

## DIRECTED RISK RESEARCH PROPOSAL

|                   |             |
|-------------------|-------------|
| <b>Risk Theme</b> | Market Risk |
|-------------------|-------------|

**Client Info:** *(only applicable if proposal is in response to a client problem statement)*

|                      |  |                    |              |               |              |
|----------------------|--|--------------------|--------------|---------------|--------------|
| <b>Problem Title</b> | Pricing variable annuity guarantees in South Africa                |                    |              |               |              |
| <b>Client Name</b>   | Alvin Ngugi  | <b>Client Org.</b> | PWC          |               |              |
| <b>Designation</b>   | Senior Associate: Actuarial, Risk & Quants                         |                    |              |               |              |
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**Research Team:**

|                    |  |                    |                     |               |              |
|--------------------|--|--------------------|---------------------|---------------|--------------|
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|                     |         |                       |                  |
|---------------------|---------|-----------------------|------------------|
| <b>University</b>   | UP      | <b>Classification</b> | Confidential     |
| <b>Problem Nr.</b>  | PS15006 | <b>Type</b>           | Technology-Pull  |
| <b>Proposal Nr.</b> | RP15034 | <b>Date</b>           | 6 September 2015 |

**PROJECT TITLE:** Pricing variable annuity guarantees in South Africa.

**PROJECT GOAL:** Consider the pricing of variable annuity embedded derivatives using different models for the equity component – typically the FTSE/JSE All share Index.

**PROJECT SCOPE:** The purpose of this study is to investigate the pricing of variable annuity embedded derivatives using a refined model for the underlying typically FTSE/JSE All Share Index. This is one of the practical issues that continue to face life insurer’s world over in the management of derivatives embedded within these products. We will consider different models and hedging techniques.

**PROJECT OBJECTIVES**

We will consider different stochastic models describing the behavior of the equity component of the variable annuity - these will be calibrated to South African market conditions. We shall provide detailed comparisons of the models with specific emphasis on hedging aspects.

## RESEARCH OUTPUTS / DELIVERABLES

|                      |                              |
|----------------------|------------------------------|
| <b>PUBLICATIONS:</b> | <b>Name(s) / Title(s)</b>    |
| Articles             | 1                            |
| <b>STUDENTS:</b>     | <b>Name(s) of Student(s)</b> |
| Ph.D.                |                              |
| M.Sc.                |                              |
|                      |                              |
| <b>OTHER:</b>        |                              |
|                      |                              |
|                      |                              |

## APPROACH TO BE FOLLOWED

- 1) Study relevant literature
- 2) Implement different methodologies
- 3) Examine practical use of different methods and compare findings accordingly.

## STRATEGIC VALUE TO DIRECTED RISK RESEARCH

This research will contribute to practical valuation and hedging of embedded derivatives – the results will have practical and academic significance.