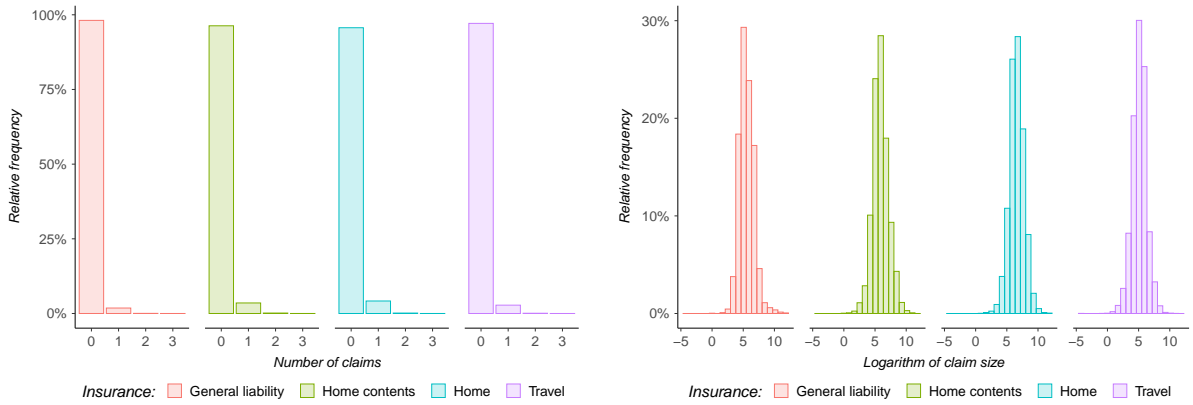
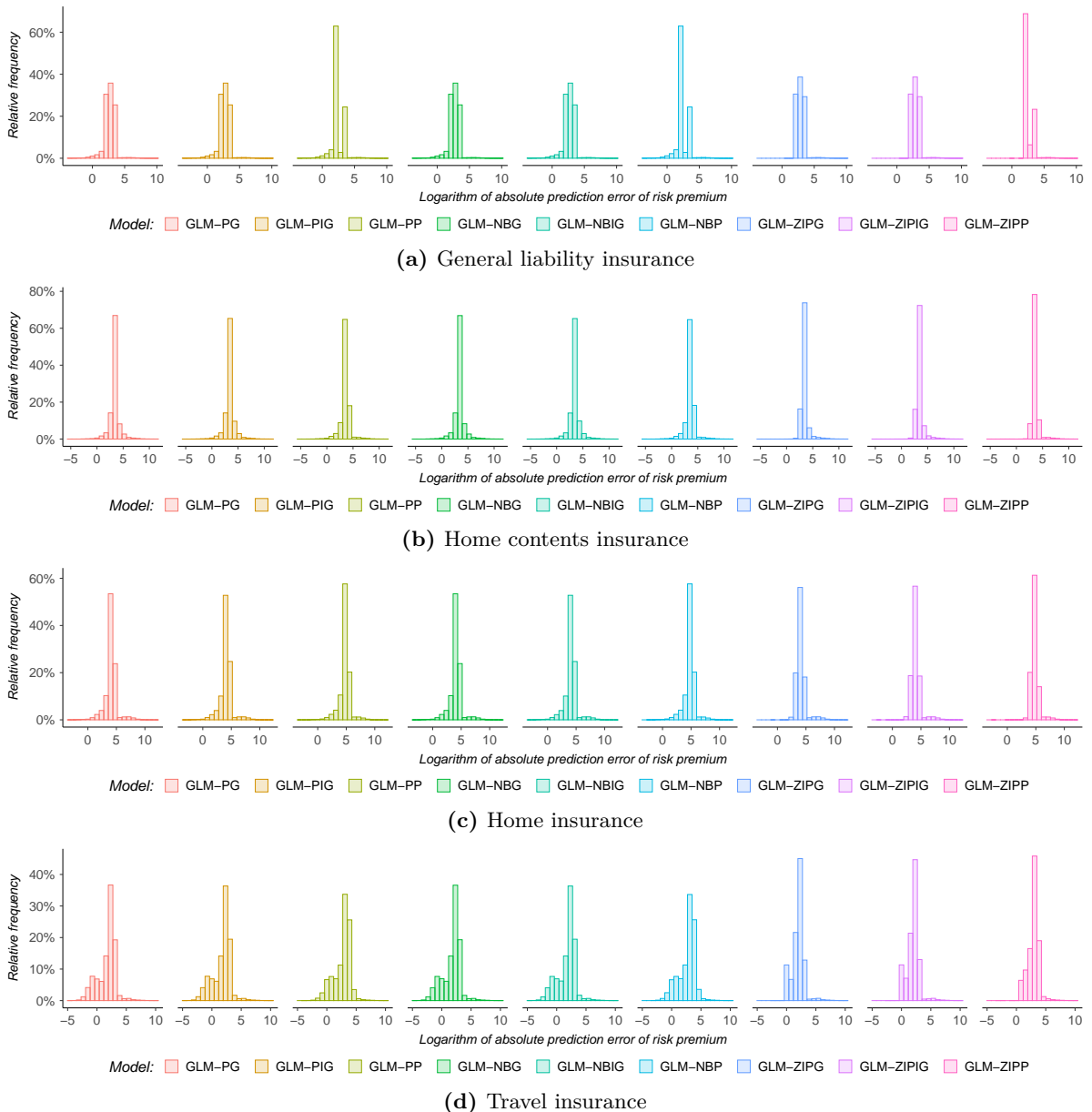


## Appendix C Supplementary material



**Figure C.1:** Empirical distribution of claim counts (left) and sizes (right) in general liability, home contents, home and travel insurance.



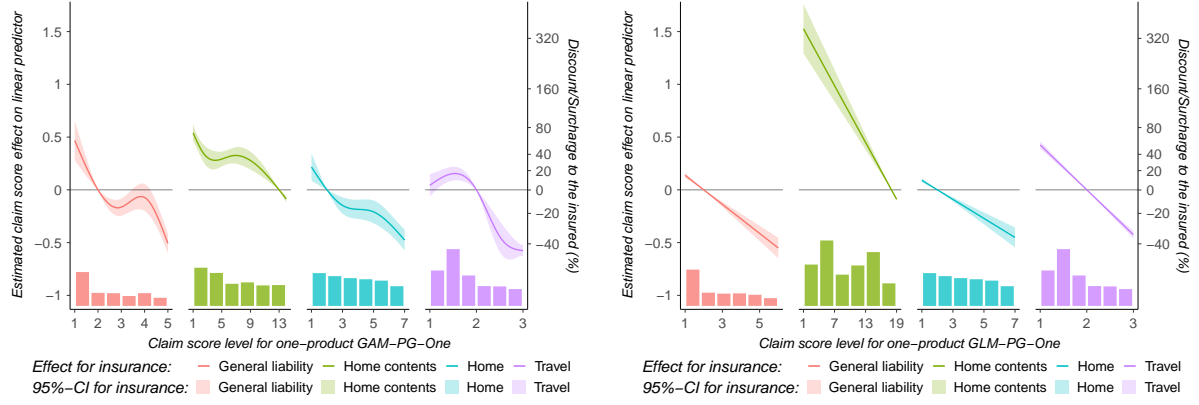
**Figure C.2:** Out-of-sample risk premium errors for general liability (panel (a)), home contents (panel (b)), home (panel (c)) and travel insurance (panel (d)) with static univariate risk classification.

**Table C.1:** Maximal ratio Gini coefficients in percentages with standard errors in parenthesis and rank for each product category with static univariate risk classification.

| Benchmark        | General liability  |          | Home contents      |          | Home               |          | Travel              |          |
|------------------|--------------------|----------|--------------------|----------|--------------------|----------|---------------------|----------|
|                  | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient         | Rank     |
| <i>GLM-PG</i>    | 10.38 (7.92)       | 5        | 20.09 (4.69)       | 7        | 14.83 (7.71)       | 7        | 29.92 (4.05)        | 7        |
| <i>GLM-PIG</i>   | 10.43 (7.87)       | 6        | 22.60 (4.66)       | 9        | 10.94 (7.62)       | 5        | 29.43 (4.03)        | 5        |
| <i>GLM-PP</i>    | 13.78 (8.75)       | 8        | 9.73 (4.92)        | 3        | 4.76 (7.72)        | 2        | 30.33 (4.00)        | 8        |
| <i>GLM-NBG</i>   | <b>4.90 (8.38)</b> | <b>1</b> | 20.02 (4.69)       | 6        | 14.80 (7.71)       | 6        | 29.91 (4.05)        | 6        |
| <i>GLM-NBIG</i>  | 4.90 (8.38)        | 2        | 22.52 (4.66)       | 8        | 10.94 (7.62)       | 4        | 29.42 (4.03)        | 4        |
| <i>GLM-NBP</i>   | 13.78 (8.75)       | 9        | <b>6.80 (5.04)</b> | <b>1</b> | <b>4.67 (7.72)</b> | <b>1</b> | 30.34 (3.99)        | 9        |
| <i>GLM-ZIPG</i>  | 8.79 (8.51)        | 3        | 14.87 (4.71)       | 4        | 23.29 (8.32)       | 9        | 8.66 (3.19)         | 3        |
| <i>GLM-ZIPIG</i> | 8.79 (8.51)        | 4        | 17.67 (4.72)       | 5        | 21.27 (8.27)       | 8        | 7.38 (3.67)         | 2        |
| <i>GLM-ZIPP</i>  | 10.77 (9.90)       | 7        | 7.80 (4.82)        | 2        | 10.32 (8.01)       | 3        | <b>-0.26 (3.37)</b> | <b>1</b> |

**Table C.2:** Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) in-sample for different severity and frequency models and for each product category.

| Severity model            | General liability |                  | Home contents     |                   | Home             |                  | Travel            |                   |
|---------------------------|-------------------|------------------|-------------------|-------------------|------------------|------------------|-------------------|-------------------|
|                           | AIC               | BIC              | AIC               | BIC               | AIC              | BIC              | AIC               | BIC               |
| <i>GLM-(P/NB/ZIP)G</i>    | 45,410.59         | 45,440.64        | 133,599.18        | 133,825.45        | 64,647.10        | 64,885.45        | 119,228.12        | 119,334.34        |
| <i>GLM-(P/NB/ZIP)IG</i>   | 43,151.65         | 43,181.70        | 132,828.71        | 133,054.98        | 64,636.71        | 64,875.06        | 122,998.63        | 123,104.84        |
| <i>GLM-(P/NB/ZIP)P</i>    | <b>43,120.45</b>  | <b>43,150.49</b> | <b>131,249.05</b> | <b>131,475.32</b> | <b>63,929.52</b> | <b>64,167.86</b> | <b>117,364.24</b> | <b>117,470.46</b> |
| Frequency model           |                   |                  |                   |                   |                  |                  |                   |                   |
| <i>GLM-P(G/IG/P)</i>      | 28,820.29         | 28,860.05        | 71,420.89         | 71,740.78         | 31,697.98        | 32,046.86        | 76,927.15         | 77,075.24         |
| <i>GLM-NB(G/IG/P)</i>     | 28,802.56         | 28,852.26        | 71,327.58         | 71,657.80         | 31,684.67        | 32,042.98        | 76,873.46         | 77,032.12         |
| <i>GLM-ZIP(G/IG/P)</i>    | 29,007.55         | 29,087.08        | 72,365.70         | 73,005.50         | 32,259.06        | 32,932.99        | 77,843.82         | 78,133.31         |
| <i>GAM-PG-One</i>         | 28,668.98         | 28,738.57        | 71,103.50         | 71,454.36         | 31,611.33        | 31,988.50        | 76,389.41         | 76,569.23         |
| <i>GAM-PIG-One</i>        | 28,668.98         | 28,738.57        | 71,103.50         | 71,454.36         | 31,611.33        | 31,988.50        | 76,389.41         | 76,569.23         |
| <i>GAM-PP-One</i>         | 28,596.01         | 28,665.60        | 70,744.32         | 71,095.18         | 31,563.67        | 31,940.84        | 76,375.71         | 76,555.53         |
| <i>GAM-NBG-One</i>        | 28,654.30         | 28,733.82        | 71,019.72         | 71,380.89         | 31,599.94        | 31,986.55        | 76,345.43         | 76,535.83         |
| <i>GAM-NBIG-One</i>       | 28,654.30         | 28,733.82        | 71,019.72         | 71,380.89         | 31,599.94        | 31,986.55        | 76,345.43         | 76,535.83         |
| <i>GAM-NBP-One</i>        | 28,582.65         | <b>28,662.17</b> | 70,672.48         | <b>71,033.66</b>  | 31,553.25        | <b>31,939.85</b> | 76,332.50         | <b>76,522.90</b>  |
| <i>GAM-ZIPG-One</i>       | 29,012.19         | 29,121.54        | 72,353.42         | 73,024.17         | 32,257.91        | 32,960.12        | 77,826.68         | 78,147.90         |
| <i>GAM-ZIPIG-One</i>      | 29,012.19         | 29,121.54        | 72,353.42         | 73,024.17         | 32,257.91        | 32,960.12        | 77,826.68         | 78,147.90         |
| <i>GAM-ZIPP-One</i>       | 29,010.68         | 29,120.03        | 72,345.25         | 73,016.00         | 32,263.28        | 32,965.49        | 77,818.74         | 78,139.96         |
| <i>GLM-PG-One</i>         | 28,702.50         | 28,752.21        | 71,304.14         | 71,634.36         | 31,613.28        | 31,971.60        | 76,450.02         | 76,608.68         |
| <i>GLM-PIG-One</i>        | 28,679.04         | 28,728.75        | 71,304.14         | 71,634.36         | 31,613.28        | 31,971.60        | 76,450.02         | 76,608.68         |
| <i>GLM-PP-One</i>         | 28,764.66         | 28,814.36        | 70,822.61         | 71,152.83         | 31,619.00        | 31,977.32        | 76,405.93         | 76,564.59         |
| <i>GLM-NBG-One</i>        | 28,624.03         | 28,683.68        | 71,212.04         | 71,552.58         | 31,601.76        | 31,969.51        | 76,404.15         | 76,573.39         |
| <i>GLM-NBIG-One</i>       | 28,663.64         | 28,723.28        | 71,212.04         | 71,552.58         | 31,601.76        | 31,969.51        | 76,404.15         | 76,573.39         |
| <i>GLM-NBP-One</i>        | 28,748.31         | 28,807.96        | 70,746.86         | 71,087.40         | 31,606.09        | 31,973.84        | 76,362.56         | 76,531.80         |
| <i>GLM-ZIPG-One</i>       | 29,009.31         | 29,098.77        | 72,348.33         | 72,998.45         | 32,254.21        | 32,937.57        | 77,824.29         | 78,124.36         |
| <i>GLM-ZIPIG-One</i>      | 29,009.30         | 29,098.77        | 72,348.33         | 72,998.45         | 32,254.21        | 32,937.57        | 77,824.29         | 78,124.36         |
| <i>GLM-ZIPP-One</i>       | 29,008.72         | 29,098.19        | 72,341.38         | 72,991.49         | 32,257.75        | 32,941.10        | 77,816.01         | 78,116.08         |
| <i>GAM-PG-Multi</i>       | 28,627.22         | 28,786.27        | 70,891.00         | 71,334.73         | 31,551.30        | 32,013.34        | 76,365.83         | 76,640.85         |
| <i>GAM-PIG-Multi</i>      | 28,627.22         | 28,786.27        | 70,891.00         | 71,334.73         | 31,551.30        | 32,013.34        | 76,365.83         | 76,640.85         |
| <i>GAM-PP-Multi</i>       | 28,560.19         | 28,719.24        | 70,711.38         | 71,155.11         | 31,525.54        | 31,987.58        | 76,354.76         | 76,629.78         |
| <i>GAM-NBG-Multi</i>      | 28,613.72         | 28,782.72        | 70,815.55         | 71,269.60         | 31,541.22        | 32,012.69        | 76,322.48         | 76,608.08         |
| <i>GAM-NBIG-Multi</i>     | 28,613.72         | 28,782.72        | 70,815.55         | 71,269.60         | 31,541.22        | 32,012.69        | 76,322.48         | 76,608.08         |
| <i>GAM-NBP-Multi</i>      | <b>28,547.69</b>  | 28,716.69        | 70,641.47         | 71,095.52         | 31,516.01        | 31,987.48        | <b>76,312.25</b>  | 76,597.84         |
| <i>GAM-ZIPG-Multi</i>     | 29,016.92         | 29,215.73        | 72,354.33         | 73,117.96         | 32,265.48        | 33,052.56        | 77,837.52         | 78,253.94         |
| <i>GAM-ZIPIG-Multi</i>    | 29,016.92         | 29,215.73        | 72,354.33         | 73,117.96         | 32,265.48        | 33,052.56        | 77,837.52         | 78,253.94         |
| <i>GAM-ZIPP-Multi</i>     | 29,021.61         | 29,220.42        | 72,350.00         | 73,113.63         | 32,273.18        | 33,060.26        | 77,825.60         | 78,242.02         |
| <i>GLM-PG-Multi</i>       | 28,689.77         | 28,769.30        | 71,219.46         | 71,580.64         | 31,616.26        | 32,002.86        | 76,452.69         | 76,643.08         |
| <i>GLM-PIG-Multi</i>      | 28,665.77         | 28,745.30        | 71,213.25         | 71,574.42         | 31,616.43        | 32,003.03        | 76,451.93         | 76,642.33         |
| <i>GLM-PP-Multi</i>       | 28,725.02         | 28,804.55        | 70,775.76         | 71,136.94         | 31,565.07        | 31,951.67        | 76,396.32         | 76,586.72         |
| <i>GLM-NBG-Multi</i>      | 28,626.19         | 28,715.66        | 71,121.49         | 71,492.99         | 31,606.29        | 32,002.32        | 76,403.95         | 76,604.93         |
| <i>GLM-NBIG-Multi</i>     | 28,650.72         | 28,740.19        | 71,125.91         | 71,497.41         | 31,604.95        | 32,000.98        | 76,406.25         | 76,607.22         |
| <i>GLM-NBP-Multi</i>      | 28,709.45         | 28,798.92        | 70,701.54         | 71,073.04         | 31,553.57        | 31,949.60        | 76,353.28         | 76,554.26         |
| <i>GLM-ZIPG-Multi</i>     | 29,010.73         | 29,130.02        | 72,339.95         | 73,021.02         | 32,255.98        | 32,967.63        | 77,828.22         | 78,160.02         |
| <i>GLM-ZIPIG-Multi</i>    | 29,010.72         | 29,130.01        | 72,339.95         | 73,021.02         | 32,255.95        | 32,967.59        | 77,828.21         | 78,160.01         |
| <i>GLM-ZIPP-Multi</i>     | 29,011.42         | 29,130.71        | 72,341.33         | 73,022.41         | 32,260.98        | 32,972.63        | 77,821.74         | 78,153.54         |
| <i>GAM-PG-Multi-PL</i>    | 28,617.69         | 28,776.75        | 70,874.53         | 71,318.26         | 31,550.76        | 32,012.80        | 76,356.05         | 76,631.07         |
| <i>GAM-PIG-Multi-PL</i>   | 28,617.69         | 28,776.75        | 70,874.53         | 71,318.26         | 31,550.76        | 32,012.80        | 76,356.05         | 76,631.07         |
| <i>GAM-PP-Multi-PL</i>    | 28,578.46         | 28,737.51        | 70,709.87         | 71,153.60         | 31,516.70        | 31,978.74        | 76,357.97         | 76,632.99         |
| <i>GAM-NBG-Multi-PL</i>   | 28,604.49         | 28,773.48        | 70,799.34         | 71,253.39         | 31,540.74        | 32,012.21        | 76,312.94         | 76,598.53         |
| <i>GAM-NBIG-Multi-PL</i>  | 28,604.49         | 28,773.48        | 70,799.34         | 71,253.39         | 31,540.74        | 32,012.21        | 76,312.94         | 76,598.53         |
| <i>GAM-NBP-Multi-PL</i>   | 28,565.70         | 28,734.69        | <b>70,640.08</b>  | 71,094.13         | <b>31,507.37</b> | 31,978.84        | 76,315.53         | 76,601.13         |
| <i>GAM-ZIPG-Multi-PL</i>  | 29,015.55         | 29,214.37        | 72,355.06         | 73,118.69         | 32,270.66        | 33,057.74        | 77,839.87         | 78,256.29         |
| <i>GAM-ZIPIG-Multi-PL</i> | 29,015.55         | 29,214.37        | 72,355.06         | 73,118.69         | 32,270.66        | 33,057.74        | 77,839.87         | 78,256.29         |
| <i>GAM-ZIPP-Multi-PL</i>  | 29,020.68         | 29,219.50        | 72,347.87         | 73,111.50         | 32,265.16        | 33,052.24        | 77,824.40         | 78,240.82         |



**Figure C.3:** Estimated claim score effects on linear predictor and corresponding discounts/surcharges to the insured with 95% confidence intervals and histograms of average observed claim frequencies of general liability, home contents, home and travel insurance for one-product GAM-PG-One (left) and GLM-PG-One (right).

**Table C.3:** Maximal ratio Gini coefficients in percentages with standard errors in parenthesis and rank for each product category with dynamic univariate risk classification.

| Benchmark            | General liability  |          | Home contents      |          | Home               |          | Travel              |          |
|----------------------|--------------------|----------|--------------------|----------|--------------------|----------|---------------------|----------|
|                      | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient         | Rank     |
| <i>GLM-PG</i>        | 11.48 (7.80)       | 17       | 30.05 (4.20)       | 21       | 14.83 (7.71)       | 12       | 33.12 (4.04)        | 26       |
| <i>GLM-PIG</i>       | 11.48 (7.80)       | 18       | 32.38 (4.15)       | 25       | 11.91 (7.61)       | 7        | 32.42 (3.99)        | 24       |
| <i>GLM-PP</i>        | 17.55 (8.23)       | 24       | 20.45 (4.95)       | 6        | 6.39 (7.43)        | 4        | 32.21 (3.96)        | 23       |
| <i>GLM-NBG</i>       | 11.48 (7.80)       | 15       | 30.02 (4.20)       | 20       | 14.80 (7.71)       | 11       | 33.13 (4.04)        | 27       |
| <i>GLM-NBIG</i>      | 11.48 (7.80)       | 16       | 32.32 (4.15)       | 24       | 11.92 (7.61)       | 8        | 32.44 (3.98)        | 25       |
| <i>GLM-NBP</i>       | 17.55 (8.23)       | 23       | 20.45 (4.95)       | 5        | 6.34 (7.42)        | 3        | 32.21 (3.96)        | 22       |
| <i>GLM-ZIPG</i>      | 9.41 (7.63)        | 9        | 27.58 (4.74)       | 16       | 24.37 (8.33)       | 27       | 16.11 (3.82)        | 6        |
| <i>GLM-ZIPIG</i>     | 9.41 (7.63)        | 8        | 29.63 (4.69)       | 19       | 22.77 (8.29)       | 24       | 15.90 (3.80)        | 5        |
| <i>GLM-ZIPP</i>      | 15.80 (7.34)       | 20       | 22.65 (4.84)       | 9        | 16.22 (8.10)       | 15       | 17.75 (3.77)        | 9        |
| <i>GAM-PG-One</i>    | 9.89 (7.54)        | 12       | 24.26 (4.39)       | 11       | 21.34 (7.81)       | 19       | 20.78 (3.26)        | 11       |
| <i>GAM-PIG-One</i>   | 9.89 (7.54)        | 13       | 27.03 (4.39)       | 13       | 18.62 (7.73)       | 16       | 20.64 (3.29)        | 10       |
| <i>GAM-PP-One</i>    | 16.12 (8.74)       | 21       | 15.20 (4.86)       | 4        | 22.22 (7.81)       | 21       | 26.89 (3.44)        | 20       |
| <i>GAM-NBG-One</i>   | 9.88 (7.54)        | 10       | 24.15 (4.39)       | 10       | 21.33 (7.81)       | 18       | 20.93 (3.27)        | 13       |
| <i>GAM-NBIG-One</i>  | 9.88 (7.54)        | 11       | 26.91 (4.40)       | 12       | 18.62 (7.73)       | 17       | 20.79 (3.30)        | 12       |
| <i>GAM-NBP-One</i>   | 16.14 (8.74)       | 22       | 15.06 (4.86)       | 3        | 22.17 (7.81)       | 20       | 27.05 (3.45)        | 21       |
| <i>GAM-ZIPG-One</i>  | 9.34 (7.59)        | 5        | 27.28 (4.74)       | 14       | 24.25 (8.32)       | 26       | 15.79 (3.82)        | 3        |
| <i>GAM-ZIPIG-One</i> | 9.34 (7.59)        | 4        | 29.34 (4.68)       | 17       | 22.62 (8.28)       | 23       | <b>15.57 (3.80)</b> | <b>1</b> |
| <i>GAM-ZIPP-One</i>  | 13.37 (7.88)       | 19       | 22.21 (4.84)       | 7        | 15.92 (8.10)       | 14       | 17.24 (3.79)        | 7        |
| <i>GLM-PG-One</i>    | 9.31 (8.63)        | 3        | 30.49 (4.14)       | 23       | 14.28 (7.65)       | 10       | 25.26 (4.14)        | 18       |
| <i>GLM-PIG-One</i>   | <b>7.69 (8.64)</b> | <b>1</b> | 32.79 (4.10)       | 27       | 10.92 (7.49)       | 6        | 25.22 (4.14)        | 17       |
| <i>GLM-PP-One</i>    | 24.39 (7.86)       | 27       | 7.05 (4.91)        | 2        | 2.89 (7.42)        | 2        | 23.07 (4.11)        | 14       |
| <i>GLM-NBG-One</i>   | 11.43 (7.69)       | 14       | 30.47 (4.13)       | 22       | 14.24 (7.65)       | 9        | 25.28 (4.20)        | 19       |
| <i>GLM-NBIG-One</i>  | 7.87 (8.37)        | 2        | 32.77 (4.10)       | 26       | 10.91 (7.50)       | 5        | 25.20 (4.14)        | 16       |
| <i>GLM-NBP-One</i>   | 24.37 (7.86)       | 26       | <b>0.90 (5.14)</b> | <b>1</b> | <b>2.00 (7.34)</b> | <b>1</b> | 23.07 (4.10)        | 15       |
| <i>GLM-ZIPG-One</i>  | 9.36 (7.60)        | 7        | 27.31 (4.74)       | 15       | 24.17 (8.32)       | 25       | 15.81 (3.82)        | 4        |
| <i>GLM-ZIPIG-One</i> | 9.36 (7.60)        | 6        | 29.34 (4.68)       | 18       | 22.52 (8.28)       | 22       | 15.59 (3.80)        | 2        |
| <i>GLM-ZIPP-One</i>  | 18.65 (7.12)       | 25       | 22.22 (4.84)       | 8        | 15.87 (8.10)       | 13       | 17.24 (3.78)        | 8        |

**Table C.4:** Maximal ratio Gini coefficients in percentages with standard errors in parenthesis and rank for each product category with dynamic multivariate risk classification.

| Benchmark              | General liability  |          | Home contents      |          | Home               |          | Travel              |          |
|------------------------|--------------------|----------|--------------------|----------|--------------------|----------|---------------------|----------|
|                        | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient         | Rank     |
| <i>GLM-PG</i>          | 16.19 (8.43)       | 34       | 30.57 (4.22)       | 37       | 14.83 (7.71)       | 18       | 33.12 (4.04)        | 44       |
| <i>GLM-PIG</i>         | 16.19 (8.43)       | 35       | 32.38 (4.15)       | 41       | 11.91 (7.61)       | 12       | 32.42 (3.99)        | 42       |
| <i>GLM-PP</i>          | 19.66 (8.31)       | 42       | 21.60 (4.71)       | 10       | 6.62 (7.51)        | 4        | 32.37 (3.96)        | 41       |
| <i>GLM-NBG</i>         | 16.19 (8.43)       | 32       | 30.51 (4.22)       | 35       | 14.80 (7.71)       | 17       | 33.13 (4.04)        | 45       |
| <i>GLM-NBIG</i>        | 16.19 (8.43)       | 33       | 32.32 (4.15)       | 40       | 11.92 (7.61)       | 13       | 32.44 (3.98)        | 43       |
| <i>GLM-NBP</i>         | 19.66 (8.31)       | 43       | 21.55 (4.71)       | 9        | 6.63 (7.51)        | 5        | 32.36 (3.96)        | 40       |
| <i>GLM-ZIPG</i>        | 12.04 (7.63)       | 18       | 28.23 (4.72)       | 28       | 24.37 (8.33)       | 45       | 16.72 (3.23)        | 10       |
| <i>GLM-ZIPIG</i>       | 12.04 (7.63)       | 17       | 29.91 (4.68)       | 33       | 22.77 (8.29)       | 40       | 15.92 (3.80)        | 9        |
| <i>GLM-ZIPP</i>        | 15.80 (7.34)       | 31       | 22.67 (4.80)       | 15       | 16.48 (8.11)       | 22       | 18.23 (3.77)        | 15       |
| <i>GAM-PG-One</i>      | 12.29 (7.32)       | 24       | 24.95 (4.42)       | 18       | 21.34 (7.81)       | 33       | 20.78 (3.26)        | 17       |
| <i>GAM-PIG-One</i>     | 12.29 (7.32)       | 23       | 27.27 (4.41)       | 21       | 18.92 (7.73)       | 27       | 20.64 (3.29)        | 16       |
| <i>GAM-PP-One</i>      | 18.16 (8.22)       | 39       | 16.73 (4.84)       | 8        | 22.22 (7.81)       | 35       | 26.97 (3.47)        | 36       |
| <i>GAM-NBG-One</i>     | 12.26 (7.34)       | 22       | 24.84 (4.42)       | 16       | 21.33 (7.81)       | 32       | 20.93 (3.27)        | 19       |
| <i>GAM-NBIG-One</i>    | 12.26 (7.34)       | 21       | 27.14 (4.41)       | 20       | 18.91 (7.73)       | 26       | 20.79 (3.30)        | 18       |
| <i>GAM-NBP-One</i>     | 18.20 (8.21)       | 40       | 16.61 (4.84)       | 7        | 22.17 (7.81)       | 34       | 27.14 (3.48)        | 37       |
| <i>GAM-ZIPG-One</i>    | 11.69 (7.66)       | 13       | 27.98 (4.72)       | 27       | 24.25 (8.32)       | 44       | 15.83 (3.82)        | 6        |
| <i>GAM-ZIPIG-One</i>   | 11.69 (7.66)       | 14       | 29.65 (4.67)       | 32       | 22.62 (8.28)       | 39       | 15.58 (3.81)        | 2        |
| <i>GAM-ZIPP-One</i>    | 14.92 (8.13)       | 29       | 22.33 (4.80)       | 13       | 16.33 (8.10)       | 20       | 17.74 (3.78)        | 12       |
| <i>GLM-PG-One</i>      | 11.27 (8.58)       | 10       | 30.59 (4.15)       | 39       | 14.28 (7.65)       | 16       | 25.26 (4.14)        | 34       |
| <i>GLM-PIG-One</i>     | 9.90 (8.60)        | 4        | 32.79 (4.10)       | 43       | 10.92 (7.49)       | 10       | 25.22 (4.14)        | 33       |
| <i>GLM-PP-One</i>      | 24.39 (7.86)       | 45       | 7.05 (4.91)        | 3        | 6.54 (7.41)        | 3        | 23.12 (4.11)        | 25       |
| <i>GLM-NBG-One</i>     | 16.54 (8.03)       | 38       | 30.58 (4.15)       | 38       | 14.24 (7.65)       | 15       | 25.28 (4.20)        | 35       |
| <i>GLM-NBIG-One</i>    | 9.90 (8.60)        | 5        | 32.77 (4.10)       | 42       | 10.91 (7.50)       | 9        | 25.20 (4.14)        | 32       |
| <i>GLM-NBP-One</i>     | 24.37 (7.86)       | 44       | 6.31 (4.66)        | 2        | 6.53 (7.41)        | 2        | 23.11 (4.11)        | 24       |
| <i>GLM-ZIPG-One</i>    | 11.91 (7.63)       | 15       | 27.98 (4.72)       | 26       | 24.17 (8.32)       | 42       | 15.85 (3.82)        | 8        |
| <i>GLM-ZIPIG-One</i>   | 11.91 (7.63)       | 16       | 29.64 (4.67)       | 30       | 22.52 (8.28)       | 37       | 15.60 (3.81)        | 4        |
| <i>GLM-ZIPP-One</i>    | 18.65 (7.12)       | 41       | 22.33 (4.80)       | 11       | 16.32 (8.10)       | 19       | 17.74 (3.78)        | 13       |
| <i>GAM-PG-Multi</i>    | 10.08 (7.74)       | 6        | 25.00 (4.45)       | 19       | 19.35 (7.75)       | 28       | 21.12 (3.29)        | 22       |
| <i>GAM-PIG-Multi</i>   | 10.08 (7.74)       | 7        | 27.56 (4.46)       | 23       | 17.31 (7.68)       | 24       | 20.97 (3.31)        | 20       |
| <i>GAM-PP-Multi</i>    | 14.04 (8.44)       | 25       | 15.75 (4.79)       | 6        | 20.40 (7.80)       | 31       | 27.16 (3.45)        | 38       |
| <i>GAM-NBG-Multi</i>   | 10.11 (7.74)       | 8        | 24.92 (4.45)       | 17       | 19.36 (7.75)       | 29       | 21.27 (3.29)        | 23       |
| <i>GAM-NBIG-Multi</i>  | 10.11 (7.74)       | 9        | 27.47 (4.46)       | 22       | 17.32 (7.68)       | 25       | 21.12 (3.32)        | 21       |
| <i>GAM-NBP-Multi</i>   | 14.06 (8.41)       | 26       | 15.67 (4.79)       | 5        | 20.39 (7.80)       | 30       | 27.34 (3.46)        | 39       |
| <i>GAM-ZIPG-Multi</i>  | 11.33 (7.59)       | 11       | 27.91 (4.72)       | 24       | 23.94 (8.31)       | 41       | 15.77 (3.82)        | 5        |
| <i>GAM-ZIPIG-Multi</i> | 11.33 (7.59)       | 12       | 29.59 (4.67)       | 29       | 22.26 (8.27)       | 36       | <b>15.52 (3.81)</b> | <b>1</b> |
| <i>GAM-ZIPP-Multi</i>  | 14.76 (8.06)       | 27       | 22.39 (4.81)       | 14       | 16.78 (8.12)       | 23       | 17.67 (3.79)        | 11       |
| <i>GLM-PG-Multi</i>    | 9.41 (8.58)        | 3        | 30.56 (4.18)       | 36       | 11.80 (7.49)       | 11       | 25.14 (4.21)        | 31       |
| <i>GLM-PIG-Multi</i>   | <b>7.99 (8.67)</b> | <b>1</b> | 33.01 (4.15)       | 45       | 8.30 (7.39)        | 7        | 24.59 (4.18)        | 29       |
| <i>GLM-PP-Multi</i>    | 16.44 (8.60)       | 36       | 10.18 (4.98)       | 4        | 8.79 (7.61)        | 8        | 23.84 (4.10)        | 26       |
| <i>GLM-NBG-Multi</i>   | 14.94 (8.61)       | 30       | 30.30 (4.17)       | 34       | 12.91 (7.55)       | 14       | 24.78 (4.20)        | 30       |
| <i>GLM-NBIG-Multi</i>  | 8.02 (8.67)        | 2        | 32.98 (4.14)       | 44       | 8.30 (7.39)        | 6        | 24.47 (4.16)        | 28       |
| <i>GLM-NBP-Multi</i>   | 16.44 (8.60)       | 37       | <b>1.11 (5.14)</b> | <b>1</b> | <b>5.53 (7.05)</b> | <b>1</b> | 23.84 (4.10)        | 27       |
| <i>GLM-ZIPG-Multi</i>  | 12.10 (7.63)       | 19       | 27.95 (4.72)       | 25       | 24.18 (8.32)       | 43       | 15.83 (3.82)        | 7        |
| <i>GLM-ZIPIG-Multi</i> | 12.10 (7.63)       | 20       | 29.65 (4.67)       | 31       | 22.58 (8.28)       | 38       | 15.59 (3.81)        | 3        |
| <i>GLM-ZIPP-Multi</i>  | 14.92 (8.07)       | 28       | 22.33 (4.81)       | 12       | 16.39 (8.10)       | 21       | 17.75 (3.78)        | 14       |

**Table C.5:** Likelihood Ratio test statistics and p-values for the hypothesis that the alternative frequency model improves the ‘null’ model in-sample, based on the asymptotic chi-squared distribution with  $(k - 1) = 3$  ( $3(k - 1) = 9$ ) and 1 (3) degrees of freedom for the one-product (multi-product) GAMs and GLMs, respectively.

| Alternative            | Null            | General liability |         | Home contents  |         | Home           |         | Travel         |         |
|------------------------|-----------------|-------------------|---------|----------------|---------|----------------|---------|----------------|---------|
|                        |                 | Test statistic    | P-value | Test statistic | P-value | Test statistic | P-value | Test statistic | P-value |
| <i>GAM-PG-One</i>      | GLM-P(G/IG/P)   | 157.3049          | 0.0000  | 323.3865       | 0.0000  | 92.6489        | 0.0000  | 543.7363       | 0.0000  |
| <i>GAM-PIG-One</i>     | GLM-P(G/IG/P)   | 157.3049          | 0.0000  | 323.3865       | 0.0000  | 92.6489        | 0.0000  | 543.7363       | 0.0000  |
| <i>GAM-PP-One</i>      | GLM-P(G/IG/P)   | 230.2776          | 0.0000  | 682.5611       | 0.0000  | 140.3106       | 0.0000  | 557.4337       | 0.0000  |
| <i>GAM-NBG-One</i>     | GLM-NB(G/IG/P)  | 154.2614          | 0.0000  | 313.8604       | 0.0000  | 90.7237        | 0.0000  | 534.0246       | 0.0000  |
| <i>GAM-NBIG-One</i>    | GLM-NB(G/IG/P)  | 154.2614          | 0.0000  | 313.8604       | 0.0000  | 90.7237        | 0.0000  | 534.0246       | 0.0000  |
| <i>GAM-NBP-One</i>     | GLM-NB(G/IG/P)  | 225.9094          | 0.0000  | 661.0923       | 0.0000  | 137.4164       | 0.0000  | 546.9565       | 0.0000  |
| <i>GAM-ZIPG-One</i>    | GLM-ZIP(G/IG/P) | 1.3616            | 0.7146  | 18.2839        | 0.0004  | 7.1502         | 0.0673  | 23.1461        | 0.0000  |
| <i>GAM-ZIPIG-One</i>   | GLM-ZIP(G/IG/P) | 1.3616            | 0.7146  | 18.2839        | 0.0004  | 7.1502         | 0.0673  | 23.1461        | 0.0000  |
| <i>GAM-ZIPP-One</i>    | GLM-ZIP(G/IG/P) | 2.8710            | 0.4120  | 26.4548        | 0.0000  | 1.7809         | 0.6191  | 31.0857        | 0.0000  |
| <i>GLM-PG-One</i>      | GLM-P(G/IG/P)   | 119.7840          | 0.0000  | 118.7430       | 0.0000  | 86.6931        | 0.0000  | 479.1327       | 0.0000  |
| <i>GLM-PIG-One</i>     | GLM-P(G/IG/P)   | 143.2456          | 0.0000  | 118.7430       | 0.0000  | 86.6931        | 0.0000  | 479.1327       | 0.0000  |
| <i>GLM-PP-One</i>      | GLM-P(G/IG/P)   | 57.6336           | 0.0000  | 600.2778       | 0.0000  | 80.9743        | 0.0000  | 523.2202       | 0.0000  |
| <i>GLM-NBG-One</i>     | GLM-NB(G/IG/P)  | 180.5256          | 0.0000  | 117.5327       | 0.0000  | 84.9023        | 0.0000  | 471.3110       | 0.0000  |
| <i>GLM-NBIG-One</i>    | GLM-NB(G/IG/P)  | 140.9189          | 0.0000  | 117.5327       | 0.0000  | 84.9023        | 0.0000  | 471.3110       | 0.0000  |
| <i>GLM-NBP-One</i>     | GLM-NB(G/IG/P)  | 56.2432           | 0.0000  | 582.7177       | 0.0000  | 80.5751        | 0.0000  | 512.8989       | 0.0000  |
| <i>GLM-ZIPG-One</i>    | GLM-ZIP(G/IG/P) | 0.2500            | 0.6171  | 19.3708        | 0.0000  | 6.8427         | 0.0089  | 21.5339        | 0.0000  |
| <i>GLM-ZIPIG-One</i>   | GLM-ZIP(G/IG/P) | 0.2555            | 0.6132  | 19.3708        | 0.0000  | 6.8427         | 0.0089  | 21.5339        | 0.0000  |
| <i>GLM-ZIPP-One</i>    | GLM-ZIP(G/IG/P) | 0.8349            | 0.3609  | 26.3238        | 0.0000  | 3.3111         | 0.0688  | 29.8140        | 0.0000  |
| <i>GAM-PG-Multi</i>    | GAM-PG-One      | 59.7639           | 0.0000  | 230.4990       | 0.0000  | 78.0248        | 0.0000  | 41.5821        | 0.0000  |
| <i>GAM-PIG-Multi</i>   | GAM-PIG-One     | 59.7639           | 0.0000  | 230.4990       | 0.0000  | 78.0248        | 0.0000  | 41.5821        | 0.0000  |
| <i>GAM-PP-Multi</i>    | GAM-PP-One      | 53.8253           | 0.0000  | 50.9466        | 0.0000  | 56.1256        | 0.0000  | 38.9525        | 0.0000  |
| <i>GAM-NBG-Multi</i>   | GAM-NBG-One     | 58.5708           | 0.0000  | 222.1712       | 0.0000  | 76.7239        | 0.0000  | 40.9546        | 0.0000  |
| <i>GAM-NBIG-Multi</i>  | GAM-NBIG-One    | 58.5708           | 0.0000  | 222.1712       | 0.0000  | 76.7239        | 0.0000  | 40.9546        | 0.0000  |
| <i>GAM-NBP-Multi</i>   | GAM-NBP-One     | 52.9535           | 0.0000  | 49.0160        | 0.0000  | 55.2396        | 0.0000  | 38.2564        | 0.0000  |
| <i>GAM-ZIPG-Multi</i>  | GAM-ZIPG-One    | 13.2777           | 0.1504  | 17.0919        | 0.0473  | 10.4283        | 0.3169  | 7.1551         | 0.6210  |
| <i>GAM-ZIPIG-Multi</i> | GAM-ZIPIG-One   | 13.2777           | 0.1504  | 17.0919        | 0.0473  | 10.4283        | 0.3169  | 7.1551         | 0.6210  |
| <i>GAM-ZIPP-Multi</i>  | GAM-ZIPP-One    | 7.0771            | 0.6291  | 13.2440        | 0.1519  | 8.0981         | 0.5243  | 11.1422        | 0.2661  |
| <i>GLM-PG-Multi</i>    | GLM-PG-One      | 18.7301           | 0.0003  | 90.6821        | 0.0000  | 3.0262         | 0.3876  | 3.3292         | 0.3436  |
| <i>GLM-PIG-Multi</i>   | GLM-PIG-One     | 19.2734           | 0.0002  | 96.8971        | 0.0000  | 2.8520         | 0.4150  | 4.0825         | 0.2527  |
| <i>GLM-PP-Multi</i>    | GLM-PP-One      | 45.6328           | 0.0000  | 52.8441        | 0.0000  | 59.9346        | 0.0000  | 15.6064        | 0.0014  |
| <i>GLM-NBG-Multi</i>   | GLM-NBG-One     | 3.8377            | 0.2795  | 96.5529        | 0.0000  | 1.4797         | 0.6870  | 6.1942         | 0.1025  |
| <i>GLM-NBIG-Multi</i>  | GLM-NBIG-One    | 18.9189           | 0.0003  | 92.1315        | 0.0000  | 2.8172         | 0.4207  | 3.9023         | 0.2722  |
| <i>GLM-NBP-Multi</i>   | GLM-NBP-One     | 44.8629           | 0.0000  | 51.3169        | 0.0000  | 58.5265        | 0.0000  | 15.2756        | 0.0016  |
| <i>GLM-ZIPG-Multi</i>  | GLM-ZIPG-One    | 4.5784            | 0.2054  | 14.3819        | 0.0024  | 4.2344         | 0.2372  | 2.0740         | 0.5572  |
| <i>GLM-ZIPIG-Multi</i> | GLM-ZIPIG-One   | 4.5766            | 0.2056  | 14.3834        | 0.0024  | 4.2651         | 0.2342  | 2.0823         | 0.5555  |
| <i>GLM-ZIPP-Multi</i>  | GLM-ZIPP-One    | 3.2955            | 0.3483  | 6.0423         | 0.1096  | 2.7611         | 0.4299  | 0.2713         | 0.9653  |

**Table C.6:** Maximal ratio Gini coefficients in percentages with standard errors in parenthesis and rank for each product category with dynamic multivariate piecewise linear risk classification.

| Benchmark                 | General liability  |          | Home contents      |          | Home               |          | Travel              |          |
|---------------------------|--------------------|----------|--------------------|----------|--------------------|----------|---------------------|----------|
|                           | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient        | Rank     | Coefficient         | Rank     |
| <i>GLM-PG</i>             | 16.19 (8.43)       | 41       | 30.57 (4.22)       | 46       | 14.83 (7.71)       | 18       | 33.12 (4.04)        | 53       |
| <i>GLM-PIG</i>            | 16.19 (8.43)       | 42       | 32.38 (4.15)       | 50       | 11.91 (7.61)       | 12       | 32.42 (3.99)        | 51       |
| <i>GLM-PP</i>             | 19.66 (8.31)       | 51       | 21.60 (4.71)       | 12       | 6.89 (7.53)        | 5        | 32.37 (3.96)        | 50       |
| <i>GLM-NBG</i>            | 16.19 (8.43)       | 39       | 30.51 (4.22)       | 44       | 14.80 (7.71)       | 17       | 33.13 (4.04)        | 54       |
| <i>GLM-NBIG</i>           | 16.19 (8.43)       | 40       | 32.32 (4.15)       | 49       | 11.92 (7.61)       | 13       | 32.44 (3.98)        | 52       |
| <i>GLM-NBP</i>            | 19.66 (8.31)       | 52       | 21.55 (4.71)       | 11       | 6.88 (7.53)        | 4        | 32.36 (3.96)        | 49       |
| <i>GLM-ZIPG</i>           | 12.04 (7.63)       | 24       | 28.23 (4.72)       | 36       | 24.37 (8.33)       | 54       | 16.72 (3.23)        | 12       |
| <i>GLM-ZIPIG</i>          | 12.04 (7.63)       | 23       | 29.91 (4.68)       | 42       | 22.77 (8.29)       | 48       | 15.92 (3.80)        | 11       |
| <i>GLM-ZIPP</i>           | 15.80 (7.34)       | 38       | 22.67 (4.80)       | 18       | 16.48 (8.11)       | 22       | 18.28 (3.77)        | 18       |
| <i>GAM-PG-One</i>         | 13.81 (7.37)       | 28       | 24.95 (4.42)       | 22       | 21.34 (7.81)       | 40       | 20.78 (3.26)        | 20       |
| <i>GAM-PIG-One</i>        | 13.81 (7.37)       | 27       | 27.27 (4.41)       | 26       | 18.92 (7.73)       | 30       | 20.64 (3.29)        | 19       |
| <i>GAM-PP-One</i>         | 19.25 (8.11)       | 49       | 16.73 (4.84)       | 10       | 22.22 (7.81)       | 42       | 26.97 (3.47)        | 43       |
| <i>GAM-NBG-One</i>        | 13.82 (7.38)       | 30       | 24.84 (4.42)       | 19       | 21.33 (7.81)       | 39       | 20.93 (3.27)        | 22       |
| <i>GAM-NBIG-One</i>       | 13.82 (7.38)       | 29       | 27.14 (4.41)       | 25       | 18.91 (7.73)       | 29       | 20.79 (3.30)        | 21       |
| <i>GAM-NBP-One</i>        | 19.28 (8.11)       | 50       | 16.61 (4.84)       | 9        | 22.17 (7.81)       | 41       | 27.14 (3.48)        | 44       |
| <i>GAM-ZIPG-One</i>       | 11.69 (7.66)       | 19       | 27.98 (4.72)       | 35       | 24.25 (8.32)       | 53       | 15.83 (3.82)        | 8        |
| <i>GAM-ZIPIG-One</i>      | 11.69 (7.66)       | 20       | 29.65 (4.67)       | 41       | 22.62 (8.28)       | 47       | 15.58 (3.81)        | 3        |
| <i>GAM-ZIPP-One</i>       | 14.92 (8.13)       | 36       | 22.33 (4.80)       | 15       | 16.33 (8.10)       | 20       | 17.80 (3.78)        | 15       |
| <i>GLM-PG-One</i>         | 11.27 (8.58)       | 14       | 30.59 (4.15)       | 48       | 14.28 (7.65)       | 16       | 25.26 (4.14)        | 41       |
| <i>GLM-PIG-One</i>        | 9.90 (8.60)        | 7        | 32.79 (4.10)       | 52       | 10.92 (7.49)       | 10       | 25.22 (4.14)        | 40       |
| <i>GLM-PP-One</i>         | 24.39 (7.86)       | 54       | 7.05 (4.91)        | 3        | 6.54 (7.41)        | 3        | 23.14 (4.11)        | 32       |
| <i>GLM-NBG-One</i>        | 16.54 (8.03)       | 45       | 30.58 (4.15)       | 47       | 14.24 (7.65)       | 15       | 25.28 (4.20)        | 42       |
| <i>GLM-NBIG-One</i>       | 9.90 (8.60)        | 8        | 32.77 (4.10)       | 51       | 10.91 (7.50)       | 9        | 25.20 (4.14)        | 39       |
| <i>GLM-NBP-One</i>        | 24.37 (7.86)       | 53       | 6.31 (4.66)        | 2        | 6.53 (7.41)        | 2        | 23.13 (4.10)        | 31       |
| <i>GLM-ZIPG-One</i>       | 11.91 (7.63)       | 21       | 27.98 (4.72)       | 34       | 24.17 (8.32)       | 51       | 15.85 (3.82)        | 10       |
| <i>GLM-ZIPIG-One</i>      | 11.91 (7.63)       | 22       | 29.64 (4.67)       | 39       | 22.52 (8.28)       | 45       | 15.60 (3.81)        | 5        |
| <i>GLM-ZIPP-One</i>       | 18.65 (7.12)       | 48       | 22.33 (4.80)       | 13       | 16.32 (8.10)       | 19       | 17.80 (3.78)        | 16       |
| <i>GAM-PG-Multi</i>       | 10.08 (7.74)       | 9        | 25.00 (4.45)       | 23       | 19.35 (7.75)       | 31       | 21.12 (3.29)        | 28       |
| <i>GAM-PIG-Multi</i>      | 10.08 (7.74)       | 10       | 27.56 (4.46)       | 30       | 17.31 (7.68)       | 25       | 20.97 (3.31)        | 24       |
| <i>GAM-PP-Multi</i>       | 14.04 (8.44)       | 31       | 15.75 (4.79)       | 8        | 20.40 (7.80)       | 36       | 27.16 (3.45)        | 45       |
| <i>GAM-NBG-Multi</i>      | 10.11 (7.74)       | 11       | 24.92 (4.45)       | 20       | 19.36 (7.75)       | 32       | 21.27 (3.29)        | 30       |
| <i>GAM-NBIG-Multi</i>     | 10.11 (7.74)       | 12       | 27.47 (4.46)       | 29       | 17.32 (7.68)       | 26       | 21.12 (3.32)        | 27       |
| <i>GAM-NBP-Multi</i>      | 14.06 (8.41)       | 32       | 15.67 (4.79)       | 7        | 20.39 (7.80)       | 35       | 27.34 (3.46)        | 47       |
| <i>GAM-ZIPG-Multi</i>     | 11.33 (7.59)       | 17       | 27.91 (4.72)       | 32       | 23.94 (8.31)       | 49       | 15.77 (3.82)        | 7        |
| <i>GAM-ZIPIG-Multi</i>    | 11.33 (7.59)       | 18       | 29.59 (4.67)       | 38       | 22.26 (8.27)       | 43       | <b>15.52 (3.81)</b> | <b>1</b> |
| <i>GAM-ZIPP-Multi</i>     | 14.76 (8.06)       | 33       | 22.39 (4.81)       | 16       | 16.78 (8.12)       | 23       | 17.71 (3.78)        | 13       |
| <i>GLM-PG-Multi</i>       | 10.42 (8.10)       | 13       | 30.56 (4.18)       | 45       | 11.80 (7.49)       | 11       | 25.14 (4.21)        | 38       |
| <i>GLM-PIG-Multi</i>      | 8.45 (8.27)        | 4        | 33.01 (4.15)       | 54       | 8.30 (7.39)        | 7        | 24.59 (4.18)        | 36       |
| <i>GLM-PP-Multi</i>       | 16.44 (8.60)       | 43       | 10.18 (4.98)       | 4        | 8.79 (7.61)        | 8        | 23.84 (4.10)        | 33       |
| <i>GLM-NBG-Multi</i>      | 14.94 (8.61)       | 37       | 30.30 (4.17)       | 43       | 12.91 (7.55)       | 14       | 24.78 (4.20)        | 37       |
| <i>GLM-NBIG-Multi</i>     | 8.42 (8.27)        | 3        | 32.98 (4.14)       | 53       | 8.30 (7.39)        | 6        | 24.47 (4.16)        | 35       |
| <i>GLM-NBP-Multi</i>      | 16.44 (8.60)       | 44       | <b>1.61 (5.12)</b> | <b>1</b> | <b>5.53 (7.05)</b> | <b>1</b> | 23.84 (4.10)        | 34       |
| <i>GLM-ZIPG-Multi</i>     | 12.10 (7.63)       | 25       | 27.95 (4.72)       | 33       | 24.18 (8.32)       | 52       | 15.83 (3.82)        | 9        |
| <i>GLM-ZIPIG-Multi</i>    | 12.10 (7.63)       | 26       | 29.65 (4.67)       | 40       | 22.58 (8.28)       | 46       | 15.59 (3.81)        | 4        |
| <i>GLM-ZIPP-Multi</i>     | 14.92 (8.07)       | 35       | 22.33 (4.81)       | 14       | 16.39 (8.10)       | 21       | 17.80 (3.78)        | 17       |
| <i>GAM-PG-Multi-PL</i>    | <b>8.39 (7.86)</b> | <b>1</b> | 25.02 (4.43)       | 24       | 20.28 (7.79)       | 34       | 21.08 (3.28)        | 25       |
| <i>GAM-PIG-Multi-PL</i>   | 8.39 (7.86)        | 2        | 27.43 (4.45)       | 28       | 17.82 (7.72)       | 27       | 20.94 (3.30)        | 23       |
| <i>GAM-PP-Multi-PL</i>    | 16.99 (8.53)       | 47       | 14.93 (4.79)       | 6        | 20.45 (7.79)       | 38       | 27.23 (3.45)        | 46       |
| <i>GAM-NBG-Multi-PL</i>   | 8.54 (7.84)        | 6        | 24.93 (4.43)       | 21       | 20.28 (7.79)       | 33       | 21.24 (3.28)        | 29       |
| <i>GAM-NBIG-Multi-PL</i>  | 8.54 (7.84)        | 5        | 27.35 (4.45)       | 27       | 17.83 (7.72)       | 28       | 21.09 (3.31)        | 26       |
| <i>GAM-NBP-Multi-PL</i>   | 16.99 (8.53)       | 46       | 14.87 (4.79)       | 5        | 20.44 (7.79)       | 37       | 27.41 (3.46)        | 48       |
| <i>GAM-ZIPG-Multi-PL</i>  | 11.30 (7.67)       | 15       | 27.85 (4.72)       | 31       | 24.12 (8.32)       | 50       | 15.77 (3.82)        | 6        |
| <i>GAM-ZIPIG-Multi-PL</i> | 11.30 (7.67)       | 16       | 29.53 (4.67)       | 37       | 22.50 (8.28)       | 44       | 15.53 (3.81)        | 2        |
| <i>GAM-ZIPP-Multi-PL</i>  | 14.83 (8.06)       | 34       | 22.41 (4.81)       | 17       | 16.79 (8.12)       | 24       | 17.79 (3.78)        | 14       |