Causes and consequences of the current financial crisis: what lessons for European Union countries?" Friday, 12 June 2009, London

Pension funds: the hidden side of the financial crisis

Preliminary draft; do not quote

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Introduction

As was the case after the market collapse in 2001, the current financial turmoil will reshape the political debate over the structure of pension provisions. Prefunded retirement accounts, individual, corporate and public, will be adversely affected by the crisis and neither private pension backlash nor government bail outs cannot be ruled out. Given long time horizons in retirement-income investing, the effects of the crisis can be compensated in the long term. However, individuals and pension funds will experience short-term stress, especially those close to the pay-out phase. Issues concerning the adequacy of retirement income and the absence of intergenerational sharing of portfolio risk are at stake. The question of the stabilising role of retirement institutions as well as of the pro-cyclical nature of funding requirements needs to be addressed. In fact, funding pressure could not come at a worst time as financial position of sponsors often matches that of pension plans.

This paper aims at identifying the sensitivity to market risk of pre-funded pension provisions in selected European countries and in the United States. It provides a thorough description of the risk-sharing features of pension plan designs and their implications for funding requirements. As matter of fact, the different forms of pension plans imply different degrees of risk and benefit guarantees requiring different regulatory frameworks, which may have an impact on asset allocation and on funding needs.

The trend towards risk-based regulation is analysed and a comparison of the regulations having indirect implications for plan design and risk-sharing is implemented. The trade-off between benefit protection and costs to the provider is also analysed and the risk of abandonment of certain pension arrangements is discussed. The role of accounting provisions and of their interaction and divergence from funding valuation standards is also discussed. We draw attention to the challenge of providing sufficient flexibility to pension funds in covering funding deficits while providing incentives to establish funding buffers in good economic times.

After having qualitatively characterised the sensitivity of private pension systems to market risk, we run a stress-test simulating the impact of changes in equity prices and in interest rates on funding ratios across countries. We also try to provide an answer to the question whether gains in term of lower contributions may be worth the cost of increased volatility of sponsor's financial statements due to different liabilities valuation methods.

We analyse the impact of the « perfect storm » of the period 2001-2003 (low interest rates and poor assets returns) on pension funds' solvability. We try to track failures in the regulatory framework having led to contribution holidays and underfunding as well as to overexposure to equity markets. Although immediate answers have concentrated on temporary easing of funding requirements and on prolonged recovery delays, we explore paths for redesigning private provisions and governance structures. Facing a generalised trend towards equalisation of expected risk-free rewards from public and private schemes we stress the need of a stronger emphasis on collective risk-sharing, within private pension provisions, as main risk originates from the inability to allocate risk across generations. We also put the accent on the need to better design private schemes in order to take into account the generosity of mandatory PAYG schemes, avoiding increasing poverty risk coming form a fall in benefits from both pillars.

The analysis concentrates on the four main pension funds markets: the United States, the United Kingdom, the Netherlands and Germany.

Pension funds features and risk sharing

In a decentralised market economy, when a financial shock occurs (strong assets depreciation) the whole consequences of the shock are borne by older generations, with no opportunity for them to share the risk with those who have not entered the labour market yet. When a demographic or a productivity shock occurs both generations are affected, the older one *via* dividend income, the younger one *via* wage growth. Yet, nothing ensures the optimal allocation of such a risk between generations, as such a risk is not tradable on financial markets. Collective savings provisions allow such risk sharing if all generations are bound to the contract and if there is no opportunity for opting-out (discontinuity risk). The risk of opting-out depends on pension funds features: it is a function of the probability of underfunding, of the funding ratio, of the delay in providing additional contributions in recovery plans, but also on the discretionary power of stakeholders on property rights, such as the appropriation of the fund's surplus. In order to limit the discontinuity risk, solvability rules have been introduced.

This chapter provides a detailed description of the risk-sharing features of pension funds and of their implications for funding requirements. The different types of plan design, pure defined benefit, hybrid, protected and unprotected defined contribution schemes, are also evaluated as they imply different risks and guarantees on benefits and require different regulatory frameworks. Full or conditional indexation rules, additional employer's and employees contributions as well as explicit rules on minimum return on investment and on protection and valorisation of accrued benefits also have an impact on asset allocation and on the need for reserves.

Conception of pension plans

Collective pension funds are organised according to a wide variety of legal entities. The different institutional features prevailing across countries play a crucial role in shaping the nature and degree of risk underwriting, the provider/beneficiary risk-sharing features, the investment policies and funding requirements.
Legal entities vary from direct sponsor underwriting to insurance companies similar to life insurance undertakings to autonomous pension funds. The former are entities legally different from insurance companies, linked to the employer who provides capital back-up in case of underfunding. Such plans present more often defined benefits promises with soft funding rules. The latter two entities are legally separated from the sponsor, not relying to the capital of the employer in case of underfunding. Such plans are often defined contributions promises with strict funding rules.

One exception is Germany where legislation establishes the ultimate guarantee of the sponsor even though *Pensionkassen* and *Pensionfonds* directly underwrite the underfunding risk. On the contrary in the Netherlands, the new collective DC funds, although financially linked to the sponsor, cannot rely on it in case of underfunding.

Table 1 : Institutional design of pension funds

	Germany	The Netherlands	United Kingdom	United States
Pension insurance companies and autonomous pension funds	**X**	**X**		
Pension funds with employer's underwriting			**X**	**X**

Rules of risk sharing between employer and subscribers are function of the extent to which the employer's promise is irrevocable. The engagement to ensure a certain replacement rate is an intergenerational contract which shares the cost of keeping the employer's promise among different generations. In traditional defined benefit plans the engagement is the strongest. Benefit depends on the reference wage (final wage or average career wage), of the length of activity and of the replacement rate promised. All risks (financial and longevity risk) are borne by the sponsor, even if the plan allows for an employee's contribution, since the employee's contribution rate is generally fixed and is not used as a lever to balance the fund. Two exceptions to this general framework are the Netherlands and, in more rare cases, the United Kingdom, where the employees' contribution rate can be raised, thus contributing to explain the survival of DB plans in these countries. This heavy burden for the employer together with a disaffection of younger employees towards DB plans considered unsolvable, have led to a progressive desertion of this kind of provisions, notably after the deterioration of funds' solvability following the financial crisis of 2001-2002.

Hybrid defined benefit schemes (HDB), which entail a certain degree of risk sharing between the employer and the employees, have progressively developed, notably in the Netherlands and in the United States. Two kinds of HDB plans have gained in significance : conditional benefit schemes, with benefits (or rather revalorisation of accrued benefits and indexation of benefits) depending on fund performance or on life expectancy of beneficiaries and cash-balance plans, functioning as individual notional accounts with a predefined rate of return (fixed, equal to an index or to a basket of funds). In the first kind of plans the risk for the sponsor is weak. Such plans are well developed in the Netherlands, where employer's contributions are fixed for five years and indexation of benefits. In the second kind of plans, even though the guaranteed rate of return is low, financial risk is still borne the sponsor before retirement, the sole longevity risk being borne by the beneficiary. On the other hand, after the annuity purchase the beneficiary bears all risk as the annuity price is function of life expectancy and of the interest rate.

A more radical change towards DC plans has occurred in the United States. In these DC provisions the employer's contribution is fixed and there is no obligation to increase it in case of underfunding. Within this kind of plans two types of schemes have developed with a different degree of risk sharing. In protected defined contributions plans (DCP), the employer's contribution rate is fixed and the fund « guarantees » a rate of return on investment. In case of underfunding benefit is reduced, the risk being borne by pensions as well as by accrued benefits not yet in payment, with no change, however, in the way future contributions are calculated. In unprotected defined contributions plans (DCU) the employer's contribution rate is fixed, but the fund does not guarantee any rate of return during the capital build up phase. At retirement the beneficiary can acquire an annuity and lock in a defined

benefit. The transfer of the risk (both financial and longevity risk) is then borne by the fund after retirement in case of annuity purchase.

Table 2 : Type of plan

	Germany	The Netherlands	United Kingdom	United States
Defined Benefits	Almost entirely	71.6% (of which 58% hybrid)	n.a.	38%
Defined Contributions	DCU Prohibited as at least guarantee of accrued benefits	28.4%	n.a.	15% DCP 47% DCU

Explicit rules on plans' nature can also influence risk exposure of the different stakeholders. Legislation can impose the type of benefit, annuity or capital, where the annuity transfers the financial and longevity risk on the employer after retirement. The most common type of benefit in Europe is the annuity, often associated to defined benefit promises. Minimum return regulations can make the risk on the employer asymmetric, thus leading to a more defensive investment and to a lower return on investment. Few countries impose such regulations, but accrued benefits, (cumulated capital), is protected in most countries. In Germany the amount of cumulated contributions is guaranteed, corresponding to a minimum return rule of 0%. One exception are the Netherlands, where upon approval of employees, of the employer and of the supervisory authority, cumulated capital cannot be ensured. In the United States multi-employer plans can modify irrevocably the choice between annuity or capital as well as any increase in accrued benefits decided in the previous five years. On the other hand, rules on revaluation of accrued benefits exist in few countries, notably those guaranteeing a low public pension or those, where the public pension can be replaced by an occupational pension. In the United Kingdom revaluation of accrued benefits as well as of benefits in payment is mandatory, with a lower limit in the Consumer Price index (CPI) and a ceiling at 2.5% since 2005. The opportunity to increase employees' contributions in case of underfunding, is another lever of adjustment to equilibrium and of risk sharing. Generally the employee's contribution is fixed, with the exception of the Netherlands and of the United States. Since 2000 Dutch funds use this adjustment tool. In the United States this opportunity is limited to DC plans of the 401(k) type, which solely permit tax deduction of employees' contributions.

Table 3 : Type of benefit

	Germany	The Netherlands	United Kingdom	United States
Annuity	**X**	**X** **99.5%**	**X** **86.1%**	**X**

Lump sum	**X** Possible		**X** **Max (1/3)**	**X**

Table 4 : Guarantees offered by pension funds

	Germany	**The Netherlands**	**United Kingdom**	**United States**
Required return rate	Minimum 0%* Guarantee of cumulated contributions	No	No	No
Employees' contribution	Fixed	Function of performance	Fixed	Taxed for DB and DC excepted 401(K)
Revaluation of accrued benefits	**O**	**O**	**M** CPI Capped at **2.5%**	**O**
Indexation of benefits in payment	**M** CPI or 1% Excepted if surplus to benefits	**O**	**M** CPI Capped at **2.5%**	**O**

O=optional, M=mandatory

Strong deterioration of DB plans' solvability, notably since 2001, has driven funds development towards a reduction in employer's promise as to benefits purchasing power. Limits to indexation of benefits allow for shifting the burden of adjustment to pensioners and to older generations in case of underfunding. Indexation deferral is often due to the fact that funds surpluses are not used to increase benefits. Full price indexation is mandatory in countries where DB plans prevail, it is optional in countries with hybrid DB or DC plans (the Netherlands and the United States).

Funding regulation

We examine different approaches of regulatory authorities to valuing pension liabilities (choice of the discount rate, accounting for the future increase in wages and benefits), as they have an impact on plan design and on funding needs. This paper also analyses divergences in funding ratios and their implications for plan design. Such funding rules ensure that pension funds are sufficiently capitalised to satisfy promises towards beneficiaries. Rights to excess assets or surpluses, rules on contribution holidays and overfunding ceiling influence different sensibility of pension schemes to market risk across countries. The trade-off between benefit protection and funding costs affects the risk of opting-out of future generations as well as the risk of desertion by the sponsor.

The funding ratios required by supervisory authorities aim at ensuring a certain degree of benefit protection at an acceptable cost in terms of level and volatility of contributions, such a cost affecting both the willingness of the sponsor to provide pension provisions and that of younger generations to stay in the plan. Such ratios differ and are not comparable among countries. The methodologies for evaluating liabilities required by supervisors differ among countries as far as the discount rate, the way future increases in wages and benefits are taken into account, the minimum funding ratio and the premium to the pension protection fund. Some countries, as for example Germany, fix a maximum actualisation rate often linked to public bonds rates. Some other countries, like the Netherlands and the United Kingdom, use market rates (corporate bond rates). The lower the liabilities actualisation rate, the higher will be the present value of liabilities. Moreover, a fixed actualisation rate implies a lower volatility and a low sensitivity to changes in the interest rate, stable liabilities and a low return defensive investment strategy aimed at maintaining a regular level of assets. Taking into account future increases in wages and benefits, when evaluating liabilities, implies a higher level of liabilities.

Strict funding rules exist in countries where there is not direct underwriting of pension promises by the employer (pension insurance companies in Germany and in the Netherlands) and in countries where there are no risk-sharing opportunities (conditional indexation and additional employees' contribution). In Germany the minimum funding ratio for *Pensionkassen* is 104.5%. In the Netherlands, for a funding ratio lower than 105% benefit indexation depends on the short-term (three years) recovery plan which is automatically launched and agreed by the supervisory authority (the Central bank). For a ratio lower than 130% benefit indexation is conditional upon the long-term (15 years) recovery plan. Such strict rules with short recovery periods affect the fund's investment strategy leading to a more defensive asset allocation. The obligation for the sponsor to provide additional contributions in case of underfunding was one of the causes of the shift to fund types with higher risk-sharing features, such as hybrid DB plans in the Netherlands and DC plans in the United Kingdom. In fact, in defined benefit plans benefits are guaranteed and any deterioration in the fund's funding position ends up in an increase in employer's contributions.

Symmetry towards risk for the sponsor can be restored, when, in case of favourable results, the employer can put on hold his contributions or withdraw the surplus and when ceilings on funding exist. In the United States high taxation of the surplus in case of fund termination has favoured the shift to hybrid DB plans, rather than to DC plans, which would have required the initial plan termination. In many countries some benefit protection funds have been established, with the aim of guaranteeing part of the benefit promise in case of bankruptcy. If such funds provide workers and retirees with a security net, they nevertheless increase costs for the employers, who must pay a premium to the protection fund.

Table 5 : Funding regulation

	Germany	The Netherlands	United Kingdom	United States
Liabilities actualisation rate	Fixed 2.25%	Interbank swap market yield curve	High-grade corporate bonds rate (AAA)	T-bond 30 years until 2002 Corporate bonds rates (AA) after 2002
Futur wages and benefits	No	Yes if indexation and revaluation	Yes	No

Minimum funding rate	104.5%	105%	No, statutory, spécific to each fund	100%
Additional contribution for recovery	In 3 years if <104,5% Immediate if <100%	In 3 years if <105% In 15 years if Pr(>100%) <97.5%	Yes	Yes
Benefit protection fund	Yes	No	Yes	Yes
Limits to overfunding	No For Pensionkassen trade-off Surplus-indexation	No		100%
Contribution holidays		Option	Option	Option
Surplus withdrawal		According to fund rules	Upon trustees' agreement	Yes since overfunding taxed at 50%

Accounting provisions

We address the role played by accounting provisions and their interactions with evaluation rules connected to funding rules. We show that the trend towards market-based valuation methods in business accounting is not entirely consistent with the parallel exercise undertaken by many pension regulators, as fair-value accounting standards (with immediate recognition of actuarial gains and losses) can contribute to higher funding levels than required by regulators.
The regulator's point of view differs from the one of the sponsors as far as the evaluation of assets and liabilities of the pension fund are concerned. The evaluation of the liabilities of DB plans for accounting reasons is based on all countries on the (IAS19) standards (FRS17for the United Kingdom). This accounting reference applies to all quoted European companies since 2005.

Within the IFRS (IAS19) framework liabilities are evaluated with the method of the *projected unit credits* using as the actualisation rate the rate of corporate bonds and taking into account future increased in wages and benefits.
The use of the rate of *high-grade* corporate bonds, a higher rate taking into account a risk premium, end up in a lower evaluation of the present value of pension liabilities. Such a rate also implies a high sensitivity of pension liabilities to changes in the interest rate and a higher *duration* in the funds' portfolio.
Taking into account future increases in wages and in benefits increases the value of liabilities. Wage increases are based on projections of productivity growth, of the age structure of careers and of the inflation rate. Benefits increases take into account life expectancy projections.
The evaluation of the assets according to the *fair value* method, implies the immediate accounting of gains and losses. In certain cases the IAS19 standards increase the value of liabilities and their volatility compared to regulatory provisions. The evaluation of the assets

at the fair value may oblige the funds to cumulate more assets than required by the regulatory framework.

Stress test

This chapter analyses quantitatively the sensitivity of different prefunded pension schemes to market risk. We run a stress test which allows appreciating the sensitivity of the funding ratio of pension funds to financial markets conditions.

We simulate a 10% and a 20 % increase and fall in equity prices as well as a rise and a reduction of 50 and 100 basis points of the interest rate. We assume that the investment strategy is the one reflected in the effective share of equity and bonds in 2007 according to the financial accounts of the national account systems. We also make the rather restrictive hypothesis, in this period of falling prices of real estate and credit derivatives, that the value of the other assets is stable. The initial funding ratio is set equal to 100% in each country as the different methodologies for evaluating assets and liabilities differ among countries. However, a second simulation is run in each country using the effective funding ratio provided by the regulatory authorities whenever possible, otherwise by the National Accounts.

The main differences in results among countries come from the different investment strategies and from the actualisation ratio used for evaluating liabilities.

In the worst scenario analysed in our simulation (a simultaneous fall of 20% in equity prices and of 100 basis points of the corporate bonds interest rate) the country which is the most affected is the United States, with a fall of the funding ratio to 67.5% from the initially balanced position. Such a ratio would imply a seven-years recovery plan, but would also qualify the fund as being in the critical range (65%), calling for a cut in future benefits by a change in their calculation. This result is due to a higher equity exposure (72.3%). The recent use of the corporate rate as the actualisation rate contributes to the deterioration of the funding ratio by increasing the value of liabilities. If the previous Treasury bond rate were used the funding ratio would have limited its fall to 86.6%. For a funding ratio at 104.4% corresponding to the effective one at the end of 2007, the worst scenario would entail a drop in the funding ratio to 70.5 %.

Table 6: United States : Funding ratios

Interest rate change (basis points) Equity price change	100	50	0	-50	-100
20%	145,5	129,1	114,5	101,5	90,1
10%	136,3	120,9	107,2	95,1	84,4
0%	127,0	112,7	100,0	88,7	78,8
-10%	117,7	104,5	92,8	82,3	73,2
-20%	108,5	96,3	85,5	76,0	67,5

The second most affected country by the deterioration of financial conditions is the United Kingdom, with a funding ratio falling to 71.9 %. Again, it is a high equity exposure (52.2 %) which determines such a result. Starting from the effective funding ratio of 111% at the end of 2007 the worst scenario would reduce the funding ratio to 79.8 %.

Table 7: United Kingdom : Funding ratios

Interest rate change (basis points) Equity price change	100	50	0	-50	-100
20%	138,5	123,7	110,4	98,6	88,2
10%	131,8	117,8	105,2	94,0	84,1
0%	125,1	111,9	100,0	89,4	80,0
-10%	118,4	106,0	94,8	84,8	75,9
-20%	111,7	100,1	89,6	80,2	71,9

The third most affected country by the deterioration of financial conditions is the Netherlands, with a funding ratio falling to 83.1 %. The equity exposure is lower (43 %). Starting from the effective funding ratio of 144% at the end of 2007 the worst scenario would reduce the funding ratio to 105.7 %.

Tableau 8: The Netherlands : Funding ratios

Interest rate change (basis points) Equity price change	100	50	0	-50	-100
20%	136,0	121,5	108,6	97,1	98,3
10%	130,5	116,7	104,3	93,3	94,5
0%	124,9	111,8	100,0	89,5	90,7
-10%	119,4	106,9	95,7	85,7	86,9
-20%	113,9	102,1	91,4	81,9	83,1

Germany stands out as the least affected country because of the lowest equity exposure (31.3%) and of the use of a fixed rate on public bonds as the actualisation rate. This implies a limited deterioration in the solvability with a funding ratio falling to 96%.

Table 9: Germany : Funding ratios

Interest rate change (basis points) Equity price change	100	50	0	-50	-100
20%	104,2	105,2	106,3	107,4	108,5
10%	101,1	102,1	103,1	104,2	105,4
0%	97,9	98,9	100,0	101,1	102,2
-10%	94,8	95,8	96,9	98,0	99,1
-20%	91,7	92,7	93,7	94,8	96,0

Developments after the Internet bubble burst

This chapter analyses the impact of the 2001-2003 crisis on the solvability of pension funds in order to find out weaknesses in the regulatory framework conducive to structural underfunding and contribution shortages as well as to overexposure to equity.
During the 1990s exceptional performance of equity markets has risen interest for prefunded schemes in a context where sustainability problems of mandatory pay-as-you-go (PAYG) systems were put forward and where reforms diminished their generosity.
Good returns from prefunded schemes did have consequences on costs of sponsoring firms. Periods of contribution holidays have diminished wage costs (notably in the United States, where contributions are tax deductible just in case of underfunding), have increased firms' profitability, thus nourishing the overestimation of returns on invested capital. In the United States DB funds have calculated their contributions on the basis of an anticipated return rate of 8% on the 1997-2007 period. At the same time the increase in life expectancy had been underestimated. The exposure of pension funds to equity investment has also increased. In the United States it passed from 42.9 % in 1985 to 70.9 % in 2001. In the United Kingdom, where the bias towards equity was already important the share of equity in total assets went from 67 % in 1987 to 69.1 % in 1999. The most spectacular increase in the share of equity has taken place in the Netherlands where it went from 8.5 % in 1986 to 48.3 % in 2001.

The burst of the Internet bubble has led to a deep deterioration of the financial situation of pension funds. In addition to the fall in assets' value, the concomitant fall in interest rates, in a context where governments reduced massively their debt, has led to an increase in the present value of liabilities, further worsening the funding ratios. Fall in assets value has been massive in the United States and in the United Kingdom (-20% and -17 % respectively between 1999 and 2002), more moderate in the Netherlands (-7 %), where the average funding ratio has nevertheless dropped from 130% in 2000 to 105% in 2002. According to the *Pension Protection Fund* in the United Kingdom, 81% of pension funds were in deficit at the end of 2002. In the United States the funding ratio of the funds adhering to the PBGC fell from 153.2 % in 1999 to 75.3 % in 2003.

The sharp increase in refunding costs for the sponsors of DB funds has pushed them to close this type of plans to new workers and to opt either for hybrid forms or for DC plans. In the United Kingdom the *Pension Protection Fund* has been established following the example of provisions already existing in the United States and in Germany and aiming at protecting workers and retirees against the risk of sponsor bankruptcy. The development of such provisions has ended up in a policy of premia entailing a bias in favour of a structural underfunding with a cost potentially high for the taxpayer.
Although some differences exist between the financial crisis of 2001-2002 and the present one, the drop in equity prices has gone along with a fall in the long term interest rate. During the 2001 crisis such a fall had led to a significant fall in the annuity rate; one observes again a 5% drop in the annuity rate in 2008 in the United States. Moreover, during the 2001 crisis in the United States an important postponement of retirement age took place entailing an 0.7 point increase in the participation rate of those older than 65 between April and November 2001. According to a Watson Wyatt survey on firms belonging to FTSE100, an increase in the contribution rate (employer and employee) from 13 % to 14.7 % has been observed between 2004 and 2008 in the United States.

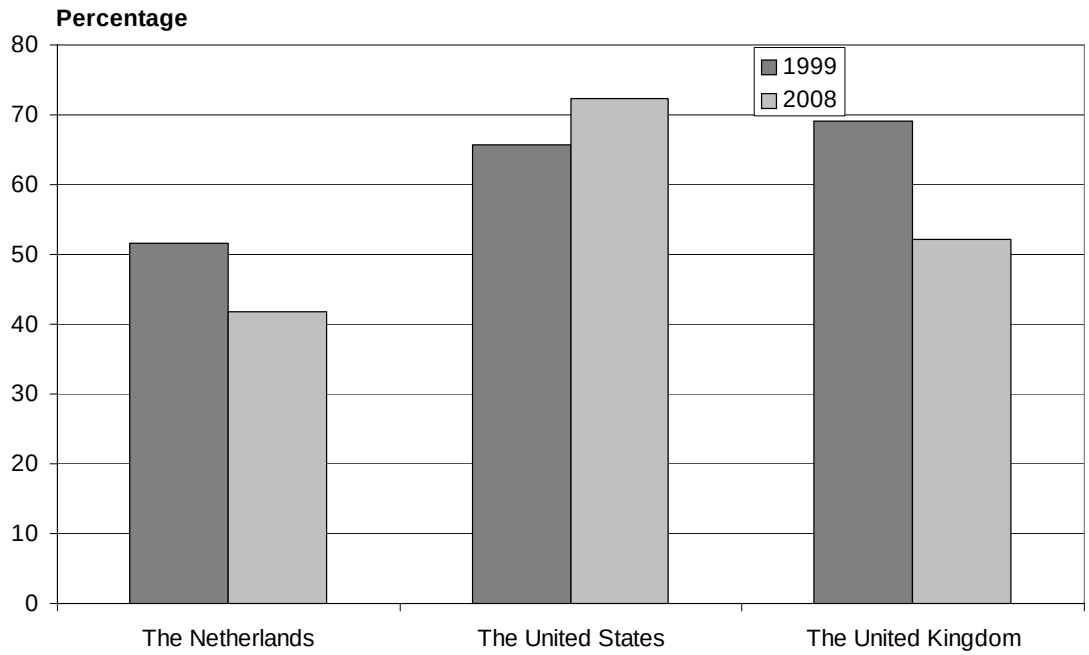
Pension funds in the financial crisis

If the fall in assets value is common to the previous crisis the drop in interest rates on public bonds has gone along with the increase in the risk premium on corporate bonds. For those countries using the interest rate on corporate bonds (AAA and AA) such a development means a higher actualisation rate and a fall in the present value of liabilities. This has hidden the deterioration of funding ratios notably in the United States, in the United Kingdom and in the Netherlands, but constitutes a Damocle's sword for pension funds budgets in case of an upswing in the corporate bond market. Moreover the downward revision of inflation expectations to which future benefits are indexed, contributes to lower the estimation of liabilities.

The stricter required funding conditions (under FTK in the Netherlands and the *Pension Protection Act* since 2006 in the United States) have reduced the risk of underfunding but may have increased the stress on the sponsor's budget, thus contributing to the spiral of assets depreciation and to the increasing conditionality of benefits. Where solvability rules based on fair value and on quantitative risk management exist, pension funds may not play the stabilising role and may act pro-cyclically by selling equities. Although one should not exaggerate the impact of the crisis, because of the long-term investment horizon of pension funds, there may be severe consequences for workers close to retirement, notably in countries with hybrid DB and DC plans.

Although most countries had reduced their equity exposure following the 2001 crisis (Graph), the more and more intensive use of financial instruments aimed at better hedging against risk (interest rate, inflation, longevity) and the increase in alternative investment (hedge funds, private equity funds, real estate) aimed at raising the return compared to a benchmark, may have introduced a higher counterparty risk.

Graph 1 : Share of equity in pension funds' assets

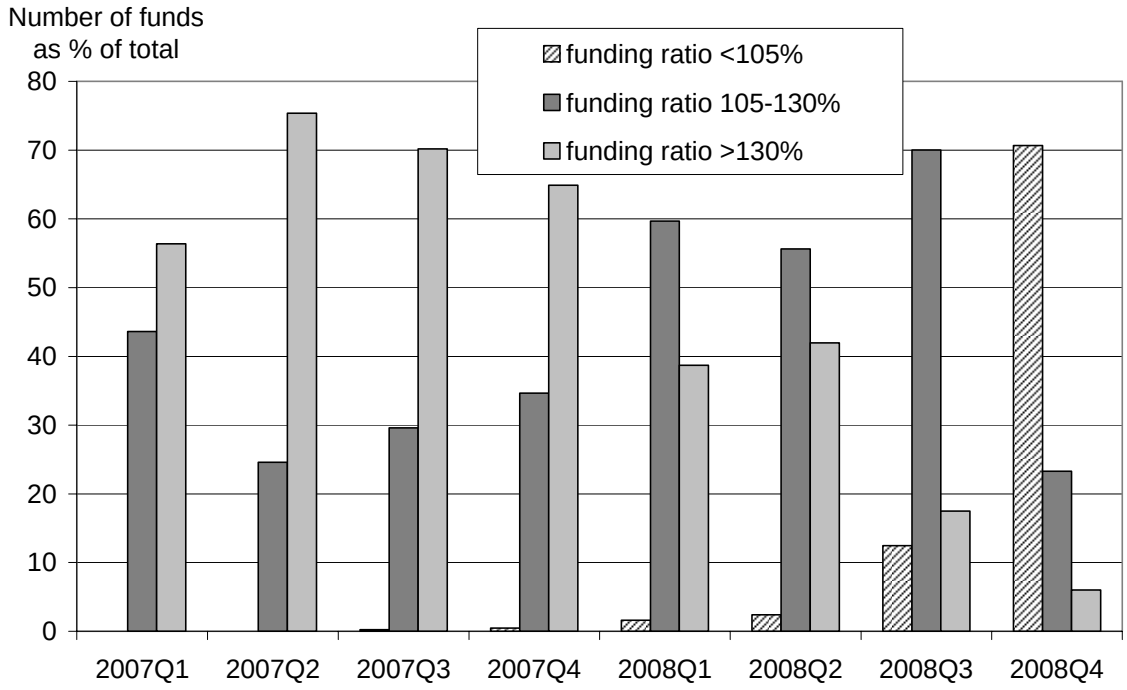


In the United Kingdom the share of funds in deficit among those eligible to PPF was 54.4% in 2007. The average funding ratio fell from 111% in April 2007 to 80.4% in April 2009. In spite of a 26% increase in firms' bankruptcy during the third quarter 2008 (on a year-to-year basis) there has been no immediate increase in the claims to the PPF at the end of 2008,

according to the *Purple Book* 2008. Some important changes in the British pension funds landscape cannot be excluded, thus strengthening existing trends. The annual survey of the *National Association of Pension Funds*, in January 2009 interviewed 100 among the largest funds. 45% of DB plans which are still open have signalled their willingness to shut down in the next five years. Moreover, 19% of the existing beneficiaries could be transferred to DC plans and 35% in plans with more risk-sharing features. The shift to DC plans could concern 800000 workers, and the shift towards hybrid provisions one million additional workers. Such a trend would concern also closed funds, 13% of which could shift to DC promises, thus affecting 197 000 workers.

In the Netherlands the average funding ration fell from 141% in the first quarter of 2007 to 95% in the fourth quarter 2008. In the last quarter 2008, 71% of all funds had a funding ratio lower than 105% against 0.5% at the end of 2007. This concerns 87% of the insured that is 4 800 000 workers and retirees.

Graph 2 : The Netherlands : Recent trends in funding ratios

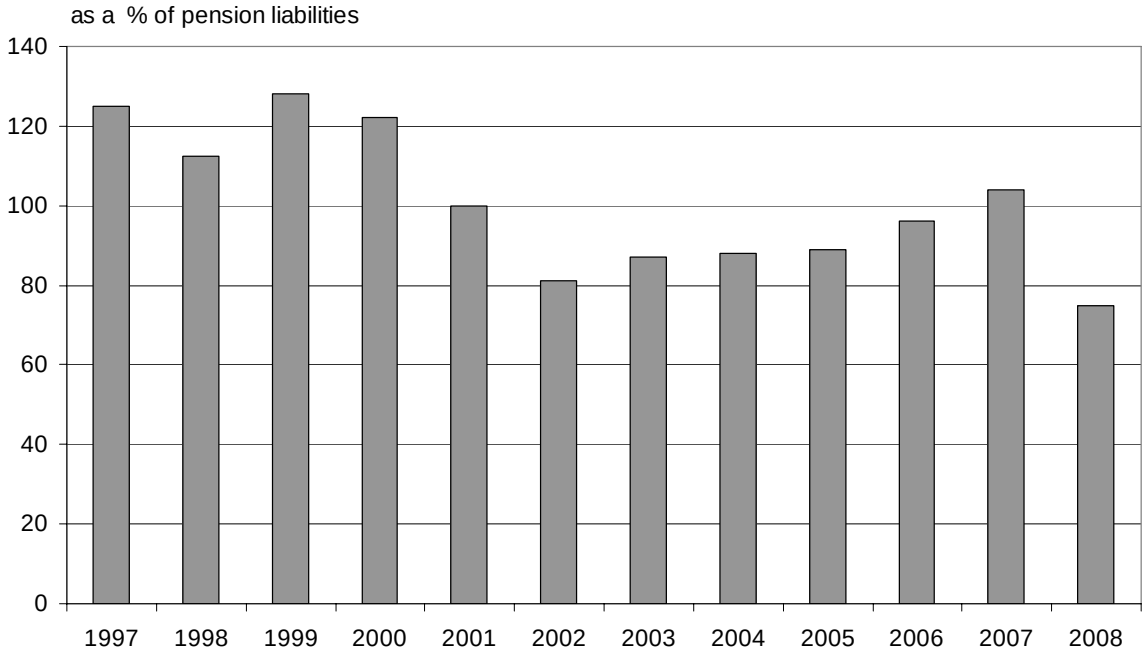


In Germany, at the end of 2008 the benefits guarantee fund (PSVaG) was still over-funded. It appears not to have suffered from the financial crisis in 2008 as the number of claims fell by 21%. However, past experience calls for some prudence as in 2002 the number of claims had increased by 86 % causing a two points increase in the premium rate.

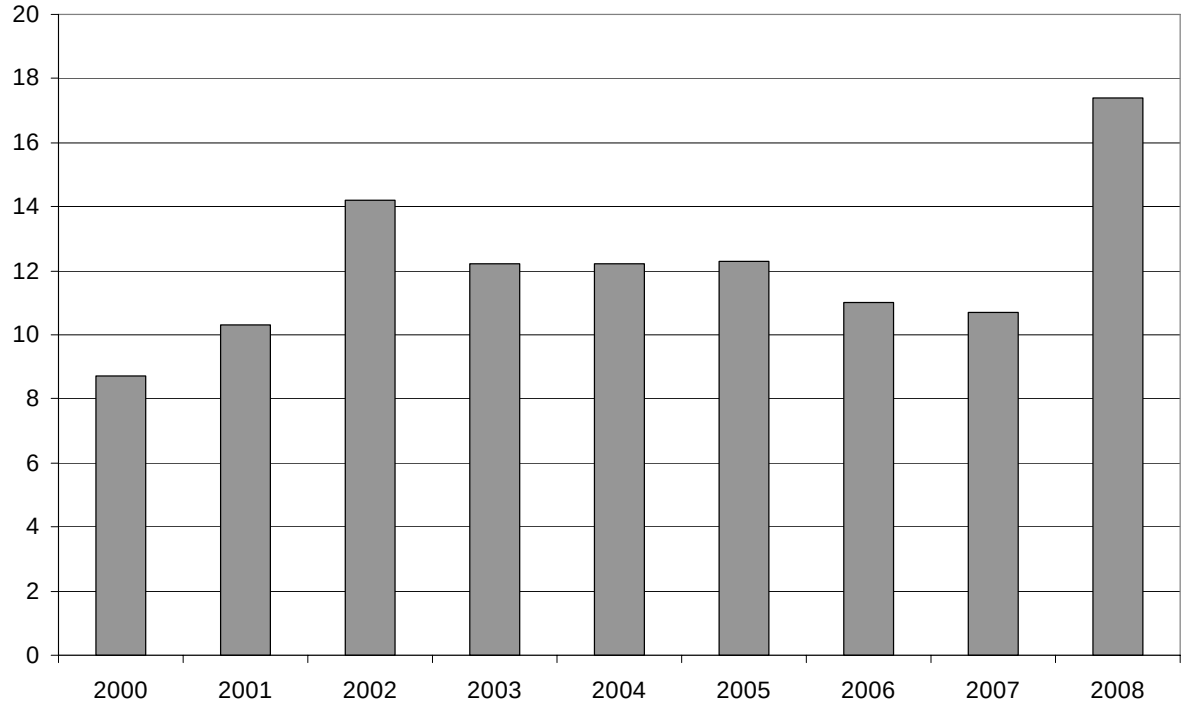
In the United States, there has been a 28% fall in pension funds' assets value. According to the consulting firm *Mercer*, 44.2% funds among those participating in the S&P1500 index were underfunded in 2007 and only 25.4%of them were over-funded. The average funding ratio fell from 122% in 2000 to 75% in 2008. Pension funds have become an increasing cost for S&P1500 firms : pension liabilities have increased from 8.7 % of market capitalisation in 2000 to 17.4 % in 2008 with a consequent change in the share of employers' contributions in

net cash flow from 2.2% in 2000 to 4% in 2007). According to *Mercer*'s projection of contributions increases in 2009 the profitability of S&P1500 firms is expected to decline by 8% in 2009. Nevertheless the average return on investment of S&P1500 firms' pension funds attained 9.6% during the 1997-2007 period against an anticipated rate of return of 8.6% on average on the basis of which contributions have been calculated.

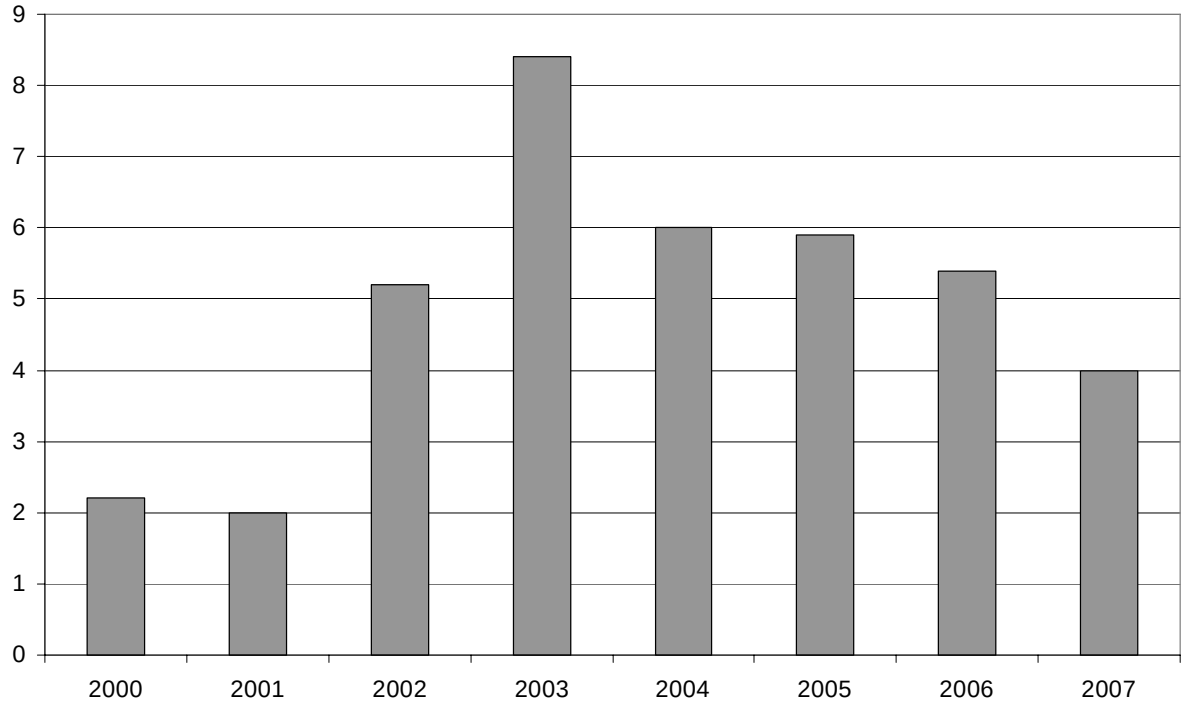
Graph 3 : Funding ratio of the pension funds of the S&P1500 firms



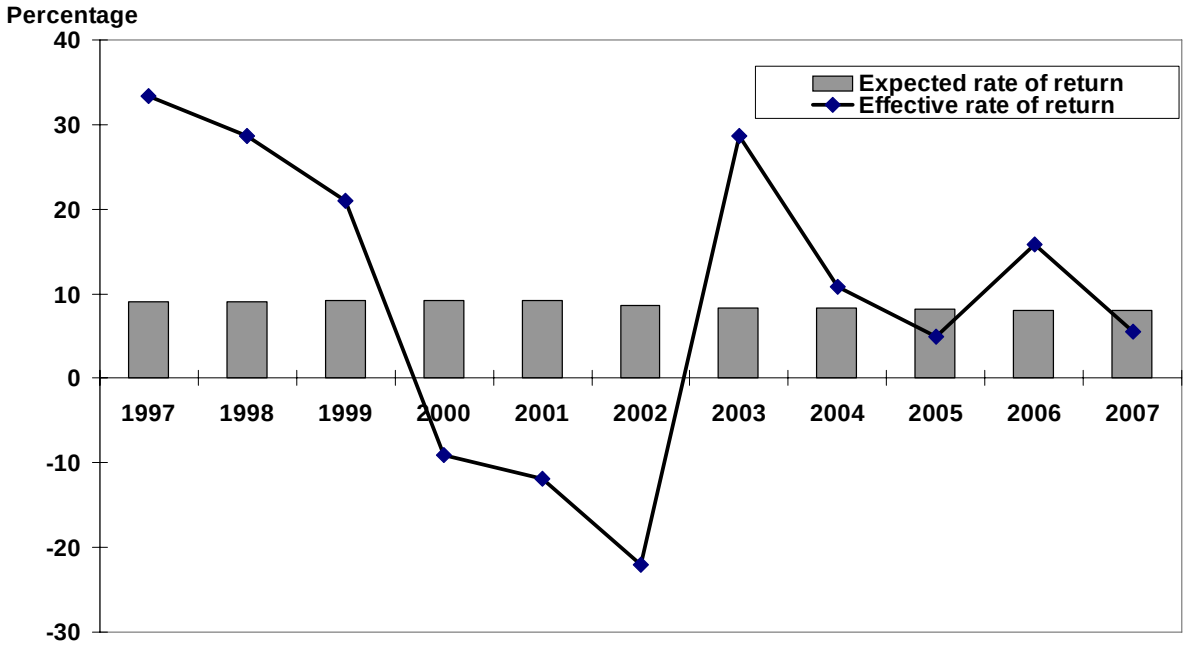
Graph 4 : S&P1500 firms: pension liabilities as a percentage of market capitalisation



Graph 5 : S&P1500 firms: employer's contributions as a percentage of net cash flows



Graph 6 : Pension funds of the S&P1500 firms



Because of its structural underfunding (see Graph 13), the PBGC will not easily face the deterioration in pension funds solvability ; many observers wait for the taxpayer to be called for rescue (notably after the nationalisation of *Freddie Mac* and *Fannie Mae*). Since the *Pension Protection Act* of 2006 funding rules have become stricter and premia have been augmented according to the risk of future liabilities. But premia have already much increased (see Table Mais celles-ci ont déjà fortement augmenté (voir tableau 10) and a further increase would imply an additional burden on the already stressed balance sheets of the sponsoring firms. The remaining solution is a cut in benefit level (PBGC guarantee) or a higher return on PBGC's investment. It is the latter strategy which has been adopted by the PBGC. Until February 2008 75% of assets were invested in bonds (with a maturity coherent with the liability structure). The new riskier strategy allocates 45% of assets in bonds, 45% in en equities and 10%in alternative assets. In case of no change in PBGC guarantee policy, if the taxpayer is called to recapitalise the fund, it may be reimbursed by the higher return in the long term.

Graph 7 : Net assets of plans insured by the PBGC

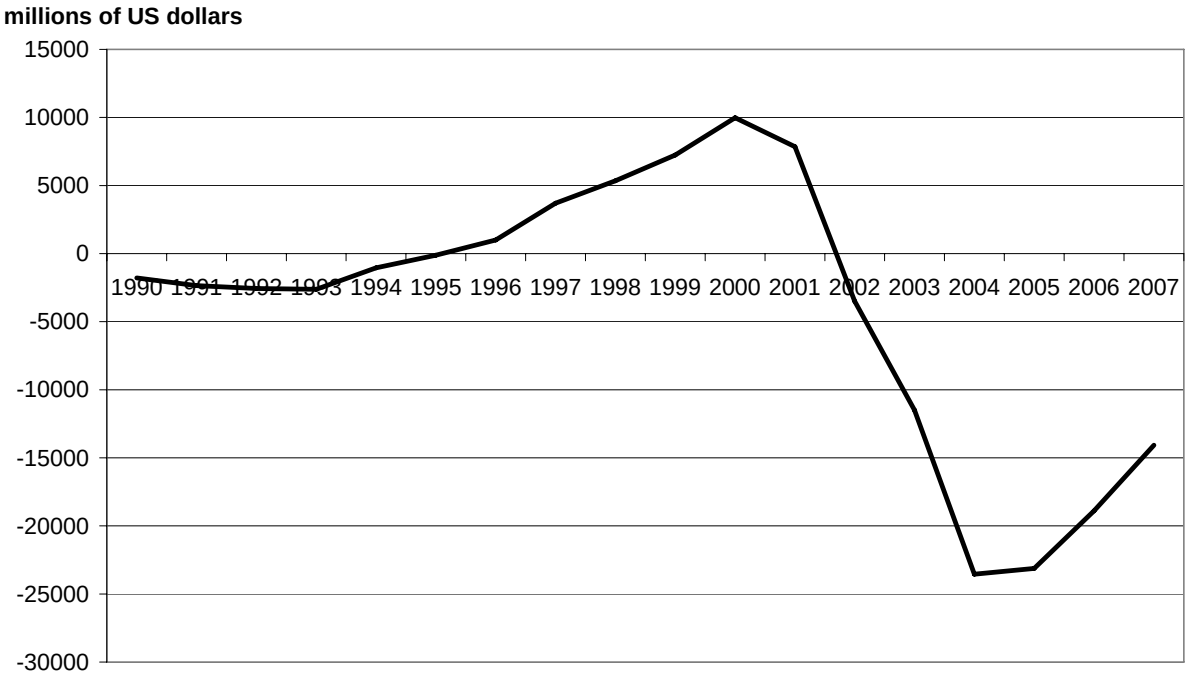


Table 10 : Premium to PBGC

	Taux par adhérent (en dollar)
1974-1979	0.50
1979-1980	1.0
1980-1984	1.4
1984-1986	1.8
1986-1988	2.2
1988-2005	2.6
2006-2007	8
2008	9

Macroeconomic consequences

The macroeconomic consequences of the deterioration in the financial situation of pension funds are important.

The sponsoring firms of DB plans will be called to increase their contributions to the pension funds and will have to direct an increasing share of their cash flow to consolidate the funds' balance sheets. They will have to count on less resources to finance investment projects. In addition to that the lower ratings due to their pension funds' deficit will increase the financial costs, thus limiting their availability of credit and their investment. Cela le laissera avec moins de moyens pour financer des projets d'investissement. The increase in employer's contributions will negatively affect firms' profitability and competitiveness. On the other hand, call for employees to participate to pension funds' recovery with an increase in their contribution could entail a spiral of wage increases or rather a loss in their purchasing power. Moreover, benefit guarantee has shown its limits in plans, like DC ones, which do not allow for any intergenerational risk sharing. The negative impact on consumption could be

important in countries where this kind of plans is well developed. An increase in precautionary savings is highly probable facing a greater uncertainty on the level of pension benefits and of employees' contributions. Public finances may also be affected as iin case of underfunding contributions to pension funds (notably in the United States) are tax-deductible, thus leading to a loss in fiscal revenues.

The ways out of the crisis

Immediate answers of regulators and supervisory authorities have concentrated on the temporary softening of funding rules and on the deferral of recovery plans.

In Germany, the supervisory authority, BaFin (*Bundesanstalt für Finanzdienstleistungsaufsicht*), introduced an obligation of weekly information on liquidity, on funding ratios and on assets value for the largest pension funds and pension insurance companies. A change in the actualisation rate, in case of a prolonged fall in interest rates has also been evoked.

In the Netherlands, the submission delay for recovery plans has been postponed to April 2009 and the delay for recovery has been spread on five years (from the original three). In addition to that any cut in benefits included in the recovery plans will not take place before the end of 2011. Moreover, it is now possible at retirement to use half of the capital to buy a five-years annuity, and to defer the acquisition of the remaining annuity later on in order to avoid locking in positions at time of low asset prices.

In the United States the *Pension Protection Act* of 2006 already introduced the suspension of minimum funding requirements in case of temporary difficulty of the employer. The *Worker, Retiree and Employer Recovery Act*, signed at the end of 2008, adds the possibility to suspend the recovery plan for funds which were already underfunded in 2008 if they are unable to maintain the recovery schedule. It also defers the cut in future benefits for funds with a funding ratio lower than 65%. It introduces the opportunity to smooth losses in assets value, by spreading them over two years.

In the United Kingdom, the system is already quite flexible in case of strong stress on the sponsoring employer, allowing him to renegociate the recovery plan previously established with the Pensions Regulator. Moreover a debate has started within the PPF on a temporary suspension of premia. The government is also evaluating the opportunity to facilitate the return of fund's supluses to the employer.

In the United Kingdom the *National Association of Pension Funds* has adressed to the government and to the supervisory authority a few requests :

- More issues of long-term public debt allowing firms to easier short term financing with no crowding out by the public sector. Moreover this additional supply of bonds would help raise long term interest rates thus leading to a lower evaluation of liabilities.
- Reschedule the delays of recovery plans from 10 to 15 years.
- More hybrid DB plans than pure DB and DC ones.
- Explicit guarantee of the government as a lender of the last resort of the PPF.

The regulatory and supervisory authorities should be able to part temporary effects of the economic cycle on the sponsor's balance sheet and the more structural changes aimed at improving the fund's sustainability. Even though excessive regulation could have negative effects on the sponsors, leading to bankruptcy or to fund termination, nevertheless, some flexibility in difficult times should be accompanied by the stakeholders' engagement to increase funding in good times. This would limit the asymmetry of the present system, thus strengthening the rules as well as the incentives to increase funding in good times in order to create a buffer to be used during the downturn.

Some technical elements are also worth being revised. The actualisation rate should take into account the risk and maturity structure of liabilities, better reflecting the schedule of benefit payments. A debate on the proper actualisation rate has been opened in the Netherlands and in the United Kingdom. A smoother asset pricing, as it has been introduced in the United States could emancipate balance sheets evaluation from market volatility. Premia to benefit guarantee funds should be a function of the risk of underfunding of the participating fund. For DC plans the introduction of a certain amount of flexibility at the acquisition of the annuity, as it is the case in the Netherlands, could allow to defer the acquisition in periods of low assets prices. Least but not last the opportunity to share the risk among generations allowed by hybrid DB plans is the better guarantee of a reduction in losses for those generations hit by a financial crisis at the time of retirement.