

An EDHEC Risk and Asset Management Research Centre Publication

The European Pension Fund Industry Again Beset by Deficits

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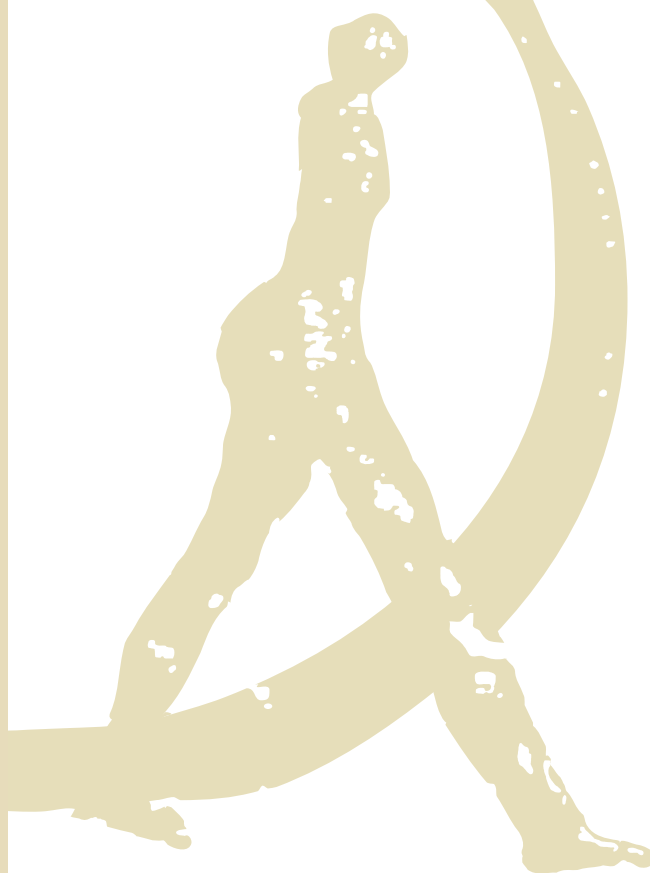
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Abstract

In 2003, the pension fund industry was severely affected by the steep fall in equity prices and the fall in interest rates. This fall and its consequences led to broad regulatory changes and spurred work on asset and liability management theory and techniques. But it seems that these new regulations and techniques have not enabled the pension fund industry to weather the current return of the perfect storm? We go over recent publications and look into the reasons for the fall in funding ratios.

About the author



Samuel Sender has participated in the activities of the EDHEC Risk and Asset Management Research Centre since 2006, first as a research associate—at the same time he was a consultant to financial institutions on ALM, capital and solvency management, hedging strategies, and the design of associated tools and methods. He is now a full-time applied research manager at the EDHEC Risk and Asset Management Research Centre. He has a degree in Statistics and Economics from ENSAE (Ecole Nationale de la Statistique et de l'Administration Economique) in Paris.

I. European Pension Funds Are Now Underfunded



I. European Pension Funds Are Now Underfunded

Figure 1

	USA, top 100 Funds	UK	Netherlands	Switzerland	without state guarantee	with state guarantee
Funding ratios. Dec. 07	109%	100%	144%	110%	114.4	94.5
Funding ratios. Dec. 08	79%	80%	95%	93,7%	97,5	82,3
Basis	Accounting	Prudential	Prudential	Prudential	Prudential	Prudential
Source	Watson Wyatt (2009)	The Pension Regulator (2009)	DNB (2009)	Swiss regulator	Swiss regulator	Swiss regulator

The two leading pension industries in the European Union, those in the UK and the Netherlands, are now underfunded.

As in 2003, the decline in equity markets (and in the market for risky assets) has lowered the market value of assets, while the decline in interest rates increased the value of liabilities.

That we are compelled to say that pension funds have been devastated by the current crisis in the very same way as they were after the perfect storm of 2003 is very disheartening. After all, after 2003, both regulation and asset-liability management practices have undergone profound change, as underscored by a recent EDHEC publication (Amenc *et al.* 2009) sponsored by Axa investment managers:

“The bankruptcy of the sponsors of major pension plans, whose participants often lost not only half their pension rights but also their jobs, and the risk posed by devastated pension have made transparency and security the latest watchwords. Financial analysts are demanding more transparent accounting, supervisors a better view of the risks involved in running a business, and ministries of labour strengthened security mechanisms.

In accounting, which measures the cost of the pensions as recognised in the

sponsor's accounts, there have been marked changes:

- Revisions to IAS 19 in 1998 and 2002 introduced marked-to-market valuations for pension assets and the discounting of pension liabilities at an AA corporate rate.
- Since 2004, an amendment has allowed immediate recognition of gains and losses in the P&L of the sponsor; in the UK (FRS 17) this immediate recognition has been made mandatory.

Prudential regulations have also experienced tumultuous change; domestic and European regulations have been undergoing constant updating since 2002, funding constraints leave ever less room for manoeuvre, and allowances for pension deficits are being cut down on.

Naturally, the wave of stricter prudential and accounting regulations did not go unnoticed by the providers of services to pension funds and their sponsors. The options now available to pension funds and their sponsors include modern asset-liability management (ALM) techniques as well as new derivative products to supplement ALM techniques and protect pension funds against combined risks such as that of a stock market crash and a fall in interest rates; tentative issues of biometric derivatives have taken place to mitigate non-financial risks such as longevity risk. In addition, ALM techniques

I. European Pension Funds Are Now Underfunded

may be developed and applied by third parties such as fiduciary management companies; finally, full transfer of risk is made possible in the form of buy-outs, a transaction in which both assets and liabilities are transferred to a third party, often an insurance company, that will assume any further risks and regulatory ramifications. [...]

These changes call for an improvement in ALM strategies and the use of state-of-the-art models—such as dynamic liability-driven investments—for the design of these strategies. An understanding of the constraints to which pension funds are subject is essential to building efficient ALM strategies:

- The portfolio that minimises regulatory risk should take into account the regulatory discount rates.
- Rebalancing rules should depend on the surplus and be based on insights from dynamic asset allocation concepts and portfolio insurance techniques.
- Modelling should capture the specific risk-mitigation mechanisms available to the pension fund, such as conditional indexation, variable contributions, support from the sponsor, modification in asset allocation, support from pension insurance schemes.
- The practice of risk management should be developed, that is, understanding and monitoring the various risk factors faced by pension funds and the design of appropriate responses to changes."

In our view, the current downturn essentially reveals the shortcomings of risk management and asset-liability management practices at pension funds.

The rest of this position paper is structured as follows:

- in section II, we review the risk factors that impact pension funds and the ways these factors are reflected in prudential reports.
- in section III, we provide more insight into the Dutch prudential framework, which probably accounts for the *ex-ante* interest rate sensitivity of Dutch pension funds but fails to account for the deficits.
- in section IV we focus on the management of wage-indexed liabilities, liabilities that require both a long-term approach to investing and the management of short-term regulatory constraints.

I. European Pension Funds Are Now Underfunded

II. Risk Factors Affecting Pension Funds



II. Risk Factors Affecting Pension Funds

Table 1: Risk factors affecting pension funds

	Asset	Liability	Funding Ratio
(Fall in) equity and other risky assets	(-) Generally great sensitivity as asset allocation is generally not dynamic	(=/-) Low over the short term. Sensitivity to the upside in the Netherlands because of conditional indexing	(-) Generally high sensitivity to large falls in equity prices
(Fall in) interest rates	(+) Fall in interest rates increases the value of bonds	(++) Duration of liabilities is generally higher than that of assets	(-) A fall in interest rates lowers the funding ratio

II.1 Pension Fund Assets

Pension funds throughout Europe value assets at marked to market, so analysis of assets is fairly standard:

- Over the short term, pension funds are quite sensitive to the price of risky assets. For instance, the Pension Protection Fund (2009) provides the following rule of thumb: a "7.5 per cent rise in equity markets boosts SF179 [net] assets by around 4.0 per cent".
- As far as interest rates are concerned, because pension liabilities are very long dated liabilities, they have generally been more sensitive to interest rates than assets. The Pension Protection Fund (2009) provides the following rule of thumb: "a 0.3 per cent rise in gilt yields reduces scheme [net] assets by 1.0 per cent".

II.2 Pension Fund Liabilities

The main factors affecting pension fund liabilities are indexation, the discount rate and expected mortality/longevity.

- Indexation, or how pension rights or pension payments are increased over time, is generally linked to inflation or wages, but in some jurisdictions either benefits or accumulated savings are flat, i.e., they are nominal benefits. In the Netherlands, indexation is conditional on the funding ratio of the pension fund, so liabilities are also sensitive to the return on financial assets. In prudential reporting, however,

conditional indexation is not measured in the Netherlands (and liabilities are reported as insensitive to stock prices, for instance).

- Because pension funds generally offer annuities to retirees, longevity assumptions have a significant impact on value: raising life expectancy after retirement from twenty to twenty-five years may increase pension liabilities by 25%! (depending on indexation and interest rate hypotheses). Mortality is generally derived from official tables, so a revision to these tables will impact pension funds at a given year. So far this century, mortality has always been revised downwards (and life expectancy assumed higher)!
- From an economic standpoint, the discount rate for (nominal) liabilities is the risk-free interest rate, derived either from the government bond curve or from the swap yield curve. For inflation-indexed benefits, discounting indexed benefits at the risk-free yield curve discounting nominal pension promises at the real yield curve are equivalent.

II.3 Biases in Regulatory Reporting

Because pension liabilities are not traded on exchange, liability values are estimated, not observed. To assess the health of a pension fund one usually tracks its funding ratio

II. Risk Factors Affecting Pension Funds

measured from a prudential standpoint.¹ Of course, not all jurisdictions use the same interest rate; several rates, as summarised in Amenc *et al.* (2009), are used.

For this reason, the reported impact of falling interest rates on pension funds will differ from one country to another.

Differences in the changes in funding ratios in a single country depend primarily on their interest rate sensitivity, as measured, for instance, by the duration of their assets less the duration of their liabilities.

than reveal the true extent of the impact of lower interest rates on liabilities and on the asset value of the funds. For this reason, we expect prudential reporting numbers, when they are released, to show fully funded Pensionsfonds in Germany at the end of 2008.

- In the Netherlands, as in the UK, liabilities are discounted at a market interest rate, derived from the swap yield curve. However, unlike in the UK, where indexation to inflation is unconditional and measured in prudential reporting, in the Netherlands,

Biases in regulatory reporting

	Asset	Liability	Funding Ratio
Germany	Discount rate almost fixed and artificially low	Liability reported as almost insensitive to interest rates	Reported (change in) funding ratios largely insensitive to interest rates.
UK	SF179 minimum liability discounted at the ten-year bond rate		Regulatory sensitivity to interest rate probably a reasonable approximation
Netherlands	Nominal liabilities discounted at the swap yield curve	Liability often managed as real liabilities, sensitive to real rather than to nominal rates	Reported (changes in) funding ratios will probably overstate the "real" interest rate sensitivity.

1 - An alternative is to use the IAS 19 measure, but this data is not available for multi-employer funds such as those in the Netherlands, and thus ignores many pension funds. Results may also lack comparability for other technical reasons, in particular the way indexation is measured from country to country.

From one country to another, the impact of interest rates on regulatory funding ratios may depend primarily on the prudential interest rates.

- In the UK, for instance, which bases the regulatory SF179 measure of benefits on the minimum insured benefits, accrued by legal indexation and discounted at the long-term government bond yield, the prudential reporting arguably gives a fair estimate of the funding ratio of pension funds.

- In Germany, by contrast, because liabilities are measured with an artificially low and almost fixed discount rate, liabilities are artificially made insensitive to interest rates; prudential reporting, then, may hide rather

indexation is conditional on the funding ratio of the pension fund, and is not taken into account in reporting. Because the actual liability is a real liability (indexed to inflation or wages), reporting it as a nominal liability increases its assumed sensitivity to interest rates (liabilities are in reality mostly sensitive to the real rates but are also reported as sensitive to expected inflation when in fact they are relatively insensitive to it. As a consequence, we expect the official numbers to overstate the sensitivity of Dutch pension funds to the fall in interest rates.

II. Risk Factors Affecting Pension Funds

II.4 Historical Analysis: the UK vs. the Netherlands

Figure 2: UK pension fund aggregate funding ratio (SF179)

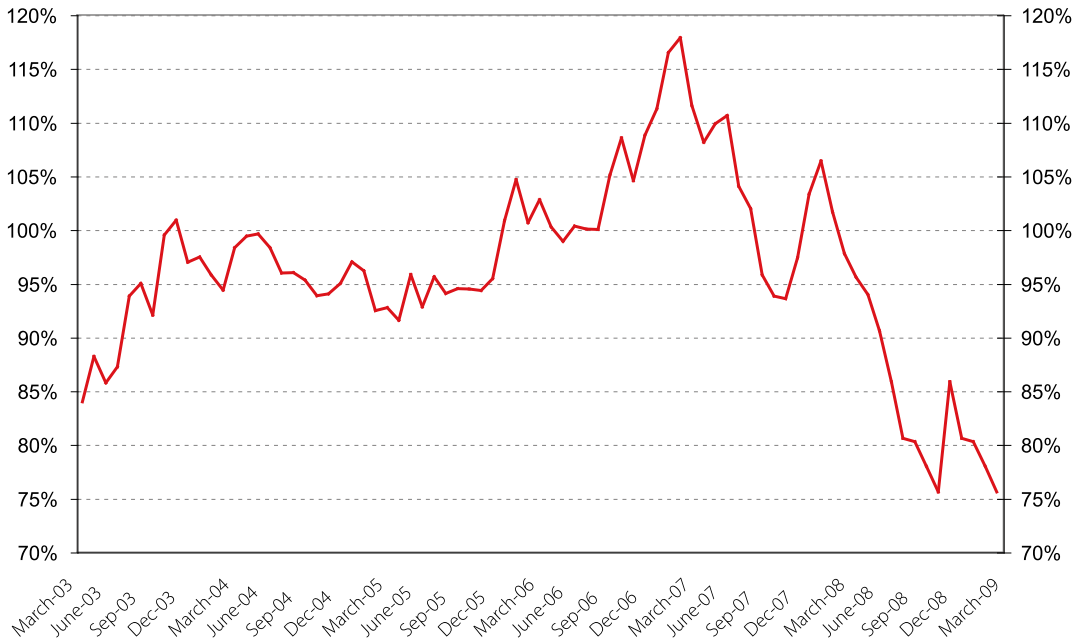
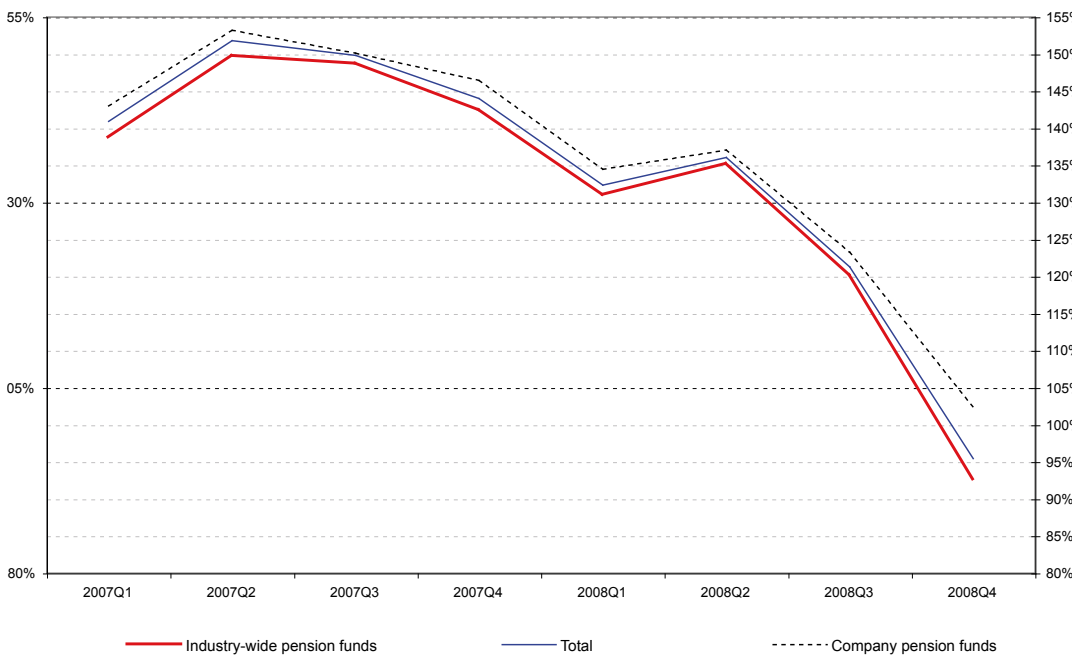
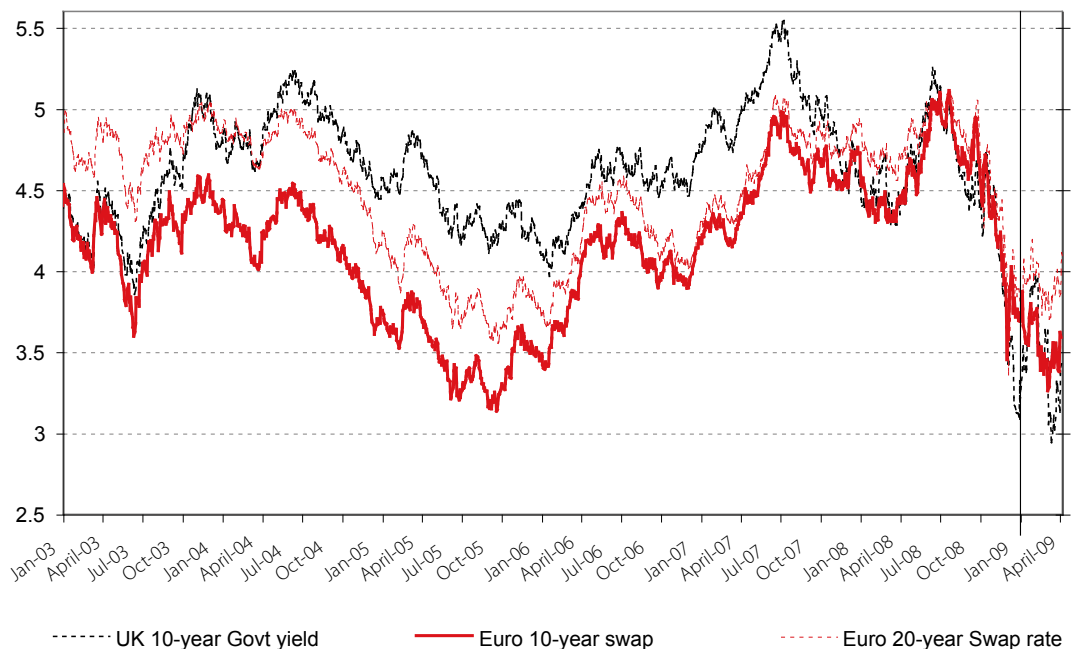


Figure 3: Dutch funding ratios



II. Risk Factors Affecting Pension Funds

Figure 4: 10-year UK gilt rates (SF 179) and 10-year euro swap rate



2 - From the press release of ABP, 29 January 2009: "Since the end of the third quarter of 2008, the coverage ratio of Stichting pensioenfonds ABP dropped from 118% to 90%. This drop was mainly due to the falling interest rate (two-thirds) and in part by the decrease of the fund assets (one-third). Over the last two months of 2008, the falling interest rate was almost entirely responsible for the decreased coverage ratio. A return on investments of -11.5 % was recorded for the fourth quarter of 2008 as a whole. The biggest loss was incurred in October. ABP's assets therefore currently amount to €173 billion. The payment of the pensions is not in danger." Accessed on: http://www.abp.nl/abp/abp/images/341eng%202008Q4%20PersberichtABP%20DEFINITIEF_tcm108-78798.pdf

Table 3

Perf at 31/12/2008	Total return				Change in yield, basis points	
	Commodity (GSCI)	Energy (GSCI)	Crude Oil	EMU DS equity index	UK 10-Y Bond yield	Euro 10-Y Swap yield
Y-o-Y	-47%	-52%	-53%	-47%	-141	-99
Q-o-Q	-47%	-55%	-55%	-21%	-135	-94

In both the UK and the Netherlands, for prudential reporting, benefits are discounted at a market-consistent risk-free rate. As illustrated in figure 4 and table 4, the trend in regulatory discount rates has not been markedly different in the two countries, so the discount rate alone cannot account for the difference in UK and Dutch funding ratios.

The "regulatory duration gap", or duration gap as reported under the relevant regulatory standard, may contribute to this difference. We have pointed out that there may be structural reasons for the regulatory duration gap to be higher in the Netherlands than in the UK, namely because the regulatory duration gap overstates the

real duration gap, as explained in sub-section II.3 of this document, and more thoroughly in section IV.1.1.2 of Amenc and Sender. The existence of such a duration gap is revealed even in such large and sophisticated pension funds as ABP.²

In addition, whereas the Dutch prudential framework required a buffer calibrated to allow pension fund to weather a crash in the markets with a probability of 97.5%. The FTK assumes a fall in equities of 25%, a fall in commodities of 30%, and a total requirement that is computed assuming benefits from diversifying risk exposures.

In reality, not only has the fall in market prices been much higher than assumed

II. Risk Factors Affecting Pension Funds

by the Dutch prudential FTK (Financieel Toetsingskader) framework but also prices fell across the board, implying higher correlations than assumed under the FTK: both equities and commodity total return indices fell some 50% over the year; commodity prices experienced most of this fall in the fourth quarter alone.

That the Dutch pension fund industry has experienced a steeper decline in its funding ratio than the UK industry and is now underfunded is all the more striking in that the Dutch framework is stricter than that of the UK, requiring as it does fully funded liabilities and much swifter recovery (three years now extended to five) in the event of underfunding than in the UK (where recovery plans are questioned only if they are lengthier than ten years).

The failure of the high buffer ratios in the FTK framework to prevent underfunding (and thus to effectively provide protection of nominal liabilities) underscores our conviction that what really protects a pension fund is not any initial funding ratio but risk management.

III. The Dutch Prudential Framework, the Duration Gap, and Underfunding



III. The Dutch Prudential Framework, the Duration Gap, and Underfunding

Amenc *et al.* (2009) emphasise that:

“A nominal regulatory framework for real pension liabilities, as in the Netherlands, increases the reported duration of liabilities. [...]

The fall in the funding ratio of pension funds in the early years of the new millennium triggered two simultaneous and yet contradictory reactions:

- The regulator implemented a new regulatory framework for pension funds, the *FTK*, a *risk-based* framework that requires buffers for any risk-taking on top of the replication of the prudential liability--the latter is measured on an accrued basis, *i.e.*, excluding any unconditional indexation.
- At the same time, pension schemes ended the systematic indexing of pension benefits to wages, and stated that any indexing was conditional to the funding ratios of the pension fund. [...]

The modified duration of conditionally indexed pension liabilities is radically different from that of fixed cash flows” (p. 133-139).

They find that: “The interest rate sensitivity of the investment strategy should fall between the regulatory ‘nominal’ and the internal ‘target’ interest rate sensitivities” (p. 136).

The actual interest rate sensitivity of a pension fund with a funding ratio around 130% is much lower than that of the prudential liability. By contrast, a pension fund with a very low funding ratio should reduce “prudential” risk, so it should increase the duration of its assets when funding ratios deteriorate.

In short, the initial duration gap and interest

rate sensitivity can be accounted for by the *FTK*, but even though their funding ratios have deteriorated pension funds have not closed the duration gap. That they have not done so is surprising.

IV. Real Liabilities Require Reconciling Long- and Short-Term Constraints



IV. Real Liabilities Require Reconciling Long- and Short-Term Constraints

A large body of academic literature in the late 1990's and in the early years of the current decade has focused on portfolio choices for long-term investors, with authors such as Bodie (1995), Brennan *et al.* (1997), Barberis (2000), Campbell and Viceira (2003, 2005), Bandi and Perron (2008). For these authors, the notion of term structure of risk refers to the idea that for some assets the variance of returns (or of unexpected returns) does not rise linearly with time as it would were returns independent and identically-distributed over time (*i.i.d.*). In particular, mean-reversion in asset returns (for instance, equity returns tend to show mean-reversion) means that the term structure of equity returns is usually downwards-sloping.

This idea of a term structure of risk can be transposed to an asset-liability management framework. It is perfectly illustrated in wage-indexation, the most traditional form of indexing. Wage indexation can be found in last-wage pension plans in the UK, and many Dutch pension plans target wage-indexation. Inflation has recently become a tradable risk factor, with the emergence of inflation swaps and bonds, but wages are not traded on exchange, so they are not fully replicable over the short term.

Over the long term, real assets such as equities are needed to replicate wages. After all, wages, like equities, are linked to overall economic performance. Wages and earnings can be understood as a share of economic output, so equity valuations that exhibit a long-term average or move within a range would allow a stable long-term relationship between wages and equity prices.

Long-term investors with wage-indexed liabilities should build exposure to equities to replicate liabilities over the long term, exposure that implies short-term risk. Short-term prudential constraints, such as minimum funding ratio requirements, must still be managed.

We find that risk-based regulatory frameworks such as the FTK provide incentives to manage the short-term risk of long-term investments with derivatives. Because of the short-term volatility in the funding ratio caused by the long-term replicating strategy, regulatory constraints require action. As we have seen, a short-sighted investment strategy is detrimental to pension funds and their sponsors over the long term. Pension funds must then resort either to a higher funding ratio at the inception of the strategy or to derivatives.

The trade-off between these two options depends on a wide range of factors, including the net cost of borrowing capital for the sponsor, the friction costs of investing in options (e.g., the bid-ask spread), profit- and loss-sharing agreements.

In the example below, we suppose that implied option volatility is equal to the regulatory prescription for volatility (15%) and that as in the FTK regulation requires that a buffer equal to 25% of the value of equity holdings be maintained.

The net cost of borrowing capital (i.e., the spread required over the risk-free rate) is 4%.

So the net cost of investing in derivatives is much lower than the cost of borrowing sufficient capital to build a regulatory buffer.

IV. Real Liabilities Require Reconciling Long- and Short-Term Constraints

In addition to its lower cost, protection with derivatives is more efficient protection from extreme risk, as a 25% buffer alone is not large enough to absorb falls of more than 25% in the value of risky assets (equity and commodity returns fell by around 50% in 2008).

Table 4

Market parameters	Implied vol $\sigma = 15\%$	Risk-free $r = 4\%$	Net cost of capital = 4%
FTK parameters	Risk-weight equity = 25%		
Liability	€100 in 20-years		
Investment strategy	€67 in equities		
Buffer	€17 required	Net cost €0.7	
20-year option	P = €2.7	Net cost €0.11	
1-year option	P = €4.1	Net cost €0.16	

IV. Real Liabilities Require Reconciling Long- and Short-Term Constraints

Conclusion



Conclusion

Optimal management of pension assets and liabilities requires reconciling a long-term economic view and short-term prudential constraints, which, as Amenc *et al.* (2009) note:

“call for an improvement in ALM strategies and the use of state-of-the-art models—such as dynamic liability-driven investments—for the design of these strategies. An understanding of the constraints to which pension funds are subject is essential to building efficient ALM strategies. [...]

Second, specific attention should be paid to the long-term nature of pension funds. In our view, the replication of wage-indexed liabilities perfectly illustrates the coming challenges for both regulatory bodies and pension funds. These traditional pension liabilities have low short-term replicability, and risk-free long-term strategies involve short-term risk” (p. 14).

When, as in the Netherlands, pension funds target indexation, they should focus on long-term investing. However, they must also manage short-term prudential constraints. Derivatives are instrumental to the management of these constraints.

The plunge in funding ratios arguably demonstrates that these techniques are not used by pension funds as often as they should be. In particular, the failure of the FTK's high buffers to prevent underfunding underscores our conviction that what really protects a pension fund is not so much initial funding ratio as risk management.

In addition, “the idea that risk management is best reflected in an internal model is especially relevant for pension funds; after all, no standard formula can capture the

diversity of the pension landscape and the variety of protection mechanisms” (p. 14).

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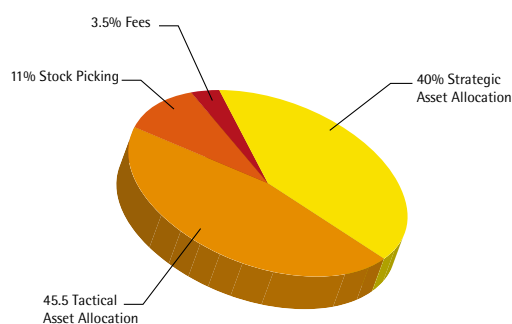
About the EDHEC Risk and Asset Management Research Centre

EDHEC is one of the top five business schools in France. Its reputation is built on the high quality of its faculty (110 professors and researchers from France and abroad) and the privileged relationship with professionals that the school has been developing since its establishment in 1906. EDHEC Business School has decided to draw on its extensive knowledge of the professional environment and has therefore focused its research on themes that satisfy the needs of professionals. EDHEC is also one of the few business schools in Europe to have received the triple international accreditation: AACSB (US-Global), EQUIS (Europe-Global) and Association of MBAs (UK-Global).

EDHEC pursues an active research policy in the field of finance. The EDHEC Risk and Asset Management Research Centre carries out numerous research programmes in the areas of asset allocation and risk management in both the traditional and alternative investment universes.

The choice of asset allocation

The EDHEC Risk and Asset Management Research Centre structures all of its research work around asset allocation. This issue corresponds to a genuine expectation from the market. On the one hand, the prevailing stock market situation in recent years has shown the limitations of active management based solely on stock picking as a source of performance.



Source EDHEC (2002) and Ibbotson, Kaplan (2000)

On the other, the appearance of new asset classes (hedge funds, private equity), with risk profiles that are very different from those of the traditional investment universe, constitutes a new opportunity in both conceptual and operational terms. This strategic choice is applied to all of the Centre's research programmes, whether they involve proposing new methods of strategic allocation, which integrate the alternative class; measuring the performance of funds while taking the tactical allocation dimension of the alpha into account; taking extreme risks into account in the allocation; or studying the usefulness of derivatives in constructing the portfolio.

An applied research approach

In an attempt to ensure that the research it carries out is truly applicable, EDHEC has implemented a dual validation system for the work of the EDHEC Risk and Asset Management Research Centre. All research work must be

part of a research programme, the relevance and goals of which have been validated from both an academic and a business viewpoint by the Centre's advisory board. This board is made up of both internationally recognised researchers and the Centre's business partners. The management of the research programmes respects a rigorous validation process, which guarantees the scientific quality and the operational usefulness of the programmes.

To date, the Centre has implemented six research programmes:

Asset Allocation and Alternative Diversification

Sponsored by SG Asset Management and Newedge

The research carried out focuses on the benefits, risks and integration methods of the alternative class in asset allocation. From that perspective, EDHEC is making a significant contribution to the research conducted in the area of multi-style/multi-class portfolio construction.

Performance and Style Analysis

Part of a business partnership with EuroPerformance

The scientific goal of the research is to adapt the portfolio performance and style analysis models and methods to tactical allocation. The results of the research carried out by EDHEC thereby allow portfolio alpha to be measured not only for stock picking but also for style timing.

Indices and Benchmarking

Sponsored by Af2i, Barclays Global Investors, BNP Paribas Investment Partners, NYSE Euronext, Lyxor Asset Management, and UBS Global Asset Management

This research programme has given rise to extensive research on the subject of indices and benchmarks in both the hedge fund universe and more traditional investment

About the EDHEC Risk and Asset Management Research Centre

classes. Its main focus is on analysing the quality of indices and the criteria for choosing indices for institutional investors. EDHEC also proposes an original proprietary style index construction methodology for both the traditional and alternative universes. These indices are intended to be a response to the critiques relating to the lack of representativeness of the style indices that are available on the market. In 2003, EDHEC launched the first composite hedge fund strategy indices.

Asset Allocation and Derivatives

Sponsored by Eurex, SGCIB and the French Banking Federation

This research programme focuses on the usefulness of employing derivative instruments in the area of portfolio construction, whether it involves implementing active portfolio allocation or replicating indices. "Passive" replication of "active" hedge fund indices through portfolios of derivative instruments is a key area in the research carried out by EDHEC. This programme includes the "Structured Products and Derivatives Instruments" research chair sponsored by the French Banking Federation.

Best Execution and Operational Performance

Sponsored by CACEIS, NYSE Euronext, and SunGard

This research programme deals with two topics: best execution and, more generally, the issue of operational risk. The goal of the research programme is to develop a complete framework for measuring transaction costs: EBEX ("Estimated Best Execution") but also to develop the existing framework for specific situations (constrained orders, listed derivatives, etc.). Research also focuses on risk-adjusted performance measurement

of execution strategies, analysis of market impact and opportunity costs on listed derivatives order books, the impact of explicit and implicit transaction costs on portfolio performances, and the impact of market fragmentation resulting from MiFID on the quality of execution in European listed securities markets. This programme includes the "MiFID and Best Execution" research chair, sponsored by CACEIS, NYSE Euronext, and SunGard.

ALM and Asset Management

Sponsored by BNP Paribas Investment Partners, AXA Investment Managers and ORTEC Finance

This research programme concentrates on the application of recent research in the area of asset-liability management for pension plans and insurance companies. The research centre is working on the idea that improving asset management techniques and particularly strategic allocation techniques has a positive impact on the performance of asset-liability management programmes. The programme includes research on the benefits of alternative investments, such as hedge funds, in long-term portfolio management. Particular attention is given to the institutional context of ALM and notably the integration of the impact of the IFRS standards and the Solvency II directive project. It also aims to develop an ALM approach addressing the particular needs, constraints, and objectives of the private banking clientele. This programme includes the "Regulation and Institutional Investment" research chair, sponsored by AXA Investment Managers, the "Asset-Liability Management and Institutional Investment Management" research chair, sponsored by BNP Paribas Investment Partners and the "Private Asset-Liability Management" research chair, in partnership with ORTEC Finance.

About the EDHEC Risk and Asset Management Research Centre

Ten research chairs have been endowed:

Regulation and Institutional Investment

In partnership with AXA Investment Managers

The chair investigates the interaction between regulation and institutional investment management on a European scale and highlights the challenges of regulatory developments for institutional investment managers.

Asset-Liability Management and Institutional Investment Management

In partnership with BNP Paribas Investment Partners

The chair examines advanced asset-liability management topics such as dynamic allocation strategies, rational pricing of liability schemes, and formulation of an ALM model integrating the financial circumstances of pension plan sponsors.

MiFID and Best Execution

In partnership with NYSE Euronext, SunGard, and CACEIS Investor Services

The chair looks at two crucial issues linked to the Markets in Financial Instruments Directive: building a complete framework for transaction cost analysis and analysing the consequences of market fragmentation.

Structured Products and Derivative Instruments

In partnership with the French Banking Federation (FBF)

The chair investigates the optimal design of structured products in an ALM context and studies structured products and derivatives on relatively illiquid underlying instruments.

Financial Engineering and Global Alternative Portfolios for Institutional Investors

In partnership with Morgan Stanley Investment Management

The chair adapts risk budgeting and risk management concepts and techniques to the specificities of alternative investments, both in the context of asset management and asset-liability management.

Private Asset-Liability Management

In partnership with ORTEC Finance

The chair will focus on the benefits of the asset-liability management approach to private wealth management, with particular attention being given to the life cycle asset allocation topic.

Dynamic Allocation Models and New Forms of Target Funds

In partnership with Groupe UFG

The chair consists of academic research devoted to the analysis and improvement of dynamic allocation models and new forms of target funds.

Advanced Modelling for Alternative Investments

In partnership with Newedge

The chair involves a three-year project whereby academic research dedicated to alternative investments and to the analysis and modelling of their returns will be conducted.

Asset-Liability Management Techniques for Sovereign Wealth Fund (SWF) Management

In partnership with Deutsche Bank

The chair introduces a formal dynamic asset allocation model that will incorporate the most salient factors in sovereign wealth fund management and propose

About the EDHEC Risk and Asset Management Research Centre

an empirical analysis of the risk factors impacting the inflows and outflows of cash for various sovereign funds.

Core-Satellite and ETF Investment

In partnership with CASAM

The research chair consists of conducting academic research dedicated to exchange traded funds (ETFs) and their use within the framework of a core-satellite investment approach.

The EDHEC PhD in Finance

The PhD in Finance at EDHEC Business School is designed for professionals who aspire to higher intellectual levels and aim to redefine the investment banking and asset management industries.

It is offered in two tracks: a residential track for high-potential graduate students who will hold part-time positions at EDHEC Business School, and an executive track for practitioners who will keep their full-time jobs.

Drawing its faculty from the world's best universities and enjoying the support of the research centre with the most impact on the European financial industry, the EDHEC PhD in Finance creates an extraordinary platform for professional development and industry innovation.

Research for Business

To optimise exchanges between the academic and business worlds, the EDHEC Risk and Asset Management Research Centre maintains a website devoted to asset management research for the industry: www.edhec-risk.com, circulates a monthly newsletter to over 250,000 practitioners,

conducts regular industry surveys and consultations, and organises annual conferences for the benefit of institutional investors and asset managers. The Centre's activities have also given rise to the business offshoots and EDHEC Asset Management Education.

EDHEC Asset Management Education helps investment professionals to upgrade their skills with advanced risk and asset management training across traditional and alternative classes.

EDHEC Position Papers and Publications from the last four years

EDHEC Risk and Asset Management Research Centre

2009 Position Papers

- Gregoriou, G., and F.-S. Lhabitant. Madoff: A riot of red flags (January).
- Lioui Abraham,. The Undesirable Effects of Banning Short Sales (April).

2008 Position Papers

- Amenc, N., and S. Sender. Assessing the European banking sector bailout plans (December).
- Amenc, N., and S. Sender. Les mesures de recapitalisation et de soutien à la liquidité du secteur bancaire européen (December).
- Amenc, N., F. Ducoulombier, and P. Foulquier. Reactions to an EDHEC study on the fair value controversy (December). With the EDHEC Financial Analysis and Accounting Research Centre.
- Amenc, N., F. Ducoulombier, and P. Foulquier. Réactions après l'étude. Juste valeur ou non : un débat mal posé (December). With the EDHEC Financial Analysis and Accounting Research Centre.
- Amenc, N., and V. Le Sourd. Les performances de l'investissement socialement responsable en France (December).
- Amenc, N., and V. Le Sourd. Socially responsible investment performance in France (December).
- Amenc, N., B. Maffei, and H. Till. Les causes structurelles du troisième choc pétrolier (November).
- Amenc, N., B. Maffei, and H. Till. Oil prices: The true role of speculation (November).
- Sender, S. Banking: Why does regulation alone not suffice? Why must governments intervene? (November).
- Till, H. The oil markets: let the data speak for itself (October).
- Amenc, N., F. Goltz, and V. Le Sourd. A comparison of fundamentally weighted indices: Overview and performance analysis (March).
- Sender, S. QIS4: Significant improvements, but the main risk for life insurance is not taken into account in the standard formula (February). With the Financial Analysis and Accounting Research Centre.

2009 Publications

- Goltz, F. A long road ahead for portfolio construction: Practitioners' views of an EDHEC survey. (January).

2008 Publications

- Amenc, N., L. Martellini, and V. Ziemann. Alternative investments for institutional investors: Risk budgeting techniques in asset management and asset-liability management (December).

EDHEC Position Papers and Publications from the last four years

- Goltz, F., and D. Schröder. Hedge fund reporting survey (November).
- D'Hondt, C., and J.-R. Giraud. Transaction cost analysis A-Z: A step toward best execution in the post-MiFID Landscape (November).
- Amenc, N., and D. Schröder. The pros and cons of passive hedge fund replication (October).
- Amenc, N., F. Goltz, and D. Schröder. Reactions to an EDHEC study on asset-liability management decisions in wealth management (September).
- Amenc, N., F. Goltz, A. Grigoriu, V. Le Sourd, and L. Martellini. The EDHEC European ETF survey 2008 (June).
- Amenc, N., F. Goltz, and V. Le Sourd. Fundamental differences? Comparing alternative index weighting mechanisms (April).
- Le Sourd, V. Hedge fund performance in 2007 (February).
- Amenc, N., F. Goltz, V. Le Sourd, and L. Martellini. The EDHEC European investment practices survey 2008 (January).

2007 Position Papers

- Amenc, N. Trois premières leçons de la crise des crédits « subprime » (August).
- Amenc, N. Three early lessons from the subprime lending crisis (August).
- Amenc, N., W. Géhin, L. Martellini, and J.-C. Meyfredi. The myths and limits of passive hedge fund replication (June).
- Sender, S., and P. Foulquier. QIS3: Meaningful progress toward the implementation of Solvency II, but ground remains to be covered (June). With the EDHEC Financial Analysis and Accounting Research Centre.
- D'Hondt, C., and J.-R. Giraud. MiFID: The (in)famous European directive (February).
- Hedge Fund Indices for the Purpose of UCITS: Answers to the CESR Issues Paper (January).
- Foulquier, P., and S. Sender. CP 20: Significant improvements in the Solvency II framework but grave incoherencies remain. EDHEC response to consultation paper n° 20 (January).
- Géhin, W. The Challenge of hedge fund measurement: A toolbox rather than a Pandora's box (January).
- Christory, C., S. Daul, and J.-R. Giraud. Quantification of hedge fund default risk (January).

2007 Publications

- Ducoulombier, F. Etude EDHEC sur l'investissement et la gestion du risque immobiliers en Europe (November/December).

EDHEC Position Papers and Publications from the last four years

- Ducoulombier, F. EDHEC European real estate investment and risk management survey (November).
- Goltz, F., and G. Feng. Reactions to the EDHEC study "Assessing the quality of stock market indices" (September).
- Le Sourd, V. Hedge fund performance in 2006: A vintage year for hedge funds? (March).
- Amenc, N., L. Martellini, and V. Ziemann. Asset-liability management decisions in private banking (February).
- Le Sourd, V. Performance measurement for traditional investment (literature survey) (January).

2006 Position Papers

- Till, H. EDHEC Comments on the Amaranth case: Early lesson from the debacle (September).
- Amenc, N., and F. Goltz. Disorderly exits from crowded trades? On the systemic risks of hedge funds (June).
- Foulquier, P., and S. Sender. QIS 2: Modelling that is at odds with the prudential objectives of Solvency II (November). With the EDHEC Financial Analysis and Accounting Research Centre.
- Amenc, N., and F. Goltz. A reply to the CESR recommendations on the eligibility of hedge fund indices for investment of UCITS (December).

2006 Publications

- Amenc, N., F. Goltz, and V. Le Sourd. Assessing the quality of stock market indices: Requirements for asset allocation and performance measurement (September).
- Amenc, N., J.-R. Giraud, F. Goltz, V. Le Sourd, L. Martellini, and X. Ma. The EDHEC European ETF survey 2006 (October).
- Amenc, N., P. Foulquier, L. Martellini, and S. Sender. The impact of IFRS and Solvency II on asset-liability management and asset management in insurance companies (November). With the EDHEC Financial Analysis and Accounting Research Centre.

EDHEC Financial Analysis and Accounting Research Centre

2008 Position Papers

- Amenc, N., F. Ducoulombier, and P. Foulquier. Reactions to an EDHEC study on the fair value controversy (December). With the EDHEC Risk and Asset Management Research Centre.
- Amenc, N., F. Ducoulombier, and P. Foulquier. Réactions après l'étude. Juste valeur ou non : un débat mal posé (December). With the EDHEC Risk and Asset Management Research Centre.

EDHEC Position Papers and Publications from the last four years

- Escaffre, L., P. Foulquier, and P. Touron. The fair value controversy: Ignoring the real issue (November).
- Escaffre, L., P. Foulquier, and P. Touron. Juste valeur ou non : un débat mal posé (November).
- Sender, S. QIS4: Significant improvements, but the main risk for life insurance is not taken into account in the standard formula (February). With the EDHEC Risk and Asset Management Research Centre.

2007 Position Papers

- Sender, S., and P. Foulquier. QIS3: Meaningful progress toward the implementation of Solvency II, but ground remains to be covered (June). With the EDHEC Risk and Asset Management Research Centre.

2006 Position Papers

- Foulquier, P., and S. Sender. QIS 2: Modelling that is at odds with the prudential objectives of Solvency II (November). With the EDHEC Risk and Asset Management Research Centre.

2006 Publications

- Amenc, N., P. Foulquier, L. Martellini, and S. Sender. The impact of IFRS and Solvency II on asset-liability management and asset management in insurance companies (November). With the EDHEC Risk and Asset Management Research Centre.

EDHEC Economics Research Centre

2009 Position Papers

- Chéron, A. Quelle protection de l'emploi pour les seniors ? (January).
- Courtioux, P. Peut-on financer l'éducation du supérieur de manière plus équitable ? (January).
- Gregoir, S. L'incertitude liée à la contraction du marché immobilier pèse sur l'évolution des prix (January).

2008 Position Papers

- Gregoir, S. Les prêts étudiants peuvent-ils être un outil de progrès social ? (October).
- Chéron, A. Que peut-on attendre d'une augmentation de l'âge de départ en retraite ? (June).
- Chéron, A. De l'optimalité des allègements de charges sur les bas salaires (February).
- Chéron, A., and S. Gregoir. Mais où est passé le contrat unique à droits progressifs ? (February).

EDHEC Position Papers and Publications from the last four years

2007 Position Papers

- Chéron, A. Faut-il subventionner la formation professionnelle des séniors ? (October).
- Courtioux, P. La TVA acquittée par les ménages : une évaluation de sa charge tout au long de la vie (October).
- Courtioux, P. Les effets redistributifs de la « TVA sociale » : un exercice de microsimulation (July).
- Maarek, G. La réforme du financement de la protection sociale. Essais comparatifs entre la « TVA sociale » et la « TVA emploi » (July).
- Chéron, A. Analyse économique des grandes propositions en matière d'emploi des candidats à l'élection présidentielle (March).
- Chéron, A. Would a new form of employment contract provide greater security for French workers? (March).

2007 Publications

- Amenc, N., P. Courtioux, A.-F. Malvache, and G. Maarek. La « TVA emploi » (April).
- Amenc, N., P. Courtioux, A.-F. Malvache, and G. Maarek. Pro-employment VAT (April).
- Chéron, A. Reconsidérer les effets de la protection de l'emploi en France. L'apport d'une approche en termes de cycle de vie (January).

2006 Position Papers

- Chéron, A. Le plan national d'action pour l'emploi des seniors : bien, mais peut mieux faire (October).
- Bacache-Beauvallet, M. Les limites de l'usage des primes à la performance dans la fonction publique (October).
- Courtioux, P., and O. Thévenon. Politiques familiales et objectifs européens : il faut améliorer le benchmarking (November).

EDHEC Leadership and Corporate Governance Research Centre

2009 position papers

- Petit, V. Leadership : ce que pensent les top managers (May)
- Petit, V., and I. Mari. La légitimité des équipes dirigeantes : une dimension négligée de la gouvernance d'entreprise (January).

EDHEC Marketing and Consumption Research Centre – InteraCT

2007 Position Papers

- Bonnin, Gaël. Piloter l'interaction avec le consommateur : un impératif pour le marketing. (January).

About AXA Investment Managers

AXA Investment Managers is an active asset manager backed by the AXA Group, a world leader in financial protection.

Today, AXA IM has more than 3,100 employees operating in 22 different countries, with 485 billion euros under management as at 31 December 2008.

With about 1000 funds and 600 fund managers and analysts, AXA IM offers expertise across all major asset classes and alpha strategies.

As a multi-expert, it believes that specialisation is the key to sustainable performance and therefore focuses its resources on the investment capabilities where it can add real and sustained value:

- Fixed Income
- Equity (AXA Rosenberg, AXA Framlington, Equity Conviction, Talents)
- Alternatives (Structured Finance, AXA REIM, AXA Private Equity, Fund of Hedge Funds)
- Investment Solutions (Structured Management, Asset Liability Management, Asset Allocation, Insurance Investment)

AXA IM's ambition is to offer high-performance financial products and investment solutions that meet the specific needs of its clients – institutional investors, distributors and the AXA Group – and provide them with quality information and support throughout the investment process.

Thanks to its multi-expert business model combining the strength of global shares resources with the agility of small empowered and autonomous teams,

AXA IM understands and responds to clients' investment needs.

AXA IM is acknowledged as a key player and thought leader in the asset management industry owing to its steady investment performance and the quality of its solutions and services. Today it is ranked 9th asset manager in the world*.

* Global Investor Magazine GI100 as at 30/06/2008

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