the sum over all rows, (AYs) including the Prior row, of the reserve amount in the desired initial reserve year column. For initial reserve dates before 2001, the initial reserve is the sum of the oldest AY and the Prior rows (rows 1 and 2) from the appropriate Annual Statement, as described in the calculation of the runoff (numerator).

Reserve Runoff Ratio

We calculate reserve runoff ratios for each company/pool, for each Schedule P line of business.

For most of our analyses we use the runoff ratio at the most mature evaluation, calculated as described above.

For the maturity analysis in Section 6 we also compiled runoff ratios at all possible maturities. The initial reserve amount is the same regardless of maturity. The reserve movement is the difference between the incurred at the initial reserve date and the incurred at each calendar year end for which there is data.

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[39] Part 3 is cumulative AY **incurred** loss and defense and cost containment amounts, net of reinsurance, including IBNR

[40] Part 2 is cumulative AY **paid** loss and defense and cost containment amounts, net of reinsurance, including IBNR.

Alternative Approach and Consistency Across Annual Statements[41]

As an alternative to the approach described above, we also used Parts 2 and 3 to construct the 'trapezoids' of cumulative payments and ultimate incurred amounts for each AY for each available valuation date. At each Annual Statement date we also retain the Prior values.

For each initial reserve date, the initial reserve is the difference between (a) the sum of the incurred amounts over all AYs, in the column corresponding to the initial reserve date, including the appropriate Prior row values and (b) the sum of the cumulative paid amounts over all AYs in the corresponding column, including the appropriate Prior row values,.

The reserve movement is the difference between (a) the incurred at the desired valuation year, e.g., 9 years, or less if necessary, after the initial year, for AYs prior to and including the initial reserve date plus the appropriate Prior value, and (b) the incurred at the initial reserve date for all AYs plus the appropriate Prior value.

The two methods should be produce the same results if the Schedule P's are consistent from year to year, i.e., if Prior rows from one Annual Statement can be constructed from AY and Prior rows in earlier Annual Statements.. We found cases where the expected consistency did not exist so that the two methods do not produce the same results. This would happen, for example, if there were a change in pooling arrangements.

Appendix H Part 2 shows how we applied the consistency tests. We did not use data from companies that failed the tests.

[41] The actual calculations done by the working party used this alternative method.

Appendix H - Part 2 - Examples of Consistency Tests

Example of Test 1:

2009 Statement - Net Loss & DCCE Reserve										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Prior	1005894	**33177**	28988	20852	14965	11295	6754	4653	4205	836
2000	13196	**9253**	8896	8094	4644	3296	3116	2860	1990	1103
2001	0	9787	11999	11862	8561	6854	6304	5804	3900	3108
2002	0	0	14546	18454	17428	13566	10923	8461	6293	5131
2003	0	0	0	25729	21918	22273	18911	12744	9329	8360
2004	0	0	0	0	22354	24441	22498	17476	12937	11122
2005	0	0	0	0	0	19444	23708	20445	15826	14441
2006	0	0	0	0	0	0	13252	12935	11613	10281
2007	0	0	0	0	0	0	0	19647	19780	18410
2008	0	0	0	0	0	0	0	0	22960	20662
2009	0	0	0	0	0	0	0	0	0	17889
Total	1019090	**52217 (Prior_2)**	64429	84991	89870	101169	105466	105025	108833	111343

2010 Statement - Net Loss & DCCE Reserve										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Prior	**42430**	37884	28946	19609	14591	9870	7513	6195	1939	1285
2001	9787	11999	11862	8561	6854	6304	5804	3900	3108	2332
2002	0	14546	18454	17428	13566	10923	8461	6293	5131	4868
2003	0	0	25729	21918	22273	18911	12744	9329	8360	7314
2004	0	0	0	22354	24441	22498	17476	12937	11122	9415
2005	0	0	0	0	19444	23708	20445	15826	14441	12845
2006	0	0	0	0	0	13252	12935	11613	10281	9650
2007	0	0	0	0	0	0	19647	19780	18410	17583
2008	0	0	0	0	0	0	0	22960	20662	19407
2009	0	0	0	0	0	0	0	0	17889	19973
2010	0	0	0	0	0	0	0	0	0	14500
Total	**52217 (Prior_1)**	64429	84991	89870	101169	105466	105025	108833	111343	119172

Since the difference between $42,430K in the 2010 statement and $33,177K plus $9,253K (=$42,430K) in the 2009 statement is less than 5%, the data point in the 2010 passes Test 1.

Note these reserve triangles are obtained by subtracting Schedule P Part 3 from Schedule P Part 2.

Example of Test 1 and Test 2:

2008 Statement - Net Loss & DCCE Reserve

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Prior	724350	198449	**184853**	149432	104512	73229	60131	33266	36871	30019
1999	23539	16625	**16212**	12979	64196	2576	1884	1440	1141	573
2000	0	16580	**14695**	14580	10610	8605	2236	1285	1187	928
2001	0	0	15808	20234	12203	10417	6690	2934	1041	981
2002	0	0	0	21899	19626	15930	15031	11027	5456	1511
2003	0	0	0	0	17371	17815	15051	14396	10021	3481
2004	0	0	0	0	0	18055	19569	17386	13664	13853
2005	0	0	0	0	0	0	12549	15050	12438	10359
2006	0	0	0	0	0	0	0	8851	15249	14718
2007	0	0	0	0	0	0	0	0	8493	15067
2008	0	0	0	0	0	0	0	0	0	14838
Total	747889	231654	231568	219124	228518	146627	133141	105635	105561	106328

2009 Statement - Net Loss & DCCE Reserve

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Prior	775968	**201065**	162411	168708	75805	62015	34706	38012	30592	21275
2000	16580	**14695**	14580	10610	8605	2236	1285	1187	928	494
2001	0	15808	20234	12203	10417	6690	2934	1041	981	494
2002	0	0	21899	19626	15930	15031	11027	5456	1511	1276
2003	0	0	0	17371	17815	15051	14396	10021	3481	1507
2004	0	0	0	0	18055	19569	17386	13664	13853	6418
2005	0	0	0	0	0	12549	15050	12438	10359	9356
2006	0	0	0	0	0	0	8851	15249	14718	14356
2007	0	0	0	0	0	0	0	8493	15067	14321
2008	0	0	0	0	0	0	0	0	14838	17323
2009	0	0	0	0	0	0	0	0	0	16240
Total	792548	**231568 (Prior_2)**	219124	228518	146627	133141	105635	105561	106328	103060

2010 Statement - Net Loss & DCCE Reserve

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Prior	**887041**	176991	179318	84410	64251	35991	39199	31520	21769	11812
2001	15808	20234	12203	10417	6690	2934	1041	981	494	205
2002	0	21899	19626	15930	15031	11027	5456	1511	1276	1061
2003	0	0	17371	17815	15051	14396	10021	3481	1507	1430
2004	0	0	0	18055	19569	17386	13664	13853	6418	1346
2005	0	0	0	0	12549	15050	12438	10359	9356	4560
2006	0	0	0	0	0	8851	15249	14718	14356	12486
2007	0	0	0	0	0	0	8493	15067	14321	14215
2008	0	0	0	0	0	0	0	14838	17323	14827
2009	0	0	0	0	0	0	0	0	16240	15783
2010	0	0	0	0	0	0	0	0	0	13196
Total	**902849 (Prior_1)**	219124	228518	146627	133141	105635	105561	106328	103060	90921

In this case, data point Prior_1 in the 2010 Statement fails Test 1 but passes Test 2. Therefore, data point Prior_1 is replaced with data point Prior_2.

Appendix H – Part 3 – Annual Statement Schedule P Parts 2 and 3

ANNUAL STATEMENT FOR THE YEAR December 31, 2010 Sample Company

SCHEDULE P - PART 2 - Private Passenger Auto Liability

		1	2	3	4	5	6	7	8	9	10	11	12
		INCURRED NET LOSSES AND DEFENSE AND COST CONTAINMENT EXPENSES REPORTED AT YEAR END ($000 OI										DEVELOPMENT	
Years in Which Losses Were Incurred		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	One Year	Two Year
1	Prior	3,414	3,448	3,442	3,490	3,551	3,575	3,590	3,606	3,617	3,631	14	26
2	2001	5,686	5,659	5,649	5,653	5,666	5,663	5,659	5,658	5,659	5,658	(1)	1
3	2002	XXX	6,028	5,954	5,927	5,929	5,922	5,914	5,911	5,908	5,907	(1)	(4)
4	2003	XXX	XXX	6,152	5,958	5,882	5,862	5,844	5,841	5,834	5,826	(8)	(14)
5	2004	XXX	XXX	XXX	6,219	5,990	5,904	5,864	5,843	5,833	5,827	(6)	(16)
6	2005	XXX	XXX	XXX	XXX	6,317	6,104	6,034	6,007	5,984	5,970	(14)	(37)
7	2006	XXX	XXX	XXX	XXX	XXX	6,277	6,194	6,152	6,109	6,073	(37)	(80)
8	2007	XXX	XXX	XXX	XXX	XXX	XXX	6,548	6,516	6,467	6,422	(45)	(94)
9	2008	XXX	XXX	XXX	XXX	XXX	XXX	XXX	6,544	6,482	6,418	(64)	(126)
10	2009	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	6,846	6,757	(89)	XXX
11	2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	7,052	XXX	XXX
12	Total											(248)	(345)

SCHEDULE P - PART 3 - Private Passenger Auto Liability

		1	2	3	4	5	6	7	8	9	10	11	12
		CUMULATIVE PAID NET LOSSES AND DEFENSE AND COST CONTAINMENT EXPENSES REPORTED AT YEAR END ($000 OMITTED)										Number of	Number of
Years in Which Losses Were Incurred		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Claims Closed With Loss Payment	Claims Closed Without Loss Payment
1	Prior	0	1,533	2,330	2,759	2,972	3,091	3,165	3,221	3,259	3,290	2,071	929
2	2001	2,301	4,012	4,780	5,212	5,439	5,620	5,591	5,617	5,632	5,639	1,618	716
3	2002	XXX	2,412	4,184	4,996	5,448	5,680	5,785	5,837	5,863	5,875	1,643	724
4	2003	XXX	XXX	2,410	4,142	4,909	5,361	5,596	5,710	5,757	5,782	1,630	718
5	2004	XXX	XXX	XXX	2,438	4,150	4,925	5,379	5,613	5,710	5,754	1,590	707
6	2005	XXX	XXX	XXX	XXX	2,513	4,274	5,067	5,521	5,745	5,843	1,616	694
7	2006	XXX	XXX	XXX	XXX	XXX	2,566	4,364	5,170	5,610	5,830	1,617	708
8	2007	XXX	XXX	XXX	XXX	XXX	XXX	2,721	4,628	5,436	5,897	1,654	761
9	2008	XXX	XXX	XXX	XXX	XXX	XXX	XXX	2,696	4,566	5,373	1,510	689
10	2009	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	2,803	4,733	1,505	751
11	2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	2,874	1,129	654

GLOSSARY

Term	Interpretation
ALAE	Allocated loss adjustment expenses
AY	Accident year
A&O	Adjusting and Other Expense
Baseline filtering	As defined in below Table 3.4.
CCM	Current Calibration Method
Data point	Each data point is an LOB-runoff ratio, for a single company or pool, at the latest available maturity (for most analyses) or at successive annual evaluation dates (in the maturity analysis in Section 6)
DCCE	Defense and cost containment expenses
DCWP	Dependency and Calibration Working Party
Formula RBC Formula	The 2010 RBC Formula
Initial Reserve	The reserve amount at that initial reserve date for all accident years prior to the initial reserve date.
Initial Reserve Date	Each year-end in our data set, December 31, 1997 through December 31 2010
LOB	Line of Business
LOB-size	Line of business size (reserves)
Minor lines	LOB whose data points are excluded due to LOB-size versus total company size
NEP	Net Earned Premium
Reserves or Loss Reserves	Case, bulk and IBNR loss and defense and cost containment expense (DCCE) [42]reserves net of reinsurance, as shown in Schedule P – Part 2 and 3.
RRF	Reserve Risk Factor
Runoff ratio or Reserve Runoff Ratio	The ratio of the incurred movement from the initial reserve to the latest available date, for all constituent accident years combined.

[42] "Defense and Cost Containment Expenses" are called "Allocated Loss Adjustment Expenses" (ALAE) in older Annual Statements. In our analysis we treat DCCE and ALAE as equivalent.

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