



Mean percentage of returns for stock market linked savings accounts



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ABSTRACT

Stock market linked savings accounts have become more and more popular. The returns of these accounts are random so the returns, even the initial capital, are not guaranteed. They are very much different from the familiar fixed-term-fixed-rate savings accounts. The aim of this paper is to perform the stochastic and numerical analysis on the stock market linked savings accounts in order to establish the theory on the mean percentage of return (MPR). We will mainly perform the case studies on 5 typical plans linked to the UK Financial Times Stock Exchange (FTSE) 100 Index, but the theory developed is fully illustrated so that it can be applied to other plans by the reader.

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1. Introduction

Income needs seem to be a top priority at the moment—and with low savings rates and top UK equity income funds yielding less than 4%, it is perhaps easy to understand why. With savings rates continuing at their record lows, some savers are turning to alternatives. It is in this spirit that many financial institutions are offering stock market linked savings plans to those looking to combine a high yield opportunity with some protection against a falling stock market. Here are some of them:

- P1 Target income deposit plan: this plan from Investec is designed to repay your initial deposit and to deliver a pre-defined income if the UK Financial Times Stock Exchange (FTSE) 100 Index (we will simply use the Index from now on) increases over the 3 year term: (a) 13% income if the Index is higher after 3 years. (b) If after 3 years the Index is equal to or lower than its starting level, you will receive back only your initial deposit.
- P2 Stock market linked savings bound: this plan from Santander is designed to repay your initial deposit and to deliver a return over the 5 year term: (a) 40% income if the Index is increased by more than 40% in 5 years. (b) If after 5 years, the Index is increased by a percentage between 0.5% and 40%, you will receive an income by the same percentage. (c) If after 5 years the Index is not increased by more than 0.5%, you will receive a 0.5% income.
- P3 Deposit kick out plan: this plan from Gilliat is a 5 year plan. If the index is at or above its starting value at the end of year 3, 4 or 5, you will receive your original capital back plus 35% income. But if the Index is lower at the end of any of these 3 years, you will not receive any growth and you will only receive your capital back.
- P4 The Investec FTSE 100 target income deposit plan: this is a six year structured deposit plan linked to the performance of the Index. The Index is measured at the start of the Plan, and then on a yearly basis thereafter. If the average closing level of the

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Fig. 1. FTSE 100 Index: 2013.

Index for the five business days up to and including the anniversary date is higher than 90% of the Initial Index Level a fixed income of 5% gross will be paid to you. If the anniversary Index level is equal to or below 90% of the Initial Index Level no income will be paid for that year. However should the Index meet the required level on any future anniversary, any previously missed income payments will be added back and paid out.

P5 Income accumulator plan: this plan from Morgan Stanley is a six year structured income investment plan linked to the performance of the Index. It offers up to 6.5% each year, with income being accrued for each week the Index closes between 4500 and 9000 points – if it closes outside of this range, no income will be added for that week. Income payments will be calculated and paid at the end of each quarter, the total income payment being proportionate to the number of Weekly Observation Dates the Index is between the 4500 to 9000 range. For example for a quarter consisting of 13 weeks, should the Index finish between the range on 11 of 13 Weekly Observation Dates, the quarterly income payment would be 1.375% $((0.065/4) \times 11/13)$. Also included is some protection against a falling market, since your initial capital is returned in full unless the value of the Index at the end of the term is below 4250 points. If the Index is lower, your initial investment will be reduced by 1% for each 1% that the Final Index Level is below the level of the Index at the start of the plan so you could lose some or all of your original capital.

All these plans are linked to the performance of the Index. The incomes of these plans are random. They are very much different from the familiar fixed-term-fixed-rated savings accounts. The index has increased by 14.43% in year 2013 (see Fig. 1 at the end of paper). On the other hand, leading three to six year fixed rates are currently offering between 2.6% and 3.15%, so the plans above look very attractive.

However, the past performance of the Index is not a guide to its future performance. In particular, recalling the past 17-year performance (see Fig. 2 at the end of paper), one might feel the Index may have reached its peak and it will decline in the future (Plans P4 and P5 aim to attract these savers). So the returns of these plans, even the initial capital, are not guaranteed.

The aim of this paper is to perform the stochastic and numerical analyses on the stock market linked savings accounts in order to establish the theory on the mean percentage of return (MPR). We will mainly perform the case studies on Plans P1–P5 listed above, but the theory developed is fully illustrated so that it can be applied to other plans by the reader.

Our stochastic and numerical analyses are dependent on the stochastic models for the Index. There are many stochastic models developed in the past 50 years, including the geometric Brownian motion, the CRR model, the mean reverting square root process (see e.g. [1,3–5,7,8,10,13,14,17]). In this paper we will use some of these known models to establish our new theory. We have to emphasize that it is certainly not the aim of this paper to model the Index. Our aim is to compute the mean payoffs for the stock market linked savings accounts should the Index follows a given stochastic model.

To illustrate the use of our theory, we will only compare the stock market linked savings accounts with the bank fixed term savings accounts by assuming that the savers choose only one of these two. Leading three to six year fixed rates are currently offering between 2.6% and 3.15% annually. For illustration, we will assume the annual fixed rate is 2.875% (the average of these two) throughout this paper. By the common sense, the saver will not choose a stock market linked savings account if the corresponding MPR is not greater than the percentage of the income of a fixed term savings account. For example, Plan P1 is not attractive if its MPR is not greater than $8.875\% (= (1 + 0.02875)^3 - 1)$.

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