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A Credit Disability Morbidity Table

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Abstract

Currently no disability table is defined in the model valuation laws for credit insurance. The authors have obtained data from the credit insurance industry and analyzed the demographic factors. We discovered that the 1985 Commissioners Individual Disability Table A (1985 CIDA) accurately reproduces the experience of the industry. The paper provides information on the background, construction, and analysis of the resulting table, and then offers suggestions for the development of a valuation table.

Background

The Actuarial Committee of the Consumer Credit Insurance Association (CCIA) determined the credit insurance industry needed a credit disability morbidity table, one that could be used for valuation and pricing. The existing tables were the NAIC's (National Association of Insurance Commissioners) 1968 and the 1974 credit disability tables. Both tables were created with all ages and both genders combined. A sub-committee consisting of Robert Butler, chairman; Christopher Hause; Steve Ostlund; and Craig Squier was formed to develop the table. The following describes the creation of the basic table.

The authors considered an approach similar to that which had been used in the past two credit disability studies. This involved collecting claim and exposure, possibly by age and gender of the insured. After researching this further, the authors decided to abandon this approach for the following reasons:

1. Many companies do not record the reason a claim is terminated. It is crucial to know whether a claimant's benefits terminated because of recovery, death or expiration of benefits.

2. Many of the companies' data processing resources were committed to solving the year 2000 problem.
3. The most recent 1974 NAIC table, which was constructed in this manner, had claim costs higher than what the industry in total was experiencing.

In view of this, the authors decided to use an existing disability table and modify it to fit the industry's actual experience. A number of disabled life tables were reviewed, and the 1985 Commissioner Individual Disability Table was selected as the best choice from all available tables.

Data Sources

I. In-Force Data

The CCIA asked its member companies to submit their new credit disability single premium business written in 1997, gross of any refunds. The data was collected for each of the elimination periods, original term of coverage in months, age last birthday at issue (or date of birth and issue date) and gender, where available. Collected premiums and original amount of insurance (insured monthly indemnity times the number of months insured) were provided. Business that is summary processed was excluded. Appendix A contains a copy of the survey form and instructions. Sixteen corporate groups, representing two-thirds of the credit disability market, contributed data, representing insurance written on \$25,250,854,000 of gross insured initial indebtedness. These corporate groups are:

American Bankers Insurance Group

American General Finance Company

American Security Insurance Group

American United Life

Associates Financial Services

Beneficial Finance

Central States Health & Life

Cherokee National Life

Cuna Mutual Group

Lyndon Life

North Central

Plateau Group, Inc.

Protective Insurance Group

Resource Dealer Group

Trans-City Life

Universal Underwriters Group

Many companies use a default age when the certificate is received without age. The data submitted for each company was reviewed by term, age and plan. Where the data was heaped at a particular age, the data was smoothed out by comparing to the exposure at surrounding ages. The data was then grouped by the 13 original terms in months (6, 12, 18, 24, 30, 36, 48, 60, 72, 84, 96, 108, 120). Most loans are written at these terms. The resulting distribution of 1997 new business is displayed in Exhibit 1.

The following chart on page 4 shows the average weighted age and term by plan from the survey.

(continued on page 4, column 1)

A Credit Disability Morbidity Table

from page 3

Plan	Term in Months	Age
7-day retroactive	45.5	39.3
14-day retroactive	49.5	38.9
14-day elimination	43.2	38.4
30-day retroactive	51.0	40.6
30-day elimination	52.3	39.6
<u>Unknown</u>	<u>59.1</u>	<u>41.7</u>
Total	49.2	39.1

There is no significant difference in the age distribution by plan, so only the total age distribution was used throughout the study. There are significant differences in the distribution of original term in months by plan, so each plan's unique distribution by term was used throughout the study.

II. Loss Experience Data

Each year all companies writing credit insurance complete the Credit Insurance Experience Exhibit as part of their annual statement filing. This exhibit is prepared for each state's own experience. The data is provided for credit life, disability, unemployment and property. The experience is also separated between single premium and monthly business. The credit disability business experience is further split into six elimination periods: 7-day retroactive, 14-day retroactive, 14-day elimination, 30-day retroactive, 30-day elimination and all other. Earned premiums at each state's *prima facie* rates and incurred losses are reported. The data for all states is submitted on diskettes to the NAIC. Only the single premium data for years 1992 through 1996 was used to

develop the table. The primary purpose of the study is the development of a valuation table, so the monthly business was ignored.

Prima facie rates in force at each year end by state, plan and for the 13 monthly terms of loan (6, 12, 18, 24, 30, 36, 48, 60, 72, 84, 96, 108, 120) were gathered and recorded. Most states' *prima facie* rates allow a company to exclude pre-existing conditions during the first six months of coverage if the condition resulted in treatment or medical advice during the six months prior to the effective date of coverage (6/6 pre-existing condition exclusion). A few states also allow the coverage to be written at higher rates if there is no exclusion of pre-existing conditions. Where this alternative exists, the rates for the 6/6 pre-existing exclusion coverage were selected. It is assumed that the rate differential for the two forms of pre-existing coverages is appropriate. The study therefore represents the net single premiums for credit disability insurance written with a 6/6 pre-existing exclusion.

Weighted single premium rates per \$100 of initial insured indebtedness were determined for the U.S. and Puerto Rico

combined for each of the five experience years in the study. This was done separately for each of the five elimination periods and 13 original terms in months. The total earned premium at *prima facie* rates for each plan by state was used for the weighting. This is given in Exhibit 2 beginning on page 18. Concern has been expressed in the past that not all companies properly adjust their actual earned premium to what the earned premium would be if *prima facie* rates were charged. This has been seen on the credit life business where rate changes have been frequent in the recent past. *Prima facie* rates for credit disability have been very stable. This is not considered a source of error in the study.

Results and Analysis

The following summarizes the experience for the five plans. Shown is the weighted *prima facie* rate for all terms combined and the implied weighted claim cost. The distribution of the companies' 1997 new business by term within plan was used to get the weighted single rate.

7-Day Retroactive

<u>Indebtedness</u>	Earned		<u>Per \$100 Of Initial Insured</u>		
	Premium @ Prima Facie	Incurred Claims	Loss Ratio	Weighted Rate	Weighted Claim Cost
1992	228,714,534	94,996,100	41.5%	4.92	2.04
1993	210,376,660	85,431,518	40.6%	4.93	2.00
1994	231,077,571	91,713,521	39.7%	4.85	1.93
1995	249,503,928	100,925,262	40.5%	4.79	1.94
1996	<u>232,751,916</u>	<u>92,275,022</u>	<u>39.6%</u>	<u>4.76</u>	<u>1.89</u>
Total	1,152,424,609	465,341,423	40.4%	4.85	1.96

14-Day Retroactive

1992	967,092,971	538,633,838	55.7%	4.18	2.33
1993	920,435,200	493,695,846	53.6%	4.13	2.22
1994	992,259,484	490,018,990	49.4%	4.11	2.03
1995	1,083,022,918	539,144,899	49.8%	4.07	2.03
1996	<u>1,036,041,881</u>	<u>498,672,714</u>	<u>48.1%</u>	<u>4.14</u>	<u>1.95</u>
Total	4,998,852,454	2,560,166,287	51.2%	4.11	2.10

14-Day Elimination

1992	39,898,187	24,946,217	62.5%	3.53	2.21
1993	44,021,739	29,782,082	67.7%	3.48	2.35
1994	45,591,676	27,577,853	60.5%	3.60	2.18
1995	40,532,506	29,676,855	73.2%	3.64	2.66
1996	<u>36,745,566</u>	<u>24,192,384</u>	<u>65.8%</u>	<u>3.58</u>	<u>2.36</u>
Total	206,789,674	136,175,391	65.9%	3.57	2.35

30-Day Retroactive

1992	76,453,523	49,708,317	65.0%	3.83	2.49
1993	71,962,795	52,792,612	73.4%	3.72	2.73
1994	78,879,430	49,573,967	62.8%	3.77	2.37
1995	89,376,411	53,786,204	60.2%	3.77	2.27
1996	<u>87,821,543</u>	<u>48,140,854</u>	<u>54.8%</u>	<u>3.74</u>	<u>2.05</u>
Total	404,493,702	254,001,954	62.8%	3.77	2.36

(continued on page 6, column 1)

A Credit Disability Morbidity Table from page 5

30-Day Elimination					
<u>Indebtedness</u>	Earned		Per \$100 Of Initial Insured		
	Premium @ Prima Facie	Incurred Claims	Loss Ratio	Weighted Rate	Weighted Claim Cost
Year					
1992	77,652,603	57,767,350	74.4%	2.83	2.11
1993	63,484,494	51,643,515	81.3%	2.76	2.25
1994	69,388,571	50,964,492	73.4%	2.79	2.05
1995	70,943,640	50,867,994	71.7%	2.77	1.99
1996	59,078,735	42,510,028	72.0%	2.77	1.99
Total	340,548,043	253,753,379	74.5%	2.79	2.08

There are anomalies in the actual experience. The seven-day retroactive plan should be the most expensive plan, and yet it has the lowest claim cost. This can be partly explained because some states only allow use of this plan for terms of loan of 60 months or less. The 30-day retroactive, claim costs are higher than the 14-day retroactive, and the 30-day elimination costs are not as low as one might expect. The 30-day plans are more popular with credit union business, which traditionally have higher underlying costs. Also, companies in markets where the single premium might be too high to otherwise get good penetration (i.e., home equity loans) use the 30-day plans to reduce premium. Accounts with high loss ratios sometimes are moved to the 30-day plans to minimize their adverse impact on the combined life and disability experience in lieu of a rate increase. It was decided not to pursue analyzing these anomalies since data was unavailable to adequately reflect these underwriting practices.

Application of 1985 CIDA

The 1985 CIDA has separate tables (incidence and termination rates) for males and females and four occupation groups. There are separate tables for 7-day elimination, 14-day elimination, 30-day

elimination and 90+ elimination (plus 0-day accident). Three disability tables were constructed for the 7-day elimination, 14-day elimination and 30-day elimination periods. The published data was used to create these tables. Disabled lives by claim duration were computed for ages 22, 27, 32, 37, 42, 47, 52, 57, 62 and 67. The 5-point LaGrange formula that was recommended in the 1985 *Transactions of the Society of Actuaries* was used to compute the disabled lives for these ages. The 7-day elimination table was used to compute rates for both 7-day elimination and 7-day retroactive period plans. Likewise the 14-day and 30-day elimination table was used for both elimination and retroactive period plans.

For each table there are eight sub-tables; one each for the four occupation classes and two genders. A few of the companies captured gender in their databases. Most companies did not. For those that reported gender, 65% of their new business was males by count and 69% were males by exposure. Many of those that do not capture gender in their databases did run samplings of their new business by first name to determine gender. The results of these samplings were very similar to the other data. It

was decided to assume the inforce credit disability business is 70% male.

No company recorded occupation in the data provided. This information is not routinely kept by the credit insurance industry. The distribution of the U.S. work force by occupation was determined from the July 1998 *Bureau of Labor Statistics* published by the U.S. Department of Labor. The distribution is as follows:

Occupation	Male	Female
Class 1	26.8%	30.7%
Class 2	19.5%	40.8%
Class 3	29.1%	19.6%
Class 4	24.7%	8.8%

It is expected that the credit insurance distribution by occupation mirrors the work force. It has been argued that the lower occupation risks are more likely to purchase credit insurance. It can also be argued that the better occupation risks take out larger loans, and that when they do purchase credit insurance, the larger loan amount offsets this bias.

For each elimination period, there are

eight tables containing the number of disabled lives by age at disablement and duration of claim through 20 years. Using the distribution by occupation above and assuming 70% male, a composite table was produced. From this composite table net single premiums were computed for each of the five elimination period plans of insurance. Net single premiums were computed for each age at disablement. Under this calculation the resulting net

single premiums assume the insured remains the same age throughout the period of coverage. From these net single premiums, a second set of net single premiums was created where the insured ages throughout the period of coverage. The cost for each yearly advance in age was linearly interpolated between the central age in each five-year age bracket. The two sets of net single premiums for each plan of insurance are given in

Exhibit 3 beginning on page 22.

Using the net single premiums computed above a net single premium was determined by weighting all ages and all terms using the distribution from the survey. We then compared this to the weighted claim cost of the industry experience for the calendar years 1992 through 1996 combined. Included in the comparison are the weighted net single premiums from the 1968 NAIC study.

Plan	Prima Facie Premium Distribution	New Table Net Single Premiums No Aging	Assuming Aging	1992-1996 Experience Claim Cost	68 NAIC Net Single Premium
<u>Premium</u>					
7-day retroactive	16.2%	2.67	2.77	1.96	n/a
14-day retroactive	70.4%	2.40	2.52	2.10	2.26
14-day elimination	2.9%	1.97	2.06	2.35	2.00
30-day retroactive	5.7%	1.70	1.80	2.36	1.51
30-day elimination	4.8%	1.38	1.47	2.08	1.24
Total	100.0%	2.34	2.46	2.10	n/a

The 1974 study was omitted because there were no published net single premiums for term in excess of 60 months.

The calendar year period 1992 to 1996 has been a very good economic period for

the U.S. and Puerto Rico. Credit disability claim costs should be at the low end of their cycle. The actual to expected ratio (2.10 / 2.46) of 85% is considered an excellent fit.

The largest plan is the 14-day retroactive plan. Sensitivity testing was run to see the impact of varying the gender and /or occupation mix. The results are as follows:

Sensitivity Tests	<u>Weighted Net Single Premium Assuming</u>	
	No Aging	Aging
Base case, 70% Male	2.40	2.52
100% Male	2.21	2.34
50% Male	2.52	2.63
Base case occupation	2.40	2.52
Shift 5 full points from classes 1 & 2 to 3 & 4	2.51	2.63
Shift 10 full points from classes 1 & 2 to 3 & 4	2.62	2.74

Based on the above analysis, the subcommittee of the Consumer Credit Insurance Association recommends adopting the proposed table as the new basic table for credit disability business.

A Credit Disability Morbidity Table *from page 7*

Valuation Table

The authors defer to the NAIC the development of loading factors for a valuation table. It is hoped that the NAIC will recognize the basic table as truly representative of the net single premiums for credit disability insurance and determine the proper loading factors to create a valuation table. One advantage of modifying the 1985 CIDA for credit disability is the opportunity to adjust demographic weightings to reflect differences existing between companies.

The authors have applied different loading criteria to the base table to assist in this effort. Exhibit 3 displays the effect of lowering the disability termination rates by 5% (as recommended in the write up of the 1985 CIDA) and

discounting at 5% interest. Also, to determine the effect of modifying the makeup or components of the table, we constructed a model by central age and term and an assumed persistency rate, using the distribution in the data submitted for the study. The factors mentioned below, then, are the effect on a stable population of credit disability in force based on a model distribution.

1. Changing the Male-Female mix from 70%-30% to 50%-50% adds 5% to our model reserves.
2. Moving 10% of the occupation classes from each of 1 & 2 to 3 & 4 adds 10% to our model reserves.

3. Using 90% of the basic termination rates adds 10% to our model reserves.
4. Adding 10% to the incidence rates adds 10% to our model reserves.

The above potential loadings are multiplicative, in that the total change for making all of the above modifications is very near the product of the individual factors. Some combination of these margins may be considered, along with a flat percentage load.

We hope that this preliminary work will aid in the selection of appropriate loading factors for the final valuation table.

Appendix A

Form A

Credit Disability Data Request New Business Writings Only (Refunds Excluded)

Company Name _____

Company's 1997 Credit Disability Single Premium Direct Writings _____

Amount and Percentage of Direct Business On Which Detail Data Provided _____

Period Covered by Detail Data:

Beginning Month and Year _____

Ending Month and Year _____

Contact:	Name	_____
	Address:	_____

	Phone #	_____
	Fax #	_____

Can we release name and company to Chris Hause? _____ YES

_____ NO

Appendix A (Continued)

Form B

Record Layout of Disk File (ASCII) Containing Input Data

<u>Description</u>	<u>Field Position</u>	<u>Comments</u>
Company Name or ID given by CCIA	1 to 20	
Age Last Birthday Low	21 to 23	
Age Last Birthday High	24 to 26	Can be same as low
Original Term in Months	27 to 29	Insert 000's if not available
Elimination Period:	30	
1 = 7 retro		
2 = 14 retro		
3 = 14 elim		
4 = 30 retro		
5 = 30 elim		
6 = other		
0 = not available		
Sex:	31	
1 = male		
2 = female		
0 = not available		
Original Single Premium	32 to 43	dollars and cents
Original Amount of Insurance Issued (Note: this equals monthly indemnity times term in months)	44 to 50	dollars only
Monthly Indemnity	51 to 57	dollars and cents
Source of Business	58	
1 = Auto		
2 = Financial Institution		
3 = Finance Company		
4 = Other		
0 = Not Available		
Underwritten	59	
1 = yes		
2 = no		
0 = Not available		
Joint/Single	60	
1 = Single		
2 = Joint		
0 = Not Available		
Pre-ex Indicator	61	
1 = Pre-ex applies		
2 = No Pre-ex		
0 = Not available		
Critical Period Indicator	62	
1 = Full Benefit		
2 = Critical Period		
0 = Not Available		