

Determination of the Disability Premium there is Life Insurance with Annual Payment for Type Benefit Waiver of Premium

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Abstract. When there is a work accident that results in someone becoming disabled or sick, it often leads to termination of employment (layoff) for reasons of productivity. A person who has a chance of having a work accident needs to buy a disability life insurance policy to reduce the financial losses that occur. One type of disability benefit in life insurance is the waiver of premiums. The purpose of this study is to determine the amount of annual disability premium that will be paid to be able to benefit from the type of benefit waiver of premium on dual-purpose life insurance either manually or using Excel Visual Basic for Application. The results showed that the calculation of annual premiums can be generalized that the older the insured, the greater the premium paid. Meanwhile, the greater the policy term, the smaller the premium paid.

Keywords: Life insurance, Disability Premium, Benefit Waiver of Premium, Excel Visual Basic for Applications.

1 Introduction

Insurance has various types according to the uses and benefits required by the owner. There are three types of insurance, namely general insurance, reinsurance, and life insurance [1]. Life insurance is related to loss of income due to death and also covers disability due to work accidents. Often, when a work accident occurs that results in a person becoming disabled or sick, it always ends in termination of employment (PHK). Companies tend to reject people with disabilities in the workplace on productivity grounds. This is burdensome for a person's future as a result of the work accident. Therefore, someone who has the opportunity to experience a work accident feels the need to buy a life insurance policy to reduce financial losses that will occur [2].

Life insurance companies will provide benefits if the insured has a disability. Disability benefits in life insurance consist of lump sum benefits, waivers of premiums, disability annuities, and installment settlements in advance [3]. The difference between the four types of benefits is the amount of premium paid by the insured during the contract. The type of benefit waiver of premium has the smallest premium compared to other types of disability benefits.

In this study, disability benefits are used as a disability benefit waiver of premium with annual premium payments. Benefits of disability waiver of premium, for example, someone who is actively working is x years old, the insurance is an n yearly endowment and the premium is paid for n years. In the insurance contract, a

special contract is added before the insured reaches the age of $y15$ years (where $y - x \leq n - 1$) becomes a disability, so he becomes a waiver of premium [3].

On benefits waiver of premium, the insured will be exempt from premium payments if the insured suffers total and permanent disability due to illness or accident [4]. The insured will receive a lump sum benefit in the form of money if the insured is disabled or dies within a certain period according to the insurance contract made, or if the insured is still alive at the end of that period, the insured will receive the full amount of coverage or what is commonly called endowment insurance.

disability premium waiver of annual premium on endowment life insurance using the help of Excel Visual Basic for Application. In Excel VBA, the combination of disability mortality tables used based on the age of the insured can be changed as needed without changing the language of the application program [5]. So that the determination of the disability premium with changing ages can be calculated quickly and accurately.

2 Method

This research is an experiment that will estimate the number of annual disability premiums in endowment life insurance that must be paid by the insured who is x years old with a disability. The data needed in this study is the interest rate of the Bank Indonesia 7-Day Reverse Repo Rate (BI7DRR) in January 2023 and a combination of mortality and disability tables at productive age. The stages of this research are:

1. Presenting a table at productive age. The information contained in the disability mortality table includes age (x), the number of people who are still actively working at the age x of years (l_x^{aa}), the number of people who are actively working at the age of x those who die at the age of $x + 1$ years (d_x^{aa}), the number of people who are actively working will experience disability at the age of x up to $x + 1$ years (i_x), the number of people with disabilities at the age x of years (l_x^{ii}), the number of people with disabilities at the age of x who died $x + 1$, (d_x^{ii})the number of people living at the age of x years (l_x), and the number of people who died at the age of x (d_x).

Table 1. Combination Table of Mortality and Disability in Productive Age.

x	l_x^{aa}	d_x^{aa}	i_x	l_x^{ii}	d_x^{ii}	l_x	d_x
20	100,000	72	8	0	0	100,000	72
21	99,920	72	10	8	0	99,928	72
22	99,838	72	12	18	0	99,856	72
23	99,754	72	14	30	0	99,784	72
24	99,668	72	16	44	1	99,712	73
25	99,580	73	18	59	1	99,639	74
26	99,489	74	20	76	1	99,565	75
27	99,395	75	22	95	1	99,490	76
28	99,298	77	24	116	1	99,414	78
29	99,197	79	26	139	2	99,336	81
30	99,092	82	28	163	2	99,255	84
31	98,982	86	30	189	2	99,171	88
32	98,866	90	32	217	2	99,083	92

Table 1. (continued).

x	l_x^{aa}	d_x^{aa}	i_x	l_x^{ii}	d_x^{ii}	l_x	d_x
33	98,744	95	34	247	3	98,991	98
34	98615	101	36	278	3	98,893	104
35	98,478	108	38	311	3	98,789	111
36	98,332	116	40	346	4	98,678	120
37	98,176	125	42	382	4	98,558	129
38	98,009	135	45	420	5	98,429	140
39	97,829	147	48	460	6	98,289	153
40	97,634	161	51	502	7	98,136	168
41	97,422	178	55	546	8	97,968	186
43	96,932	221	64	643	10	97,575	231
44	96,647	247	70	697	11	97,344	258
45	96,330	276	77	756	13	97,086	289
46	95,977	308	85	820	15	96,797	323
47	95,584	344	94	890	17	96,474	361
48	95,146	384	105	967	19	96113	403
49	94,657	428	118	1,053	22	95,710	450
50	94,111	475	123	1,149	25	95,260	500
51	93513	525	150	1,247	29	94,760	554
52	92,838	578	170	1,368	34	94,206	612
53	92,090	634	193	1,504	40	93,594	674
54	91,263	692	219	1657	47	92,920	739
55	90,352	752	249	1829	55	92,181	807
56	89,351	814	283	2023	64	91,374	878
57	88,254	877	322	2,242	75	90,496	952
58	87055	941	367	2,489	87	89,544	1028
59	85,747	1006	419	2,769	102	88516	1.108
60	84,322	1,072	480	3,086	119	87,408	1,191
61	82,770	1,139	552	3,447	139	86,217	1,278
62	81,079	1,207	637	3,860	164	84,939	1,371
63	79,235	1275	738	4,333	193	83,568	1,468

2. Calculates the commutation value.

The commutation values that will be calculated include:

a. Commutation v^x .

$$v^x = \left(\frac{1}{1+i} \right)^x \tag{1}$$

Where:

- i : The interest rate used.
- v^x : Discount factor on age x .

b. K commutations C_x .

$$C_x = v^{x+1}d_x \tag{2}$$

Where:

C_x : The commutation symbol of the discount factor is raised to the power of age plus 1 multiplied by the number of people who died at age x.

c. K commutations M_x .

$$M_x = C_x + C_{x+1} + \dots + C_{\omega-1} \quad (3)$$

Where:

M_x : Symbol of commutation of sums C_{x+j} to $j = 0$ arrive $\omega - 1$.

ω : Maximum age reached.

d. K commutations D_x .

$$D_x = v^x l_x \quad (4)$$

Where:

D_x : The commutation symbol of the discount factor to the power of age multiplied by the number of people living at that age x.

e. K commutations N_x .

$$N_x = D_x + D_{x+1} + \dots + D_{\omega-1} \quad (5)$$

Where:

N_x : Symbol of commutation of amount D_{x+j} to $j = 0$ arrive $\omega - 1$.

3. Calculating the value of endowment life insurance for the insured who is x years old with a term of n years.

$$A_{x:\overline{n}|} = \frac{M_x - M_{x+n} + D_{x+n}}{D_x} \quad (6)$$

4. Calculating the value of the initial term life annuity for the insured aged x years with a term of n years.

$$\ddot{a}_{x:\overline{n}|} = \frac{N_x - N_{x+n}}{D_x} \quad (7)$$

5. Calculating the annual gross premium for the insured who is x10-12 years old with a term of n10-15 years.

$$P'_{x:\overline{n}|} = \frac{(1 + \gamma_1)A_{x:\overline{n}|} + \gamma \ddot{a}_{x:\overline{n}|}}{(1 - \beta - \alpha_4)\ddot{a}_{x:\overline{n}|} - (\alpha_3 - \alpha_4)\ddot{a}_{x:\overline{10}|} - (\alpha_2 - \alpha_3)\ddot{a}_{x:\overline{2}|} - (\alpha_1 - \alpha_2)} \quad (8)$$

Where:

α_1 : New closing costs

α_2 : Fees paid to premium collectors in the second year of the policy

α_3 : Fees paid to premium collectors in the third year to the tenth year of the policy

α_4 : Fees paid to premium collection officers in the eleventh year and thereafter

β : Premium collection fee

γ : Maintenance costs during the premium period

γ_1 : The cost of paying the sum insured due to death or termination of the contract

6. Calculating the value of disability commutation.

Disability commutation values that will be calculated include:

a. Commutation q_x^i .

$$q_x^i = \frac{d_x^{ii}}{l_x^{ii} + \frac{1}{2}i_x} \quad (9)$$

Where:

q_x^i : the probability that an invalid person will die in the age range $[x, x + 1]$

b. K commutations $D_x^{\alpha\alpha}$.

$$D_x^{\alpha\alpha} = v^x I_x^{\alpha\alpha} \tag{10}$$

Where:

$D_x^{\alpha\alpha}$: The commutation symbol of the discount factor to the power of age multiplied by the number of active people at that age x.

c. Commutation D_x^{ii} .

$$D_x^{ii} = v^x I_x^{ii} \tag{11}$$

Where:

D_x^{ii} : The commutation symbol of the discount factor to the power of age multiplied by the number of people with disabilities at age x.

d. K ommutations D_x^i .

$$D_x^i = v^x I_x^i \tag{12}$$

dim a na:

D_x^i : The commutation symbol of the age discount factor multiplied by invalid people at age x.

e. K ommutations $N_x^{\alpha\alpha}$.

$$N_x^{\alpha\alpha} = \sum_{t=0}^{\omega-x} D_{x+t}^{\alpha\alpha} \tag{13}$$

dim a na:

$N_x^{\alpha\alpha}$: Symbol of commutation of sums $D_{x+t}^{\alpha\alpha}$ to $t = 0$ reach the maximum age

f. K ommutations N_x^i .

$$N_x^i = \sum_{t=0}^{\omega-x} D_{x+t}^i \tag{14}$$

dim a na:

N_x^i : The commutation symbol of the number D_{x+t}^i for $t = 0$ up to the maximum age

7. Calculating the value of the disability annuity.

The present value of disability annuity which will be calculated includes:

a. An initial term annuity n for a person aged x 19-25 is active and payments are made if n the insured is still alive during the year.

$$\ddot{a}_{x:\overline{n}|}^{\alpha} = \frac{N_x - N_{x+n}}{D_x^{\alpha\alpha}} - \frac{D_x^{ii} N_x^i - N_{x+n}^i}{D_x^{\alpha\alpha} D_x^i} \tag{15}$$

b. A year-old initial annuity n for a person aged x years is active and payments are made as long as they are still active.

$$\ddot{a}_{x:\overline{n}|}^{\alpha\alpha} = \frac{N_x^{\alpha\alpha} - N_{x+n}^{\alpha\alpha}}{D_x^{\alpha\alpha}} \tag{16}$$

8. Calculates the net single premium from the disability benefit waiver of premium for a person x aged with a timeframe n year.

$$P' a_{x:\overline{n-1}|}^{\alpha(i:\overline{y-x|})} = P' \left[\ddot{a}_{x:\overline{n}|}^{\alpha} - \ddot{a}_{x:\overline{n}|}^{\alpha\alpha} - \frac{D_y^{\alpha\alpha}}{D_x^{\alpha\alpha}} \left(\ddot{a}_{y:\overline{n-y+x}|}^{\alpha} - \ddot{a}_{y:\overline{n-y+x}|}^{\alpha\alpha} \right) \right] \tag{17}$$

9. Calculating the annual disability premium with a benefit waiver of premium.

$$P_x^D = P' a_{x:\overline{n-1}|}^{\alpha(i:\overline{y-x|})} \div \ddot{a}_{x:\overline{y-x}|}^{\alpha\alpha} \tag{18}$$

10. Conclude.

3 Result and Discussion

3.1 Determination of Disability Premiums in Life Insurance with Annual Payments for Benefit Waiver of Premium Types.

This sub-chapter will discuss the calculation of the amount of disability premium in life insurance with annual payments for the type of benefit waiver of premium at the age of 20 to 64 years. As a start, the determination of the annual disability premium will be carried out at the age of 30 with a benefit of IDR 150,000,000.00 with an interest rate of 5.75% according to BI7DRR in January 2023 and estimated costs for companies including new closing costs of 50%, staff fees premium collectors in the second year are 45%, fees for premium collectors in the tenth year are 43%, fees for premium collectors in the eleventh year and so on are 40%, premium collection fees are 55%, maintenance fees are 40%, and money payment fees coverage of 50%. If the insured is 30 years old and will buy a policy for a period of 15 years and premium payments are made annually, then how much premium will be paid by the insured?

Based on the cases above, it is known that $x = 30$ years, $B = 150.000.000$, $i = 5,75\%$, $\alpha_1 = 50\%$, $\alpha_2 = 45\%$, $\alpha_3 = 43\%$, $\alpha_4 = 40\%$, $\beta = 55\%$, $\gamma = 40\%$, and $\gamma_1 = 50\%$. The premium used in the benefit waiver of premium is the gross premium. Calculation of gross premium using Equation (8) and the combined disability mortality table for the cases above are as follows:

$$\begin{aligned} \text{Gross Premium} &= \frac{(1+\gamma_1)^A \ddot{a}_{x:\overline{n}|} + \gamma \ddot{a}_{x:\overline{n}|}}{(1-\beta-\alpha_4)\ddot{a}_{x:\overline{n}|} - (\alpha_3-\alpha_4)\ddot{a}_{x:\overline{10}|} - (\alpha_2-\alpha_3)\ddot{a}_{x:\overline{2}|} - (\alpha_1-\alpha_2)} \\ &= \frac{(1 + 50\%) \left(B \times \frac{M_{30} - M_{45} + D_{45}}{D_{30}} \right) + 40\% \left(\frac{N_{30} - N_{45}}{D_{30}} \right)}{(1 - 55\% - 40\%) \left(\frac{N_{30} - N_{45}}{D_{30}} \right) - (43\% - 40\%) \left(\frac{N_{30} - N_{40}}{D_{30}} \right) - (45\% - 43\%) \left(\frac{N_{30} - N_{32}}{D_{30}} \right) - (50\% - 45\%) \left(\frac{N_{30} - N_{22}}{D_{30}} \right)} \\ &= \frac{(1,5) \left(150.000.000 \times \frac{873 - 628 + 7844}{18550} \right) + 0,4 \left(\frac{285230 - 92843}{18550} \right)}{(0,05) \left(\frac{285230 - 92843}{18550} \right) - (0,03) \left(\frac{285230 - 139704}{18550} \right) - (0,02) \left(\frac{285230 - 249154}{18550} \right) - (0,05) \left(\frac{285230 - 100000}{18550} \right)} \\ &= \frac{98.114.555,256065 + 4,1485067385}{0,5185633423 - 0,2353520216 - 0,0388959569 - 0,05} \\ &= 504.924.353,30825 \end{aligned}$$

The gross premium paid in the case above using manual calculations is IDR 504,924,353.00. The gross premium paid is a net single premium added with costs that will be used for administrative maintenance of the insured and as a source of interest income for reserve purposes.

The single net premium for the type of benefit waiver of premium based on Equation (17) and the combined disability mortality table for the case examples above are as follows:

$$P' \left[\ddot{a}_{x:\overline{n}|}^\alpha - \ddot{a}_{x:\overline{n}|}^{\alpha\alpha} - \frac{D_y^{\alpha\alpha}}{D_x^{\alpha\alpha}} \left(\ddot{a}_{y:\overline{n-y+x}|}^\alpha - \ddot{a}_{y:\overline{n-y+x}|}^{\alpha\alpha} \right) \right]$$

$$\begin{aligned}
 &= P' \left[\left(\frac{N_x - N_{x+n}}{D_x^{\alpha\alpha}} - \frac{D_x^{ii}}{D_x^{\alpha\alpha}} \frac{N_x^i - N_{x+n}^i}{D_x^i} \right) - \left(\frac{N_x^{\alpha\alpha} - N_{x+n}^{\alpha\alpha}}{D_x^{\alpha\alpha}} \right) \right. \\
 &\quad \left. - \frac{D_y^{\alpha\alpha}}{D_x^{\alpha\alpha}} - \left(\left(\frac{N_y - N_{x+n}}{D_y^{\alpha\alpha}} - \frac{D_y^{ii}}{D_y^{\alpha\alpha}} \frac{N_y^i - N_{x+n}^i}{D_y^i} \right) - \left(\frac{N_y^{\alpha\alpha} - N_{x+n}^{\alpha\alpha}}{D_y^{\alpha\alpha}} \right) \right) \right] \\
 &= 504.924.353 \left[\left(\frac{285230 - 92843}{18519} - \frac{30}{18519} \frac{236 - 66}{17} \right) - \left(\frac{282757 - 91074}{18519} \right) \right. \\
 &\quad \left. - \frac{8258}{18519} - \left(\left(\frac{101160 - 92843}{8258} - \frac{60}{8258} \frac{73 - 66}{7} \right) - \left(\frac{99331 - 91074}{8258} \right) \right) \right] \\
 &= 11.015.143,291955
 \end{aligned}$$

The net single premium that must be paid by the insured to get the benefit waiver of premium is IDR 11,015,143.00. The single net premium can be paid annually or paid annually. In this study, the insured will pay an annual premium.

Calculation of the annual premium for the type of benefit waiver of premium using Equation (18) and the combination of the disability mortality table for the example case above is as follows:

$$\begin{aligned}
 P_x^D &= P' a_{x:\overline{n-1}|}^{\left(i: \overline{y-x} \right)} \div \ddot{a}_{x:\overline{y-x}|}^{\alpha\alpha} \\
 &= 11.015.143 \div \left(\frac{N_x^{\alpha\alpha} - N_y^{\alpha\alpha}}{D_x^{\alpha\alpha}} \right) \\
 &= 11.015.143 \div \left(\frac{282757 - 99331}{18519} \right) \\
 &= 1.112.107,545405
 \end{aligned}$$

The annual premium to be paid by the insured who is 30 years old with a term of 15 years and a benefit of IDR 150,000,000.00 is IDR 1,112,108.00.

3.2 Determination of Disability Premiums in Life Insurance with Annual Payments for Benefit Waiver of Premium Types Using Excel Visual Basic for Application.

This sub-chapter will discuss the calculation of the disability premium in life insurance with annual payments for the type of benefit waiver of premium at the age of 20 years to 64 years in Excel Visual Basic for Application

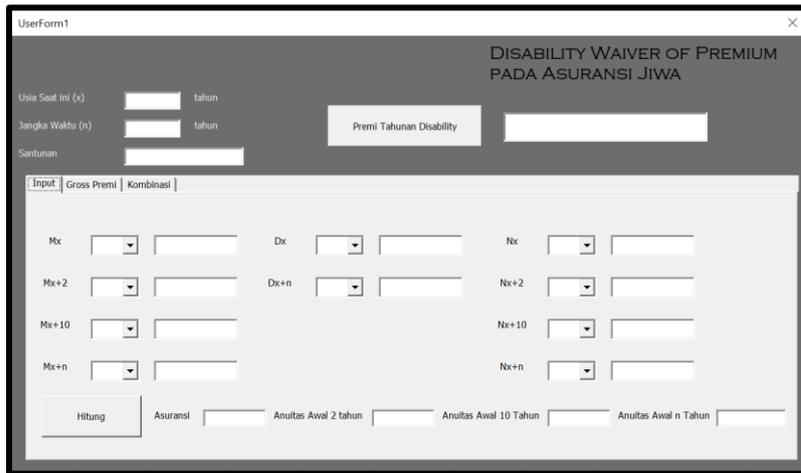


Fig. 1. Excel VBA Calculation Program

As a start, the determination of the annual disability premium will be carried out at the age of 30 with a benefit of IDR 150,000,000.00 with an interest rate of 5.75% according to BI7DRR in January 2023 and estimated costs for companies including new closing costs of 50%, staff fees premium collectors in the second year are 45%, fees for premium collectors in the tenth year are 43%, fees for premium collectors in the eleventh year and so on are 40%, premium collection fees are 55%, maintenance fees are 40%, and money payment fees coverage of 50%. If the insured is 30 years old and will buy a policy for a period of 15 years and premium payments are made annually, then how much premium will be paid by the insured?

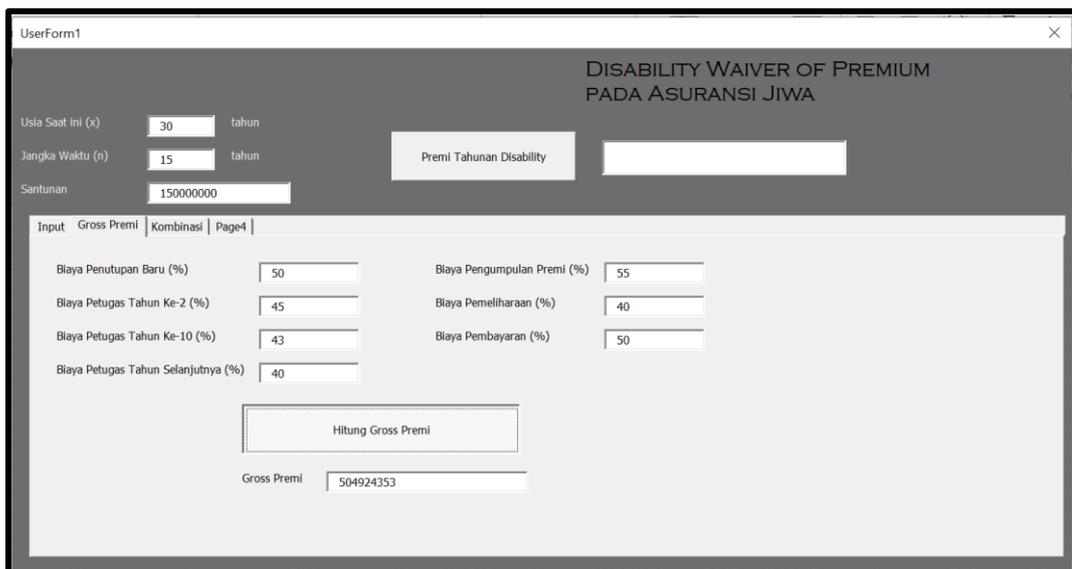


Fig. 2. Calculation of Gross Premiums

Based on the cases above, it is known that $x = 30$ years, $B = 150.000.000$, $i = 5,75\%$, $\alpha_1 = 50\%$, $\alpha_2 = 45\%$, $\alpha_3 = 43\%$, $\alpha_4 = 40\%$, $\beta = 55\%$, $\gamma = 40\%$, and $\gamma_1 = 50\%$. The premium used in the benefit waiver of premium is the gross premium. Calculation of gross premiums using Excel VBA and combined death tables due to disabilities for the cases above are as shown in Fig. 2. The gross premium paid in the above case based on Fig. 2 using Excel VBA is IDR 504,924,353.00. The annual premium for the type of benefit waiver premium using Excel VBA for the cases above are as shown in Fig. 3.

Fig. 3. Annual Waiver of Premium Calculation

Based on Fig. 3, the values listed in the combination section are derived from the combined disability mortality table. The net single premium that must be paid by the insured based on Excel VBA to get the benefit waiver of the premium is IDR 11,015,143.00. The calculation of the annual premium for the type of benefit waiver of premium that must be paid by the insured based on Excel VBA for the above case is IDR 1,112,108.00.

3.3 Calculation Validation

This sub-chapter will discuss the calculation of the amount of disability premium in life insurance with annual payments for the type of benefit waiver of premium at the age of 20 to 64 years. As a start, the determination of the annual disability premium will be carried out at the age of 30 with a benefit of IDR 150,000,000.00 with an interest rate of 5.75% according to BI7DRR in January 2023 and estimated costs for companies including new closing costs of 50%, staff fees premium collectors in the second year are 45%, fees for premium collectors in the tenth year are 43%, fees for premium collectors in the eleventh year and so on are 40%, premium collection fees are 55%, maintenance fees are 40%, and money payment fees coverage of 50%. If

the insured is 30 years old and will buy a policy for a period of 15 years and premium payments are made annually, then how much premium will be paid by the insured?

Disability premium in life insurance with an annual payment for the type of benefit waiver of premium with manual calculation for the insured who is 30 years old, term of 15 years, the BI7DRR interest rate in January 2023 is 5.75% with a benefit amount of Rp. 150,000,000.00 is in the amount of IDR 1,112,108.00. Whereas the disability premium in life insurance with annual payments for the type of benefit waiver of premium with Excel VBA for the insured who is 30 years old, term of 15 years, the BI7DRR interest rate in January 2023 is 5.75% with a benefit amount of IDR 150,000,000.00 is Rp. 1,112,108.00. From the case above, it can be seen that the calculation results for disability premiums for life insurance with annual payments for the type of benefit waiver of premium using manual calculations and Excel VBA have the same results. It can be concluded that disability premiums in life insurance with annual payments for the type of benefit waiver of premium with changing ages can be calculated using Excel VBA.

3.4 Premium Calculation with Changing Age and Term

The amount of premium at other ages will be determined by Excel VBA. Premiums calculated using Excel VBA can be made into a table of premiums for someone aged 18-25 x who has a disability over a period of $n20-12$ years. Annual premium data obtained for ages 20 to 64 years with a term of 15 years with a benefit amount of IDR 150,000,000.00 and using the BI7DRR interest rate in January 2023 of 5.75% as shown in Table 2. The data obtained based on Table 2 shows that the older the insured is, the greater the premium paid. When the insured is 50 years old, the insured cannot buy this type of insurance policy for a period of 15 years, because the combined disability mortality table only reaches the age of 64 years.

Table 2. 15-Year Annual Premium Data with Excel VBA.

x	Annual Premium (Rupiah)
20	483,114
21	556,847
22	599,348
23	671,819
24	725,516
25	766,317
26	854,660
27	912,052
28	996,673
29	1,076,596
30	1,112,108
31	1,195,006
32	1,267,425
33	1,375,020
34	1,399,418
35	1,445,896
36	1,805,553
37	1,830,162
38	1,864,490

Table 3. (continued).

x	Annual Premium (Rupiah)
39	2,417,505
40	2,403,405
44	3,902,151
48	6,007,400
49	9,185,774
50	0
51	0
52	0
53	0
54	0
55	0
56	0
57	0
58	0
59	0
60	0
61	0
62	0
63	0
64	0

Annual premium data obtained for ages 20 to 64 years with a term of 20 years with a benefit amount of IDR 150,000,000.00 and using the BI7DRR interest rate in January 2023 of 5.75% as shown in Table 3.

Table 4. Annual Premium Data for 20 Years with Excel VBA.

x	Annual Premium (Rupiah)
20	359,761
21	406,082
22	442,107
23	484,735
24	516,414
25	557,708
26	607,929
27	650,840
28	718,713
29	762,859
30	785,379
31	884,265
30	785,379
31	884,265
32	923,660
33	965,790

Table 3. (continued).

x	Annual Premium (Rupiah)
34	1,098,774
35	1,144,987
36	1,319,357
37	1,377,440
38	1,641,116
39	1,811,295
40	1,967,129
41	2,158,311
42	2,531,129
43	2,631,008
44	3,704,190
45	0
46	0
47	0
48	0
49	0
50	0
51	0
52	0
53	0
54	0
55	0
56	0
57	0
58	0
59	0
60	0
61	0
62	0
63	0
64	0

The data obtained based on Table 3 shows that the older the insured is, the greater the premium paid. When the insured is 45 years old, the insured cannot buy this type of insurance policy for a period of 20 years, because the combined disability mortality table only reaches the age of 64 years.

Data from Table 3 and Table 2 can be graphed to obtain an increase in annual premiums paid at age 20 to 64 years using the BI7DRR interest rate for January 2023 of 5.75% with tenors of 15 years and 20 years as shown in Fig. 4.

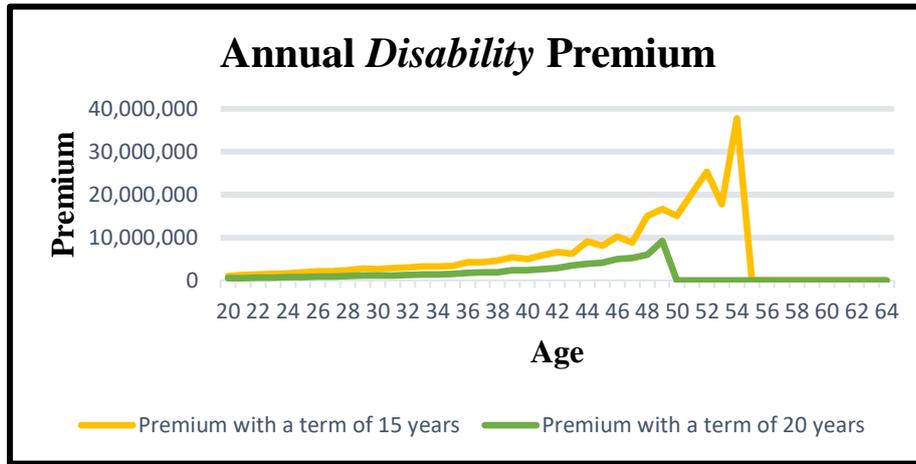


Fig. 4. Annual Disability Premium Graph

Based on Fig. 4 it can be generalized that the older the insured is, the greater the premium paid. This is because the older the insured is based on the combined disability mortality table, the greater the chance of the insured experiencing disability.

Based on Table 2, the maximum age for the insured to purchase a disability life insurance policy is at the age of 49 and benefits will be given at the age of 64. Whereas in Table 3, the maximum age the insured can buy a disability life insurance policy is at the age of 44 years and benefits will be given at the age of 64 years. It can be seen from both tables, that the premium paid will be smaller if the policy period is extended. This is because at the age of 49 to 64 years, the chance of the insured experiencing disability based on the combination of the disability mortality table will be even greater, while at the age of 44 to 64 years, the chance of the insured experiencing disability based on the combination of the disability mortality table will be smaller.

4 Conclusion

Based on the discussion in the previous chapter, it can be concluded that:

1. The results of manual premium calculations and Excel Visual Basic for Application for the type of benefit waiver of premium with annual premium payments for the insured who is 30 years old with a payment period of 15 years and the amount of benefit to be obtained is IDR 150,000,000.00 is IDR 1.112,108.00.
2. The calculation of the annual premium can be generalized that the older the insured is, the greater the premium paid. Meanwhile, the longer the term of the policy, the smaller the premium paid.

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