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FUND PORTFOLIO VALUES**

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Abstract

The emergence, in recent years, of large financing deficits in the portfolio values of UK DB pension funds, along with changes in the way such funds are valued by actuaries, has led fund managers to increase the weighting of fixed income securities, including corporate bonds, relative to equities in the portfolios they manage. Since bond prices tend to be less volatile than those of equities, greater bond holdings are attractive in the context of an accounting framework which now values funds on the basis of the current market values of the assets they hold and does not permit the smoothing of asset values over time. When selecting the fixed income securities to be held in the portfolios they manage, fund managers will have regard to the credit ratings assigned to corporate bond issuers. Through a consideration of some key credit rating metrics, and a survey of some relevant literature, this paper seeks to shed light on the ways, and the extent to which, the actions of the credit rating agencies may impact upon the values of defined benefit pension fund portfolios. The paper is organized as follows. Section i provides a general introduction to the theory and practice of credit rating and notes the relevance of credit ratings to defined benefit pension funds. Section ii presents a discussion of pension fund portfolios and their asset allocations. Sections iii and iv analyse the significance of credit ratings and the behaviour of rating agencies for defined benefit pension funds. Section v draws some tentative conclusions and offers some suggestions on the direction that future research on this topic might take.

(i) Introduction

Sovereign and corporate bond investors require a rate of interest that compensates them for the level of risk associated with holding a particular issuer's paper. Thus, the cost to an issuer of raising bond finance is negatively correlated with investors' perceptions of their creditworthiness. For this reason, issuers employ credit rating agencies (CRAs) to provide them with credit ratings that can be utilized by their investors. Bank for International Settlements estimates put the number of CRAs worldwide at between 130 and 150. Many are very small and serve niche markets. Probably the most well-known CRAs are Moody's Investors Service (Moody's), Standard and Poor's (S&P) and Fitch. The ratings provided by CRAs are not definitive statements of risk. Rather, they are expressions of a CRA's opinion of an issuer's creditworthiness.

The theoretical explanation for the existence of CRAs lies in the contribution these entities make to the efficiency of bond markets. In short, CRAs reduce an issuer's costs of capital by overcoming problems of asymmetric information and transaction costs. In a world without CRAs, investors would be forced to evaluate for themselves the creditworthiness of bond issuers. With only public domain information to go on, investors, like the purchasers of used cars in Akerlof's market for lemons (Akerlof 1970), would be unable confidently to differentiate between bonds with different risk profiles. Consequently, they would demand excessively high rates of interest on low risk bonds to compensate for this uncertainty. As part of the rating process, CRAs are able to access proprietary information which, though required for a comprehensive risk assessment of an issuer, is commercially sensitive and, therefore, outside the public domain.

Even if investors had unrestricted access to all relevant information, private as well as public, they would face data collection and processing costs. For individual investors, these costs would be substantial when the universe of possible bond investments was large. Some potential investors would be discouraged from participating in the bond markets; others would seek to recover these costs from the bond issuers through higher interest rates. *1 Because specialist CRAs are able to benefit from information economies of scale, they enjoy lower costs of data collection and analysis. In addition, CRAs can return these lower costs to bond issuers in the form of upfront charges for their services rather than as ongoing interest payments.

CRAs might also help to resolve conflicts of interest that can arise between the owners of financial assets, such as pension and mutual fund investors, and their agents, the fund managers Fridson (1999). Where the reward to fund managers is linked to investment performance, these agents will have an incentive to invest in high risk bonds to the potential detriment of their principals. Even though the owners of financial assets may lack the capacity to evaluate for themselves their financial exposure, they can use credit ratings to limit the level of risk to which they are actually exposed. They can do so by mandating fund managers to invest

only in bonds that are rated above some minimum threshold, BB for example. In other words, credit ratings represent a means by which principals can discipline their agents without incurring high monitoring costs.

CRA's use a system of letter grades to denote the probability of an issuer defaulting on their debt obligations. Grading systems vary between CRA's, but typically range from AAA – the lowest probability of default – to C – the highest. As Table One shows, S&P also use a D grade to denote issuers who are currently in payment default. *2 As well as borrower ratings, individual bond issues are sometimes rated separately from the issuer and may or may not have the same rating depending on the nature of the issue. *3 Borrower ratings, the focus of this paper, are entity-specific. Thus, the subsidiaries in a consolidated group may have ratings that differ from one another and from that of the quoted parent.

Table 1: Credit-Rating Systems on Corporate Debt

Moody's grade	Moody's	S&P	S&P's grade
Best quality	Aaa	AAA	Highest rating
High quality	Aa	AA	Slightly below highest
Upper medium	A	A	Strong
Medium grade	Baa	BBB	Adequate protection
Speculative elements	Ba	BB	Potential vulnerability
Speculative	B	B	Greater vulnerability
Poor	Caa	CCC	Identifiable vulnerability
-	-	CC	Highly vulnerable
Highly speculative	Ca	C	Bankruptcy filed
Extremely poor	C	D	In payment default

Source: Pilbeam (2005) p. 135

Credit ratings are of crucial importance to defined benefit (DB) pension funds. There are two reasons for this. First, DB funds are major investors in bonds. Second, national regulations frequently prohibit DB funds from investing in bonds that are not rated 'investment grade', - that is not having a rating of BBB or above on the S&P system. Employer-provided DB funds exist to provide their beneficiaries with retirement pensions equal to some fraction of their preretirement incomes multiplied by years of service. The pensions provided are financed from a portfolio of assets – mainly equities and bonds (Blake 1992) - accumulated from active members' *4 contributions and investment returns. In addition to retirement pensions, many DB schemes also provide their members with retirement lump sums and/or death in service and survivors' benefits.

Defined Contribution (DC) funds are the other major type of employer sponsored pension fund. The difference between the two types of pension arrangement lies in the relationship between contributions and benefits. With DB funds, benefits are fixed, but contributions are variable. In the case of DC funds contributions are fixed by the rules of the scheme – usually as a specified fraction of workers' earnings – but benefits are variable *5. Retirement benefits from DC funds take the form of one-off lump-sum payments 75 per cent of which must be converted into life annuities in the insurance market. As with DB funds, benefits from DC schemes are paid from an accumulated fund. The levels of benefits received by DC fund members depends on three variables: their total contributions, the investment returns these contributions earn and annuity rates *6at the time benefits are taken. Blake (2000) provides a comprehensive analysis of the different advantages and disadvantages associated with membership of both types of pension fund.

Credit ratings are of importance to DC funds because, like their DB counterparts, DC funds are major investors in fixed income securities. However, because of differences in the liability structures of both types of fund, the rating behaviour of CRAs is, arguably, of greatest significance for DB funds. As the following section shows, DB funds are particularly vulnerable to actuarial deficits. Although DC funds can fall into deficit, (Institute of Actuaries, 2005) the circumstances under which this can happen, and the potential implications for sponsoring employers, are much more restricted than for DB funds.

(ii) DB Pension Fund Portfolios

The asset types that are typically held in DB pension fund portfolios include cash, equities, fixed income and index-linked bonds, property, and collectibles such as precious metals, antiques and works of art (Blake, 1992). Fund managers seek to hold these different asset classes in proportions that match the liability structures of their funds. The total liabilities of a DB pension fund derive from the combined claims of three separate groups: current pensioners, current contributors and deferred pensioners. DB funds have an immediate financial obligation to those members who are already in retirement. They also have a future liability to pay retirement benefits to those who are currently accruing pension rights through their membership contributions and to former members who, though they have left the scheme, retain an entitlement to receive their accrued pension rights when they reach qualifying age.

Because asset types differ in their risk/return characteristics, some assets are more appropriate than others for matching particular components of DB fund liability structures. The most pressing liabilities, retirement and other benefits in payment and the entitlements of members soon to retire, need to be matched with assets that yield an immediate income at relatively low risk, namely cash and bonds. Equities, collectibles and property, on the other hand, though more volatile, have

the growth potential to match the more remote, but less predictable, liabilities represented by current contributors and deferred pensioners. While DB fund assets are valued on the basis of their current market values, liabilities are subject to three different valuation regimes (Blake 2001).

Financing surpluses and deficits can arise for DB funds, due to asymmetric rates of growth of assets and liabilities. Indeed, Bodie (1990) cites the potential for financial surpluses to arise as one of the main reasons why firms fund their DB pension schemes rather than financing them on a pay-as-you-go basis. A surplus of assets over liabilities can act as a cushion against future deficits. It can also reduce a firm's pension costs and, where regulation permits, constitute a ready source of additional finance for the firm. The possibility of benefitting from a pension scheme surplus is an important explanatory factor for firms' willingness to accept the risk of being called upon to make additional payments to their schemes in the event that assets fall short of liabilities.

Throughout the 1980s, financial surpluses were the norm for many DB pension funds. Indeed, some schemes built up surpluses which were considerably greater than the market values of their sponsoring firms. These surpluses arose for two main reasons (Sullivan, 2004). First, large numbers of workers were leaving final salary schemes early, as firms sought to boost efficiency by shedding labour. This had the effect of slowing down the rate at which pension liabilities grew. Second, the value of pension scheme assets - an increasing proportion of which were being invested in equities - rose rapidly due to a booming stock market. For example, the value of assets held by UK pension schemes rose from around £40 billion, at the end of 1979, to £150 billion at the end of 1985 (Griffiths 1986).

By the mid 2000s, the financing positions of most DB pension funds differed from those of the 1980s in two important ways. First, the financial surpluses of the 1980s had given way to sizeable funding deficits. The combined pre-tax deficit for the FTSE-100 companies stood, in 2005, at £60Bn *7, 5 per cent of market capitalization (Gallagher, 2005). Second, the weightings given to equities in DB pension fund portfolios had fallen in favour of increased bond holdings. In 2003 the average equity allocation was 68 per cent, down from 76 per cent in 1995. This figure had fallen to 61 per cent by 2007 (Frank, 2007). Whereas the average allocation of DB pension fund portfolios to bonds stood at 14 per cent in 1995, and 19 per cent by the end of 1998, it had risen to 36 per cent by 2007.

Table 2: Average portfolio allocations of UK DB Pension Funds to equities and bonds (%), 1995-2007.

	Equities	Bonds
1995	76	14
1998	72	19
2003	68	28*
2007	61	36

* Author's estimate.

Sources: Davis (2001), Frank (2007).

A number of reasons can be adduced for the increased importance currently being given to bonds in the portfolios of UK DB pension funds. These include scheme maturation (Davis, 1995), changes in the fiscal status of equities (Sullivan 2004) and, most important of all, the reactions of DB pension fund managers and trustees to an evolving regulatory and accounting environment (Blake, 2001; Davis 2001). In maturing schemes the ratios of immediate to long term liabilities are rising, due, for example, to increasing life expectancy. Consequently, fund managers of such schemes would be expected, in line with the principles of asset and liability matching, to increase the proportion of bonds they hold relative to equities. The withdrawal, in 1997, of dividend tax credits for pension funds made bond holding more attractive, by introducing a measure of taxation on income from equities, but leaving bond income tax exempt.

Since the mid 1990s, UK DB fund managers and trustees have had to adapt to a series of changes to the regulatory and accounting environment in which they operate. Coming in the wake of the Maxwell scandal, these regulatory and accounting changes boil down to: a reduced tolerance of deficits and surpluses – through a minimum funding requirement - statutory indexation of benefits – in payment and deferred - valuation of fund assets on the basis of their current market values – replacing a system of actuarial valuations and long term smoothing - and a requirement that the financial position of a firm's DB pension fund be recorded as an item on its balance sheet. The upshot of all these changes appears to be an increasing tendency for fund managers and trustees to favour asset allocations that minimize the short term volatility induced mismatch between assets and liabilities. That is, because bonds exhibit lower price volatility compared with equities, there is now a regulation induced bias towards greater bond weightings in DB fund portfolios.

(iii) Ratings and the Rating Process

Although capital markets have existed for several centuries, the rating of bond issues by independent agencies is a twentieth-century phenomenon. John Moody is credited with establishing the practice in 1909, followed in 1916 by the

then late Henry Poor's Poor Company. In effect, Moody fused together the separate investor information functions carried-out in the U.S at that time by credit reporting agencies, the specialized financial press and investment bankers (Sylla, 2001). For sixty years or so after their inception, CRAs earned the bulk of their income from fees charged to investors for supplying them with rating reports on bond issuers. It was not until the early 1970s that the current practice of charging borrowers themselves for a credit rating was adopted *8. The switch to issuer charging seems to have been motivated in part by concerns amongst CRAs that the growing availability of cheap photocopying would undermine their income base by encouraging free-riding. *9

A credit rating is not an objective measure of a bond issuer's creditworthiness. Rather, it is the expression of a CRA's opinion of the issuer's likelihood of default. As well as credit ratings, CRAs also provide investors with a number of other credit opinions. These are referred to as credit assessments. They include private credit assessments (PCAs) and quantitatively derived assessments (QDAs). The difference between credit ratings and assessments lies in the methodologies used in their production. Credit ratings are 'interactive', credit assessments are not.

The routine work involved in rating a particular bond issuer is carried out by the CRA's in-house industry analysts under the supervision of its rating committee. Ratings are interactive in the sense that the firm being rated will supply its CRA with information about itself that is not publically available. Once an issuer's credit rating has been determined, a credit report and outlook statement are produced. The credit report consists of a detailed explanation of the rationale for the rating assigned to the issuer, focusing on industry and issuer-specific risks. The outlook statement, which usually forms part of the credit report, indicates whether the assigned rating is likely to change and, if so, in which direction. A positive outlook implies that a future upgrade is likely, with the converse being signified by a negative outlook. Where a stable outlook is produced, this signifies that no change to the assigned grade is currently envisaged. Rated issuers are subject to continuous monitoring by their CRAs' and, at least once a year, to a formal rating review.

In the UK, most of the top 250 FTSE companies have interactive ratings from a major CRA (Institute of Actuaries 2005). Although the majority of credit ratings are produced in response to a request from the issuer, CRA's will sometimes assign issuers with unsolicited ratings which they produce on a non-interactive basis. As unsolicited ratings are likely to be less favourable, however, most issuers are willing to pay, since a stronger rating will reduce their cost of capital. CRAs claim that the interactive rating process permits them to produce ratings that reflect an issuer's intrinsic quality. They also claim to rate through the cycle. That is, they try to produce ratings that will remain broadly stable over the business cycle.

Globally, the market for credit ratings is dominated by the three big U.S CRAs. Together, Moody's, S&P and Fitch produce the vast majority of general bond ratings. One explanation for this global oligopoly is that to be successful CRAs must possess a strong reputation in the market. Without this, their ratings will lack credibility. Since reputation is only built through long experience of rating a wide range of issuers, it constitutes a high barrier to potential market entrants. Whilst recognizing this point, White (2002) also notes that the Securities and Exchange Commission's (SEC's) 'nationally recognized statistical rating organization' (NRSRO) designation plays a major role in keeping the global credit rating market oligopolised. The SEC instituted the NRSRO designation in the mid 1970s to answer the question of which CRA's ratings counted for the purposes of ratings-based regulation. To date, the SEC has assigned the NRSRO designation to just a handful of CRAs. Partnoy (2007) argues that the NRSRO designation confers benefits on the designated CRAs that he calls 'regulatory licenses'. He suggests that, because of regulations which prohibit fund managers from investing in bonds that have not been given some threshold rating by an NRSRO, CRAs are able to generate economic rents that persist even when they perform poorly.

The data in Table Three show that a strong negative correlation exists between the perceived credit quality of borrowers and the yields available on corporate bonds. Bond yields rise sharply as credit quality deteriorates. Put another way, since bond income is fixed in nominal terms, a positive relationship exists between an issuer's credit rating and the market price of their bonds. A reduction in an issuer's credit rating will cause the market price of their bonds to fall, whereas an uprating would have the opposite effect. Similar observations can be made from the data on quality spreads shown in Table four. The quality spread measures the difference in yields on risky assets – such as corporate bonds - and risk free assets – e.g. UK or U.S government bonds - whose characteristics are otherwise identical. An interesting feature of the data in Table Four – but one not analysed in detail here - is the observable difference in the shape of the term structure of quality spreads, being upward sloping for higher rated bonds, hump shaped for BBB grade bonds and downward sloping for all lower grades.

Table 3: Moody's Average Long term Corporate Bond Yield by Rating Category, (%) 1980-2004.

AAA	Aa	A	Baa
8.92	9.24	9.56	10.02

Source: Pilbeam (2005)

Table 4: Average Credit Quality Spread by Rating Category and Maturity, January 1997 to August 2003, in Basis Points.

	1-3 years	3-5 years	5-7 years	7-10 years
AAA	49.50	63.86	70.47	73.95
AA	58.97	71.22	82.36	88.57
A	88.82	102.91	110.71	117.52
BBB	168.99	170.89	185.34	179.63
BB	421.20	364.55	345.37	322.32
B	760.84	691.81	571.94	512.43

Source: Amato and Remolona (2003)

Although credit ratings are only expressions of rating agencies' subjective assessments of the creditworthiness of particular bond issuers, CRAs also publish a range of statistical data on their ratings which give these 'opinions' a measure of objective validity. Two main types of data are published: default and recovery measures and measures of rating migrations. In the first case, information is published on the probability of default for each and every rating category and on the likely scale of losses arising from such defaults. Annual default counts and rates are published showing the frequency of defaults amongst all issuers, and amongst issuers in the different rating categories. The same data is also published in cumulative formats covering various time periods, e.g. two, three, four and five years. Since a default does not necessarily imply a total loss for the investor, CRAs also publish annualized and cumulative loss and debt recovery statistics.

As tables five and six show, default rates are currently very low, and are especially low amongst those issuers rated as investment grade. Thus, there is statistical support for the claim's of CRAs that their ratings possess a high degree of reliability. In other words, the lower the rating category assigned to an issuer the greater the probability of their defaulting on their debt obligations. The Gini coefficient is a useful summary metric for the relationship between credit ratings and the probability of default. The Gini coefficient can take on any value between zero and 1. If defaults were randomly distributed across all rating categories, the Gini coefficient would equal 0. If defaults occurred only amongst issuers at the bottom end of the rating scale, it would equal 1. One year, three year and five year Gini coefficients for Fitch and S&P rated issuers are shown in table seven.

Table 5: Global Issuer Default Counts and Rates (2007) by Credit Rating Agency

	Number	Rate
Moody's	18	0.31
Standard and Poor's	22	0.36
Fitch	3	0.10

Source: Moody's, S&P and Fitch.

Table 6: Proportion of all S&P Defaults Involving Issuers with Ratings Below Investment Grade in Selected Years

	1990	1995	2000	2003	2005	2007
Total defaults	69	35	136	121	39	22
% non-investment grade	97	97	95%	96	97	100

Source: S&P and authors calculations

Table 7: Single and multi-year Average Fitch and S&P Corporate Issuer Gini Coefficients.

	1-year	3-year	5-year
Fitch	0.87	0.78	0.76
Standard and Poor's	0.83	0.76	0.74

Source: Fitch, S&P.

The second type of summary metrics produced by CRAs - migration rates - are published in the form of transition matrices. Probabilities can be derived from these matrices to determine the likelihood of issuers with particular ratings being subject to a rating change during a given period. Grade migrations are, in fact, much more common than actual defaults. As Table eight shows, on average, 11.47 per cent of S&P's AAA rated issuers and 15.87 of those rated BBB could expect to experience a rating change during any twelve month period. Table nine shows the proportions of S&P rated issuers with different grades that, on average, can expect either an upgrade or a downgrade over the period of one year.

Table 8: S&P Global Average Migration Rates (%), 1981-2007

	1 year	3 year	5 year
AAA	11.47	31.22	46.85
AA	12.50	33.03	48.40
A	12.79	32.85	46.91
BBB	15.87	39.43	53.28
BB	24.38	56.27	72.24
B	27.00	62.62	79.49
CCC-C	52.62	86.69	96.27

Source: Standard and Poors

Table 9: Probability of an Upgrade or Downgrade for S&P Rated Issuers by Letter Grade Over a 1-Year Period

	AAA	AA	A	BBB	BB	B	CCC-C
Upgrades	0.00	0.60	2.11	4.14	5.60	6.41	13.36
Downgrades	11.49	11.91	10.61	11.52	17.77	16.01	13.67
Defaults	0.00	0.01	0.06	0.23	1.00	4.57	25.59

Source: S&P

(iv) Credit Ratings and Pension Fund Portfolios

Credit ratings are of importance to pension funds because, like other bond investors, these funds are vulnerable to losses should the issuers of the securities they hold default on their debt obligations. Credit ratings denote a CRA's assessment of an issuer's likelihood of default. Therefore, as long as these ratings are reliable, pension funds should be able to minimize their exposure to default losses by holding the securities of only the most highly rated bond issuers. Data presented in the preceding section shows that, as predictors of default, credit ratings are indeed fairly reliable. Defaults occur most often amongst issuers with ratings in the bottom half of the rating scale and are relatively rare amongst those with an investment grade credit rating. Moreover, as Table ten shows, even where defaults do occur amongst investment grade borrowers, average loss rates tend to be rather low.

Table 10: Average Expected Credit Losses by Rating Category and Maturity, January 1997 to August 2003, in Basis Points.

	1-3 years	3-5 years	5-7 years	7-10 years
AAA	0.06	0.18	0.33	0.61
AA	1.24	1.44	1.86	2.70
A	1.12	2.78	4.71	7.32
BBB	12.48	20.12	27.17	34.56
BB	103.09	126.74	140.52	148.05
B	426.16	400.52	368.38	329.40

Source: Amato and Remolona (2003)

The reliability of credit ratings as predictors of default is not the only criterion on which to judge their significance for DB pension funds. Account must also be taken of rating stability. This is because changes in the ratings of issuers whose bonds are held by pension funds – particularly rating reductions – can have a number of negative effects for such funds. An obvious example is where the managers of a fund are mandated, either by statute or by the fund’s trustees, to hold only investment grade bonds. Where an issuer is downgraded from investment to speculative grade, the fund manager would be required to liquidate their holdings of that issuer’s bonds, either immediately or within a prescribed period. Thus, changes in credit ratings have implications for both the initial and ongoing asset allocations of DB pension fund portfolios.

Because bond yields and spreads respond to changes in credit ratings, as shown in Section Three above, rating changes can affect the market values of pension fund portfolios as well as their asset allocations. Moreover, rating changes are far more common than defaults. Thus, the price effects of rating changes, rather than the default rates associated with particular rating grades, are likely to be of most significance for DB pension funds. Recent research, see for example Gonzalez et al (2004) and the literature cited therein, points to both direct and indirect price effects of ratings changes for DB pension fund assets.

When bond issuers experience a rating change, there will be an immediate and direct price effect on the portfolios of funds which hold their bonds, due to the inverse reaction of bond yields and spreads to rating changes. Upgrades will raise the total market value of assets in pension fund portfolios by driving down the yields on the affected bonds. The reverse would be true for downgrades. Clearly, the extent to which the market value of any particular fund is vulnerable to these direct bond price effects depends upon that fund’s level of exposure to particular bond issuers. Since professional fund managers can be expected to limit their exposures to any individual issuer by holding a diversified set of fixed income securities in the portfolios they manage, there is good reason to conclude that these direct bond price effects are likely to be relatively small.

As well as their effects on bond prices, rating changes also have direct impacts on the affected issuer's equity price (Dichev and Piotroski, 2001). These equity price effects arise because of the signalling properties of credit ratings and rating changes. In an efficient market, a bond issuer's equity price will embody all current information relevant to the valuation of that entity. When new information arises that implies a change in the value of the firm, it will quickly be absorbed into the firm's equity price. Ratings changes convey just such new information. Thus, downgrades, which imply reductions in firm values, can be expected to cause those firms' equity prices to fall (Campbell and Taksler 2003, Klinger and Sarig 2000). There is some evidence that equity market reactions to rating changes are asymmetrical, with stock returns reacting more strongly to downgrades than to upgrades (Hand, Holthausen and Leftwich 1992, Ederington, Goh and Nelson 1996). The magnitude of equity price reactions to rating reductions is, of course, likely to be greatest when downgrade announcements are unexpected.

Like the direct bond price effects, the equity price reactions to rating changes on DB pension fund portfolio values might be expected to be small for well diversified portfolios. However, when combined with the indirect effects, the total impact on the market values of pension fund portfolios arising from changes to the credit ratings of corporate bond issuers has the potential to be much more significant. Indirect effects on DB pension fund portfolios arise because the price reactions arising from rating changes can be shown to extend beyond the market values of the affected issuer's own bonds and equities (Gonzalez et al 2004). That is, downgrades can have negative impacts on the bond and equity prices of a downgraded firm's rivals as well as upon those of the firm itself. The actual size of these rating change spill-overs differs between firms, depending upon their initial ratings and the sizes of their rated debt (Caton and Goh, 2003).

(v) Conclusions

The rating actions of CRAs have an influence on the choice of fixed income securities selected for inclusion in the portfolios of UK DB pension funds because only the most highly rated bonds will be chosen. CRAs also influence the values of DB fund portfolios through the impact that changes to their published ratings have on bond yields and spreads. At first sight, then, it seems reasonable to conclude that the rating actions of CRAs have become increasingly important for UK DB pension funds, given the more than doubling of bond weightings in DB fund portfolios since 1995 and the desire, amongst fund managers and trustees, to reduce the potential for volatility mis-matches to arise in the values of their schemes' assets and liabilities. However, because changes to credit ratings have been shown to have indirect as well as direct impacts on DB pension fund portfolio values, two further conclusions can be drawn. In the past, the rating actions of CRAs would have been of considerable importance to UK DB pension funds, even though the bond allocations in these funds' portfolios was, by today's

standards, relatively low. Consequently, the significance of CRA's rating actions for UK DB pension funds may not have risen in direct proportion to the increase in the bond weightings of these funds' investment portfolios.

Further investigation of this topic is required in order to quantify the degree to which the significance of CRA's rating actions has increased for UK DB pension funds. In particular, account needs to be taken of three issues which are not analysed in any detail in this paper. These are: 1 the frequency of rating changes, 2 the stability of the correlation between rating grades and bond yields and spreads and 3 the extent to which the price effect on equities associated with bond rating changes remains constant over time.

Notes

1. Many potential investors would also lack the necessary analytical skills.
2. Sometimes plus and minus signs are incorporated into the rating system.
3. e.g. subordinated, unsecured or secured.
4. those currently in employment who are accruing future pension entitlements.
5. Workers' contributions are those made by themselves, plus any made on their behalf by their employers. In the case of non-contributory schemes, contributions are made exclusively by the sponsoring employer.
6. The annuity rate is the value of an annual annuity payment expressed as a percentage of the lump-sum used to purchase it.
7. Calculated using FRS17 accounting rules.
8. Partnoy (2007) puts these charges at three to four basis points of the face value of a typical bond issue.
- 9 According to Partnoy (2007) roughly 90 per cent of CRA's income is derived from charges on bond issuers.

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