

```
airrms2 = {{ { 999, 12.886240211 }, { 499, 10.498306185 },
  { 249, 7.510595288 }, { 99, 4.8865379540000005 }, { 49, 2.7484702860000003 },
  { 19, 1.163110765 }, { 9, 0.466569098 }, { 999, 11.784340989 },
  { 499, 8.970506199 }, { 249, 6.461052711000001 }, { 99, 4.097482427 },
  { 49, 2.688639083 }, { 19, 1.266735138 }, { 9, 0.5993171220000001 } };
```

```
quantile = Quantile[CensoredDistribution[{0, 72},
  TransformedDistribution[x - u, x ≈ LogNormalDistribution[a, b]]], q]
```

```
ConditionalExpression[ { 72 (q > 0 && e^{a-\sqrt{2} b InverseErfc[2 q]} > 72) || q ≥ 1
  -u q ≥ 1 || (q ≤ 0 && u < -72)
  -e^{-\sqrt{2} b InverseErfc[2 q]} (-e^a + e^{\sqrt{2} b InverseErfc[2 q]} u) 0 < q < 1 && 0 ≤ e^{a-\sqrt{2} b InverseErfc[2 q]} < 72
  0 True
```

```
nlm = NonlinearModelFit[airrms2, quantile, {a, b, u}, q]
```

```
FittedModel[ ConditionalExpression[ { 72 (q > 0 && -1.36915 + e^{<<1>>} > 72) || q ≥ 1
  -e^{<<1>} (<<1>) <<1> , 0 ≤ q ≤ 1
  0 <<1>
```

```
τ = TransformedDistribution[x - u, x ≈ LogNormalDistribution[a, b]] /. nlm["BestFitParameters"]
```

```
TransformedDistribution[-1.36915 + x̂, x̂ ≈ LogNormalDistribution[-0.889279, 1.13793]]
```

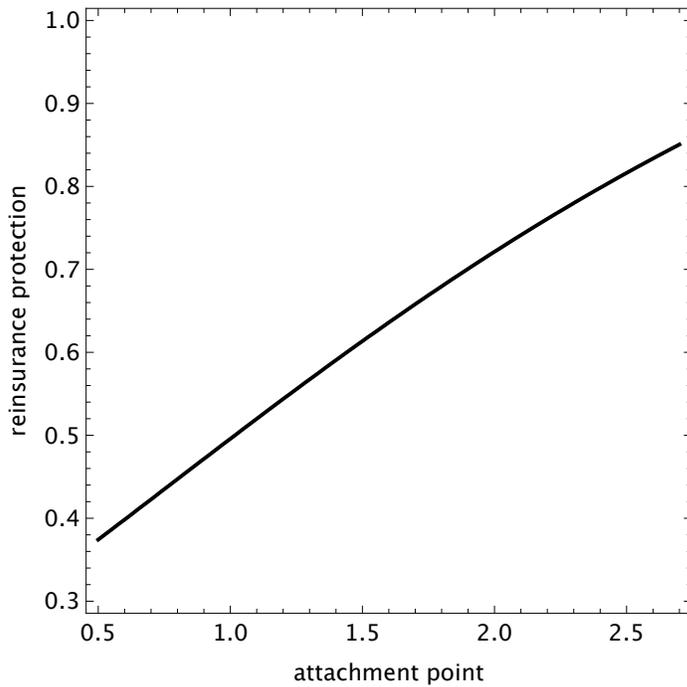
```
nlm["AdjustedRSquared"]
```

```
0.994315
```

```

cp2 = ContourPlot[0.03 xs + NExpectation[Clip[x - attach, {0, xs}], x ≈ τ], {attach, 0.5, 2.7},
  {xs, 0.3, 1.0}, Contours → {0.03 * 0.636 + NExpectation[Clip[x - 1.6, {0, 0.636}], x ≈ τ]},
  ContourShading → False, FrameLabel → {"attachment point", "reinsurance protection"},
  ContourStyle → Thick, BaseStyle → {FontSize → 12, FontFamily → "Swiss"}]

```



```

Export[(*tofile*), cp2, "PNG"]

```

```

/Users/sethchandler/Dropbox/OpEds/reinsuranceattachmentvprotection.png

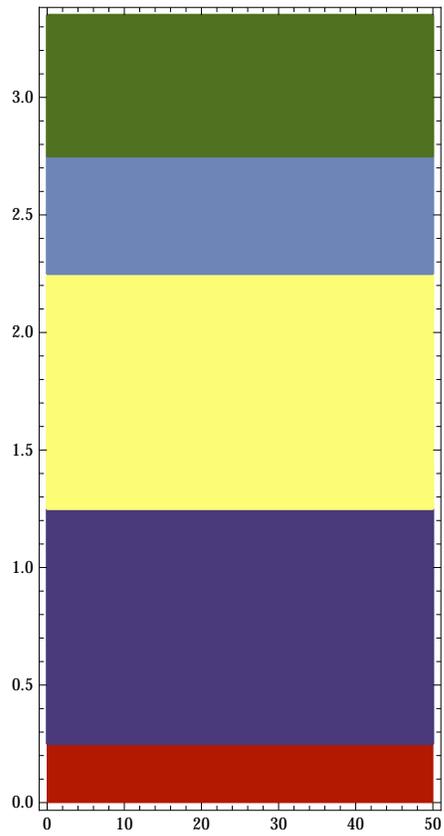
```

```

intervalToVerticalRectangle[i : Interval[a__], w_, color_] :=
  {color, List@Map[Rectangle[{0, #[[1]]}, {w, #[[2]]}] &, i]}

```

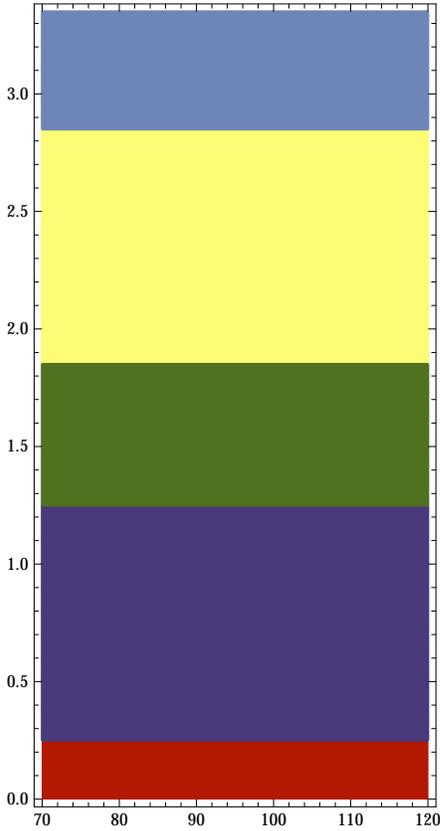
```
scenario1 = Graphics[MapThread[intervalToVerticalRectangle[#, 50, #2] &,
  {{Interval[{0, 0.25}], Interval[{0.25, 1.25}],
    Interval[{1.25, 2.25}], Interval[{2.25, 2.75}], Interval[{2.75, 3.35}]},
  Table[ColorData[61][i], {i, 1, 5}]], AspectRatio -> 2, Frame -> True]
```



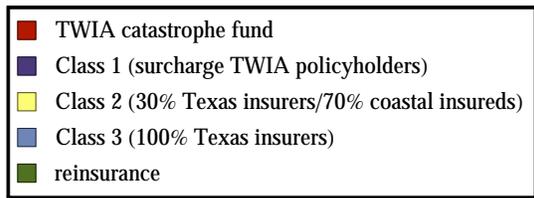
```
 $\tau = \text{TranslationTransform}[\{70, 0\}]$ 
```

```
TransformationFunction[ $\left( \begin{array}{cc|c} 1 & 0 & 70 \\ 0 & 1 & 0 \\ \hline 0 & 0 & 1 \end{array} \right)$ ]
```

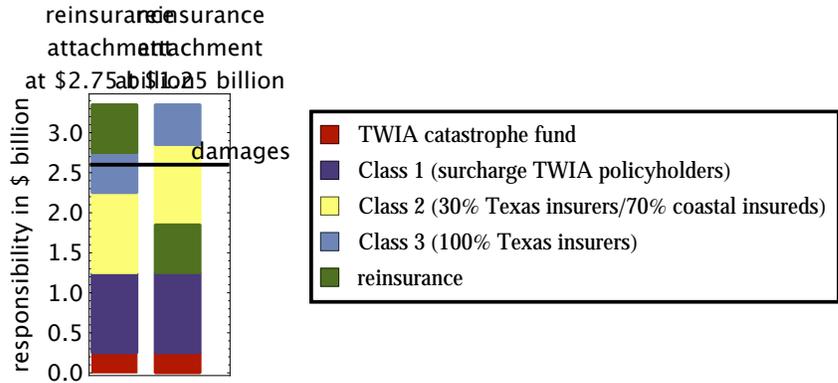
```
scenario2 =
Graphics[MapThread[intervalToVerticalRectangle[#, 50, #2] &, {{Interval[{0, 0.25}],
Interval[{0.25, 1.25}], Interval[{1.85, 2.85}], Interval[{2.85, 3.35}],
Interval[{1.25, 1.85}]}, Table[ColorData[61][i], {i, 1, 5}]}],
AspectRatio -> 2, Frame -> True] /. Rectangle[a_, b_] -> Rectangle[τ@a, τ@b]
```



```
legend = First@Cases[BarChart[Partition[{2, 3, 4, 5, 6, 7}, 1], ChartStyle -> {61, None},
ChartLegends -> {"TWIA catastrophe fund", "Class 1 (surcharge TWIA policyholders)",
"Class 2 (30% Texas insurers/70% coastal insureds)",
"Class 3 (100% Texas insurers)", "reinsurance"}, None}], _Framed]
```



```
stackDiagram = Labeled[Show[scenario1, scenario2,
  Graphics[{Thick, Line[{{0, 2.6}, {150, 2.6}}], Text["damages", {110, 2.6}, {-1, -1}],
    Text["reinsurance\nattachment\nat $2.75 billion", {20, 3.45}, {0, -1}],
    Text["reinsurance\nattachment\nat $1.25 billion", {120, 3.45}, {0, -1}]}],
  FrameTicks -> {None, Automatic}, FrameLabel -> {"", "responsibility in $ billion"},
  BaseStyle -> {12, FontFamily -> "Swiss"}], legend, Right]
```



```
Export[(*tofile*), stackDiagram, "PNG"]
```