

## **EQUITY FROM EQUITIES IN BONUS DISTRIBUTIONS**

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### **1. INTRODUCTION**

MANY years ago the question of equitable distributions of surplus would have attracted much discussion. The subject received a full philosophical, financial and mathematical treatment, with the aim of getting it just right.

As time passed this subject became less precise. Wider variations in investment conditions and different investment strategies meant that the constraints of the usual bonus methods could only achieve rough justice. Premium rates and valuation bases remained fairly static (often quite rightly so), and the declared results seemed slightly arbitrary and perhaps a little conservative. The work of the traditional actuary seemed a little 'stodgy' and the challenge and activity turned to the field of unit linking.

Today the picture is different. Just as the introduction of banks to the personal mortgage market seems to have improved the service from Building Societies, so the advent of unit-linking seems to have spurred on the traditional actuary. The expectations of what can be achieved have increased. So, over the period that the methods for valuation, pricing and projection for unit linked contracts have achieved some measure of standardization, the traditional actuary has been pushed more into the role of the pioneer.

A large part of this change has been due to investment in equities. This paper looks at the impact that investment in equities has had on the traditional system of bonus distribution and how offices have attempted to return to an equitable distribution of investment return by using the terminal bonus. The type of office considered declares a reversionary bonus plus a terminal bonus, but the underlying principles should be applicable to other forms of bonus distribution.

### **2. WITH PROFITS LIFE ASSURANCE BUSINESS**

Like many other businesses, with-profits life assurance has a number of optimum requirements, some of which will be conflicting. A comprehensive description of these requirements is set out by Fisher and Young (1), from which the following three are of particular relevance to this discussion.

- (i) That it should be easily understood and readily accepted by the public.
- (ii) It should be equitable and fair.
- (iii) There should be an even emergence of surplus leading to a stable series of bonus rates.

It is therefore perhaps a little surprising that, although the requirements are so diverse, one method—the net premium method with a reversionary bonus—became almost universally used. Let us look a little closer at the implications of using this method.

### 3. NET PREMIUM METHOD

It will be useful to recap on the theory underlying this method, so that we can see how it is affected by recent changes.

The name 'net premium' method is possibly something of a misnomer. There are three elements, of which valuation of liabilities using net premiums is only one, and not always essential. The three are:

- (a) Valuation of liabilities through a stable method which does not capitalize future bonus loadings in the premiums. This is nearly always the net premium method, though a stable bonus reserve method whose bases are attuned to the premium bases could be used.
- (b) A reversionary bonus.
- (c) Valuation of assets at book value which like (a) is also a stable method which does not capitalize future profit.

All three contribute to the success of the method.

- (a) The rate at which surplus emerges will be partly dependent on the valuation basis. If interest rates are stable over a period of years, one would like the surplus to emerge at a rate which supports a stable bonus. With this in mind Redington (2) has demonstrated the suitability of this method by showing how a basis can be chosen which will lead to an equitable and even emergence of surplus under stable conditions.
- (b) The reversionary bonus seems fair as one can visualize both the cost of bonus and the interest surplus rising as the policy proceeds. Fisher and Young (3) have gone further to give a semi-mathematical demonstration. They show that, when the system is correctly used each policy produces approximately sufficient surplus each year to support its own bonus. This means that as far as investment returns are concerned there is no cross subsidy between policies and hence equity. The demonstration does, however, only apply where investment conditions are stable or where the assets are invested short so that any change in interest rate is fully reflected in a corresponding increase in interest surplus. If, however, the assets are gilts for example, any change in interest rates will only affect the return from existing assets in respect of the reinvestment of income. It is interesting therefore to see how this ties in with taking gilts at book value.
- (c) Taking a gilt at 'book value' means that the asset has a value which moves smoothly year by year from its purchase price to its redemption value. The market value would normally fluctuate over this period due to changes in interest rates, but these 'temporary aberrations' are smoothed over,

leading to stability. There is, however, one effect which works against equity as follows. Suppose we have a period in which the net interest rate is 5% per annum in each year except one. The valuation system has been set up so that surplus emerges evenly and a level bonus is declared every year. Then look at an individual policy with ten years left to run in the one year during the period when interest rates rise to 7% per annum net. The policy has a premium of £100 per annum and we invest it in the most suitable investment which let us say is a 10 year gilt. The position to the layman is *reasonably clear, i.e. the income from existing assets would be unchanged* and that £100 investment will earn £2 profit per annum above that expected for the next 10 years. An accountant might also reach the same conclusion. The Actuary, however, can use the 'magic' of his training to overlook the incidence of cash flow and to say that the investment is worth, at 5% per annum interest, £115 and there is therefore an additional profit of £15 in this year. This would be an example of valuing assets on the same basis as liabilities, which sounds very reasonable. In practice, however, even the Actuary lets the profit emerge at £2 per annum, possibly to be shared with those whose policies were not in force at the time the money was invested. This is not strictly equitable, but we accept this rough justice for the advantages that the method brings. It avoids wild fluctuations in the bonus rate from year to year. It avoids the need to check carefully every year for consistency between the bases of valuing assets and liabilities. It achieves very fair results under reasonably stable conditions. In summary, it is what I would call a gentlemanly method and has provided policyholder satisfaction for many years.

We have seen how the system goes a long way towards meeting the requirements of a bonus system and one of the reasons it can do this is because 'book value' can avoid temporary market value fluctuations for gilts. Once we start to invest in equities, however, there are changes in value for reasons other than interest rate changes. It is this genuine capital appreciation that is not readily accommodated into the net premium method. However, rather than change the method we have tried to adapt it. After all, many of its attributes are *highly desirable*.

I wonder however whether changes such as the move to investment in equities and more turbulent investment conditions call for a move to a new approach. Is it our tenacity for the advantages of the old method combined perhaps with a fear of the unknown that has led to the continuation of the old approach?

#### 4. THE MOVE TO EQUITIES

Since the war, offices have increasingly invested in equities and property to back their with-profit portfolio. These assets have several characteristics which differ from the gilt-edged stocks which lent themselves so readily to the valuation system.

- (a) There is a trend for the dividends under equities to increase with time. This increase has at times been substantial. The normal valuation system has been set up so that each policy's contribution to surplus roughly equals the cost of its bonus. Now, with the income from assets increasing over time, the tendency will be for older policies to be contributing more to surplus than the cost of their bonus, i.e. a cross-subsidy from older policies to newer policies.
- (b) The starting yield on equities is lower than that on gilts. In return, there is generally an increase in market values from year to year. This increase is not normally reflected under the net premium method and the effect of ignoring this capital appreciation is demonstrated most effectively by Redington (4). (The terminal bonus has of course been introduced to help solve this problem.)
- (c) Equities are irredeemables and therefore have no redemption date which could be matched towards the date of realization of liabilities. If these assets have to be realized or notionally realized in order to meet the claims under policies, the value obtained will be the market value of the assets. The market value is influenced by three components. The first is the ruling rate of interest. The second I shall refer to as tangibles, i.e. dividend rates, company profitability, asset backing, relative tax advantages etc. The third is market confidence as to the prospects for the future. Now the net premium method was conceived around the idea of a reasonably matched portfolio invested in gilts. When changing to equities, the method could be adapted to eliminate the effect of temporary variations in market values due to changes in the rate of interest or in market confidence both of which go up and down with time. We would still, however, need to deal with the changes in 'tangibles' which can move up or down indefinitely and the need to realize assets at market value. (These latter items reinforce the need for a terminal bonus which can be altered at short notice.)

##### 5. AN ADAPTATION FOR EQUITIES

It is possible to adapt the method of bonus distribution to make it compatible with investment in equities. The first problem to tackle is that of an increasing income. Skerman (5) looked into a system with two rates of bonus, one based on the sum assured and the other based on the bonuses accrued. He showed that this system was better able to deal with variations in income in a way that gave a fairer distribution of surplus. The second problem is of giving the policyholder credit for capital appreciation and this can of course be tackled using a terminal bonus.

Both these ideas have been investigated by Messrs Carr and Ward (6). They looked on equities as providing over the longer term an increasing income with an increase in capital values to match and looked at how a system with a two-factor bonus plus terminal bonus could provide equitable results even when the rate of increase in dividend growth changes. They showed that this system coped

remarkably well when the bonus on bonus is a suitable amount higher than the bonus on sum assured and the terminal bonus is a percentage of total benefits based on the expired term. Encouraging though the results are, I would make two comments.

Firstly, rather like the net premium valuation system, this system is well designed but does not tell the Actuary how rough his justice is in the light of actual circumstances. We start with an attractive model of the equity market as providing in the long term an increasing series of dividends and capital values. We design a system that copes with this model and can also cope with variations in the rates of increase provided we alter the difference between the two rates of bonus used. Unfortunately, we cannot tell how much to alter these two rates because when we see a movement in the equity market, we do not know until the future whether this is a fluctuation around the existing trend or the start of a new trend. Even when a decision is reached, the system gives little indication as to how far this will have distorted equity between policies, or what corrective action ought to be taken.

Secondly, existing offices will already have a bonus system and will not wish to change it to this two-factor bonus system. Perhaps a different approach is called for.

## 6. THE CHANGE OF APPROACH

The historical approaches that have been looked at so far are 'broad' approaches. This means that they have been set up so that, bearing in mind the circumstances of the day, they would provide the required degree of equity and stability if one follows the rules. One needed to look no further at the fate of individual policyholders. By being self driven, the dependence on the Actuary's judgement was reduced so that the results seemed more independent.

Unfortunately, these valuation methods did not adequately accommodate investment in equities. A revised approach is to leave the 'broad' method and to see what results one would expect from policies had they been 'unit-linked' policies linked to the with profit fund. For example, suppose a policy was effected 10 years ago and matures today. We would know the sum assured and reversionary bonuses payable. To see what might be payable if it was a 'unit-linked-with-profit' policy, we could make deductions from each premium which we consider reasonable to cover expenses and mortality costs and imagine the balance being invested in the assets of the with profit fund. These amounts invested could be accumulated in line with the returns on the assets to give a notional amount available at maturity. The excess of this amount over the sum assured and bonuses shows the amount of terminal bonus that might reasonably be paid.

Two factors have made this change of approach possible.

- (a) When only a reversionary bonus was used that bonus had to cover all generations. A broad approach was therefore necessary. The current

combination of reversionary and terminal bonus gives the Actuary a very flexible tool to differentiate between different generations and therefore allows a more detailed approach.

- (b) Computer facilities are now available to do the calculations.

Even with the use of computers, some approximations may be used to simplify the calculations.

- (a) Exact data on the investment returns made each year on the funds may be difficult to extract. The split of the assets between the different investment sectors will almost certainly be known however, and published data on the performance of the equity and gilt markets as a whole can be combined with this to represent the returns on the actual assets.
- (b) Deductions for expenses and mortality will be approximate.
- (c) Policies currently maturing may be looked upon as being representative of the generation of policies to which they belong.

The results would show the amount of terminal bonus policyholders could expect over and above the sum assured and bonuses declared. With the approximations involved, however, they would not be regarded as definitive but rather to indicate the pattern of terminal bonus between generations.

## 7. SMOOTHING

The 'unit-linked' approach to viewing terminal bonuses has one disadvantage. It fully reflects market values of equities and hence their volatility. The with-profit policyholder, however, probably expects protection from a sudden drop in market values. (In fact, he probably also expects the full benefit when market values are high, but even the most well-intentioned office will have difficulty providing both.) This implies some smoothing of the results from year to year.

When offices were mainly invested in gilts, variations in market value were due entirely to changes in interest rate. If the portfolio was immunized, changes in market value and interest rate could be overlooked in the short term and a very stable series of bonus rates emerged. This was given effect by taking the gilts at book value.

In the case of equities, however, immunization cannot be applied in the same manner as the concept depends on a known income from existing assets. If the equities do not perform as expected then the effect must be reflected in lower returns to policyholders and hence a lower ordinary bonus or terminal bonus. In spite of this, however, it may be possible to smooth over that part of the variation in market value which is due to changes in interest rate. There are different approaches to this.

- (a) We could try to emulate the 'book value' approach. The value placed on equities is the current market value adjusted according to changes in interest rate since the equity was purchased.

- (b) The market value could be adjusted to the Actuary's estimate of the long term average rate of interest.
- (c) The Actuary can use his judgement to smooth the results. This has the advantage that he can also allow for short term fluctuations in factors other than interest rates.

It may also be part of the offices strategy to smooth over fluctuations arising from changes in market confidence or sentiment and possibly even those arising from a change in the rate of real progress in equity performance. There are, however, difficulties in achieving this.

(a) It is very difficult to separate the 'real' progress of an equity from sentiment. This is because it is not sufficient to treat the change in dividends as the only indicator of real progress as other items such as total profits, asset backing, order books, etc. are also important.

(b) If fluctuations in market value (that is those remaining after adjusting for changes in interest rate) are to be smoothed out, they should be smoothed to the expected 'trend'. At the time the market value changes, however, one does not know if the change is a 'fluctuation' or the first step in a new trend. This can only be known in retrospect, which is unfortunately too late.

#### 8. COMMERCIAL CONSIDERATIONS

Although the primary influence in an Actuary's decision as to bonus rates will be actuarial principles, he will also want to bear in mind various commercial considerations. In fact, because they may affect the future strategy or prosperity of the company, these considerations could be considered as part and parcel of the actuarial principles.

The investigations described so far will have led to possible levels of reversionary bonus and terminal bonus. It is useful to know whether these rates of bonus can be continued throughout the lifetime of the policies. This will have particular relevance for the offices strategy for the future as a drop in bonus rates may be looked upon as a sign of weakness.

The means is of course a bonus reserve valuation, a major ingredient of which will be the assumed rate of interest. With a portfolio of gilts which is reasonably well matched to the liabilities, the assumed future rate of interest is not so critical. This is because a change in the rate of interest alters the value placed on the gilts roughly in line with the change in liabilities, leaving the balance almost unchanged. With a portfolio of equities, however, one must also consider that the income from equities may diverge considerably from that currently expected. This would have a marked effect on the results obtained from the assets which is equivalent to changing the future rate of interest. It is wise therefore in the bonus reserve valuation to use a range of interest rates while leaving the asset value unchanged in order to show the vulnerability to future equity performance.

The latest declared bonus rates will affect the company's quotations for with-

profit policies. This practice was very reasonable when investments were mainly in gilts and the net premium method produced a very stable series of bonus rates. Today, quotations also include terminal bonus based on substantial capital appreciation. Strangely, the effect on quotations has been a consideration for many years now but the attitude towards it has perhaps changed. I can remember an Actuary several years ago viewing a rise in reversionary bonus rates with concern because it might give policyholders too high expectations in their quotations! Today, the emphasis seems to be on providing as competitive a quotation as possible.

The bonus rates and in particular the terminal bonus rate will affect the amount being paid on current claims and maturities, and will therefore affect the company's position in past performance tables, which may in turn affect to some extent the new business that a company attracts.

#### 9. OTHER CONSIDERATIONS

(1) Many offices have with-profit policies relating to the life fund and the pension business fund in the same company. The tax treatment of the two funds differs, so the office may ideally wish to select different assets for each fund. This is not possible, however, as the tax inspector will allocate all assets to both funds in proportion to their size rather than allowing selected assets to be attached to each fund. The result is that the investment strategy will be a hybrid strategy and may affect one of the funds adversely. For example, if the office holds an equity with a substantial capital gain, it may refrain from selling that equity because of the tax liability that would appear in the life fund even though a pension fund may want to switch that equity for a more promising one. The pension business fund has therefore lost an improved yield in order to save the life fund a tax liability and it may not be obvious that this has happened or easy to quantify the amount involved. There are other examples where one fund loses in order to benefit another and the Actuary may wish to adjust for this when considering his bonus declarations.

(2) Life offices have traditionally invested to meet maturity claims as they fall due. If one looks at the assets backing an individual policy, they would start off as equities at the beginning of the policy and move into gilts towards the end of the term (as the benefits became more guaranteed) so that the results on maturity were less volatile. There was therefore a case for allowing for this when using the 'unit-linked' approach described in section 6. Recently, however, a large part of the with profit portfolio of many companies has been backed by equities and property to the extent that one would have difficulty hypothesizing the traditional gilt backing as policies increase in duration.

By contrast, unit linked policies have normally been invested in a fund where the benefits for all policies, whatever their outstanding term, were linked to the same assets. The concept of investing to meet a particular maturity does not apply. Interestingly, however, at least one company is offering 'dated' unit linked

funds for its pension policies. This means that the assets of the fund are invested for realization in a particular 3 year period (e.g. the funds might be 1987–89, 1990–92, etc), so that the policyholder could choose a fund appropriate to his retirement age and avoid the volatility of the result. One wonders, has the wheel turned full circle?

#### 10. FUTURE DEVELOPMENTS

(1) The question of future projections has caused some controversy in recent years.

The tendency for offices to invest their with-profits portfolio in equities has paid dividends (!) over the last decade or so. The result is that they are in a position to declare record levels of bonuses. If these bonuses are projected into the future, they represent yields which are possible but which have a low probability of being fulfilled. So, why do offices illustrate the unlikely rather than the likely? The reason must surely be competition.

However, before looking at the competition, I should like to suggest an alternative method of illustration which shows that the policy proceeds will depend on future investment results. That is to give projections based on two assumed rates of interest—as currently done for unit-linked projections—alongside or instead of that based on bonuses. Of course, if they were shown alongside the projection based on bonuses, the latter may in some cases cause amusement or confusion for the recipient and would probably be dropped. How does this alternative allow the with-profit offices to meet the competition?

First in line are the unit linked offices. Quotations would now be on a similar basis. The attractions of unit-linking can be countered by explaining that with-profits policies allow investment in stock markets without the same vulnerability to short term fluctuations at the time of claim.

Next in line are other savings institutions such as banks and building societies. The advantage of with profits policies here is that they provide the opportunity for higher yields through investing in stock markets.

The change of approach could therefore stand up against the above sources of competition. Finally, though, one must consider competition between with-profits offices. It would be difficult for any one office to change approach without giving the impression that they are less confident of maintaining bonuses than the others. For this reason, the change should be introduced simultaneously by agreement between a number of offices.

There seem to be signs that offices are ready for this change. Firstly the cautionary wordings attached to projections of bonuses have become stronger. Many contain specific reference to the possibility of bonuses reducing in the future. Secondly, offices seem to be placing more emphasis on past performance in competition and less on future projections. The professional bodies are working on this problem. We may therefore see some progress in the near future.

(2) There is one area where I feel a quantum leap forward in our thinking is

needed. That is the theory that is being used to deal with equities. We have ideas based on a fixed rate of interest at the time of investment, based on pre-determined investments which lend themselves to mathematical treatment and based on the concept of immunization and have subsequently laboured to apply these ideas to equities. A new set of tools is now called for.

Firstly, I should like to see an end to the distinction between income and capital appreciation, where the former is treated as firmly 'in the pocket' and the latter as rather 'dubious'. After all, income is often immediately invested back into equities, and at the end of the day we have a set of assets whose value can disappear just as readily whether it arose from reinvested income or capital appreciation. Furthermore, by switching from one sector of the equity market to another, or by switching from equities to gilts, one can alter the income from the assets without a corresponding effect on the total 'return'. Would it not be preferable to take into account the overall return from the asset and then concentrate on the 'quality' of the assets held at the end of the day and the degree to which they can be relied upon into the future.

Secondly, I should like to see new techniques that deal with the uncertainty over levels of future dividends from equities. But why do we need to know about the future? There are two main reasons.

- (a) If a sudden change in economic circumstances wiped out most future dividend income, offices would have difficulty meeting their guaranteed liabilities. Any intermediate change would have corresponding implications for cutting bonuses.
- (b) Although offices have protected themselves with the non-guaranteed terminal bonus, they are still trying to maintain stability and protect policyholders from market fluctuations. When market values or dividends change unexpectedly the office must decide whether it is a short term fluctuation or an indicator of a new trend.

Dividends defy the purely mathematical treatment used on the precisely known income from gilts. This has weakened the use of valuation concepts such as immunization and at the same time removed the sense of stability and security that previously existed. In some respects, the actuary has moved from mathematician to speculator.

One could say that the science has moved. Future dividends can be estimated from economic indicators, company 'ratios', etc. The risks can be assessed by applying stochastic methods to a stock market model. These methods, however, are not reliable and leave room for uncertainty and speculation as to the future. I should therefore like to see a break from the existing techniques based on a fixed future rate of interest to ones that can deal with the unknown future returns from equities while still retaining some of the aspects of immunization. The methods envisaged would allow the effects of the true results from equity investment to emerge while smoothing over the fluctuations due to changes in the 'long term rate of interest' I am not sure what is required—perhaps the idea is too

optimistic—but even a few ideas and a recognized vocabulary with which the profession could discuss them would be a step forward.

## 11. CONCLUSION

There has been a trend over the last quarter of a century for with-profit life offices to invest in equities—so much so that they hold the key to our future. One might reflect on how this compares with the alternative of investing in gilts.

It has brought one undeniable advantage. It has provided substantial investment returns which have allowed offices to compete successfully with other forms of savings. We must be grateful for this life-saving gift.

It has also brought its difficulties. One has been the incidence of increasing income and capital appreciation rather than the steady income on which earlier valuation systems were based. This problem was minor, however, and the difference soon assimilated by the industry once it was recognized.

More importantly, it has brought in its wake high expectations by the policyholder based on high levels of bonus, combined with an uncertainty in offices as to how far they will be able to meet these expectations, depending as they do on good returns from equities. The test will, of course, come if the equity market does not perform as well as hoped. The consequential action in terms of reduced bonus rates has the potential to create bad publicity and poor public reaction.

Here, we can learn from the unit linked industry. Their policies are sold in the market with surrender penalties, capital units, bid/offer spreads and completely variable claim values. In spite of this, they seem to have won the day, in the eyes of the public, for clarity and fairness. They have not held back from using these sensible but potentially unpopular items and have been open and clear about them.

Fortunately, with profit offices seem to be taking a sensible approach too, many having already sounded warnings about future bonuses. I hope that the industry can now act unitedly to provide a consensus of approach and communicate with an equally clear and convincing voice. This runs the risk of reducing an individual office's freedom to use its own judgement. The benefit, however, is likely to be a healthier future for all.

## 12. ACKNOWLEDGEMENT

The sometimes unorthodox views and opinions occasionally expressed in this paper should leave the reader in little doubt that they are my own. Fortunately, they have been improved and augmented by those of friends and colleagues. I am therefore very grateful to those who have given help and advice in preparing this paper, to my secretary for her hard work and to my wife and children for their forbearance.

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