

The New Equity Linked Buffer in the Finnish Occupational Pension System

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Abstract

At the beginning of 2007 a new equity linked buffer was created as a part of the liabilities of the Finnish statutory occupational pension system. The purpose was to transfer part of the market risk of the equity investments from individual pension institutions to the pension system as a whole. As a consequence, the pension institutions are able to increase the proportion of equity investments in their portfolios. In the long run, the higher average investment yields are expected to result in a pension premium level that is about 2 percentage points lower than in the former forecasts. This paper describes the new mechanism of the equity linked buffer and gives some results of its effects calculated by both deterministic forecast models and simulation methods.

1. The Finnish occupational pension system

Some details of the Finnish pension system are needed as a background. The statutory occupational pension system (TyEL) is a defined benefit system. For the workers it makes up the greatest part of their future pension. The administration of the pension is decentralized to various kinds of private pension institutions: pension insurance companies, company pension funds and industry-wide pension funds. The amount of the pension is calculated according to common rules that are independent of the pension institution.

The pensions are partly funded. The actual funds are estimated to be about 1/3 of theoretical full funding. The rest of the pensions are paid through a pay-as-you-go system that is pooled between the pension institutions. To manage the pooled part equitably, the technical reserves of the funded part have to be calculated using a common actuarial basis in all the pension institutions.

The reserves are calculated using a constant 3% discount rate. In addition, there is another, variable interest rate called the calculated interest rate. This is determined as a function of the average solvency level of the pension system. Since the beginning of 2007 the calculated interest rate is 0.2 times the average solvency ratio, and the value is changed two times a year. In addition, it has a minimum value that is the 3% discount rate. The investment return corresponding to the difference between these two interest rates is used yearly to increase the funded part of the pensions. As a consequence, the calculated interest rate forms a long term minimum target for the investment return level of the pension institutions.

In the short term the investment returns may fluctuate considerably around the long term target. The solvency capital acts as a buffer for this variation of the returns. The calculated interest rate acts as a feedback mechanism in regulating the average solvency of the pension system. When the solvency ratio grows large, the calculated interest rate becomes higher and transfers a greater part of the solvency capital to the technical reserves. On the other hand, a low solvency ratio results in a low level of the calculated interest rate and the amount transferred to the reserves is decreased. The average investment return, the growth rate of the technical reserves and the formula for the calculated interest rate determine a long term equilibrium level for the solvency ratio. Since the actual returns are not constant, the solvency ratio fluctuates around the equilibrium level.

The previous description applies to the pension system as a whole. From the point of view of a pension institution its solvency ratio is generally different from the average level that determines the calculated interest rate, i.e. the common long term minimum target for the investment return. If the solvency ratio of a pension institution stays too much lower than the average it may get into difficulties.

Therefore, a pension institution has an extra long term investment risk in that its returns must not remain significantly lower than in the pension system as a whole.

2. The purpose of the reform

During the past years there have been various reforms in the Finnish statutory occupational pension system to check the future rise of the contribution level. For example, the amount of future pensions have been cut in different ways, some early retirement options have been removed and later retirement has been encouraged by giving extra pension accrual to the oldest employees.

Another way to achieve a lower contribution level is to increase the average return of investments in the long run. Of course, this means that the risk will be increased in the same time. It is often claimed that equities are a favourable investment in the long run because the relative risk decreases in time. This view has been disputed, however, as depending on measuring the risk using the standard deviation instead of variance.

In any case, the equities have a higher expected return and therefore, increasing their proportion in the portfolio results in a lower expected contribution level in the long run. The problem was to find a way to achieve this long term effect without risking the solvency of the pension institutions either in the short or the long term.

These considerations were the background for the project to find a way to increase the equity investments in the Finnish pension system.

3. Alternative solutions

A restriction in the possible solutions was that the risk of ruin of a pension company or fund should not be essentially increased. Clearly this meant that some kind of extra buffer for the variation of the equity returns was needed.

One method that was considered was to increase the solvency ratio of the pension institutions. However, the possibility of getting extra money to the solvency capital from outside, for example by increasing the contributions was ruled out. Another possibility is based on the fact that in the Finnish partially funded system the border between the funded and unfunded parts is to some extent arbitrary and the rules could be changed. The solvency ratio could be increased if the accrual of the funded part of the pensions was decreased and the difference transferred to the solvency capital. In effect, the total capital in the pension system would remain

constant but the border between the reserves and the solvency capital would be moved.

This solution was, however, not accepted. It was considered that the purpose of the extra buffer should be to act against the market fluctuations common to the pension system as a whole. Therefore, it was not considered appropriate to use the solvency capital whose purpose was seen to buffer those risks that are not common to the whole pension system but specific to an individual pension institution. From this demarcation principle it followed that the new buffer should be established inside the technical reserves.

A possible way to achieve this could have been to add to the formula of the calculated interest rate a component that is dependent on the market returns. In this solution the minimum level of 3% was found to be a problem. Simulation studies showed that the effects of the reform would not have been sufficient if the minimum level had been kept in the formula. However, allowing the calculated interest rate to fall below 3% was also considered problematic as this would have meant that the already accrued funded part of the pensions would then have had to be decreased.

This problem was solved by deciding that the formula of the calculated interest rate would not be changed to include the market return. Instead, a new component was created in the technical reserves to act as the buffer for the market fluctuations.

One question was in which way the buffer should be dependent on the market returns. At first, two possibilities were considered. The first was to link the buffer to some publicly quoted equity index, the second to the average investment returns of the whole pension system.

Some problems were seen in both these alternatives. The use of a given equity index was considered to limit too much the independence of the investment decisions of each pension institution. There might also been problems in the decision process of choosing a suitable index for all the pension institutions and changing the index later if needed. The average investment returns, on the other hand, might be dominated too much by the biggest companies. In that alternative, a pension institution would have too great a risk in having an asset allocation that was different from the average.

A solution was found by combining parts of each alternative. The buffer was not linked to the investment return as a whole but only to the equity investments. This was not, however, done by applying an index but the average equity return of the pension institutions would be used instead. The problems of choosing the index was so avoided. Using the average equity return instead of the general investment

return means that the differences in the asset allocations would not have too great an effect.

4. The equity linked buffer

From the beginning of the year 2007, a new component, the equity linked buffer, has been included in the reserves of the pension institutions. Its yearly change is calculated as the return of the equity investments applied to 10% of the total amount of the reserves. When the equity return has been positive the buffer grows. Negative returns, on the other hand, lead to a decrease of the buffer so that its value can even be negative in some years.

In practise this means that a small part of the investment returns that formerly would have been added to or subtracted from the solvency capital of the pension institution are now transferred to the reserves instead. The result is that the negative effect of a poor investment year on the solvency capital is slightly diminished. The existing solvency capital can therefore be utilized to increase the proportion of the risky equity investments.

The partly funded pension system requires that all the pension institutions calculate their reserves using the same basis. As applied to the equity linked buffer this means that its value is not linked to the institution's own equity return but to the average return of the whole pension system. Collecting the figures from the pension institutions and calculating the average is done by the Central Pension Security Institute. Since the process takes some time, the result for each quarter can be published only about one month afterwards. In case an estimate of the equity linked buffer is needed earlier, a preliminary index figure can be used temporarily as a basis for calculations.

To avoid using estimations of the average equity return even temporarily, it was considered that the calculations could be based on the equity return of the previous quarter which would be known in time. However, simulation studies showed that this 3 month lag would diminish the effects of the buffer too much. For the equity linked buffer to work efficiently, it must be calculated using the equity return without any time lag.

Because the equity linked buffer is meant to operate in the pension system level, its effect should be uniform in all the pension institutions. To achieve this, it was decided that ratio of the equity linked buffer to the total amount of the reserves should be the same for all. When the pension institutions have first calculated the amount of the buffer using their own figures, the differences are then evened out by transferring money through the pooled part of the pension system. This will add a further lag to the time required to calculate the amount of the equity linked

buffer. In fact, calculating the final figure will take almost one year. Until this has been done, approximations have to be used.

The growth of the old age pension reserves has been decreased a little in order to direct capital to the equity linked buffer. To achieve the desired lower pension contributions it is necessary that eventually the money must flow back to the pension reserves. This has been achieved by defining an upper border for the equity linked buffer. The value of the upper border is 5% of the total amount of the reserves. When the buffer grows above this border the difference is transferred to the old age pension reserves.

There is also a lower border that is -10% of the total reserves. The purpose of this is to ensure that the buffer will not decrease too much the total amount of the reserves even in weak investment periods. It is expected, however, that in normal times this lower border will never be reached. Only a very long depression in the economy might result in the equity linked buffer getting to its lower limit.

To smooth the starting phase the weight used to calculate the equity linked buffer is only 2% in the year 2007 and will grow to the full value of 10 % during 5 years. After that period possible further increases in the weight may be considered.

5. A simulation of the equity linked buffer

The simulation figure (on the next page) shows how the equity linked buffer is expected to fluctuate. The figure shows the buffer as per cent of the total amount of the reserves.

The starting value of the equity linked buffer is zero in the beginning of year 2007. Because of the starting phase when the weight grows from 2% to 10%, the fluctuations are small in the beginning. The 5% upper border is shown in the picture. When the buffer grows above the upper limit, it stays there during the following year because of the time lag in calculating the exact amount of the buffer. The difference between the buffer and the upper border is transferred to the old age pension reserves in one year's time.

According to the simulation example, the equity linked buffer might reach its upper border first time after four years, but the expected time is about ten years. After that the upper border will be reached approximately in 40% of the years. In the simulation there are also realizations that don't reach the upper border any time in the 20 year's period. The probability of this is very small, however.

The figure shows also that the equity linked buffer is not likely to approach its lower limit of -10% of the reserves. In fact the buffer stays above -5% in the simulation example.

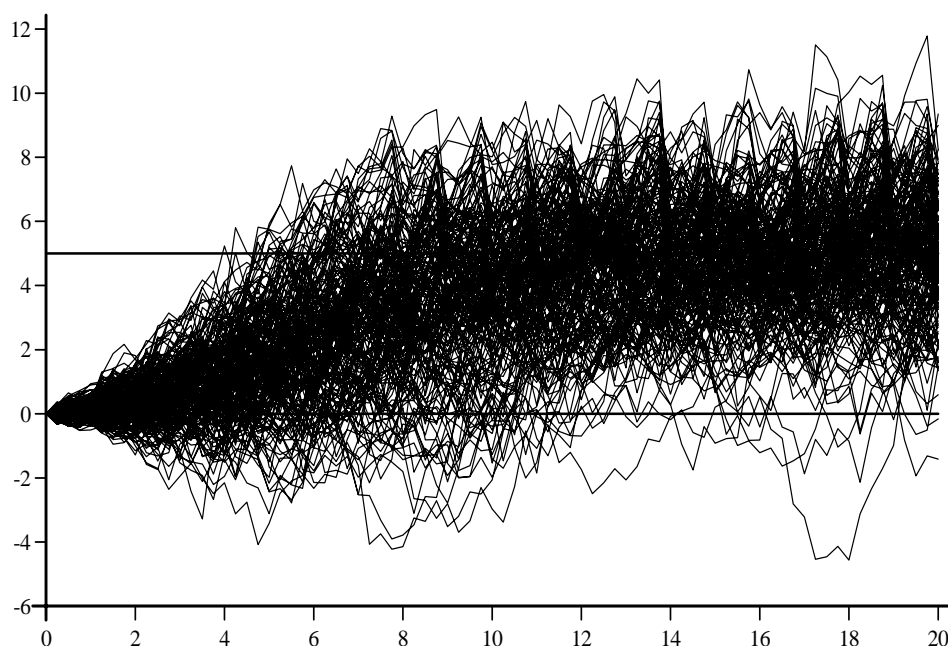


Figure: The equity linked buffer as per cent of total reserves

6. Estimated effects of the equity linked buffer

During the development of the new system simulation models were continuously used to estimate the effects of various proposed alternatives. Simulation studies show that the equity linked buffer should allow the proportion of the equities in the investment portfolio to be increased about 10 percentage points. At this stage it is too early to say to which extent this will be realised.

The effects of the reform depend on the actual increase in the proportion of the equity investments and the resulting change in the investment returns. These future returns are unknown and a long period of low equity returns is quite possible and has occurred in former times. In that case no positive results would result from the reform for a long time. However, it is more probable that the

equity returns will be higher than the bond returns by perhaps 3-4 percentage points, in which case the result would be a positive increase in the total returns.

Pension forecast models have been used to estimate how much the higher investment returns would lower the contribution level in the long run. It has been estimated that the contributions could be about 2 percent lower in proportion to the wages in 30 years time. This would mean that the pension contributions in the TyEL system would be 26-27% of wages at that time.

As mentioned before, a higher expected return must mean that the risk also increases. The equity linked buffer removes most of the increased risk away from individual pension institutions (there remains a small residual risk because the equity returns of a pension institution are always to some extent different from the average return). That means that the risk has been transferred to the level of the pension system, and in practice this means an increased volatility in the contribution level. Therefore, the forecasts of the future pension contributions are somewhat more uncertain than before the reform.

7. Conclusion

The working new equity linked buffer in the Finnish occupational pension system depends very much of the decentralized, partly funded character of the system. If the system were not decentralized, it would not possible to transfer investment risk from individual pension institutions to the system as a whole. In a wholly unfunded system there would be no investments. On the other hand, in a totally funded pension system it would not be possible to transfer money in and out of the funded part of the pensions as is done using the equity linked buffer.