

APPENDIX B: HAUSMAN TEST ANALYSIS

ROA MODEL FOR FAMILY TAKAFUL

. hausman fixed random

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
cr	-.1346325	-.1466005	.011968	.0178918
vaic	-.0028462	-.0007121	-.002134	.0011243
rbc	-.0110918	-.0076571	-.0034348	.0026353

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(3) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 4.32 \\ \text{Prob}>\text{chi2} &= 0.2291 \end{aligned}$$

ROE MODEL FOR FAMILY TAKAFUL

. hausman fixed random

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
cr	-.1492436	-.1749078	.0256642	.0304848
vaic	-.002927	.0002782	-.0032052	.0018603
rbc	-.0192916	-.0138778	-.0054139	.0044436

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(3) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 3.54 \\ \text{Prob}>\text{chi2} &= 0.3158 \end{aligned}$$

ROA MODEL FOR GENERAL TAKAFUL

. hausman fixed random, sigmamore

Note: the rank of the differenced variance matrix (2) does not equal the number of coefficients being tested (3); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
cr	.1295511	.1502075	-.0206564	.1474851
vaic	-.0002053	-.0004208	.0002155	.0000933
rbc	-.0005036	.0261293	-.0266329	.0101772

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

ROE MODEL FOR GENERAL TAKAFUL

. hausman fixed random, sigmamore

Note: the rank of the differenced variance matrix (2) does not equal the number of coefficients being tested (3); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
cr	.0098449	.2256271	-.2157822	.2408352
vaic	-.0002999	-.0007048	.0004049	.0001523
rbc	.0075231	.0447184	-.0371953	.0166188

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

**APPENDIX C: BREUSCH-PAGAN LAGRANGE MULTIPLIER TEST
ANALYSIS**

ROA MODEL FOR FAMILY TAKAFUL

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{roa}[\text{company},t] = Xb + u[\text{company}] + e[\text{company},t]$$

Estimated results:

	Var	sd = sqrt(Var)
roa	.010057	.1002848
e	.0023371	.0483433
u	.0084704	.0920348

Test: $\text{Var}(u) = 0$

$\text{chibar2}(01) = 45.80$
 $\text{Prob} > \text{chibar2} = 0.0000$

ROE MODEL FOR FAMILY TAKAFUL

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{roe}[\text{company},t] = Xb + u[\text{company}] + e[\text{company},t]$$

Estimated results:

	Var	sd = sqrt(Var)
roe	.0273938	.1655106
e	.0062685	.0791737
u	.0233955	.1529558

Test: $\text{Var}(u) = 0$

$\text{chibar2}(01) = 47.84$
 $\text{Prob} > \text{chibar2} = 0.0000$

ROA MODEL FOR GENERAL TAKAFUL

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{roa}[\text{company},t] = Xb + u[\text{company}] + e[\text{company},t]$$

Estimated results:

	Var	sd = sqrt(Var)
roa	.0062906	.079313
e	.002066	.0454533
u	0	0

Test: $\text{Var}(u) = 0$

$\text{chibar2}(01) = 0.00$
 $\text{Prob} > \text{chibar2} = 1.0000$

ROE MODEL FOR GENERAL TAKAFUL

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{roe}[\text{company},t] = Xb + u[\text{company}] + e[\text{company},t]$$

Estimated results:

	Var	sd = sqrt(Var)
roe	.0168892	.1299585
e	.0055172	.0742781
u	0	0

Test: $\text{Var}(u) = 0$

$\text{chibar2}(01) = 0.00$
 $\text{Prob} > \text{chibar2} = 1.0000$

APPENDIX D: CROSS-SECTIONAL DEPENDENCE TEST ANALYSIS

ROA MODEL FOR FAMILY TAKAFUL

. xtcsd, pesaran abs

Pesaran's test of cross sectional independence = 2.633, Pr = 0.0085

Average absolute value of the off-diagonal elements = 0.505

ROE MODEL FOR FAMILY TAKAFUL

. xtcsd, pesaran abs

Pesaran's test of cross sectional independence = 1.783, Pr = 0.0746

Average absolute value of the off-diagonal elements = 0.467

ROA MODEL FOR GENERAL TAKAFUL

. xtcsd, pesaran abs

Pesaran's test of cross sectional independence = 0.896, Pr = 0.3700

Average absolute value of the off-diagonal elements = 0.249

ROE MODEL FOR GENERAL TAKAFUL

. xtcsd, pesaran abs

Pesaran's test of cross sectional independence = 0.893, Pr = 0.3721

Average absolute value of the off-diagonal elements = 0.405

APPENDIX E: HETEROSKEDASTICITY ANALYSIS

ROA MODEL FOR FAMILY TAKAFUL

```
. quietly reg roa cr vaic rbc
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of roa

chi2(1)      =      1.12
Prob > chi2  =    0.2906
```

ROE MODEL FOR FAMILY TAKAFUL

```
. quietly reg roe cr vaic rbc
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of roe

chi2(1)      =      0.62
Prob > chi2  =    0.4311
```

ROA MODEL FOR GENERAL TAKAFUL

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (3) =      814.71
Prob>chi2 =    0.0000
```

ROE MODEL FOR GENERAL TAKAFUL

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (3) =      996.86
Prob>chi2 =    0.0000
```

APPENDIX F: AUTOCORRELATION ANALYSIS

ROA MODEL FOR FAMILY TAKAFUL

. xtserial roa cr vaic rbc

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 10) = 0.267

Prob > F = 0.6169

ROE MODEL FOR FAMILY TAKAFUL

. xtserial roe cr vaic rbc

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 10) = 0.086

Prob > F = 0.7752

ROA MODEL FOR GENERAL TAKAFUL

. xtserial roa cr vaic rbc

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 2) = 86.404

Prob > F = 0.0114

ROE MODEL FOR GENERAL TAKAFUL

. xtserial roe cr vaic rbc

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 2) = 8.166

Prob > F = 0.1037

APPENDIX G: NORMALITY TEST ANALYSIS

ROA MODEL FOR FAMILY TAKAFUL

. sktest cr vaic rbc

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint	
				adj chi2(2)	Prob>chi2
cr	15	0.2284	0.7053	1.81	0.4038
vaic	15	0.0003	0.0068	14.59	0.0007
rbc	15	0.0270	0.2193	5.94	0.0514

ROE MODEL FOR FAMILY TAKAFUL

. sktest cr vaic rbc

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint	
				adj chi2(2)	Prob>chi2
cr	15	0.2284	0.7053	1.81	0.4038
vaic	15	0.0003	0.0068	14.59	0.0007
rbc	15	0.0270	0.2193	5.94	0.0514

ROA MODEL FOR GENERAL TAKAFUL

. swilk cr vaic rbc

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
cr	15	0.92365	1.480	0.776	0.21888
vaic	15	0.44098	10.839	4.713	0.00000
rbc	15	0.85892	2.735	1.990	0.02329

ROE MODEL FOR GENERAL TAKAFUL

. swilk cr vaic rbc

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
cr	15	0.92365	1.480	0.776	0.21888
vaic	15	0.44098	10.839	4.713	0.00000
rbc	15	0.85892	2.735	1.990	0.02329

APPENDIX H: PANEL CORRECTED STANDARD ERRORS MODEL

ROA MODEL FOR FAMILY TAKAFUL

```
. xtpcse roa cr vaic rbc
```

Linear regression, correlated panels corrected standard errors (PCSEs)

```

Group variable:  company          Number of obs   =    55
Time variable:  year             Number of groups =    11
Panels:         correlated (balanced)  Obs per group:
Autocorrelation: no autocorrelation    min =           5
                                           avg =           5
                                           max =           5

Estimated covariances =           66      R-squared       =    0.1799
Estimated autocorrelations =           0      Wald chi2(3)    =    27.47
Estimated coefficients =           4        Prob > chi2     =    0.0000

```

roa	Panel-corrected		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
cr	-.1574275	.0351722	-4.48	0.000	-.2263637	-.0884913
vaic	.0051074	.0013804	3.70	0.000	.0024019	.0078129
rbc	.0031648	.0047937	0.66	0.509	-.0062308	.0125603
_cons	.088038	.0246372	3.57	0.000	.0397501	.136326

ROE MODEL FOR FAMILY TAKAFUL

```
. xtpcse roe cr vaic rbc
```

Linear regression, correlated panels corrected standard errors (PCSEs)

```

Group variable:  company          Number of obs   =    55
Time variable:  year             Number of groups =    11
Panels:         correlated (balanced)  Obs per group:
Autocorrelation: no autocorrelation    min =           5
                                           avg =           5
                                           max =           5

Estimated covariances =           66      R-squared       =    0.1858
Estimated autocorrelations =           0      Wald chi2(3)    =    34.53
Estimated coefficients =           4        Prob > chi2     =    0.0000

```

roe	Panel-corrected		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
cr	-.243549	.0519349	-4.69	0.000	-.3453396	-.1417584
vaic	.0090526	.0021044	4.30	0.000	.004928	.0131771
rbc	.0051022	.0079246	0.64	0.520	-.0104299	.0206342
_cons	.1398279	.0370561	3.77	0.000	.0671994	.2124565

APPENDIX I: GENERALIZED LEAST SQUARES MODEL

ROA MODEL FOR GENERAL TAKAFUL

```
. xtglm roa cr vaic rbc
```

Cross-sectional time-series FGLS regression

Coefficients: **generalized least squares**
Panels: **homoskedastic**
Correlation: **no autocorrelation**

Estimated covariances	=	1	Number of obs	=	15
Estimated autocorrelations	=	0	Number of groups	=	3
Estimated coefficients	=	4	Time periods	=	5
Log likelihood	=	19.37002	Wald chi2(3)	=	4.90
			Prob > chi2	=	0.1790

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
cr	.1502075	.160172	0.94	0.348	-.1637237	.4641388
vaic	-.0004208	.0002697	-1.56	0.119	-.0009495	.0001079
rbc	.0261293	.0138273	1.89	0.059	-.0009718	.0532303
_cons	.1121946	.0866478	1.29	0.195	-.057632	.2820212

ROE MODEL FOR GENERAL TAKAFUL

```
. xtglm roe cr vaic rbc
```

Cross-sectional time-series FGLS regression

Coefficients: **generalized least squares**
Panels: **homoskedastic**
Correlation: **no autocorrelation**

Estimated covariances	=	1	Number of obs	=	15
Estimated autocorrelations	=	0	Number of groups	=	3
Estimated coefficients	=	4	Time periods	=	5
Log likelihood	=	12.01424	Wald chi2(3)	=	5.04
			Prob > chi2	=	0.1689

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
cr	.2256271	.2615521	0.86	0.388	-.2870056	.7382597
vaic	-.0007048	.0004405	-1.60	0.110	-.0015682	.0001585
rbc	.0447184	.0225793	1.98	0.048	.0004638	.088973
_cons	.1576617	.1414912	1.11	0.265	-.1196559	.4349792

APPENDIX J: SUMMARIZED VAIC VALUES

Year	Company	VAIC	
		Family Takaful	General Takaful
2015	AIA	0.4450	
	AmMet Life	0.6968	
	Etiqa	16.1531	253.8667
	FWD	1.3360	
	Great Eastern	0.8629	
	Hong Leong MSIG	1.3166	1.5896
	Prudential BSN	8.3469	-1.7461
	Sun Life	5.3658	
	Syarikat Takaful Malaysia Berhad	0.9253	0.5301
	Takaful Ikhlas	2.2588	4.3176
	Zurich Takaful	-1.4194	1.2681
2016	AIA	0.0891	
	AmMet Life	0.8680	
	Etiqa	20.2685	327.2944
	FWD	1.3923	
	Great Eastern	0.6462	
	Hong Leong MSIG	-0.2453	-0.2738
	Prudential BSN	5.5157	1.8569
	Sun Life	4.8937	
	Syarikat Takaful Malaysia Berhad	0.9416	0.4158
	Takaful Ikhlas	-0.5288	3.2697
	Zurich Takaful	1.9221	1.5831
2017	AIA	8.0614	
	AmMet Life	0.6502	
	Etiqa	18.2108	-0.4770
	FWD	1.9263	
	Great Eastern	1.1900	
	Hong Leong MSIG	-0.0689	-0.0393
	Prudential BSN	14.7487	-2.1231
	Sun Life	5.6463	
	Syarikat Takaful Malaysia Berhad	1.8829	0.4985
	Takaful Ikhlas	0.5289	2.7659
	Zurich Takaful	-0.2942	1.4170
2018	AIA	2.0718	
	AmMet Life	1.3748	
	Etiqa	26.5394	1.0957
	FWD	1.2210	
	Great Eastern	1.3557	
	Hong Leong MSIG	0.2445	0.2300
	Prudential BSN	4.1861	-1.2723
	Sun Life	5.8064	
	Syarikat Takaful Malaysia Berhad	2.1945	2.5767
	Takaful Ikhlas	3.8119	2.4261
	Zurich Takaful	-7.6305	-0.1945
2019	AIA	-1.1447	
	AmMet Life	1.3074	
	Etiqa	22.4531	0.8382
	FWD	14.3487	
	Great Eastern	1.5823	
	Hong Leong MSIG	1.7665	1.3810
	Prudential BSN	12.1292	-1.1883
	Sun Life	4.2177	
	Syarikat Takaful Malaysia Berhad	4.6910	1.7592
	Takaful Ikhlas	2.6901	4.0849
	Zurich Takaful	0.0532	2.7819

APPENDIX K: APPENDIX II IN BNM'S TAKAFUL FRAMEWORK

APPENDIX II (a) Illustration on Capital Computation for a licensed takaful operator with Derivatives Position

1. Position in equity derivatives

Assume a licensed takaful operator holds the following in its portfolio:

- Shares in X of RM100 mil, Y of RM100 mil, Z of RM200 mil

The licensed takaful operator entered into the following transaction to hedge its equity risk:

- Long Z put option with equivalent market value of RM200 mil (option delta = -0.7)
- Short, say, appropriate Shariah-compliant futures/forward with market value of RM200 mil,

Assume that it can be demonstrated that the positions in X and Y are effectively hedged by appropriate Shariah-compliant futures/forward

A licensed takaful operator will be subject to the following risk charge:

- X and Y exposures are carved out from the equity risk capital computation
- Capital exposure to Z = $[200 - (200 \times 1 - 0.7)] \times 20\% = \text{RM}12 \text{ mil}$

Therefore, total equity capital charge = RM12 mil

2. Portfolios of profit rate exposures (including derivatives)

Assume a licensed takaful operator holds the following in its portfolio:

- An Islamic private debt securities (IPDS), with market value of RM20 mil, residual maturity 8 years;
- A Government Islamic Instruments (GII), market value RM75 mil, residual maturity 2 months;
- A profit rate swap, RM150 mil under which the licensed takaful operator receives floating rate and pays fixed. The next profit fixing occurs after 9 months and residual life of the swap is 8 years; and
- A long position in GII futures of RM60 mil, maturing in 6 months' time with underlying government security of 4 years.

APPENDIX L: APPENDIX IV IN BNM'S TAKAFUL FRAMEWORK

APPENDIX IV Risk Charges for Liabilities of General Takaful Business

1. The following risk charges shall be applied in the computation of general takaful liabilities risk capital charges:

Class	Risk charge applicable for -	
	Claims liabilities	URR @ 75% confidence level
1. Aviation	30%	45%
2. Bonds	20%	30%
3. Cargo	25%	37.5%
4. Contractor's All Risks & Engineering	25%	37.5%
5. Fire	20%	30%
6. Liabilities	30%	45%
7. Marine Hull	30%	45%
8. Medical and Health	25%	37.5%
9. Motor "Act"	25%	37.5%
10. Motor "Others"	20%	30%
11. Offshore Oil & Gas related	20%	30%
12. Personal Accident	20%	30%
13. Workmen's Compensation & Employer's Liability	25%	37.5%
14. Others	20%	30%

APPENDIX M: APPENDIX V IN BNM'S TAKAFUL FRAMEWORK

APPENDIX V Stress Factors for Liabilities of Family Takaful Business

- The following stress factors shall be applied in the computation of family takaful liabilities risk capital charges (FCC) and shareholders' fund expense liabilities risk capital charges (ECC) for family takaful business, as appropriate:

Valuation Parameters	Stress Factors
(a) Mortality (non-annuity)	
(i) guaranteed tabarru'	±40% of best estimate rates
(ii) non-guaranteed tabarru'	±20% of best estimate rates
(b) Mortality (annuity)	Rates used in valuation with 5-year setback
Total and Permanent Disability	
(i) guaranteed tabarru'	±45% of best estimate rates
(ii) non-guaranteed tabarru'	±22.5% of best estimate rates
Critical Illness	
(i) guaranteed tabarru'	±45% of best estimate rates
(ii) non-guaranteed tabarru'	±22.5% of best estimate rates
Renewal Expense	±20% of best estimate rates
Persistency	±50% of best estimate rates

Note: Guaranteed here indicates guaranteed for 3 years or more

- In computing each FCC and ECC, the Appointed Actuary is required to determine and declare, for each product separately, whether it is decrement-supported (e.g. lapse-supported, mortality-supported, etc), and to use the appropriate direction of stress factors accordingly. The selected direction of stress shall be the one that produces the higher liability value in each risk factor, to prevent any instances of negative FCC and ECC. The basis of selecting the stress factors for each product and each fund shall be described in the accompanying actuarial report.
- The value of V^* shall be computed for each certificate by stressing all risk factors simultaneously in the direction selected for that product.

APPENDIX N: VALUATION LIABILITIES FOR FAMILY TAKAFUL

8. Valuation Assumptions

- 8.1 The Appointed Actuary shall consider appropriate and reasonable assumptions to be used in conducting the valuation of family takaful fund liabilities and the shareholders' fund expense liabilities, accordingly. He shall conduct comparative/experience analysis or other studies as appropriate, to justify the assumptions used.
- 8.2 The assumptions, based on but not limited to the following sections A - E, shall be considered such that the value of liabilities determined commensurate the features of the takaful certificates.

A. Discount Rates

- 8.3 The risk-free discount rate shall be used to discount all cash flows to determine the liabilities of family takaful business.
- 8.4 The risk-free discount rate shall be derived from a yield curve, as follows:
- (a) for durations of less than 15 years : zero-coupon spot yield of GII with matching duration; and
 - (b) for durations of 15 years or more : zero-coupon spot yield of GII with 15 years term to maturity,
- 8.5 The GII zero-coupon spot yields shall be obtained from a recognised bond pricing agency in Malaysia, or any other source as may be specified by the Bank. Where yields at certain durations are not available, these yields shall be appropriately interpolated from the observable data.

B. Expenses

- 8.6 For liabilities of family takaful fund, expected future expenses payable from the takaful funds shall be included as the expense assumptions in the valuation. For expense liabilities of the shareholders' fund, management expenses and any other expected future expenses payable from the shareholders' fund in managing the takaful fund shall be included in the valuation.
- 8.7 The expense assumptions shall be derived based on the following:
- (a) Distribution expenses shall be based on the actual costs to be incurred; and
 - (b) Expenses payable from the takaful fund and management expenses payable for the shareholders' fund shall be based on recent expense analysis with due regard to likely improvement or deterioration of experience in the future.
- 8.8 Suitable expense inflation, estimates of future wage and price inflation derived from historical data and other available information shall be factored in as appropriate and recognised in the valuation of family takaful liabilities and expense liabilities, accordingly.

C. Mortality and Morbidity

- 8.9 The mortality and morbidity assumptions shall be based on rates that are appropriate with the person whose life or health is placed under takaful coverage as well as the takaful operator's experience in providing such cover. Appropriate industry data may be used with due regard to credibility, availability and reliability of such information if the takaful operator's actual

- 8.10 Where appropriate, any mortality or morbidity improvement and deterioration shall be explicitly considered in the valuation.

D. Persistency

- 8.11 The persistency rates shall be reflective of actual trends with due regard to changing business practices and market conditions.
- 8.12 Participants' behaviour due to specific features of the product or market condition shall be taken into consideration explicitly when determining the appropriate persistency assumption. This includes the possibility of anti-selection by participants and variations in persistency experience for different cohorts of participants.

E. Growth Rate of PIF

- 8.13 Where an inflow to be considered in valuing the liabilities of family takaful business is dependent on the growth of the PIF, the fund growth rate assumption shall be adjusted accordingly to meet the requirement for PRAD in section 9.

9. PRAD

- 9.1 The PRAD for the liabilities of takaful business shall be determined by adjusting significant valuation assumptions coherently, without necessarily setting all parameters to be at 75% confidence level. However, the overall value of liabilities of family takaful fund and expense liabilities of shareholders' fund shall secure 75% sufficiency, respectively.
- 9.2 For the valuation of family takaful fund liabilities, the 75% confidence level shall be secured with respect to each PRF accordingly. Where a takaful operator segregates the PRF into further sub-funds other than that required in prevailing guidelines and manages these sub-funds separately, the Appointed

Actuary shall ensure 75% sufficiency of the liabilities of these sub-funds individually.

- 9.3 To achieve the 75% sufficiency, the Appointed Actuary shall consider adjusting the valuation assumptions for liabilities of the PRF and shareholders' fund in a consistent manner and such adjustment shall be made for several scenarios (e.g. higher mortality assume in PRF shall be accordingly assume in shareholders' fund for a particular scenario). Based on the results of the valuation made under these scenarios, the Appointed Actuary shall select the scenarios that result in the highest provision for the PRF and shareholders' fund individually as the value of liabilities.

10. Retakaful

- 10.1 The liabilities of the family takaful business shall be valued on gross basis, and deducting retakaful⁷ cessions only if:
- the retakaful arrangement achieve effective risk mitigation;
 - there is no obligation on the part of the ceding fund to repay any amount, other than the refund of deposit referred to below in (d), to the retakaful operator in the event a certificate lapses or the retakaful contract is cancelled;
 - the valuation of liability placed under retakaful coverage is made in accordance to paragraph 6.1 above; and
 - there is a deposit held from retakaful operator other than a retakaful operator registered under the Takaful Act 1984 (the Act) or a qualifying retakaful operator, as security for the said retakaful operator's due performance of its obligations under the retakaful contract, subject to the condition that any release of deposit shall not exceed the reduction of liability of the retakaful operator.

10.2 For the purpose of paragraph 10.1(d), a qualifying retakaful operator refers to a (re)takaful operator⁸ which is licensed under the Labuan Islamic Financial Services and Securities Act 2010⁹ and satisfies either of the following conditions:

- (a) the (re)takaful operator carries a financial strength rating of category three¹⁰ or better; or
- (b) i) the (re)takaful operator has obtained an explicit and irrevocable guarantee¹¹ from its parent company (or head office¹²) to provide full support to the (re)takaful operator in the event of financial difficulties; and
 - ii) its parent company (or head office) is registered under the Act or carries a financial strength rating of category three¹⁰ or better. For the purpose of meeting the rating requirement in the event that the parent company (or head office) does not have its own financial strength rating, the rating of subordinated debt issued by the parent company (or head office) that is rated with rating of category three¹⁰ or better may be accepted. Where there are a number of ratings available, the following principles shall be applied:
 - a) Where two ratings are available, the lower is to be applied; or
 - b) Where three or more ratings are available, the lower of the two highest ratings is to be applied.

10.3 If only conditions stipulated in paragraphs 10.1(a), (c) and (d) are met, a deduction for retakaful may be made only to the extent of the net amount determined by deducting the amount repayable on the cancellation of the contract on the valuation date from the valuation of the credit for retakaful.

10.4 Where the retakaful is ceded to (re)takaful operators other than those registered under the Act or qualifying retakaful operators, the amount of deduction which can be made under paragraphs 10.1 and 10.3 above shall not exceed the amount of deposit held, where required on the date of valuation in respect of the corresponding retakaful.

11. Business Outside Malaysia

11.1 The valuation of liabilities in respect of family takaful certificates for business outside Malaysia shall be conducted on a basis:

- (a) not less stringent than the basis required by the laws of the country in which the certificate is issued; and
- (b) not less stringent than the basis prescribed in this Guidelines.

In the absence of any basis specified by the laws of that country, the certificates shall be valued in accordance to this Guidelines.

12. Foreign Currency-Denominated Certificates

12.1 Foreign currency-denominated certificates shall be valued as per the requirements stipulated in this Guidelines and converted into Ringgit currency using the spot currency conversion rate as at the valuation date. The method for determining the spot conversion rate should be consistently used.

12.2 In determining the discount rate assumptions, the GII as referred to in Paragraph 8.4 shall be replaced by an appropriate risk-free security that is consistent with the currency the certificate is denominated in, such as government securities of the relevant country.

13. Actuarial Valuation Report

- 13.1 The Appointed Actuary shall prepare a report on the valuation of liabilities of family takaful business referred to as "The Report on Valuation of Liabilities of Family Takaful Business" (the Report), including the Reporting Forms for Valuation of Liabilities of Family Takaful Business (Reporting Forms). The Appointed Actuary shall disclose the extent of compliance with the requirements of this Guidelines and reasons for non-compliance, if any. The general format of the Report, outlining the minimum information required to be included and the guidance notes for submission of the Reporting Forms are set out in **Appendices II** and **III**, respectively. The softcopy of the Reporting Forms to be completed is available via the Regulatory Handbook (refer to Attachment I).
- 13.2 The Board shall provide effective oversight to ensure adequate controls are in place for the valuation process. The Board shall also ensure proper actions and timely follow ups are undertaken based on these results.

A. Presentation of the Valuation

- 13.3 The Appointed Actuary shall provide relevant supporting documents, worksheets and other information, with sufficient details on his estimations of the value of liabilities of family takaful business as appendices to the Report, such that any other suitably experienced actuary may verify the results independently.

B. Certification of the Valuation

- 13.4 The Report shall be signed by the Appointed Actuary and the CEO or his authorised signatory.
- 13.5 The Appointed Actuary shall state in the Report, his name and professional qualifications.

C. Reporting to the Bank

- 13.6 Takaful operators are required to submit the Report, including the hardcopy of the Reporting Forms to Pengarah, Jabatan Perkhidmatan Statistik within 3 months from the financial year end together with the annual audited financial statements or on other such date as may be requested by the Bank.
- 13.7 The softcopy of the Reporting Forms shall be zipped, password protected and submitted to takafulval@bnm.gov.my. Takaful operators are expected to provide the password(s) of the file(s) via a separate email to this email address. For softcopy submission, takaful operators shall be guided by the requirements as stipulated in paragraph 7 of Appendix III(a).