

PENSION FUNDS AND THE U.K. ECONOMY

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ABSTRACT

The paper considers the impact of U.K. defined benefit (DB) pension plan funding and investment on the U.K. economy. It suggests that many conventional theories are based on incomplete or inconsistent economics. In particular, the author suggests 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 closely matched with bonds.
- Funding pension liabilities has no primary impact on individuals' consumption and saving or on firms' capital investment.
- Pension funds are not natural investors in the equity of new ventures.

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. The author argues that such risks can, in essence, "crowd out" entrepreneurial risk. He asserts that the U.K. economy would gain from greater focus on the matching of these assets and liabilities, and that the best way to stimulate enterprise is by eliminating the frictional costs in the economy arising from current practices.

1. INTRODUCTION

Pension funds are generally regarded as having a significant impact on the U.K. economy. This has prompted two major investigations into the role of "institutions," namely, the Wilson Report (1978) and, more recently, the Myners (2001) Review. Given the number of committees, enquiries, and other bodies that have looked in earnest at pension funding, it is perhaps not surprising that a number of theories have developed, not all of which appear to be based on consistent economic analysis. Some examples follow.

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 historically invested more in bonds (such as the Netherlands and Switzerland) did not appear to suffer during periods of strong equity returns as a result of their supposedly higher labor costs or experience higher unemployment when compared with, say, the United Kingdom, where pension funds invested more in equities.

Applying a more complete economic analysis reveals why this supposed labor cost advantage of the United Kingdom did not translate into superior economic performance. If we look at the same phenomenon from a different perspective, we find that U.K. companies have also generally been more heavily equity financed than their European counterparts, and during periods when equities have returned more than bonds, the same incomplete economics applied to the *issuers* (as opposed to the pension fund buyers) of these equities could equally suggest that equities have been a "costly" way for companies to raise capital. Combining these two different perspectives then quickly reveals that the returns on securities issued by one firm in an economy and bought by the pension fund of another firm must,

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at the level of economic argument adopted by the European Commission, be irrelevant to the labor costs of that economy.

The more interesting question addressed by my paper is whether a more subtle analysis (looking beyond the differences in expected market returns on equities versus bonds) can actually reveal why equity investment by pension plans could explain some of the relative *underperformance* of an economy, such as the United Kingdom.

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 bond markets (see Myners 2001 and associated submissions). These distortions allegedly involve bond prices becoming inflated (interest rates depressed). Once again, if we take these concerns at face value, they turn out to be looking at just the one side of a coin. In different contexts, it has been argued that low long-term interest rates are *beneficial* for the economy—as cited, for example, in relation to membership of the European single currency. Of course, in the personal sector, low interest rates are good for mortgage borrowers but bad for those buying retirement annuities. Equally, low interest rates could be said to be bad for savers and good for, say, businesses raising fixed borrowing for capital investment.

In terms of the debate on the U.K. economy, one might therefore argue that, rather than stifling enterprise, “low” long-term bond yields provide “cheap” debt capital for long-term projects (such as infrastructure investment) and reward entrepreneurs prepared to take the residual long-term equity risk.

However, in this paper I will argue that the level of long-term interest rates in a market economy is determined by the preferences of individuals in that economy. The association between these interest rates and the asset allocation of pension plans is misplaced.

1.3 Consumption, Saving, and Capital Investment

There also appear to be conflicting and inconsistent views on the benefits of funding. The Euro-

pean Commission (1997) 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 of the objections to a more stringent solvency standard for U.K. pension plans have suggested that increased funding of pension plans would result in either reduced consumption or reduced capital investment by the sponsoring firms, with (despite the inherent contradiction) *both* of these consequences claimed to be bad for the economy.

In this paper I will argue that the association between the funding of DB plans and the levels of consumption and saving by individuals, or the levels of capital investment by firms, is far more subtle than the implied suggestion that £1 of funding is £1 either added to or removed from (depending on the choice of contradictory standpoints described) consumption and saving or capital investment.

However, current widespread practices in the funding and investment of U.K. pension plans can, I argue, destroy value, thus reducing aggregate economic wealth.

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

Another recurring argument (and one of the main motivations for the U.K. Treasury commissioning the Myners Review in 2001) is that conservative U.K. pension scheme investment policies starve new ventures of capital. On the other hand, many U.K. pension funds are currently insolvent (insufficient assets to meet liabilities to members if the scheme wound up) mainly as a result of these funds taking very large risks relative to their liabilities.

According to the European Commission (1997) green paper, “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” p. 7. In other words, the green paper suggests that pension funds should be able to invest in assets that are risky and thus earn a risk premium, but still guarantee to payout sufficient to meet the promised benefits.

I will argue in this paper that such investment strategies simply do not and cannot exist, even in the “long term.” Instead of trying to achieve what I regard as mutually inconsistent objectives (security of employee pension promises and increased investment by pension plans in the equity of new ventures), I argue instead that pension plans could have a real impact on economic welfare by focusing on the close matching of liabilities with bonds.

In the following four sections I will expand in detail on each of these issues in an attempt to shed more light on what I believe to be the fallacies of conventional theories. In Section 6, I then discuss what I consider to be the real economic costs imposed by current pension fund investment and funding policies in the United Kingdom. The conclusion reached in Section 7 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 and that the best way to stimulate enterprise is by eliminating the frictional costs arising from current practices, thereby reducing overall costs of capital in the economy.

2. THE ASSETS HELD

The basic irrelevance of asset allocation by DB pension funds has been widely discussed both historically (see, e.g., 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; Chapman, Gordon, and Speed 2001), as well as 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 argu-

ment. 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 often simply rediscover a fallacy amply explained, for example, by Samuelson (1979) and are in any event irrelevant in the face of the above arbitrage argument.

The sophistication of the basic indifference proposition is often lost in popular debate on pensions issues. In a nutshell, if equities go up (either over a day, a year, or 100 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, I suggest that a sensible way forward is to

start with the basic proposition. From here it is then possible to analyze the simplifying assumptions to see how these affect the conclusion.

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, as suggested in the introduction of my paper. Looking at the whole economy, we can start with the more mundane concept of a closed economy. In this case, the holders of DB promises have fixed (defined) claims on future production. The equity holders have the residual claim. If we then consider the position of equity holders in aggregate—or consider somebody holding all of the equities in the economy—we can see that, ignoring tax and bankruptcy, the creation of financial securities held by pension funds simply creates a series of cross-holdings. If the cross-held securities are equities, then the apparent dilution of the shareholder's ownership of the issuing company (by the creation of additional shares) is offset by the shareholder holding exposure to the same additional shares himself via ownership of the companies whose pension funds buy them. Likewise, if the securities are bonds, then the apparent leverage of the profits of the issuing company is offset by the shareholder holding exposure to the same bonds via ownership of equities in the companies whose pension funds buy the bonds.

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 the pension funds of U.K. companies to buy shares in *overseas* companies the only source of the economic benefit derived by pension fund equity investment? If so, could the same benefit be achieved on a larger scale by the U.K. government borrowing money to buy holdings in foreign companies? This would be an odd slant indeed on the idea discussed in the introduction that pension funds should provide venture capital for the economy.

In reality, the example of a closed economy is given merely as a means of explanation that arrives at a conclusion neatly consistent with the arbitrage argument (in other words, the micro-analysis and macroanalysis agree). On the other hand, it is a matter of some concern when theories fail to pass the test of a closed economy—as appears to be the case for some of the arguments

in the European Commission (1997) green paper discussed in the introduction.

My conclusions so far are just 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. Leaving aside issues such as bankruptcy risk, 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 we want to find out whether the U.K. economy would benefit in real economic terms 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 (such as tax, bankruptcy, and agency costs) hidden within the simplifying assumptions. These will be considered in Section 6.

At the risk of laboring the point, though, the one carryout from this section is the irrelevance proposition: that the differences between expected equity and bond returns are irrelevant to the optimal asset allocation of DB pension funds.

3. MATCHING LIABILITIES WITH BONDS

The vexing question of 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 described in the previous section. 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 a hedge for final-salary-related pension liabilities.

The traditional argument in favor of a link between equities and salaries rests on the assumption that, because both company profits and em-

ployee wages form constituents of total U.K. GDP, the growth in equities must be linked in some way to the growth of salaries. However, Dyson and Exley (1995) offer a series of observations that pick apart this argument. In particular:

- The share of profits as a percentage of GDP is not constant and, therefore, growth in GDP does not necessarily translate into the same growth in both (aggregate) salaries and (aggregate) profits.
- The number of shares and the number of employees are not constant and, thus, inferences about profits *per share* and salary *per employee* cannot be drawn from the any link between aggregate components of GDP. Growth can come from increasing numbers employed or from the investment of new equity (or debt) capital.
- 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 while salaries are gross of tax; thus, the former are affected directly by shocks such as changes in government taxation policy whereas 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 by company profits rises, it is possible that the government may raise corporate taxes. To kill this possibility, Smith (1998) tackles the question using statistical analysis, rather than an economic argument. Smith's is the "proof of pudding" argument—whatever the economic arguments, if a link exists, then it should be possible to detect it statistically.

To avoid doubt, a statistical analysis must do more than rediscover that equities and salaries have both gone up in order to establish a "match." Simply because inflation-linked bonds are linked to inflation and salaries have grown on average 2% pa faster than inflation, say, this does not rule out index-linked gilts as a match—it just means that the initial amount set aside to hedge the liability has to build in advance allowance for this 2% pa growth.

Smith (1998) 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 the CPI, or a salary-linked currency linked to National Average Earnings (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 inflation-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 a 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 any "long-term" argument, because a link based on belief is of no practical use. For a given liability, belief alone does not tell us whether we need £*x* or £*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.

The new strand of the equity matching debate was advanced in Exley, Mehta, and Smith (1997). This casts fundamental doubt on whether a link between salaries and equities should be relevant to an asset and liability matching policy for U.K. pension funds—even if the link 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 say instead that the discontinuance liability (or "accrued benefit obligation"), subject to contractual, but capped, CPI increases prior to retirement in the United Kingdom, gives a more consistent liability measure. Additional increases to this liability arising from future salary increases in excess of the contractual CPI are regarded as new ac-

crual 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 the various conjectures about long-term hedging of future salary increases with equities.

Thus, a close match of the liabilities of pension plans—and particularly the accrued liabilities—can best be achieved by investing plan assets in fixed-income and inflation-linked bonds. In reality, the liabilities of most U.K. pension schemes are very similar in this respect, with differences only in the duration of these bonds according to the degree of maturity. Furthermore, the composition of these hedge portfolios is also likely to be relatively insensitive to the choice of model used to calculate the matching portfolio, provided that any model is reasonably well calibrated to bond market values.

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 (particularly via the mechanism of individual transfer values) from the personal sector or from government issuance. I deal with each of these in turn.

Arguably, the “neatest” solution is created if companies buy back their equities from pension funds and issue debt. It is sometimes, incorrectly, 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 specious. The U.K. equity market capitalization is around £1 trillion (as of March 31, 2003), of which only around £300 billion 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 the Merton model for corporate debt and plausible assumptions suggests that, in purely theoretical terms, for each £100 of equities switched to bonds in the pension fund, around £20 of additional balance sheet debt capacity is created at the original (pre-pension switch) default risk level.

3. Debt can be asset backed, collateralized, or tranching to create investment-grade debt from subinvestment-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. To the extent that liabilities are currently unfunded, the deficit already represents a form of corporate debt obligation, so the funding of this debt by issuing bonds, in principle, simply involves swapping one form of debt for another.

The role of individual investors is an important consideration. By removing the equity exposure in pension plans of companies in which they invest, their personal portfolio will be underweight in equity exposure and overweight in bonds relative to their current position, so individuals may sell their personal holdings of bonds (direct or indirect) and buy equities. In reality, of course, the largest component of many individuals' effective bond exposure in their personal portfolio is, itself, in the form of DB pension promises from current and former employers. To the extent that individuals can take transfer values from these schemes equal to the economic value of the promise, the capacity of the personal sector to act as a counterparty is clearly exactly equal to the liability that needs to be hedged!

When the possibility of pension funds investing in government debt is considered, misplaced concern is often expressed over the potential “distortion” that this may cause. However, a key theme of this paper will be that an economy consists of individuals and references to institutions such as “pension funds” or “the government” as economic agents can sometimes be misleading. Ultimately individuals are the end investors (or issu-

ers, in the case of government debt). For example, as discussed in van Bezooyen et al. (1998), there is a form of equivalence between taxation and purchase of government debt (to the extent that they both involve paying money to the government, which is then redistributed or recycled back to individuals in some way).

Looking at the economy as a whole, government debt is a liability of taxpayers generally and, when held in a U.K. company pension plan, an asset of the shareholders. As such, it is difficult to support an argument that the issuance of government debt, and the purchase of this same debt by pension funds of U.K. companies—owned in turn by shareholders who largely reside and pay taxes in the same economy—can be a primary determinant of the level of long-term interest rates. Indeed, by issuing bonds on behalf of individual taxpayers, it may be better to view the government as an intermediary in achieving exactly the same personal sector transaction as described previously.

Thus, it is not obvious that a country such as the U.K., 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, quite separate from the correct observation that, if the pension scheme members are currently bearing equity risk (or “beta” risk with respect to the U.K. economy), via the default risk of their pension, then eliminating this risk by investing in matched bonds simply transfers the equity risk somewhere else within the economy. I do, however, argue (see Section 6), that it is more efficient in economic terms for this risk to reside elsewhere.

4. CONSUMPTION, SAVING, AND CAPITAL INVESTMENT

The next of our popular economic questions relates to whether the funding of a pension liability affects consumption and saving or levels of capital investment in the economy at a *primary* level.

The explanation of why funding is also basically irrelevant is similar to the irrelevance of the asset allocation, as described previously. Once again we have to look at the position of individuals, rather than taking a company-centric view. For

example, a company might have a choice between paying a £1 cash dividend, making a capital investment of £1 within the business, or paying it into the pension fund. Many of the theories discussed (and criticized) in the introduction to this paper associated these different choices with different implications for the economy as a whole—such as assuming that the £1 of dividend will become £1 of additional “consumption,” or assuming that £1 allocated to a pension fund represents £1 of additional “saving”—although criticisms of solvency standards also suggest that this same £1 contributed to the pension plan might be at the expense of capital investment by the same company.

If, however, I look through to the individual, I would argue that the individual decides his or her own level of consumption. Suppose an individual’s consumption is determined not by him spending only the dividend income he receives from his shares but is, more rationally, based on his own personal consumption versus saving preferences. If he receives £1 of dividend, but wants to save rather than spend, then he will reinvest the dividend. Likewise if the company contributes £1 to the pension scheme instead of paying a dividend, or the company makes a capital investment instead, 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. Furthermore, if the £1 is invested in the pension plan and the company really has other viable investment opportunities, then the capital markets will provide the funds for these too. It should not be a choice between a firm contributing to the pension or exploiting these opportunities.

It is interesting to pursue this same line of argument at a macroeconomic level. The pre-funding of U.K. pension liabilities is often cited as an economic advantage relative to other systems. However, in a closed economy, it is immaterial to first order 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 in Section 2 (that is, borrow money from each other to finance investment).

5. IMPACT OF PENSION FUND INVESTMENT ON ENTERPRISE CAPITAL

An association between pension funds and investment in the seed capital for enterprises often seems to be 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, but this is generally true of any closed-ended investment vehicle.

However, these basic investment concepts are confused with the time horizon of the investor bearing the risk of DB pension funding. Ultimately the risk of such investment is borne, not (necessarily) by “a long-term investor” but by shareholders (who may equally be short- or long-term investors, if such distinct characters exist) in the sponsoring company that runs the pension scheme.

If a shareholder sells his shares in a company, then he ceases to have any “long-term” interest in the assets of the pension fund. The time horizon of the typical pension fund, when traced back to the 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 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 vehicle. So DB pension funds are not “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 2001) also seems misplaced. The liabilities of DB pension plans are undeniably bond-like, and, thus, any investment policy aimed at matching assets against liabilities will involve substantial bond investment. Thus, critics of bond investment should perhaps be aiming any criticism at the design of pension plan benefits. This is considered further below.

There are many anecdotal theories about the impact final-salary pension schemes have on issues such as the flexibility of the U.K. labor market. These theories are open to criticism, however. For example, Exley, Mehta, and Smith (1997), applying their view of liability accrual described in Section 3, 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 her 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 much higher salary to persuade her to leave, then this merely suggests that the cash salary currently being paid to the long-serving employee is being pulled down by the value of the nonsalary pension benefit. The employee is not “locked in” at all, just highly paid in terms of total remuneration.

Any labor market inefficiencies created by final-salary pensions, if they exist, are instead quite subtle, second-order frictional effects. For example, different employees will have different values of pension arising from different service histories, implying the need for individually tailored pay scales that introduce frictional administration costs. These frictional costs could be reduced by changes in benefit design within the DB framework. An obvious way of mitigating some of the frictional costs would be a reversion to the old-fashioned “career-average” basis for pension calculations, rather than the popular final-salary basis.

However, 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 a bond-like, or inflation-linked bond-like, vehicle (because the basic *benefits* are bond-like). Arguably, he may not want this allocation, leading to an inefficiency in his personal allocation of wealth.

This inefficiency is, in principle, the same as the loss of welfare associated with the giving of gifts (rather than cash) to one’s friends—a gift might cost you £20, but it may be worth only £10 to an ungrateful friend who would have chosen to spend the £20 differently.

I would argue that the nub of any issue of the gearing of the 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. These defined benefits create a form of gearing of the U.K. economy when they are granted—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.

The analogy with the buying of unwanted gifts could then have some relevance here in terms of the potential for pension funds to affect bond prices. As suggested earlier, if there is any case to answer, then it must be associated with benefit design. By analogy, if everyone decided to buy their friends a particular gift, then the price of this gift could rise well beyond the value of the gift to the recipients—demand would indeed be “artificially” inflated. The price would reflect only the value placed on the gift by the individual recipients if we could either correctly guess our friends’ preferences or our friends could sell the gifts at retail value.

Thus, by analogy, in order to establish that the design and provision of DB pensions for employees had led to a distortion in the pricing of debt assets, we would need to establish that substantial numbers of individuals would choose not to hold these bond-like DB pensions *and* that they have no ability to sell or “short” them.

For a reasonably wealthy individual, it can be argued that these conditions are unlikely to be met. He will probably be able to reorganize his personal assets and liabilities (mortgage, mortgage repayment vehicle, employee share schemes, Individual Savings Accounts, etc.) so that his overall personal asset allocation, including the pension, meets his preferences.

However, there may be less wealthy individuals for whom the DB pension represents a substantial proportion of their wealth. 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 anyway (e.g., due to the

high implicit beta in their employment, since manual workers may be more exposed to the consequences of recessions or gain more from overtime work and labor shortages during upturns). Also, it must be recognized that it is probably relatively easy for many individuals to “short” (implicitly) an unwanted DB promise (by setting against common defined forms of debt such as mortgages).

Thus, it seems that frictional costs could arise from DB pensions being imposed on some types of individuals but, in practice, the impact would seem to be subdued, especially if the scale of benefits is reasonable in relation to total wealth. There are, however, important additional features of current design (such as exposing employees to the joint event of loss of employment and loss of pension) that can lead to obvious economic inefficiencies, as I discuss in the following section.

Finally, one issue that could easily be addressed by government is the U.K. requirement for retirement benefits (aside from the tax-free lump sum) to be paid in the form of a pension. This is a clear example of a particular asset (an annuity) being imposed on members at retirement and that may be suboptimal for the individual concerned.

6. THE REAL IMPACT OF PENSION FUND INVESTMENT ON THE U.K. ECONOMY

Having 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 more firm basis for analysis. As suggested earlier, my starting point is to accept the various first-order indifference propositions described in the preceding sections. However, I now explore important “second-order” economic effects, which I believe to be the source of some real costs imposed on the U.K. economy by current pension funding and investment policies.

6.1 Tax

One of the major simplifying assumptions underlying the analysis thus far 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. com-

panies and corresponding bond investment by U.K. pension funds. Indeed, even the Miller (1977) argument that personal taxes eliminate the tax advantage of a geared firm appears to be neatly rebutted when the bonds are held within pension funds (see van Bezooyen et al. 1998).

On the question of funding pension plans, there are also tax issues, but these should not be overstated. 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 effective capital gains taxation of returns on pension assets held within company pension plans may eliminate much of the apparent tax advantage of 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 are 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 represent a drag on an economy. In particular, capital may not be allocated optimally to worthwhile projects that would have enhanced overall wealth.

Classical examples of management using internal cash against the wishes of shareholders include the costs of extravagant head office buildings or ambitious but unprofitable pet projects or empire-building acquisitions. 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 and bondholders on the allocation of resources. To see the indirect impact of pension fund investment policy to these agency costs, let us assume that the optimal level of balance sheet gearing of a company represents some trade-off involving costs of bankruptcy or financial distress versus the positive gains from gearing, including, according to Jensen and Meckling, reduced agency monitoring costs. In simple terms, a mismatched pension fund investment policy must have the effect of increasing the risk of the overall firm value and moving this optimal level of gearing downwards (i.e., more equity and less bond finance of the firm), thus increasing agency monitoring costs for the firm and for the economy at large.

There are, however, potentially more direct agency costs imposed by pension fund investment policy due to the impact of internal cash generated by mismatching. If the mismatched assets perform well, then management has access to cash arising from reduced pension contributions. The effect is not symmetric, though, since if a deficit emerges, the company management can call on the shareholders or other investors to make good the shortfall. It might also be noted that any pension fund surplus will tend to arise in the sort of "boom" conditions when control of cash flow in the hands of management is paramount, whereas deficits tend to emerge in situations of financial distress when the risk of profligacy with shareholders' money is probably already well under control.

The above effects focused only on the impact of asset and liability mismatching. However, the underfunding of pension plans is another potentially more direct way of management gaining access to internal cash. Systematic underfunding of schemes can give company management regular access to substantial amounts of cash. A mismatched investment policy is often an important facilitator, however, since actuaries in the United Kingdom are often only prepared to reduce recommended company contributions if advance credit can be taken for the higher expected returns on these more risky assets. Ironically, this approach to funding based on expected asset returns, which seems to maximize the potential for

the agency costs described above, was strongly advocated by the Myners (2001) Review.

There is, of course, the counterargument that flexibility in the funding of schemes gives a flexible line of credit to companies—they can overfund when cash is plentiful and underfund when cash is tight. Although this theory may have some merit, consistent application of the theory is rarely observed in practice. The recent experience in the United Kingdom has generally been one of contribution reductions during economic upturns followed by a strong desire for continued reductions during downturns. If the smoothing of corporate cash flows are an important consideration, then this would also seem to argue strongly in favor of matching, and against current mismatched policies that may create deficits at precisely the wrong time in this supposed cash-flow smoothing process.

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 (if, indeed, accounting is opaque enough for signaling to be an explanation for dividend policy in the first place), 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 accounting disclosures.

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 International Accounting Standards Board toward more transparent recognition of financial gains and losses through pension funds is an alternative solution to matching in this particular context. However, I would argue that any accounting standard is prone to some manipulation, and, thus, the signaling gains from matching assets and liabilities are likely to persist to some degree.

6.4 Value Transparency

If rational economic decisions are to be made by individuals (in terms of wage bargaining, consumption versus saving, asset allocation), then I argue that it is important that pension plan members can assess the value of their pension.

However, mismatching and underfunding creates the risk that if the firm goes bankrupt, there may be a deficit in the pension fund and some of the promised pensions may not be paid. Also, if a scheme is mismatched and surplus accrues in the fund, then in some schemes there is a possibility of contractual benefits being improved. The value lost or gained from these embedded features is extremely difficult for a typical plan member (or even an expert professional) to assess. These aspects of pension benefits arising from underfunding and mismatching can thus be costly to an economy, since individuals may not make personally optimal choices between consumption and saving, or between various forms of asset exposure. Distortions such as this ultimately destroy economic welfare.

On the other hand, if a pension plan is fully funded and invested in matched assets, then we have a transparent and easily valued benefit (by reference to an equivalent insurance contract), and economic welfare is, in principle, enhanced.

6.5 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 lack of transparency. 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 employee's 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 overall loss of value in the economy.

6.6 Specialization (Core Business Focus)

Another important principle of modern business management (Stewart 1990) is the focus of 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. In the context of operating a pension plan, the time spent by senior company management on decisions associated with a policy that basically involves deliberate mismatching or underfunding of assets and liabilities (and on the consequences of that mismatching or underfunding) represents the misdirection of valuable company management skills. Obviously, in terms of the economic exposures created by mismatching, the shareholder could, as I have already stressed, usually achieve exactly the same asset exposures himself, more efficiently, simply by buying and selling financial assets within his own asset portfolio.

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 being squandered by current mismatching of assets and liabilities is *human capital*, in particular, competent and efficient company management whose endeavors should be focused on their business.

6.7 Portfolio Construction Costs

Another cost at the level of the individual investor relates to the costs of constructing personal portfolios that meet investor preferences.

Suppose an investor wants to invest in, say, a telecom company. Suppose also that the pension fund of this telecom company is heavily invested in private equity. There are then two situations to consider:

- The individual did not want additional exposure to private equity (perhaps having already invested heavily in tax-privileged vehicles herself), in which case she faces the costs of selling private equity in her own portfolio (or if she has no holdings, she must either "short" the exposure somehow or face the utility costs of being forced to hold a suboptimal asset allocation).
- The individual wanted to hold private equity, although she probably prefers to control her holding directly, rather than hold it via the pension fund of a telecom company.

In either case it seems that it would have been less costly for the individual if the telecom company had simply matched its pension obligations with bonds and left the individual to construct her own portfolio.

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 project pension fund asset management beyond the realm 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 beneficial consequence of the Myners (2001) Review 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 of DB pension plans. This will 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 is reasonable to estimate that 0.3% pa of pension assets are currently spent on 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 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 value for the beneficial owners of the assets being managed.

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.

6.9 Recap

To recap, if we leave aside the question of tax, then most of the costs to the economy discussed previously are simply associated with the frictional effects of mismatching assets and liabilities. In this case, we have a quite straightforward relationship—the more mismatch risk, the more cost to the economy.

The level of funding of plans is also important in the context of the default risk borne by members (which seems to be an inefficient allocation of this risk, given employees' aversion to joint employer bankruptcy and company default). Furthermore, underfunding of plans is a very direct way of agents gaining access to internal cash and is, thus, costly in terms of the potential principal-agent conflict.

Therefore, I conclude that pension plans should simply be matched and fully funded in order to minimize economic costs associated with their operation. Overall, the economic benefits of

this approach are, in reality, little 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 and
- Why a large risk management and insurance industry exists.

To argue that the economic costs imposed by the current mismatching and underfunding of U.K. pension plans are, in aggregate, trivial would be to argue that risk management is not economically worthwhile.

I stress that I am not talking here about minimizing *business risk* in the context of an entrepreneur starting a new venture; such risk is the lifeblood of a market economy. Rather, I am talking about 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 plan?

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 Assets Held.* I assert that the assets of DB pension schemes represent little more than cross-holdings within U.K. companies. The economy cannot reduce the cost of the DB liabilities by such arrangements (unless value to members is reduced by increasing default risk). Somebody must pay. I go on subsequently to suggest that an economy functions *less* efficiently with equity cross-holdings, owing to the associated frictional costs (created by, inter alia, agents and intermediaries).
- *Matching Liabilities with Bonds.* On the liability side, I suggest that the DB liabilities of the vast majority of U.K. pension schemes can be matched with a mixture of conventional and inflation-linked bonds. I cannot establish any reason why the matching of liabilities with bonds cannot be achieved via the capital mar-

kets in the financially sophisticated U.K. economy. After all, we are simply rearranging debt and equity within this economy in such a way as to improve overall economic welfare. Such optimal reorganizations are, indeed, a supposed virtue of our deep financial markets.

- *Consumption and Investment.* Equity cross-holdings add costs without economic benefit. Thus, I suggest 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.
- *Enterprise.* The ultimate end-investor bearing the investment risk of a DB pension plan is the shareholder in the company. As such, these investors are no more “long term” than any other shareholder. 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 do not appear to be substantial. I argue 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 and underfunding of pension funds.

With the exception of the highly visible direct costs of the current institutional fund management arrangements, my arguments for reducing frictional costs has 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, 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 suggesting in simple terms is that a propensity to dabble in unproductive financial risks inside off-balance sheet 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 rather than too little risk, seems so far to have eluded the jury at large.

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REFERENCES

- ARMITAGE, SETH, AND C. JON EXLEY. 2000. Personal Tax and Cost of Equity with Applications for Investment and Pensions Actuaries. Draft paper presented to the joint Institute and Faculty of Actuaries Investment Conference. Online at www.gemstudy.com/TaxationDownloads/Personal_Tax_and_the_Cost_of_Equity.pdf.
- BLACK, FISCHER. 1980. The Tax Consequences of Long Run Pensions Policy. *Financial Analysts Journal* 36: 21–28.
- CHAPMAN, RICHARD J., TIM J. GORDON, AND CLIFF A. SPEED. 2001.

- Pensions, Funding and Risk. *British Actuarial Journal* 7(4): 605–62.
- DYSON, ANDREW D., AND C. JON EXLEY. 1995. Pension Fund Asset Valuation and Investment. *British Actuarial Journal* 1: 421–69.
- EUROPEAN COMMISSION. 1997. Supplementary Pensions in the Single Market: A Green Paper. Online at www.efrp.org/downloads/eu_publications/10jun1977.pdf.
- EXLEY, C. JON, SHYAM J. B. MEHTA, AND ANDREW D. SMITH. 1997. The Financial Theory of Defined Benefit Pension Schemes. *British Actuarial Journal* 3(Part IV): 213–383. Online at www.gemstudy.com/DefinedBenefitPensionsDownloads/Financial_Theory_of_Defined_Benefit_Pension_Schemes.pdf.
- GOLD, JEREMY. 2000. Accounting/Actuarial Bias Enables Equity Investment by Defined Benefit Pension Plans. Pension Research Council Working Paper No. 2001-5, Wharton School, University of Pennsylvania.
- GORDON, TIM J. 1999. The Price of Actuarial Values. Paper presented to Staple Inn Actuarial Society, February 1999, London.
- JENSEN, MICHAEL C., AND WILLIAM H. MECKLING. 1976. Theory of the Firm, Managerial Behaviour, Agency Costs and Ownership Structures. *Journal of Financial Economics* 4(Oct. 3): 305–60.
- MILLER, MERTON H. 1977. Debt and Taxes. *Journal of Finance* 32(2): 261–75.
- MODIGLIANI, FRANCO, AND MERTON H. MILLER. 1958. The Cost of Capital, Corporation Finance and the Theory of the Firm. *American Economic Review* 48: 261–97.
- MYNERS, PAUL. 2001. Myners Review of Institutional Investment. March. Online at www.hm-treasury.gov.uk/Documents/Financial_Services/Securities_and_Investments/fin_sec_mynfinal.cfm.
- SMITH, ANDREW D. 1998. Salary Related Cash Flows and Market Valuation. Paper presented to Institute of Mathematics and Applications. Online at www.gemstudy.com/DefinedBenefitPensionsDownloads/Salary_Related_Cash_Flows_Market_Based_Valuation.pdf.
- STEWART, G. BENNETT. 1990. *The Quest for Value*. New York: Harper Collins.
- SAMUELSON, PAUL A. 1979. Why We Should Not Make Mean Log of Wealth Big though Years to Act Are Long. *Journal of Banking and Finance* 3: 305–7.
- TEPPER, IRWIN. 1981. Taxation and Corporate Policy. *Journal of Finance* 36: 1–13.
- TREYNOR, JACK. 1977. The Principles of Corporate Pension Finance. *Journal of Finance* 32: 627–38.
- VAN BEZOOYEN, JEROEN, C. JON EXLEY, SHYAM J. B. MEHTA, ANDREW D. SMITH, AND ED WILSON. 1998. Taxation and Investment. Paper presented to the joint Institute and Faculty of Actuaries Investment Conference. Online at www.gemstudy.com/TaxationDownloads/Taxation_and_Investment.pdf.
- WILKIE, A. DAVID. 1995. More on a Stochastic Investment Model for Actuarial Use. *British Actuarial Journal* 1: 777–945.
- WILSON REPORT. 1978. Report of the Committee to Review the Functioning of Financial Institutions, Cmnd No. 7937. London: HMSO.
- ZODROW, GEORGE R. 1991. On the Traditional and New Views of Dividend Taxation. *National Tax Journal* 44: 497–509.

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