



**Embedded Value Review**  
Embedded Value as at 31 December 2016

BANGKOK LIFE ASSURANCE PUBLIC COMPANY LIMITED



## Independent Actuaries' Report

The following is the text of a report prepared by EY for the purpose of incorporation into this circular, in connection with the components of the embedded value of Bangkok Life as at 31 December 2016.

31 March 2017

The Directors  
Bangkok Life Assurance Public Company Limited  
23/115-121 Royal City Avenue, Rama 9 Road  
Huaykwang, Bangkok 10310  
THAILAND

Dear Sirs

## Independent Actuaries' Report

### 1. Introduction

Ernst & Young Advisory Pte. Ltd. ("EY" or "we"), based in Singapore, was engaged by Bangkok Life Assurance Public Company Limited ("BLA", "the company" or "Bangkok Life") to review the calculation of embedded value ("EV") and value of one year's new business ("VNB") results as at 31 December 2016.

This report sets out the scope of the work that we have performed and summarises the results of our work. The reader's attention is drawn to Section 8 which sets out the reliances and limitations relating to this report. This report has been prepared solely for the directors of Bangkok Life and cannot be relied on by any other third party.

## 2. Scope of work

The scope of our work set out in detail in our engagement letter can be summarised as:

- ▶ Review the EV and VNB methodology adopted by BLA
- ▶ Review the EV and VNB assumptions chosen by BLA, covering
  - ▶ Economic assumptions
  - ▶ Non-economic assumptions (including expense assumptions)
- ▶ Review the EV and VNB valuation results, covering
  - ▶ High level review of the actuarial models
  - ▶ EV and VNB results and sensitivities
  - ▶ EV analysis of change

## 3. Valuation methodology

Bangkok Life has adopted a traditional deterministic discounted cash flow methodology to determine the components of EV. This methodology makes implicit allowance for the time value cost of options and guarantees and other risks associated with the realisation of the expected future distributable earnings through the use of a risk adjusted discount rate. This is consistent with the generally accepted traditional embedded value principles. It is a common methodology used by life insurance companies in Asia at the current time.

The EV of BLA has been determined as the sum of:

- ▶ Net assets attributable to the shareholders after any net of tax adjustment to market value (adjusted net asset value); and,
- ▶ Value of in-force business allowing for the release of capital associated with existing business.

**Net asset value ("NAV")** of Bangkok Life is defined as the value of assets less policy liabilities. Adjustments are made to derive the adjusted net asset value, mainly to reflect the market value of any assets that are not reported at market value under the OIC regulations and the taxation of any unrealized gains.

**The value of in-force business ("VIF")** has been calculated as the present value of expected future after-tax distributable earnings for existing business discounted back to the valuation date using a traditional deterministic cash flow discount methodology. Distributable earnings are those profits arising after allowance for policy liabilities after cost of capital.

Similarly, the **value of one year's new business ("VNB")** has been calculated as the present value of expected future after-tax distributable earnings for one year's new business discounted back to the point of sale using a traditional deterministic cash flow discounting methodology.

In determining the value of in-force business of BLA, the policy databases underlying the life insurance business of BLA as at 31 December 2016 were used. New business volumes and mix have been based on the actual business written by BLA in the 12 months to 31 December 2016.

With respect to the review of valuation methodology, there are three changes illustrated below in methodology this year. After review, we find the changes in methodology this year to be reasonable.

- ▶ Projected asset cash flows up to year 100 are considered in interest rate risk charge calculation, resulting in the increase in EV and VNB approximately THB 27m and THB 2m respectively.
- ▶ Whilst VIF for Group Employee products was fully released last year, its VIF methodology is changed to net profit after tax based on unearned premium basis this year. The change results in the increase in EV approximately THB 13m.
- ▶ For VNB calculation, VNB for Group Employee products was calculated from total inforce policies last year. To be more accurate, BLA calculates its VNB based on new policies this year. The effect of data change leads to the decrease in VNB amount around THB 2m.

#### **4. Valuation assumptions**

During our review of the assumptions underlying the calculation of EV and VNB as at 31 December 2016, consideration was given to the experience analyses produced by BLA and whether the assumptions used represent a prudent best estimate of BLA's future experience.

Non-economic assumptions were checked for their consistency with the latest experience studies, and where appropriate, benchmarked against industry experience for reasonableness. Economic assumptions were also reviewed and benchmarked against the Thailand market.

The principal bases and assumptions used in the calculations are summarised below. These assumptions have been made on a "going concern" basis, assuming that the current economic and legal environment continues in Thailand.

##### ***Risk Discount Rate***

The risk discount rate represents a rate of return commensurate with the risks associated with the realisation of future distributable earnings. The discount rates appropriate to an investor will depend on objective and subjective considerations including their own requirements, tax position and perception of risks associated with the realisation of future profits.

BLA's RDR assumption is currently determined by the Investment Department and approved by senior management of the Company. The RDR remains at 9% this year. The rate is calculated using the CAPM model by assuming a 10% market return and a risk free rate of 2.6% according to current 10 year government bond yield. We have benchmarked BLA's RDR assumption with those adopted by other life insurance companies in the market. We note that the RDR adopted by BLA is within the range we observe in the market.

The EV and VNB results have also been illustrated on scenarios with risk discount rates of 8% and 10%. The selection of the risk discount rate depends upon a number of objective and subjective factors and the illustrated range is provided to assess the sensitivity of value to changes in the risk discount rate. The range given should not be interpreted to imply an upper or lower bound.

##### ***Investment Return***

For YE2016, BLA set the investment return assumption to remain at 4.25% mainly due to the change in asset allocation and a recent higher government bond yields. Investment returns were derived by

considering current and expected future asset allocations and associated investment returns for a range of major asset classes.

### ***Inflation***

Future inflation rate was assumed to be 2.0% per annum. This is in line with the forecast published by the Bank of Thailand in September 2016. However, when comparing with the ranges of inflation rate set by the other life insurance firms in Thailand, BLA has adopted a relatively low rate of inflation.

### ***Mortality***

The assumption for mortality rates was derived by taking into consideration BLA's mortality experience during 2014, 2015 and 2016. The mortality assumptions adopted have been based on the 2008 Thai Mortality Table for both male and female lives. The mortality assumptions vary by product type and gender.

### ***Persistency***

Persistency includes assumptions for policy lapse and surrender. The persistency assumptions adopted were determined based on a lapse study conducted by BLA based on the company's historical experience during 2013, 2014 and 2015. Persistency assumptions vary by sales channel, product type, premium payment mode and policy duration.

### ***Loss Ratios***

The loss ratios used to project claims in respect of the short-term business were derived with regards to BLA's recent experience. BLA sets its assumptions based on a weighted average of the last three years' experience.

### ***Operating Expenses***

Operating expenses were allowed for based on the most recent expense analysis performed by BLA. Its analysis allocated expenses to the various product lines written by the company and then attributed between acquisition expenses and maintenance expenses.

Based on this analysis, the expenses assumptions were determined for acquisition and maintenance activities, split by product type, and unit costs expressed as an amount per policy and a % of premium.

Expense assumptions have been updated in line with BLA's most recent expense experience. No maintenance expense overrun has been observed in the analysis based on the expense assumption and three years of BLA's new business plan and budget plan.

### ***Commission and Other Variable Costs***

Commission and other variable cost assumptions were based on the levels currently being paid. These were assumed to continue into the future without change.

### ***Taxation***

As per Thai's Revenue Amendment Act (No.42) 2016, tax rate is 20%. However, a tax rate of 17% for investment asset is advised by BLA since dividend from equity and property fund could be exempted from corporate income tax payment. We noted that 17% is set according to the weight of different investment income.

### ***Solvency Capital***

BLA has adopted a consistent-to-RBC approach in calculating the solvency capital. The insurance risk charge is the difference between the projected GPV95 and GPV75 reserves for future years while the interest rate risk charge is relied on the projection, shock-up and shock-down of future assets and liabilities. BLA calculates EV and cost of capital associated with the regulatory capital requirement of 140%.

### ***Other Assumptions***

- ▶ Reinsurance: This year BLA derived reinsurance assumptions only from products having reinsurance arrangements and applied the assumption to these products.
- ▶ Reserving basis: The NPV methods for calculating BLA's policy reserves have been assumed to continue unaltered.

## 5. Summary of valuation results

The components of economic value of BLA as at 31 December 2016, using the methodology and assumptions described in Sections 3 and 4 of this report, are set out in Tables 1 and 2 below:

Risk discount rate	8%	9%	10%
Adjusted net asset value	46,174	46,174	46,174
Value of in-force business (after cost of capital)	10,228	8,565	7,049
<b>Embedded value</b>	<b>56,402</b>	<b>54,739</b>	<b>53,223</b>

Note: Amounts in THB million. Figures may not be additive due to rounding.

Risk discount rate	8%	9%	10%
Value of one year's new business (before cost of capital)	2,236	2,102	1,980
Less Cost of solvency capital	434	484	525
<b>Value of one year's new business (after cost of capital)</b>	<b>1,802</b>	<b>1,618</b>	<b>1,454</b>

Note: Amounts in THB million. Figures may not be additive due to rounding.

We have relied on the accuracy of the NAV of BLA, as shown in the statutory balance sheet as at 31 December 2016, without independent verification.

## 6. Sensitivity analysis

BLA has performed sensitivity analyses on the value of in-force business and the value of one year's new business, by independently varying certain assumptions regarding future experience. Sensitivity scenarios are included to show the impact of changes in key assumptions on the components of embedded value. The sensitivities were performed by allowing parallel movements to the relevant parameters with respect to the base case.

Tables 3 and 4 show the sensitivity results of VIF and VNB, respectively.

	VIF	% change from base
<b>Base Case (@ 9% RDR)</b>	<b>8,565</b>	
1: 25 bps increase in investment returns	11,935	39%
2: 25 bps reduction in investment returns	5,190	-39%
3: 100bps increase in risk discount rate	7,049	-18%
4: 100bps reduction in risk discount rate	10,228	19%
5: 10% increase in maintenance expenses	8,254	-4%
6: 10% reduction in maintenance expenses	8,877	4%
7: 25% increase in capital requirements	6,694	-22%
8: 25% reduction in capital requirements	10,437	22%
9: 10% increase in lapse rates	8,409	-2%
10: 10% reduction in lapse rates	8,736	2%
11: 10% increase in morbidity rates	8,155	-5%
12: 10% reduction in morbidity rates	8,976	5%
13: 10% increase in mortality rates	8,381	-2%
14: 10% reduction in mortality rates	8,755	2%

Note: Amounts in THB million.

Table 4: Sensitivity results of VNB as at 31 December 2016		
	VNB	% change from base
<b>Base Case (@ 9% RDR)</b>	<b>1,618</b>	
1: 25 bps increase in investment returns	1,927	19%
2: 25 bps reduction in investment returns	1,307	-19%
3: 100bps increase in risk discount rate	1,454	-10%
4: 100bps reduction in risk discount rate	1,802	11%
5: 10% increase in maintenance expenses	1,568	-3%
6: 10% reduction in maintenance expenses	1,667	3%
7: 25% increase in capital requirements	1,497	-7%
8: 25% reduction in capital requirements	1,739	7%
9: 10% increase in lapse rates	1,558	-4%
10: 10% reduction in lapse rates	1,682	4%
11: 10% increase in morbidity rates	1,563	-3%
12: 10% reduction in morbidity rates	1,672	3%
13: 10% increase in mortality rates	1,534	-5%
14: 10% reduction in mortality rates	1,702	5%

Note: Amounts in THB million.

## 7. Opinion

Based on the scope of our work and the review we have performed, in our opinion:

- ▶ The methodology adopted by BLA to determine the components of economic value (EV and VNB) is reasonable and consistent with the generally accepted traditional embedded value principles;
- ▶ The assumptions adopted by BLA to assess the VIF, the cost of holding required solvency capital and VNB as at 31 December 2016 are reasonable; and,
- ▶ The calculations set out in Sections 5 and 6 of this report have been carried out in accordance with the methodology and assumptions described in this report, the sample calculations which we checked were satisfactory and overall results are reasonable.

We have shared recommendations and observations with BLA to help align methodology, assumptions and calculations with best practice we have seen in the market.

## 8. Reliances and limitations

In performing our review and producing this report, we have relied without independent verification upon the completeness and accuracy of the data and information supplied by BLA, both orally and in written format. Where possible, we have reviewed some of the information provided for reasonableness and consistency with our knowledge of the Thailand life insurance industry and with our knowledge of BLA. The accuracy of the results presented in this report is dependent on the accuracy of this information.

Reliance was placed on, but not limited to, the accuracy of the following information:

- ▶ Historical financial statements and regulatory returns
- ▶ Value of the audited shareholders' net assets of BLA as at 31 December 2016
- ▶ Data and results of experience studies, on which the best estimate assumptions are determined

- ▶ Cash flow projection results at an aggregate level and at an individual model point level for a number of selected products
- ▶ Details of policy terms and conditions including surrender values, current and expected future dividend formulae and crediting rates
- ▶ Reserving basis and methodology as at 31 December 2016 and the reserve factors calculated by BLA.

The estimates of value include provision only for the claims made by policyholders in the normal course of business under the terms of the policies issued to them. We have not attempted to investigate, or make allowance for, the effect upon the value of any other claim by or against BLA. The projections and values developed have been constructed on a “going concern” basis and assume a continuation of the current economic, taxation, legal and regulation environment prevailing in Thailand. We have not considered possible financial implications arising from the changes in these areas.

The values attributable to the life insurance business are highly dependent on the results of financial projections carried out by BLA. Although the financial projections are developed in conformity with what BLA believes to be the current and proposed operating environments of BLA and BLA’s view of the indicative future experience within such environments, it should be recognised that actual future results will vary from those projected. Deviations in the parameters used to reflect the environment could alter the projected results substantially. These parameters include those used to reflect factors such as management direction, insurance regulations, accounting practices, taxation and external economic factors such as inflation rates and available investment yields.

Our opinion is based on data available to us at, or prior to 31 December 2016, and takes no account of developments after that date.

For and on behalf of Ernst & Young Advisory Pte. Ltd.



Sumit Narayanan  
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