

**Guaranteed returns: risks assured?**

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**Abstract/resume:** Guaranteed returns on unit-linked funds are offered by the majority of the Dutch life insurers. Despite of the risks involved and additional solvency requirements most companies seem to offer these guarantees free of charge. As a consequence (?) they omit to build up adequate provisions for the associated risks.

**Keywords:** guarantees, investment funds, unit-linked

## Introduction

This paper is mainly based on a report produced by a working-group of the AFIR section of the Dutch Actuarial Society (AG). The subject of this report was an analysis of the risks involved in Dutch financial products with some kind of guaranteed return for the customer. The working-group consisted of 5 actuaries and 3 investment specialists (econometricians and investment analysts). The research was started by a survey among all Dutch financial institutions offering equity linked consumerproducts. Where the report had a broad scope including several types of index linked funds and so-called click funds offered by banks and investment managers, this paper concentrates on investment funds with some kind of minimum total return guaranteed, mainly offered by insurance companies as an option within unit-linked products.

## Background

Unit-linked products were already introduced in The Netherlands in 1956. The share of total life insurance (new) business nevertheless has been limited for a very long time. Since the beginning of this decade however it has been a booming market as shown in the table below.

| <u>Year</u> | <u>Share of unit-linked in new business</u> | <u>Share of unit-linked in total portfolio</u> |
|-------------|---|--|
| 1972        | not available                               | 3.0%   |
| 1984        | not available                               | 0.3%   |
| 1990        | 3.2%  | 1.5%   |
| 1993        | 9.5%  | 4.7%   |
| 1994        | 18.9%                                       | 6.9%   |
| 1995        | 17.2%                                       | 8.5%   |
| 1996        | 20.5%                                       | 11.7%  |
| 1997        | 34.9%                                       | 15.0% (E)                                      |
| 1998        | 43.6%                                       | 20.0% (E)                                      |

These figures regard all individual life business, including annuities. It must be mentioned that in some areas the shares are much higher. For regular premium paying new business the share in 1998 was more than 70% on average. For tax advanced single premium business (deferred annuities) the share of unit linked is already almost 60%.

Reasons for this development all have to do with interest: a growing interest of the average Dutchman in equities because of the booming stock prices at one hand and the decreasing interest rates at the other. The latter forced the financial services providers to look for alternatives for their savings products.

The following table shows the development of the Dutch CBS stock index (including dividends) and the return on Dutch government bonds during the past 15 years.

| <u>Year</u> | <u>CBS index per 1/1</u> | <u>% increase</u> | <u>average yield on government bonds</u> |
|-------------|--------------------------|-------------------|--|
| 1984        | 100,0                    | -                 | 8,2%                                     |
| 1985        | 128,1                    | 28,1%             | 7,3%                                     |
| 1986        | 170,5                    | 33,1%             | 6,3%                                     |
| 1987        | 186,7                    | 9,5%              | 6,4%                                     |
| 1988        | 153,3                    | (17,9%)           | 6,4%                                     |
| 1989        | 207,3                    | 35,2%             | 7,2%                                     |
| 1990        | 264,3                    | 27,5%             | 8,9%                                     |
| 1991        | 229,6                    | (13,1%)           | 8,7%                                     |
| 1992        | 272,6                    | 18,7%             | 8,1%                                     |
| 1993        | 294,2                    | 7,9%              | 6,4%                                     |
| 1994        | 433,2                    | 47,3%             | 6,9%                                     |
| 1995        | 443,1                    | 2,2%              | 6,9%                                     |
| 1996        | 530,9                    | 19,8%             | 6,2%                                     |
| 1997        | 745,0                    | 40,3%             | 5,6%                                     |
| 1998        | 1079,5                   | 44,9%             | 4,6%                                     |
| 1999        | 1320,1                   | 22,3%             |  |
| average     |                          | 18,8%             | 6,9%                                     |

The government bonds emitted in 1999 so far, showed an effective rate between 3,5% and 4%. Looking at these figures it is quite obvious why the unit-linked market developed the way it did. The shift from the traditional life business with a guaranteed interest rate however seemed only to be possible when at least some of the investment possibilities included some kind of minimum return guarantee. This of course has to do with one of the strange habits in the insurance industry, the use of a fixed interest rate when premiums are calculated. In the world of investors it is very uncommon which explains that the first unit-linked plans did not include such a guarantee. When the unit-linked plans in the nineties got a broader use, for instance as pension plans (personal plans initially, employer provided plans later) the demand became very strong.

## **The survey**

The survey was performed under 98 financial institutions; 65 were insurance companies of which 50 (almost 77%) participated. In total we counted 60 participants; 48 of them were offering unit-linked investment funds. This confirms the general observations about the growing importance of unit-linked business made earlier. All these 48 were insurance companies except 2 banks offering the products in close cooperation with an insurer. Guarantees were offered by 28 of them, 58% of the insurers offering unit-linked and 47% of all Dutch life insurers, participating in the survey. Given the level of participation these results can be regarded to be representative for the whole life insurance industry. Most companies not offering unit-linked are smaller ones and often niche players.

Except for 4, all companies offer a 4% guarantee, which is quite logical from a historical perspective because this is the interest rate used for traditional business since 1969. This rate for traditional business is always net, this means after deduction of expenses. For unit-linked business this is not always that clear.

| <u>Guarantee</u>          | <u>Number</u>                  | <u>Percentage</u> |
|---------------------------|--------------------------------|-------------------|
| 4% nett                   | 3                              | 11                |
| 4% gross                  | 13                             | 46                |
| 4% doubt about nett/gross | 6                              | 21                |
| 0% nett *                 | 5                              | 18                |
| other                     | 4 (4,25%, 2*4,75%, 5%)         | 14                |
| Total                     | 31 (3 companies doublecounted) |                   |

A guarantee of 0% nett means a guaranteed maturity payment of at least the premiums paid. This guarantee in most cases is offered for mixed or managed funds, where a 4% guarantee is most common for bond- or intrestfunds.

Although a majority of the unit-linked insurers offers some kind of guarantee, it seems that the importance of a guarantee is more in marketing and selling points than it is in consumer needs. Based on answers to our questions about turn-over and related assets we estimate that the share of guaranteed unit-linked business does not exceed 5% of total unit-linked business. This looks strange because in 75% of the cases the guarantee is offered free of charge!

| <u>Guarantee charges to policyholder</u> | <u>Number</u> | <u>Percentage</u> |
|--|---------------|-------------------|
| None                                     | 21            | 75                |
| 0,10%                                    | 1             |                   |
| 0,15%                                    | 1             |                   |
| 0,25%                                    | 3             |                   |
| 1,50%                                    | 2             |                   |
|  | 7             | 25                |
| Total                                    | 28            | 100               |

A few companies (4 or 14%) not charging the policyholder for the guarantees given, declared that there is an implicit charge because the investment strategy partially takes into account these guarantees. One company does charge the policyholder implicitly during the unit-pricing.

Further it must be mentioned that the guarantees are often restricted. In most cases only a maturity guarantee is offered, which means that in case of surrender but also in case of death the payments are bases on market value only. Besides, often a minimum policyterm of for instance 10 years is applicable. Unfortunately these limitations not always are clear in brochures and policy conditions so we have some doubts whether the policyholders' expectations will always be met in these cases.

The survey shows that in general no special arrangements support the guarantees given. Most funds just invest in bonds or a certain mix of bonds and shares. Although we should assume that the guarantees always have an impact on the investment strategy, only 4 have formalized this. So you would expect 24 companies to take other actions to deal with these guarantees. But only 7 do this by means of an additional charge to the policy holder and 1 by adjusted unit-pricing. In addition to this it is very remarkable that only 3 companies declared to built up special provisions for the yield guarantee. It is less strange when we look at the level of the charges, because only 2 companies charge enough for additional provisions.

According EEC regulations solvency margins need to be higher in case (a part of) the investment risks are for the account of the insurance company. The required solvency margin for unit-linked business is 1% of the fund value; in case of guarantees we need 4%. These additional capital requirements are one good reason for an additional charge. Most companies have to deal with a required return on equity of at least 10% after tax. Assuming an average return on investments of 7% before tax and a corporate tax rate of 35% we already need an additional charge of 0,25% per annum. Knowing that the assumed 10% often will be higher, the assumed 7% will be difficult nowadays and above that most companies aim at 150% of the required solvency margin this charge could be calculated as 0,50% as well.

So far we only looked at some results from the survey and we did some financial accounting. Let us take a look at the risks now.

## **The risks**

From a consumer perspective.

Assuming that all the insurance companies are highly solvent and have a good rating the consumer seems to make a good deal by buying an investment fund with a guaranteed minimum yield at no or low additional costs. Some remarks need to be made however. I already mentioned that most guarantees are maturity guarantees which means that in many cases – how much contracts reach their planned maturity date? – the guarantee will be of no value. Is this the reason most company do not ask any price for it?

As I stated earlier an important reason for offering guarantees is to include extra safety in pension plans. By doing this most companies are creating false illusions to the customer however. The owner of a pension plan thinks he has bought safety but he only bought a minimum lump sum payment. This payment has to be transformed into a lifelong annuity at the maturity date. The level of this annuity is in most cases based on the interest level at that very particular day in ones life. Bad luck when you are retiring in 1999. The only way to achieve a reasonable pension then is to buy a unit-linked annuity and that is what is happening now in The Netherlands. Year end 1998 already 14% of individual annuity business was unit-linked. That the consumer has attracted another risk by this will be clear, but is also another subject.

From the insurers perspective.

The risks for the insurer are of course that the guaranteed maturity payments cannot be covered by the accrued investments and deficits in case of preliminary terminations for those that have not excluded this. The problems can be caused by long-term underperformance but also by unexpected and dramatic price decreases. The first cause would also create problems for the traditional life business and for instance the pensionfunds. In that case the impact will be nationwide. The second is a specific problem for unit-linked business. In both cases time is an important aspect when judging the level of the risks involved. On the long run problems with lower bond-prices will be less because they will be compensated by higher coupons. Every bond will, as we all know, expire at its nominal value.

The potential risks are the highest when the (effective) term of the investmentcontract is too short. That is the reason why most insurers exclude terms shorter than 10 years and also cancel the guarantee in case of preliminary termination, unless it is related to early retirement. Without these restrictions investments should assure that their market value in case of liquidation always equals at least the guaranteed value of the insurance contract. This is almost impossible to achieve by equity investments. Short term investment vehicles however offer a lower return in general and thus are not really an option. But not matched investments imply possible antiselection by the customer. Besides the definition of short and long term in this case strongly depends on the level of the guarantees and the development of the yield curve during the past period.

Considering this we also have to take into account the differences between single premium plans and regular premium paying plans. Regular premium contracts in general have longer terms and benefit from compensating effects because investments are done at different times and because of that, changing circumstances. Hence, it is acceptable to offer guarantees for the investments with short remaining terms as well, because their substance and impact is limited. The contrary goes for single payments, on a single premium plan or as an additional payment on a regular premium plan. For this reason very often these premiums, and also regular premium increases, are restricted or excluded from the guarantees in case the remaining term becomes too short.

Now we will try to quantify the risks and try to determine what charges could cover these risks. We have to do this ourselves because the existing derivatives do not fit with flexible insurance plans being sold on a continuous base without any restriction. This also means that we need to take the insurance approach with elements of solidarity and spreading risks over a long term. Of course we need to decide about some assumptions regarding the risk/return-profile of the investmentfunds we wish to offer guarantees for. We make assumptions about the average return and the standard deviation as a measure for the risk, based on a normal distribution. This means we abstract from the skewness of the distribution we usually see.

The table below shows the probability that a single payment generates a return less than the common guaranteed 4%, calculated with different assumptions, related to the different categories of investment funds.

| <b>4% guarantee</b> |               | <b>Loss probability for single premium business</b> |               |                |                 |                 |                 |
|---------------------|---------------|---|---------------|----------------|-----------------|-----------------|-----------------|
| <b>Category</b>     | <b>Return</b> | <b>Risk</b>   | <b>1 year</b> | <b>5 years</b> | <b>10 years</b> | <b>15 years</b> | <b>20 years</b> |
| Bonds (realistic)   | 5%            | 3,75%   | 39,5%         | 27,5%          | 20,0%           | 15,1%           | 11,7%           |
| Bonds (optimistic)  | 7%            | 3,75%   | 21,2%         | 3,7%           | 0,6%            | 0,1%            | 0,0%            |
| Bonds (CMVI93-98)   | 4,6%          | 4,0%  | 44,0%         | 36,9%          | 31,8%           | 28,1%           | 25,1%           |
| Shares (realistic)  | 10%           | 15%   | 34,5%         | 18,6%          | 10,3%           | 6,1%            | 3,7%            |
| Shares (CMVI93-98)  | 14,6%         | 28,6%   | 35,5%         | 20,4%          | 12,1%           | 7,6%            | 4,9%            |
| Mix (realistic)     | 7,5%          | 8,26%   | 33,6%         | 17,2%          | 9,0%            | 5,0%            | 2,9%            |
| Mix (CMVI93-98)     | 8,9%          | 11,4%   | 33,4%         | 16,8%          | 8,7%            | 4,8%            | 2,7%            |

These results show that a 4% guarantee on a bondfund can be quite dangerous! On the short run the dangers are even bigger because of the actual low returns on bonds: when interest rates would increase the bond prices will drop. Interesting is that guarantees on mix funds appear to be less dangerous. For the realistic scenario we assumed a 50:50 mix of bonds and shares and a limited positive correlation ( $r=0,3$ ) between them. This has a reasonable fit with the last 5 years experience according to a Dutch index.

The table above showed the results for a single payment; the average term of this business is between 10 and 15 years. For regular premium paying business the average term is about 20 years. The loss probabilities for this kind of business is shown in the following table.

| <b>4% guarantee</b> |               | <b>Loss probability for regular premium business</b> |               |                |                 |                 |                 |
|---------------------|---------------|--|---------------|----------------|-----------------|-----------------|-----------------|
| <b>Category</b>     | <b>Return</b> | <b>Risk</b>  | <b>1 year</b> | <b>5 years</b> | <b>10 years</b> | <b>15 years</b> | <b>20 years</b> |
| Bonds (realistic)   | 5%            | 3,75%  | 39,5%         | 32,6%          | 27,1%           | 23,0%           | 19,7%           |
| Bonds (optimistic)  | 7%            | 3,75%  | 21,2%         | 10,0%          | 5,2%            | 3,2%            | 2,2%            |
| Bonds (CMVI93-98)   | 4,6%          | 4,0%   | 44,0%         | 40,0%          | 36,4%           | 33,6%           | 31,2%           |
| Shares (realistic)  | 10%           | 15%  | 34,5%         | 25,1%          | 18,5%           | 14,1%           | 10,9%           |
| Shares (CMVI93-98)  | 14,6%         | 28,6%  | 35,5%         | 26,7%          | 20,2%           | 15,7%           | 12,5%           |
| Mix (realistic)     | 7,5%          | 8,26%  | 33,6%         | 23,9%          | 17,2%           | 12,9%           | 9,8%            |
| Mix (CMVI93-98)     | 8,9%          | 11,4%  | 33,4%         | 23,6%          | 16,9%           | 12,6%           | 9,6%            |

The loss probability for a given term is higher than for single premium business. This was to be expected because for instance a 10 year term regular premium is actually a combination of 10 single payments with terms ranging from 1 to 10. When looking at these results we must be aware that the 4% guarantee in these cases is a gross guarantee, this means before the charges for additional solvency requirements and the charges to cover the probable losses.

## Pricing

In order to get some feeling about the charges needed I performed some calculations; the results are shown in the tables below for both single premiums as regular premiums.

### 4% guarantee Annual charge to cover probable losses on single premium investments

| Category           | Return | Risk  | 1 year | 5 years | 10 years | 15 years | 20 years |
|--------------------|--------|-------|--------|---------|----------|----------|----------|
| Bonds (realistic)  | 5%     | 3,75% | 1,08%  | 0,29%   | 0,14%    | 0,08%    | 0,05%    |
| Bonds (optimistic) | 7%     | 3,75% | 0,42%  | 0,03%   | 0,00%    | 0,00%    | 0,00%    |
| Bonds (CMVI93-98)  | 4,6%   | 4,0%  | 1,43%  | 0,45%   | 0,27%    | 0,19%    | 0,14%    |
| Shares (realistic) | 10%    | 15%   | 2,72%  | 0,58%   | 0,21%    | 0,10%    | 0,05%    |
| Shares (CMVI93-98) | 14,6%  | 28,6% | 3,57%  | 1,02%   | 0,39%    | 0,19%    | 0,11%    |
| Mix (realistic)    | 7,5%   | 8,26% | 1,80%  | 0,32%   | 0,11%    | 0,05%    | 0,02%    |
| Mix (CMVI93-98)    | 8,9%   | 11,4% | 2,22%  | 0,41%   | 0,14%    | 0,06%    | 0,03%    |

### 4% guarantee Annual charge to cover probable losses on regular premium investments

| Category           | Return | Risk  | 1 year | 5 years | 10 years | 15 years | 20 years |
|--------------------|--------|-------|--------|---------|----------|----------|----------|
| Bonds (realistic)  | 5%     | 3,75% | 1,08%  | 0,52%   | 0,34%    | 0,25%    | 0,19%    |
| Bonds (optimistic) | 7%     | 3,75% | 0,42%  | 0,14%   | 0,07%    | 0,04%    | 0,03%    |
| Bonds (CMVI93-98)  | 4,6%   | 4,0%  | 1,43%  | 0,73%   | 0,50%    | 0,39%    | 0,32%    |
| Shares (realistic) | 10%    | 15%   | 2,72%  | 1,24%   | 0,68%    | 0,45%    | 0,33%    |
| Shares (CMVI93-98) | 14,6%  | 28,6% | 3,57%  | 1,90%   | 1,12%    | 0,76%    | 0,55%    |
| Mix (realistic)    | 7,5%   | 8,26% | 1,80%  | 0,72%   | 0,40%    | 0,27%    | 0,19%    |
| Mix (CMVI93-98)    | 8,9%   | 11,4% | 2,22%  | 0,93%   | 0,50%    | 0,33%    | 0,24%    |

Looking at today's optionprices, where a one year putoption covering the actual prices costs approximately 15% of the purchase price, these charges will look far from realistic. However we must realize that these charges are nett, without any loading and that a basic assumption is that these charges will be made during a very long period, without any short term anti-selection based on market developments. Nevertheless the charges needed are still substantial keeping in mind that most companies do not charge anything at all to cover this guarantee. If they would do the appropriate (=charge for solvency and risk), the effective guarantee to the customer would range from 3 to 3,25%. This means also that companies offering a 4% nett guarantee need a return of at least 5% in order to cover the charges necessary in such a case. All this without taking into account the usual maintenancefees ranging from 0,5% up to more than 1%.

The differences between the charges needed for various terms are relatively big. This means it is prudent to count for short average terms when determining an appropriate charge for a whole portfolio. We can expect the remaining terms of policies with a guarantee to be shorter than average. For many unit-linked policy holders the last switch will be into a fund with a guarantee. The average term for guarantees therefore will not be much longer than the 10 years many insurers now use as minimum for participation in a guaranteefund. The charges mentioned above thus are more than desirable, they are necessary!



## Conclusion

Most insurers seem to have the illusion that guarantees can be afforded just by putting some limitations in the policy conditions. Minimum policy terms and payment restrictions are quite common. These limitations are of course helpful, but not fully covering the risks and on the other hand not very consumerfriendly. The survey showed us that most insurers do not have an investment strategy that focuses on the guarantees. This means that in these cases extra charges to cover the associated risks are necessary. These explicit charges do not affect the fundperformance, but do affect by nature the total return for the customer. This has at least one advantage: the consumer is much more aware of the cost of guarantees and will be able to consider his needs better. The advantage for the insurer is that he has better monitoring possibilities by analysing the specific charges and provisions against additional payments based on the guarantees given. In this way we can avoid that policyholders with guarantees are subsidised by policyholders without, which would be a bad example of insurancesolidarity.

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