

Pension Funds and the U.K. Economy

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Abstract

The paper considers the impact of U.K. defined benefit (DB) pension scheme funding and investment on the U.K. economy. It suggests that many conventional theories are based on incomplete or inconsistent economics. In particular, I suggest that:

- An economy cannot really gain competitive advantage from high returns on the domestic assets in which pension funds invest.
- DB liabilities are essentially similar for most schemes and can be matched with bonds.
- Funding pension liabilities has no primary impact on levels of consumption or investment.
- Pension funds are not natural investors in the equity of new ventures; changes to benefit design could have some impact on the levels of such investment, but this is unlikely to be significant.

The conclusion of the paper is that the most significant impact of pension funds on the U.K. economy relates to the costs imposed by extreme mismatching between their financial assets and liabilities. I argue that such risks can, in essence, "crowd out" entrepreneurial risk by increasing the cost of capital. I assert that the U.K. economy would gain from greater focus on the matching of the substantial assets and liabilities associated with pension funds.

1. Introduction

Pension funds are generally regarded as having a significant impact on the U.K. economy. Indeed, this has prompted two major investigations into the role of "institutions," namely, the Wilson Report (1978) and, more recently, the Myners Review (2001). Given the number of disparate commentators, committees, enquiries and other bodies that have looked in earnest at pension funding it is perhaps not surprising that a number of novel ideas have developed:

1.1 The Assets Held

According to the recent European Commission *Green Paper on Pension Reform*, "Low rates of return on pension funds ... affect the indirect costs of labour and therefore have an adverse impact on the EU's job creation ability" (European Commission 1997, p. 7) Interestingly, though, the economies of countries where pension funds have historically invested more in bonds (the

Netherlands and Switzerland) do not appear, at first sight, to have suffered as a result of these higher costs or experienced higher unemployment when compared, say, with the United Kingdom, where pension funds invest more in equities. There is also an interesting puzzle. U.K. companies have also generally been more heavily equity financed and (since equities have returned more than bonds) this could be said in simple terms to have been a costly way for U.K. companies to raise capital. In fact it seems that all the benefits of lower U.K. pension costs arising from the returns on U.K. equities have been squandered by the companies themselves on these higher costs of raising capital. The puzzle is whether this is a coincidence or not. Furthermore, if this is not a coincidence and the two effects always cancel, are there other effects associated with pension funds that might actually account for the relative underperformance of the postwar U.K. economy?

1.2 Matching Liabilities With Bonds

There appears to be a widespread belief that a move by pension funds from equities into bonds should be a cause for concern due to the potential for "distortions" in the gilt or corporate bond markets (see, again, the Myners Review (2001) and associated submissions). These distortions allegedly involve bond prices becoming inflated (interest rates depressed). These are though, somewhat curious concerns. For example, in other contexts it has been argued that low long-term interest rates (both gilt and non gilt) are beneficial for the economy—as cited for example in relation to membership of the European Single Currency.

Of course, low interest rates are good for mortgage borrowers but bad for those buying retirement annuities. Equally, low mortgage interest rates could be said to be bad for savers and low bond yields good for businesses raising fixed borrowing for ventures. In terms of the debate on the U.K. economy, one might argue that, rather than stifling enterprise, "low" long-term bond yields provide "cheap" debt capital for long-term projects and reward entrepreneurs prepared to take the residual long-term equity risk. It is all really a matter of viewpoint, but it is hard to see why low long-term interest rates in the gilt or corporate bond market should necessarily be a matter of profound concern.

1.3 Consumption and Investment

There appear to be conflicting views on the benefits of funding. The European Commission green paper sees funding as desirable and associates the establishment of retirement funds with increased investment in the

economy, which is believed to be good. On the other hand, many commentators in the United Kingdom have argued that increased funding of pension funds to meet solvency standards would result in reduced consumption, which is believed to be bad for the economy. Ideally, therefore, it seems that the commentators would like a method of pension funding that increases investment without reducing consumption.

Sadly, the conventional debate will find it somewhat difficult to square this circle. It may perhaps surprise the reader to discover that it *is* in fact possible to solve this riddle, but only if we adopt a third, enlightened viewpoint. This enlightened view will also reveal that the tussle between the two conventional viewpoints (investment good, reduced consumption bad) is probably harmless since at a primary level pension funding affects neither consumption nor investment.

1.4 Risk Tolerance of Pension Funds and Impact on New Enterprise Capital

By certain measures, it has been argued that the system of funded pension schemes in the United Kingdom leads to undo conservatism in institutional asset allocation, which allegedly starves new ventures of capital. On the other hand, it has been noted that many U.K. pension funds are currently insolvent (insufficient assets to meet liabilities to members if the scheme wound up) as a result of U.K. pension funds adopting investment strategies that take very large levels of risk relative to their liabilities. Ideally it seems that pension funds should invest in assets that are risky, but guaranteed to pay out sufficient to meet the promised benefits in the long term. In other words, risky investments are fine as long as they do not result in losses. Indeed, the EU green paper argues for precisely this utopia saying that "advocates of modern risk management techniques suggest that such techniques allow managers to control risk while investing in assets with greater volatility but higher rates of return." I argue that this utopia cannot be achieved except in the form of guaranteed funds (say, holding a bond plus a call option), but these do not offer a free lunch in the way suggested by the green paper. *Crucially, I argue that the best way to stimulate enterprise is by minimizing the frictional costs in the economy and thereby reducing overall costs of capital. For long-term ventures, I argue that small reductions in these costs can have substantial economic impact.*

I now expand in detail on each of these issues in an attempt to shed some light on what I believe to be the fallacies of conventional theories. I then explore the wider implications of my alternative viewpoint before setting out a summary of my key conclusions at the end of this paper.

2. The Assets Held

The basic irrelevance of asset allocation by defined benefit (DB) pension funds has been widely discussed both historically (see for example Treynor 1977; Black 1980; Tepper 1981) and more recently within the U.K. actuarial profession (see, e.g., Exley, Mehta, and Smith 1997; Gordon 1999; and Chapman, Gordon, and Speed 2001) and in the United States (see, e.g., Gold 2000). The basic proposition of these papers is that:

- The fact that equities are highly likely "in the long term" to outperform bonds is irrelevant in establishing the optimal asset allocation for a DB pension fund.
- Long-term data illustrating the extent of the historic equity risk premium is irrelevant—the existence of an equity risk premium is not disputed (although its size is largely unknowable going forward).
- The reason past return data is irrelevant is that the proposition is based on an arbitrage argument. This starts with the assertion that, for a pension scheme offering the same benefits to employees—regardless of investment returns in the fund—ignoring the risk of corporate bankruptcy, the shareholders of the company bear all of the investment risk (and gains) from the assets held.
- To complete the indifference proposition from this assertion requires only that rational individual investors in a company are able to look through to the underlying asset exposure of the pension fund (either directly, or indirectly through the observed volatility of U.K. shares).
- It then follows that the investor is basically indifferent between (1) £1 of equity exposure in a pension fund, (2) £1 of equity exposure held directly on the company balance sheet (by cross-holdings or, at a portfolio level, by individual companies gearing their own balance sheets) and (3) £1 of equity exposure held directly by the shareholder.

Long-term equity projections using asset and liability models simply rediscover a fallacy amply explained, in words of one syllable by Samuelson (1979) and are, in any event, totally irrelevant in the face of the above arbitrage argument.

The sophistication of this argument is often lost in popular debate on pensions issues. In a nutshell, if equities go up (either over a day, a year or one hundred years), then they go up whether they are held directly or indirectly. Value is not created (nor the cost of the DB promise reduced) by

virtue of holding equities in a pension fund rather than holding the same assets on a company balance sheet or in an individual's own portfolio.

The irrelevance of pension fund asset allocation as described above is in fact identical in structure to the first proposition of Modigliani and Miller (1958). They used the same arbitrage construction to show that the value of a firm was the same (to first order) whether financed by equity or debt. In other words, looking at the mirror image of my proposition, it is not "cheaper" to finance a company with debt simply because historic bond returns are below equity returns.

As with the Modigliani and Miller (1958) proposition, the indifference proposition for pension funds is based on simplifying assumptions. However, it is my assertion that the rational way forward is to start with the basic proposition. From here we can unfold the simplifying assumptions to see how these affect the conclusion, rather than attempting to argue that the higher returns from equities invalidate the basic indifference proposition (either as applied to pension funds or by Modigliani and Miller).

In fact, in the context of the U.K. economy as a whole, the basic Modigliani and Miller (1958) arbitrage argument can be simplified even further to explain one of the puzzles in my Introduction. Why have the reduced pension costs from U.K. pension funds investing in U.K. equities been so neatly offset by the higher costs of financing U.K. firms' capital investment with equity, rather than bonds?

Looking at the whole economy we can start, not with elegant arbitrage, but instead with the more profane concept of a closed economy. In the case of a closed economy, holders of DB promises have fixed (in terms of the scheme rules, although they may be linked to indices such as the Retail Prices Index—RPI) claims on future production. The equity holders have the residual claim. How the equity holdings are arranged between equity holders is clearly irrelevant to the big picture. If companies issue securities bought by the pension funds of other companies, then it matters little to the big picture (to first order) whether these securities are equities or bonds—they are just cross-holdings. If companies raise equity finance and pay large dividends, then these dividends may well turn out to be greater than bond coupons. However, the pension funds of companies holding the equities will receive the dividends rather than bond coupons. Clearly, for every £1 (tax aside) that the dividends cost more than bond coupons to the paying company they reduce the cost to the receiving pension funds. Arguing that equity investment by pension funds makes someone better off without making someone else worse off is, in terms of my earlier examples, like arguing that

we could improve the lot of pensioners, without any cost to the rest of us, if we doubled interest rates on savings.

Of course, it can be argued that the U.K. economy is not closed, but the relevance of closure in the whole picture needs to be considered. For example, is the ability of U.K. companies to buy shares in overseas companies the root of the economic magic performed by institutional equity investment? If so, could the magic be redoubled by the U.K. government borrowing money to buy holdings in foreign companies? This would be an odd slant indeed on the idea that pension funds provide capital for the U.K. economy.

In reality, the example of a closed economy is given merely as a means of explanation for those struggling with the arbitrage argument. Although it is easier to visualize a closed economy, closure is not essential to the basic indifference proposition. If there is a free flow of assets between economies at market value, then the total economy is simply an aggregation of the above arbitrage argument applied to each individual investor, whether he is resident in the United Kingdom or overseas.

The above represents no more than a restatement of orthodox financial theory applied to pension funds and will be familiar to many readers. The relevance to the popular debate on U.K. pension funds should not however be overlooked. Equity investment by U.K. pension funds does not reduce the cost of pension provision and a move by U.K. pension funds into bonds does not increase costs. If interest rates fall as a consequence, then this provides lower interest costs on long-term borrowing by companies that offset higher apparent pension costs. Transaction costs aside, there is, therefore, on the face of it, no overwhelming reason for concern if pension funds switched their asset allocation entirely from equities to bonds.

If we want to find out whether the U.K. economy would benefit overall from one particular form of asset allocation or another (this asset allocation being largely in the form of cross-holdings among U.K. companies), then we need to look beyond the indifference principle. Instead we need to analyze secondary effects hidden within the simplifying assumptions. These will be considered in a later section. At the risk of laboring the point, though, the one carryout from here is the irrelevance proposition; that the differences between equity and bond returns are irrelevant to the optimal asset allocation of DB pension funds. Historic data showing that equities have outperformed bonds is, as befits an irrelevance proposition, irrelevant.

3. Matching Liabilities With Bonds

The vexing question as to whether bonds or equities match the liabilities of final salary pension schemes has taken on a new urgency given the increasing acceptance of the first indifference proposition above. If equities do not reduce the cost of pension promises can a rationale for equity investment be based on a "match" between equities and final salary pension scheme liabilities?

There are two separate strands to the debate on this subject. The first strand tackles the issue head on and seems to point to a complete lack of any justifiable evidence for a link between equities and salaries. The second strand tackles the same issue from a new angle and asserts that, even if a link did exist, it would be irrelevant to a construction of final salary related pension liabilities based on classical financial economic principles. To coin a phrase, I might call this another "irrelevance proposition."

The recent argument on the first strand of this debate is set out in Dyson and Exley (1995). This gives a structural argument that dismantles the economic principle on which the link between equities and salaries is based (namely, that both company profits and salaries form components of GDP). In particular:

- The share of profits as a percentage of GDP is not constant and, therefore, even if salaries and profits grew with GDP, a link is not assured.
- The number of shares and the number of employees are not constant and, thus, inferences about profits per share and salary per employee cannot necessarily be drawn from the aggregate components of GDP.
- There is a large overseas component to the profits of U.K. companies; likewise, many U.K. employees are employed by overseas companies.
- Profits to shareholders are net of tax whilst pensionable salaries are gross of tax; thus, the former are affected directly by tax rates whilst the latter are not.

Of course, it is possible that some of these factors may offset each other. For example, if the share of GDP taken as company profits rises, it is possible that the government may raise corporate taxes. To kill this possibility, Smith (1998) tackles the first strand of the argument using a statistical, rather than a structural, approach. Smith's is the "proof of pudding"

argument—whatever the structural arguments, if a link exists, then it should be possible to detect it statistically.

For the avoidance of doubt both of these modern analyses of the equity-salary link have made the obvious point that the fact that equities have gone up and salaries have gone up is insufficient to prove a "match." I should also mention in passing that, simply because index-linked bonds are linked to inflation and salaries have grown on average 2%pa faster than inflation does not rule out index-linked gilts as a match (hint: try holding 2%pa more index-linked gilts initially).

Smith (1998) also goes further to consider the more technical aspects of statistical analysis. In particular, he explains the error of regressing units of "currency" (such as plain sterling currency, or an inflation-linked currency linked to RPI, or a salary-linked currency linked to National Average Earnings or NAE) on the prices of assets that deliver these currencies at future dates. Thus, regressing equity prices on a salary index is as hopeless as regressing index-linked gilts on inflation; the method doesn't even work in cases where a guaranteed link exists! However, despite the new sophistication in the approach, the detailed analysis by Smith (1998) only confirms the absence of any link between salary-related liabilities and equities. This is consistent with the findings of Wilkie (1995) who, although not primarily concerned with the existence of this link, also found no evidence to support a link within his proposed asset model.

As an important corollary to the statistical analysis, it is worth stressing that link between salary related liabilities and equities is only of any practical use in the subsequent discussion in this paper if it allows us to establish whether a precise amount of equities is sufficient to match a prescribed salary related liability. A vague belief that a long-term relationship exists obviously basks in the luxury of being unprovable. However, unprovability is also the nemesis of the "long-term" argument, because a link based on belief is of absolutely no practical use. For a given liability, belief alone does not tell us whether we need $\pounds x$ or $\pounds y$ of equities to match it; distant handwaving about the long run is no substitute for a financial matching algorithm that can actually be applied in practice. This is an important point, because we will discover that it is the asset versus liability risk that determines the true (frictional) economic cost associated with an asset allocation. Starting with a hedging proposition that relies entirely on handwaving does not mitigate these costs.

The new strand of the argument was advanced in Exley, Mehta, and Smith (1997). This second strand casts fundamental doubt on whether a link

between salaries and equities should be relevant to an accurate matching policy—even if it did exist. They argue that the actuarial convention of including future salary increases prior to retirement in "accrued" pension benefits is at odds with the way other corporate liabilities accrue. They assert instead that the discontinuance liability (subject to retail price indexation only prior to retirement) gives a more consistent liability measure. Additional increases to this liability arising from future salary increases are regarded as new accrual of liability arising in the year of employment and it is left to new funding, rather than investment policy, to hedge these extra liabilities. This approach has the merit of being eminently applicable in an environment of accurate liability-matching using financial techniques and can be indifferent to hand-waving conjectures about long-term hedging of future salary increases.

The macroeconomic implications of wholesale matching of pension fund liabilities with nominal and inflation bonds are, in my view, hugely overstated. The bonds can of course be sourced from either corporate issuance or from government issuance. I deal with each of these in turn.

The most "neat" solution is obviously created if companies buy back their equities from pension funds and issue debt. It is sometimes, incorrectly in my view, argued that this simply results in corporate debt taking on the same characteristics as the existing equities. However, this is a simplistic analysis for a number of reasons:

1. The implication that U.K. companies would need to become 100% debt financed (so that equity and debt took the same characteristics) is unwarranted. The U.K. equity market capitalization is around £1 trillion (March 31, 2003), of which only around £300bn is cross held by U.K. pension funds. Converting this equity entirely into debt would not result in 100% gearing, even if a straight swap were considered.
2. The first slice of new debt issuance could be created without increasing the overall risk of U.K. corporate debt, since the reduced asset and liability risk of the pension fund would allow higher balance sheet gearing for the same default risk. (Using Black's 1980 model for corporate debt and plausible assumptions suggests that, in broad terms, for each £100 of equities witted to bonds in the pension fund around £20 of additional balance sheet debt capacity is created).
3. Debt can be asset backed, collateralized or tranching to create investment grade debt from sub investment grade issuers. Property backed and mortgage backed debt needs to be included in this reckoning.
4. Foreign companies and institutions with sterling revenues can issue sterling denominated debt.

5. The role of individual investors needs to be considered. By removing the equity exposure in pension plans of companies in which they invest, their personal portfolio will be underweight in equity exposure relative to their current position so individuals may sell their personal holdings of bonds (direct or indirect) and buy equities.

When the possibility of pension funds investing in government debt is also included, there seems to be concern over the potential "distortion" that this may cause. However, a key theme of this paper will be that an economy consists of individuals and that references to institutions, such as "pension funds" or "the government" as economic agents can sometimes be misleading to the extent that, ultimately, individuals are the end investors (or issuers, in the case of government debt).

For example, as discussed in van Bezoooyen et al. (1998) there is a form of equivalence between taxation and purchase of government stock (to the extent that they both involve paying money to the government, which is then redistributed or recycled back to individuals in some way). If the price of government stock rises, then the level of general taxation can fall for the same total government expenditure. The distribution of taxes among individuals will, of course, change (reducing gilt yields has the same effect on the incomes of those buying gilts as a tax on investment income).

Furthermore, taxation does affect economic welfare to the extent that it distorts individuals' consumption (we might want to buy a new car but taxation takes wealth from us and forces us to spend it on schools or hospitals or subsidizing bankrupt industries). Thus, the level of gilt prices may indirectly affect welfare, but it is not immediately clear that higher gilt prices and lower general taxation are necessarily detrimental. A wider taxation policy that minimizes distortions in the real economy is a desirable policy aim, but it is unclear that those concerned with pension fund policy need to worry themselves with the "problem" of high demand for gilts by pension funds.

Thus, it is not obvious that an economy such as that of the United Kingdom, with sophisticated capital markets, would be unable to deliver sufficient debt instruments to match pension liabilities without pension funds investing in substantially more risky debt. This is, however, a separate issue from the quite correct observation that, if the pension scheme members are currently bearing equity risk (or "beta" risk in respect of the U.K. economy) via the default risk of their pension promise, for example, then eliminating this risk by investing in matched bonds simply transfers the equity risk somewhere else within the economy. To emphasize the important distinction

between these two issues, it should be noted that investing in gilts is not the only way of providing "absolute security" for pension fund members. For example, a fund could instead invest entirely in equities, but it could be over collateralized (otherwise known as overfunding) and subject to daily reset at this level. Under this approach, the investment policy would remain risky, but members would not bear any default risk. In considering later sections of this paper it is, therefore, necessary to decouple issues associated with default risk borne by members from issues associated with the risk profile of the investment policy and its impact on the management of the operating business of the sponsoring company.

4. Consumption and Investment

The third key economic question relates to whether the funding of a pension liability affects consumption or investment in the economy at a *primary* level.

The explanation as to why funding is also basically irrelevant is similar to the irrelevance of the asset allocation as described above. Once again we have to look at the position of individuals, rather than a company-centric view that £1 of dividends represents £1 of "consumption" and £1 of pension contributions represent £1 of "investment."

If we again look through to the individual, we might assume that the individual decides his own level of consumption. Suppose his consumption is determined not by him spending only the dividend income he receives from his shares, but based on a personal consumption pattern that could be determined by a large number of factors. If he receives £1 of dividend, but wants to save rather than spend, then he will re invest the dividend. Likewise, if the company contributes £1 to the pension scheme instead of paying a dividend, then, assuming that the liabilities (pension payments) are unaffected, it seems likely that (tax issues aside) the share price will be £1 higher relative to paying £1 dividend. Thus, if the individual wants to spend rather than save, he can sell shares to put himself in the same position as if he had received a cash dividend.

It is again interesting to pursue this line of argument at a macroeconomic level. The prefunding of U.K. pension liabilities is often cited as an economic advantage relative to other systems. However, in a closed economy, it seems rather immaterial whether companies pay out dividends, invest directly in their own business or buy each other's securities in the form of cross-holdings as described above (that is, borrow money from each other to finance investment).

To reiterate the point in the previous section, funding primarily affects collateralization of the pension promise and, hence, the default risk borne by members. Furthermore, overfunding is an alternative way of reducing default risk without changing investment policy. I discuss this further below.

5. Impact of pension fund investment on enterprise capital

I believe that an association between pension funds and investment in the seed capital for enterprises is often rooted in a misconception about pension funds as long-term investors. It is true that pension fund liabilities are generally long term in the context of their duration. It is also true that, if the pension fund can find illiquid assets that match the liabilities, then the pension fund has a relative advantage in holding these assets to maturity.

However, these basic investment concepts often seem to be confused with the time horizon of the investor bearing the risk of DB pension fund. Ultimately, this risk of such investment is borne, not by "a long-term institution" but by shareholders in the sponsoring company that runs the pension scheme. If a shareholder sells his or her shares in this company, then he or she ceases to have any "long-term" interest in the assets of the pension fund. Thus, the time horizon of the typical ultimate pension fund risk bearer is identical to that of the typical investor in the sponsoring company (the investors are one and the same). Put another way, it matters little to this ultimate investor whether the company sets up a new venture as a subsidiary (the latter, arguably, has the advantage of direct support from a parent company), the company buys shares in a venture or the company pension scheme buys the same shares. In no sense does the pension fund represent a more "long-term" investment route.

So DB pension funds are in no way "natural" investors in venture capital. At the other end of the spectrum, criticism of funding standards such as the U.K. minimum funding standard for encouraging bond investment at the expense of alternative assets (see Myners Review 2001) also seems misplaced. The choice of bond assets is a consequence of the undeniably bond-like liabilities of a DB pension scheme. Thus, critics of bond investment should look to the liabilities themselves if a case is to be made for the bond asset allocation of U.K. pension funds creating inefficiencies in the U.K. economy. This is considered further below.

There appear to be many anecdotal theories about the impact that these sorts of final salary liabilities may have on issues such as the flexibility of the

U.K. labor market. These theories are of course open to criticism. For example, Exley, Mehta, and Smith (1997) argue that, contrary to the widespread belief that final salary pensions "lock" employees into particular employers, a rational employee will look at the value of his total remuneration package. If the pension benefits associated with long service are valuable, then the long serving employee will, other things equal, work for a lower salary. If a new employer has to pay a higher salary to persuade him to leave, on account of the pension foregone, then this merely reflects that the salary being paid to the long serving employee was previously pulled down by the value of the nonsalary pension benefit.

The true impact of the much vaunted "locking in" of employees created by final salary pension that we seek to explore here is, if it exists, a second order, frictional, effect. Different employees will have different values of pension arising from different service histories, implying the need for individually tailored pay scales, which introduce frictional administration costs. These frictional costs can however be avoided by changes in benefit design within the DB framework. For example, an obvious solution is a reversion to the old fashioned "career-average" basis for pension calculations, rather than the popular final salary basis.

The main issue in benefit design is probably not the final salary link. Rather, it is the fact that, from the perspective of an individual scheme member, a DB pension may represent a substantial allocation of his personal wealth into an investment in a bond-like or inflation-linked bond-like—rather than an equity-like—vehicle, regardless of the fund's asset allocation (because the basic *benefits* are bond-like). Arguably, he may not want this allocation, leading to an inefficiency in this individual's personal allocation of wealth.

I would argue that the nub of the issue of the gearing of U.K. economy that becomes apparent when we search for bond assets to match the liabilities (as discussed in Section 3) is this *benefit design*, not the ability or inability of financial assets to be created or arranged to match them. As stressed previously, these defined benefits create a form of gearing of the U.K. economy—they are fixed (or inflation linked) claims on future production. The way the claims are recognized with matching financial assets in a sophisticated capital market must, fundamentally, be a second order issue (as revealed, for example, by the equivalence between high collateralization or overfunding, and close investment matching, from the member perspective).

For a reasonably wealthy individual it could be argued that the frictional costs imposed by rigid benefit design are very minor. Given either a DB or defined contribution arrangement, he will reorganize his personal

assets and liabilities (mortgage, mortgage repayment vehicle, employee share schemes, individual savings accounts, etc.) so that his overall implicit asset allocation meets his preferences.

Furthermore, looking at the U.K. population in aggregate, it is clear from our earlier analysis of cross-holdings that the characteristics of U.K. equities are in part determined by the implicit gearing created by DB promises. If a typical member holds an allocation to shares in U.K. companies, then he has an implicit liability to pay DB pensions to the employees of these companies. In aggregate, this must offset his personal assets in the form of his individual DB promise since, in aggregate, the population merely owns a share of future production from the economy.

However, there will clearly be many less than wealthy individuals for whom these aggregate positions do not apply. It is debatable how significant these individuals are by value of pension liabilities, given that higher pension liabilities will tend to accrue to those with greater scope to allocate other personal assets. Furthermore, less wealthy individuals may have a preference for less risky investments (for example due to the high implicit beta in their employment). Nevertheless, it seems that frictional costs in benefit design could occur for an employee who has no other assets except a DB pension. It is possible that this individual might prefer to hold, say, an equity oriented money purchase pension rather than a bond-like defined benefit.

For such an individual, it is perfectly reasonable to argue that they may prefer a DB pension with some element of "beta" or equity risk embedded via the investment policy of the fund (e.g., via default risk). However, I am certain that such individuals prefer more to less, and although they may prefer an equity-linked pension of equal value to a certain DB promise, that is a long way from saying that they would voluntarily choose a pension subject to default risk that renders the pension of lesser value (precisely and entirely due to the default risk). Thus, the imposition of bond-like DB promises on individuals as a matter of company remuneration policy can be criticized on the grounds that, given a choice, the employees would have preferred to have less of their wealth invested in bond-like assets (which they may find difficult to "short"). However, arguing that the promised benefit should not only be given some equity exposure, but that trustees should agree, on the basis of professional actuarial advice, to a funding or investment policy that reduces the value of the promised benefit is another matter.

The extent of the potential cost associated with the benefit design of DB schemes (giving employees one form of benefit when they prefer another) remains a matter for conjecture (and further research). In terms of capital for

new enterprises, I return to the assertion that there is no utopian long-term investment that is certain to deliver more than a bond whilst offering the prospect of higher returns. Accordingly, it is questionable whether an individual with no significant assets other than his company pension would seek to invest substantially in new ventures (unless exploiting the state pension-underpin). Thus, I would caution against overemphasis on this particular frictional cost as a source of misallocation of resources away from enterprise capital.

The way to address the above issue is of course to allow individuals the freedom to choose the form of their pension (or possibly total) remuneration on a cost neutral basis to the company. This will only be worthwhile if the cost of administration of these choices is less than the frictional cost associated with individual preferences not being catered for. Another approach may simply be to avoid overprovision of benefits so that a DB pension represents only part of individuals' pension provision, rather than targeting an index-linked pension of two-thirds of final salary, say.

Arguably, it is largely government interference in benefits that has led to the current levels of provision (particularly indexation). In practice, for the majority of employees, some form of DB provision (possibly based on career average to enhance portability and possibly less generous overall than some current arrangements) may well fall broadly within an optimal overall portfolio, especially if the scheme has cost advantages over equivalent retail products.

Of course, if there are concerns over frictional costs in benefit design, then apart from the compulsory indexation of benefits, the issue most easily addressed by government is the requirement for retirement benefits to be paid (aside from the tax free lump sum) in the form of a pension. This is a clear example of a particular asset (an annuity) being imposed on members at retirement. Abolishing this rule would pave the way for substantially greater flexibility in benefit provision (both defined benefit and defined contribution).

6. The Real Impact of Pension Fund Investment on the U.K. Economy

So, we have established that many of the anecdotal theories of pension funding and investment appear to lack economic rigor. In this section, I set out what I consider to be a firmer basis for analysis. As suggested earlier, our starting point is to accept our various indifference propositions, but we then explore how unraveling the simplifying assumptions in these propositions

reveals "second order" economic effects, which I believe to be the real sources of the impact that pension funds have on the U.K. economy.

6.1 Tax

One of the major simplifying assumptions underlying the basic irrelevance propositions above is the absence of tax. In fact, viewed from the shareholder's perspective in isolation, it can be shown that there are significant tax advantages to bond issue by U.K. companies and corresponding bond investment by U.K. pension schemes. Indeed, even the Miller (1977) argument that personal taxes eliminate the tax advantage of a geared firm appears to be neatly addressed when the bonds are held within pension funds (see van Bezooyen et al., 1998).

On the question of paying a dividend versus investing in a pension fund, there are tax issues, but these should not be over-stated. In particular, the tax relief on pension contributions is primarily a deferment of tax only. Furthermore, it has been suggested that even the advantage of a gross investment roll up within pension schemes may be less important than conventionally recognized. For example, Armitage and Exley (2000) argue that, if capital gains taxes are comparable with income taxes, then the taxation of the appreciation in share value arising from the investment in the pension fund may offset much of the tax advantage of tax exempt pension fund investment.

However, although the reader is invited to pursue these issues in the context of advice to individual firms, I argue here that at the level of a total economy, such tax issues are once again irrelevant. Indeed, here the simplification of assuming no taxes seems entirely appropriate, since if the total government tax revenue is to be maintained, an arrangement resulting in less tax being paid by one section of the population will need to be offset by higher taxes from another sector. Accordingly I will not pursue the issue of tax further in this paper.

6.2 Agency Monitoring

Company managements are primarily agents of shareholders put in place to manage a business. The shareholders themselves represent the principals or owners of the firm. There is widespread literature (see Jensen and Meckling 1976) on the potential conflict between agents and principals. The costs imposed by this conflict are referred to as agency costs. Ultimately these costs must be borne either by principals or agents (or some combination of the two), but either way they represent a drag on an economy to the extent

that capital is not allocated optimally to worthwhile projects that would have enhanced overall wealth. Examples include the costs of extravagant head office buildings or unprofitable pet projects in which the shareholders would not have invested had they been given the opportunity to decide by subscription of new capital.

This has led Jensen and Meckling (1976) to argue that, quite apart from any tax benefits, more highly geared firms are optimal owing to the tighter control exercised by shareholders on the allocation of resources. For our purposes here I will not attempt to quantify these costs but merely note that the costs exist and that, in the light of the basic indifference proposition, an arrangement that increased these costs would be detrimental to the economy and an arrangement that reduced costs would be beneficial.

The argument that bond investment within pension funds minimizes agency costs is rooted in the assumption that bonds match the liabilities significantly more closely than equities as discussed in Section 3 (or more practically, that a system of matching liabilities based on bonds can be implemented accurately). We also assume that the optimal level of balance sheet gearing of a company represents some trade off (which we need not specify fully for our argument) involving costs of bankruptcy or financial distress versus the positive gains (particularly reduced agency monitoring costs) from gearing. It seems clear that the effect of a mismatched pension scheme invested in equities will move this optimal level of gearing downwards (i.e., more equity and less bond finance of the firm) and, thus, increase agency monitoring costs.

Although expressed in terms of the impact on optimal gearing levels, the above effect can be explained more simply in terms of the impact that a mismatched pension fund has on free cash flow in a business. We might postulate that, during a recession, when equities will generally underperform in the mismatch, there will be a squeeze on cash flow, as cash contributions to the pension fund will increase. However, arguably such a squeeze is not beneficial since the company is likely to already be experiencing distress and so the risk of profligacy with shareholders money is probably already well under control anyway. By contrast the mismatch is likely to boost the free cash flow available to management in precisely the sort of "boom" conditions when control of cash flow in the hands of management is paramount.

6.3 Signaling Costs

Signaling costs relate to the question of insiders versus outsiders in a firm. Although generally the insiders are agents and the outsiders are

principals, the issue is not related to the conflict of interest between these two parties but rather the difficulty "insiders" have in signaling their success to "outsiders." Some of the literature on why companies pay dividends despite the apparent tax cost involved (see Zodrow 1991 for a summary of the literature) suggests that the benefits from signaling must be nontrivial if they are to offset the tax costs incurred by paying dividends.

I argue that, if the benefits of dividend signaling are large enough to offset the tax costs, then it seems likely that the costs associated with interference with the signal must also be material. Accordingly it would appear that the costs of cash flow disruption created by mismatched pension funds could also be large in terms of signaling costs. For example, a firm with an efficient business whose cash flow is disrupted by a financial event in the pension fund unrelated to the core business might be unable to signal its efficiency to outsiders, or an inefficient firm with a pension fund windfall may give a misleading signal. Overall this may result in misallocation of capital in the economy, with associated costs in terms of overall wealth. An essentially similar issue is considered further quantitatively by Gold (2000) in the context of the disclosures provided by accounts.

Of course, (as recognized also by Gold 2000) signaling costs and the scope for misinformation can be reduced by transparent accounting and the drive by the ASB towards more transparent recognition of financial gains and losses through pension funds is an alternative solution to matching. However, I would argue that any accounting standard is prone to some manipulation and matching assets and liabilities is a far simpler and cheaper solution.

Another important aspect of signaling relates to signaling between shareholders and employees. To see the importance of this we need to flex the basic model of a DB pension scheme slightly and admit two areas of fuzziness in the arrangement. First, it must be accepted that, if the firm goes bankrupt and there is a deficit in the pension fund, then some of the promised pensions may not be paid. In most schemes there are priority rules that (at present) give first priority to pensions in payment in this event, so that nonretired members bear the brunt of this default risk. Second, if surplus accrues in the fund, then in some schemes there is a possibility of contractual benefits being improved. Indeed, arguably from a member perspective this is the sole rationale for Trustees taking risks with the pension fund assets by investing in equities.

Signaling is relevant to this slightly more fuzzy model because the scheme members need to assess the value of the pension promise, not only for the wage bargaining process of employee members but also more generally

for all members in terms of deciding their optimal personal allocation of wealth. To illustrate the latter issue, if the pension is worth $\text{£}x$, *then* they may save an additional amount $\text{£}y$ and spend $\text{£}z$; but, if the pension is already worth $\text{£}x + y$, *then* they may save nothing else and spend $\text{£}y + z$. The important issue is, therefore, the accuracy with which members can assess the value of their pension. If the pension scheme holds matched assets, then the fuzziness largely disappears from the picture, but if the pension is mismatched how do members assess the company's commitment to restore a deficit, or the possibility of surplus being distributed? It seems clear to us that a fuzzy benefit created by mismatching assets and liabilities either adds signaling costs or results in leakage of value arising from misvaluation by members that, in turn, leads to suboptimal personal consumption and investment or allocation of wealth.

Of course, the latter point gives a further spin to my comments on the impact of pension funds on consumption versus investment. We start from the view that individuals, rather than policymakers, decide the correct balance between these two items. To us, it then follows that any obstacle that distorts behavior away from what the individuals were trying to achieve is costly in welfare terms, whether or not it results, say, in more "investment," which policymakers may see as desirable.

In addition, not only does uncertainty in the quantum of defined benefit distort consumption versus savings decisions of individuals, but issues such as default risk add implicit "beta" or equity exposure to the portfolios of individuals with DB pension promises. In theory, individuals would compensate for this via their holdings of other assets, but lack of clarity in the true equity exposure (e.g., implicit default risk) once again potentially leads to a distortion between actual preferences and realized personal asset allocations.

6.4 Utility Gaps

For completeness, a linked issue raised in Exley, Mehta, and Smith (1997) is the appearance of utility gaps associated with pension scheme mismatching. They, too, argue that fuzziness created in benefits is expensive in terms of signaling. However, they also note that there is a gap between the value of default seen by an investor in a company able to diversify his credit risk exposure and the cost as seen by an employee in the firm. This is because the employees' job and pension are linked to the default risk of the same firm, which is difficult or expensive for him to diversify. In this context the creation of a risk of default through mismatching creates another loss of value in the economy.

6.5 Specialization (Core Business Focus)

Another important principle of modern business management (Stewart 1990) is the focus of the scarce management resources on running the core business activity rather than peripheral activities either in which the management has no unique expertise or in which the shareholder has no desire for the management to get involved. The time spent by senior company management on the (mis) management of large pension fund assets and liabilities by deliberate mismatching of assets and liabilities ostensibly to generate surplus would seem to be a classic textbook example of quality management time wasted.

Obviously, the shareholder could, as I have already stressed, achieve exactly the same result more efficiently himself, simply by buying more equities and holding fewer bonds, or investing in geared firms. Indeed, the term "casino capitalism" seems apt to describe a situation where senior management representatives on trustee bodies devote time dabbling with highly geared financial risks rather than running a business.

In this context it seems ironic that some objections to solvency standards for pension funds attempt to argue that scarce capital is "wasted" when tied up in a pension scheme. Capital used by a pension fund to buy securities in other companies does not, of course, disappear into an economic black hole. The scarce resource here is *human capital* and, in particular, competent and efficient company management, whose endeavors should be focused on their business, not asset liability mismatching.

6.6 Portfolio Construction Costs

A final cost at the level of the individual investor relates to the costs of constructing personal portfolios that meet investor preferences. Suppose an investor wanting to invest in, say, a telecom company. Suppose also that the pension fund of this telecom company is heavily invested in private equity. We now have two situations:

1. The individual did not want additional exposure to private equity (perhaps having already invested heavily in tax privileged vehicles himself), in which case he faces the costs of selling private equity in his own portfolio (or if he has no holdings, he must either "short" the exposure somehow or face the utility costs of being forced to holding sub optimal asset allocation).

2. The individual wanted to hold private equity, although he probably prefers to control his holding directly, rather than hold it via the pension fund of a telecom company.

In either case, it seems that there are costs relative to direct holding by the individual investor himself.

6.7 Recap

I pause here to note that the above five economic costs are all associated with *mismatching* a pension liability. Returning to our earlier discussions, I should note that the real costs associated with the uncertainty in the member's benefit can be addressed by either high levels of collateralization or by reducing asset and liability mismatch (collateralization is a form of risk management). In general the costs relating to the impact on the core business operations—mainly agency costs and third party costs—are minimized by matching assets and liabilities as closely as possible, and possibly increased by high collateralization (to the extent that the shareholder lacks control over these assets). Thus, for example, to the extent that corporate debt does not exactly match liabilities the residual risk contributes to agency costs but not necessarily add to the frictional costs of employment (employees unsure of value or risk characteristics of remuneration package) if the benefits are well funded. The lower the residual risk, the greater the savings in agency related costs, but *any* reduction in risk appears to be beneficial in these terms. Reducing risk by investing in corporate debt is still worthwhile even if risk is not eliminated.

Overall, the economic costs highlighted above are nothing more than a restatement of widely accepted theories as to:

- Why risk management arms exist in companies.
- Why companies are not gratuitously risk-seeking in their financial exposure.
- Why a large risk management and insurance industry exists.

To argue that these issues are, in aggregate, trivial would be to argue that risk management is not economically worthwhile. I stress that I am not talking here about business risk in the context of an entrepreneur starting a new venture, such risks are the lifeblood of a market economy. Rather I am talking risks taken with financial assets and liabilities, risks that are costly to the underlying business without adding any value or serving any purpose. If a pension scheme's assets and liabilities can be matched, why take risks? Why not leave entrepreneurs and shareholders to decide for themselves which

equities they want to invest in and focus the management of a company on its business activities rather than the pension fund?

6.8 Direct Costs

A further, more obvious, cost associated with mismatching assets and liabilities is the direct cost of employing a whole host of external managers and professionals to deal with the arrangement. It is my assertion that most treasury professionals within U.K. companies have the expertise to match accrued liabilities with bonds. The fact that pension liabilities are long term does not, as some would have it, project pension fund asset beyond the realms of mere mortals. The liabilities of pension funds have a long duration, admittedly, and some of the matching bonds are inflation linked, rather than conventional, but this is hardly rocket science.

I suggest that one potential beneficial consequence of the Myners Review (2001) may be that the recommendation for more professionally trained trustees may encourage the involvement of corporate finance and treasury professionals with the correct expertise to manage the risk exposures associated with DB pension schemes. This will also most certainly lead to greater focus on matching bond assets and less inclination to take large financial risks that could disrupt the business.

Given my conjecture that the mismatching of pension liabilities with equities serves no particular purpose and potentially incurs significant economic costs it is interesting to look at the direct costs of the current arrangements. It would seem reasonable to suggest that 0.3% per annum of pension assets are currently spent on this management system by way of fund management and other advisors fees.

As noted previously, these fees are paid for managing pure cross-holdings in the U.K. economy. On the basis of £1 trillion of pension assets the total direct cost to the economy then amounts to £3 billion per year. Of course, this money does not disappear down a black hole either—it is reappears mainly in the form of the profits of fund management companies and salaries and bonuses paid in the city, which are then spent in the economy. However, it does divert scarce human resources into activities that do not, on the face of it, create any value at all.

By contrast, money spent on risk management systems has the potential to add value in the same way as any insurance or risk management function within a company can add value—by ensuring smooth operation of the core business.

It is my assertion that, by reducing the significant costs of financial mismatching, the cost of capital in the U.K. economy would be reduced. Inevitably, small reductions in the cost of capital have most impact on "marginal" projects, precisely those associated with new ventures. The effect would also be more pronounced for longer term projects and would in effect, increase the "time horizon" of capital projects (by lowering discount rates).

7. Conclusions

In this paper I have challenged many of the conventional views on the economic impact of DB ("final salary") pension funds, in particular, the following.

7.1 The Assets Held

I assert that the assets of DB pension schemes represent little more than cross-holdings within U.K. companies. These can be likened to the *Keiretsu* system of direct cross-holdings seen in Japan. They do not, as suggested by the Myners Review (2001, p. 4) represent "the savings of millions of people," except indirectly to the extent that individuals hold shares in the companies that hold the pension funds.

In the case of DB pension schemes the millions of members have defined benefits (pensions payable from certain dates) rather than "savings" in the sense of these asset pools. To the extent that the assets themselves are cross-holdings, cash flows such as dividends received by pension funds from U.K. shares represent an internal transfer within U.K. companies. The economy clearly cannot reduce the cost of the DB liabilities themselves by such arrangements, any more than we could all be better off if we doubled the interest rate paid on savings. Somebody must pay. I go on subsequently to assert that an economy functions *less* efficiently with equity cross-holdings, owing to the associated frictional costs (created by *inter alia*, agents and intermediaries).

7.2 Matching Liabilities With Bonds

On the liability side, I assert that the DB liabilities of the vast majority of U.K. pension schemes are surprisingly similar. In most cases the appropriate asset allocation to match the liabilities consists of a mixture of conventional and inflation linked bonds. Differences between schemes may affect the emphasis on the two different types of bond, or their duration but

the overarching feature is the substantial degree of similarity. In particular, the mix between active members and pensioners ("maturity") tends only to affect the duration of the matching bonds.

Contrary to the assertions of the Myners Review (2001), these same conclusions would be reached by different asset-liability models with different assumptions if correctly applied. Although the Myners Review (2001) does stress the importance of setting pension fund investment policy by reference to the liabilities, the widespread similarity in DB liabilities and the existence of (model-independent) matching bond portfolios does not seem to be widely appreciated. I cannot establish any reason why the matching of liabilities with these assets can be cited as a distortion of investment behavior.

7.3 Consumption and Investment

My assertion is that substantial gains in U.K. economic efficiency could potentially be achieved if equity (cross) holdings were eliminated in favor of U.K. pension funds investing instead in matching corporate or government debt securities. By eliminating equity cross-holdings, I argue that the U.K. economy could substantially reduce frictional costs, thereby reducing the cost of capital in the U.K. economy and increasing capital investment.

7.4 Enterprise

The ultimate end investor bearing the investment risk of a DB company pension scheme is the investor in the company itself. As such, these investors are no more "long term" than any other investor in company shares. The fact that DB liabilities are matched with bonds is a function of the bond-like nature of the liabilities. It is possible that some inefficiencies arise from benefit design, but these can be addressed by, for example, moves to "career-average" schemes, or more simply by less generous levels of provision. The government imposes potentially onerous indexation of pensions and restricts flexibility in pensions in payment, which could also be addressed. However, the assertion of my paper is that the best way to encourage enterprise is to focus on reducing the cost of capital in the U.K. economy by removing frictional costs associated with the mismatching of the large financial assets and liabilities of pension funds. By matching assets and liabilities costs could be substantially reduced. This would have most effect on marginal projects and projects with long time horizons, precisely those commonly seen in new enterprises.

With the exception of the highly visible direct costs of the current institutional fund management arrangements, my arguments for reducing

frictional costs have been largely couched in dry economic terms. Agency costs, signaling costs and utility gaps do not often appear in anecdotal theories, although I would hope that the gains from specialization, when expressed as "core business focus" are now widely recognized. However, the big issues should not be missed:

Mismatching by pension funds adds significant costs to the U.K. economy; these costs appear in the form of higher costs of capital that stifle enterprise and wealth creation. By matching assets and liabilities, far from damaging enterprise, the economy would be freed of a significant drag, reducing costs of capital and encouraging enterprise.

The punch-line to all of this is that it may not, after all, be coincidence that the U.K. economy, with its focus on equity investment by institutions, has nevertheless tended to underperform the economies of countries with more conservative approaches to institutional investment. My argument is that, clearly, equity investment alone cannot offer competitive advantage from superior returns (the equities themselves are internal cross-holdings). What I am saying, in simple terms, is that a propensity to dabble in unproductive financial risks inside pension funds can crowd-out investors' appetite for genuine entrepreneurial risk taking. U.K. institutions have been cross examined on two occasions (the Wilson Report and the Myners Review) on the accusation of hindering the U.K. economy. However, the conclusion of this paper, that pension funds may actually be taking too much risk, rather than too little risk seems so far to have eluded the jury at large.

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