



**Embedded Value Review**  
Embedded Value as at 31 December 2013

BANGKOK LIFE ASSURANCE PUBLIC COMPANY LIMITED,  
THAILAND



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## 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 2013.

30 April 2014

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") based in Singapore ("we" or "our") 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 2013.

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 of this report which sets out the reliances and limitations relating to this report. This report has been prepared solely for the directors of Bangkok Life Assurance and cannot be relied on by any other third party.



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## 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)

## 3. Valuation methodology

Bangkok Life has adopted a traditional deterministic discounted cash flow methodology to determine the components of Embedded Value (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 and 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 next 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, with asset value marketed to market, all measured on the Thailand statutory basis. Adjustments are made to this 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 reserves 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 2013 were used. New business volumes and mix have been based on the actual business written by BLA in the 12 months to 31 December 2013.



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

In order to review the EV and VNB, 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.

This year, BLA has adopted a CAPM approach in determining the risk discount rate assumption. This means that the risk discount rate assumption for BLA will be linked more closely with the market, and changes in economic environment. The RDR is set at 10% using the CAPM approach, which is the same as the RDR assumption adopted last year. This also falls in the range of RDRs adopted by other insurers in Thailand.

Values are also illustrated on risk discount rates of 9% and 11%. 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***

The investment return assumption is unchanged from last year. Investment returns were derived by considering current and expected future asset allocations and associated investment returns for a range of major asset classes. Assumed future investment returns, net of investment expenses, are 5% for all years.

##### ***Inflation***

Future inflation rate was assumed to be 2.25% per annum. This is lower than the rate used last year, but is in line with the forecast published by the Bank of Thailand in October 2013.

##### ***Mortality and Morbidity***

The assumption for mortality rates was derived by taking into consideration BLA's mortality experience during 2011, 2012 and the 9 months to September 2013. 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 sex.

##### ***Persistency***

Persistency includes assumptions for policy lapse, premium persistency, premium holidays and partial withdrawals. The persistency assumptions adopted were based on a lapse study conducted



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by BLA for the period January 2011 to November 2013 for all products except MRTA for which the lapse study covered the period January 2011 to September 2013. 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 experience analysis performed by BLA. Its analysis allocated expenses to the various product lines written by the company and then attributed between initial 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. BLA noted that a per policy unit cost assumption is adopted this year due to the large portfolio of limited-pay products, which makes the setting of unit cost assumption as a % of premium difficult.

Expense assumptions have been updated in line with BLA's most recent expense experience.

### ***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***

Tax rate assumption has been changed from 30% to 20% in light of potential changes in taxation legislation in Thailand as advised by the finance team of BLA.

### ***Solvency Capital***

BLA changed the insurance risk charge calculation from a fixed percentage of NPV reserves to the difference between the projected GPV95 and GPV75 reserves for future years. BLA has also changed the calculation of interest rate risk charge from a fixed percentage of NPV reserves to projecting and shocking future assets and liabilities. The current solvency capital calculation is more consistent with the RBC framework. BLA calculates EV and cost of capital associated with it assuming regulatory capital level of 140%.

### ***Other Assumptions***

- ▶ Reinsurance: BLA's current reinsurance arrangements have been assumed to continue unaltered.
- ▶ Reserving basis: The NPV methods for calculating BLA's policy reserves have been assumed to continue unaltered.

## **5. Summary of valuation results**



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The components of economic value of BLA as at 31 December 2013, using the methodology and assumptions described in Sections 3 and 4 of this report, are set out in Tables 1 and 2 below:

**Table 1: EV as at 31 December 2013**

Risk discount rate	9%	10%	11%
Adjusted net asset value (NAV)	22,448.5	22,448.5	22,448.5
Value of in-force business (after release of capital)	11,295.3	10,192.3	9,175.1
Embedded value (EV)	33,743.8	32,640.8	31,623.6

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

**Table 2: VNB in the 12 months to 31 December 2013**

Risk discount rate	9%	10%	11%
Value of one year's new business (VNB) (before cost of capital)	2,472.4	2,373.3	2,281.4
Cost of solvency capital	451.3	511.7	565.4
Value of one year's new business (VNB) (after cost of capital)	2,021.1	1,861.6	1,716.0

*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 2013, without independent verification. The following adjustments were made to derive the NAV of THB 22,448 million as at 31 December 2013 (as set out in Table 1 above).

- ▶ Market value adjustments for assets held by BLA with taxation adjustments
- ▶ Allowance for stating required solvency capital in NAV rather than in VIF

## 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.



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Tables 3 and 4 show the sensitivity results of the value of in-force business and the value of one year's new business respectively.

**Table 3: Sensitivity results of VIF as at 31 December 2013**

	Value at 10% RDR*	% change from base
<b>Base Case</b>	10,192	
1: 25 bps increase in investment returns	12,812	25.7%
2: 25 bps reduction in investment returns	7,573	(25.7%)
3: 100bps increase in risk discount rate	9,089	(10.8%)
4: 100bps reduction in risk discount rate	11,388	11.7%
5: 10% increase in maintenance expenses	9,649	(5.3%)
6: 10% reduction in maintenance expenses	10,735	5.3%
7: 25% increase in capital requirements	8,838	(13.3%)
8: 25% reduction in capital requirements	11,547	13.3%
9: 10% increase in lapse rates	10,030	(1.6%)
10: 10% reduction in lapse rates	10,363	1.7%
11: 10% increase in morbidity rates	9,777	(4.1%)
12: 10% reduction in morbidity rates	10,607	4.1%
13: 10% increase in mortality rates	9,830	(3.6%)
14: 10% reduction in mortality rates	10,560	3.6%

Note: Amounts in THB million. \*The figures are grossed up using sensitivity impacts from the yearly cashflow results

**Table 4: Sensitivity results of VNB as at 31 December 2013**

	Value at 10% RDR	% change from base
<b>Base Case</b>	1,861.6	
1: 25 bps increase in investment returns	2,116.9	13.7%
2: 25 bps reduction in investment returns	1,605.8	(13.7%)
3: 100bps increase in risk discount rate	1,716.0	(7.8%)
4: 100bps reduction in risk discount rate	2,021.1	8.6%
5: 10% increase in maintenance expenses	1,799.0	(3.4%)
6: 10% reduction in maintenance expenses	1,924.2	3.4%
7: 25% increase in capital requirements	1,733.7	(6.9%)
8: 25% reduction in capital requirements	1,989.5	6.9%
9: 10% increase in lapse rates	1,804.5	(3.1%)
10: 10% reduction in lapse rates	1,922.2	3.3%
11: 10% increase in morbidity rates	1,814.3	(2.5%)
12: 10% reduction in morbidity rates	1,908.9	2.5%
13: 10% increase in mortality rates	1,806.6	(3.0%)
14: 10% reduction in mortality rates	1,917.0	3.0%

Note: Amounts in THB million.



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## 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 2013 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 2013
- ▶ 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 2013 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.





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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 2013, and takes no account of developments after that date.

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

A handwritten signature in black ink, appearing to read 'R. Lok'.

Signed by Russel Lok

For and on behalf of,

Sumit Narayanan

Partner, Actuarial Services ASEAN