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Work now, pay later? An empirical analysis of the pension–pay trade off

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ABSTRACT

We employ random effects panel data regression methodology to investigate the potential compensating differential between wages and pensions. Using data from the British Household Panel Survey (BHPS) and derived prospective pension variables as calculated by the Institute for Fiscal Studies (IFS), we find no evidence of a trade off and, indeed, some evidence of a small premium. Further analysis finds no significant differences in the results for public and private sector workers, even after controlling for sample selection bias.

1. Introduction

According to the theory of compensating wage differentials, competition between firms equalises the overall value of employment packages for a particular type of occupation (Rosen, 1986). Thus, one would expect jobs that offered minimal fringe benefits to offer high wages, and vice versa.

The theory of compensating wage differentials has been tested, with mixed results, on a variety of such benefits: health insurance (Currie and Madrian, 1999; Olson, 2002); maternity benefits (Gruber, 1994); work-related injury and sickness insurance (Gruber and Krueger, 1991); paid vacation leave (Altonji and Usui, 2007). In contrast, relatively little empirical work has been undertaken on the compensating differential between wages and pensions, particularly on UK data. The empirical evidence that does exist is somewhat mixed—see Table A.1 (Appendix A). For North America, compelling evidence of a trade-off is found by Smith (1981), Clark and McDermed (1986), Moore (1987), Montgomery et al. (1992), Gunderson et al. (1992). Less compelling are the findings of Ehrenberg (1980), Schiller and Weiss (1980) and Bulow and Landsman (1985). No evidence of a trade-off is found by Smith and Ehrenberg (1983) or Mitchell and Pozzebon (1989) whilst significant positive relationships are found by Gustman and Steinmeier (1987), Dorsey (1989) and Even and Macpherson (1990).

In terms of the UK, Inkmann (2006) finds evidence of a perfectly compensating wage differential using data from the English Longitudinal Study of Ageing (ELSA). Andrietti and Patacchini (2004) find evidence to support the implicit contract argument that male occupational pension participants employed in the private sector earn a positive wage premium only at the beginning of their career. However, once they account for the endogenous sorting of individuals into occupational pension schemes, the magnitude decreases sharply.[1]

In this paper we investigate the relationship between wage and pension benefits using data from the British Household Panel Survey (BHPS) and derived prospective pension rights variables as calculated by the Institute of Fiscal Studies (IFS). We find no evidence of a trade-off, even after accounting for possible sample selection bias. Indeed, our results allude to the possibility of a small premium.

This paper is set out as follows: Section 2 sets out the legislative background to pension schemes in the UK whilst Section 3 discusses the theory of compensating differentials, examining in particular the remuneration trade-off in between current pay and future promised pension benefits. Section 4 outlines our data and empirical methodology. Our results are set out in Section 5 and final comments are collected in Section 6.

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[1] Studies that analyse the trade-off tend to adopt either a “spot” or “life-cycle” approach. The former approach focuses on pension benefits that have been accrued up to a particular point in time, looking at the value of pension benefits that a particular employee is enjoying in a particular year. The latter approach utilises assumptions regarding salary growth to calculate prospective benefits that may accrue over an individual's life-cycle. Whilst Inkmann (2006) and Andrietti and Patacchini (2004) find trade-offs using life-cycle approaches, it has been uncommon to find such a trade-off from a spot approach.

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2. Background

2.1. Occupational pension schemes in the UK[2]

All UK Employees who earn more than the "Lower Earnings Limit" (LEL—currently £5304 per year) are automatically enrolled in the "State Second Pension" (S2P), the earnings-related tier of the UK public pension system. Employees may choose to join an employer provided occupational pension scheme, either in conjunction with or instead of the S2P. The latter option is termed "Contracting-Out" and reduces the employee's National Insurance (NI) contributions to the S2P. Employers are not obliged to offer an occupational pension scheme, and employees are not required to join such a scheme if it is offered. If they do so join, then employees are able to claim income tax relief on their total contributions (up to a limit of 15% of gross earnings) to any occupational pension scheme that is deemed "exempt approved." Higher employee contributions are explicitly prohibited in exempt approved schemes but corporation tax relief is given on employer contributions without an upper bound. Also a tax-free lump sum payment may be received at retirement age from an exempt approved scheme.

Employers are required to contribute a minimum of 10% of the sum of employee and employer contributions to exempt approved schemes. Although employee contributions are not compulsory for exempt approved schemes, most employers set mandatory contributions as a precondition for scheme membership.

There are two main types of exempt approved schemes, "Defined Benefit" (DB) and "Defined Contribution" (DC). The former defines a pension related to the members' salary (or some other value) pre-set in advance, whereas the latter is a pension based on the contributions made and the investment return that they have produced. Employees may augment mandatory scheme contributions by Additional Voluntary (AV) and/or Free-Standing (FS) contributions. AV contributions may be used to purchase additional years of service for DB schemes or may be paid into a DC scheme offered by the employer. FS contributions are paid into an externally provided DC scheme.

2.2. Calculating pension benefits

Because individuals place a higher value on income received sooner than later, the value of a pension is usually defined as the discounted present value of the stream of pension income received from the date of retirement to death (see, for example, Disney et al., 2007a, 2007b, 2009). What this implies for DB and DC pensions is examined below.

2.2.1. The value of a defined benefit (DB) pension

The annual income received from a final salary DB pension will depend on a measure of "final" salary, an accrual fraction and the length membership in the scheme *vis*:

$$p_t = \alpha n_t y_t \tag{1}$$

p_t denotes annual pension income from normal pensionable age (NPA), α denotes the fraction of accrual, n_t denotes years of membership up to year t and y_t denotes the member's "final" salary.[3] Gross pension wealth at time t, w_t, is defined as the present discounted value of the lump sum plus this stream of pension income:

$$w_t = \delta^r \alpha n_t y_t + \sum_{s=r}^{T} \delta^s \alpha n_t y_t + \sum_{q=T+1}^{T_p} \delta^q \alpha n_t y_t \tag{2}$$

where δ denotes the real intertemporal discount factor, r the number of years to retirement, T the year of member's death and T_p the year of partner's death (if this is later than T_p). Eq. (2) assumes an exponential discount function and, for simplicity, we follow Disney et al. (2007a, 2007b) in assuming a constant discount rate of 2% such that $\delta = (1+0.2)^{-1} = 0.98'$.

The marginal benefit of remaining in the scheme for an extra year will be greater the longer the member expects to receive the pension income for (i.e. the longer is the period from retirement, r, to death of the member, T, or partner, T_p). This accrual is shown in Eq. (3):

$$\Delta w \equiv w_{t+1} - w_t = \delta^r \alpha (n\Delta y + y_{t+1}) + \sum_{s=r}^{T} \delta^s \alpha (n\Delta y + y_{t+1}) + \sum_{q=T+1}^{T_p} \delta^q \alpha (n\Delta y + y_{t+1}) - \delta c y_{t+1} \tag{3}$$

where c denotes the employee contribution rate and $\Delta y \equiv y_{t+1} - y_t$. The marginal value of remaining in a final salary pension comes both from the extra year of accrued service and the higher final salary used to calculate the pension for all previous service. The marginal value therefore depends fundamentally on the number of years of service, n.

2.2.2. The value of a defined contribution (DC) pension to members

In a DC pension plan, contributions, c, from the employee and employer are placed each year into a fund. This fund will then grow over time as a result of additional contributions and investment returns, x, until the date of annuitisation when the employee chooses to withdraw the pension, at which time an annuity is purchased (at rate ρ) that provides an annual income until death (at time T)—see Disney et al.(2009). The value of a DC pension is thus the discounted present value of the stream of pension income that will be received from the date of annuitisation until death. In return for this extra stream of pension income, the employee gives up some proportion, c, of his current salary. The value of an additional year's pension accrual is therefore:

$$\Delta w = \sum_{s=r}^{T} \delta^s \Delta b_{t+1} - \partial c y_{t+1} \tag{4}$$

where $\Delta b_{t+1} \equiv b_{t+1} - b_t = \bar{c} \rho y_{t+1} (1+x)^{r-1}$, ρ denotes the indexed annuity rate, δ the real intertemporal discount factor, x the real investment return, c the employee contribution rate and $\bar{c}$ the combined employer and employee contribution rate.

The discounted present value of the wealth therefore depends on the annuity rates available when the individual purchases the annuity, and on the prior level of contributions invested and investment returns.[4] The utility derived from contributing to a DC pension scheme is more complicated, because it depends on factors such as the annuity rate and the member's age at birth, but in general the greater the investment return, x, the more beneficial is the DC scheme.[5]

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[2] For more detailed descriptions of the UK Pension environment, see Blake (2003), Cocco and Lopes (2004), and Banks et al. (2005). The following section draws heavily from Inkmann (2006).

[3] Most DB schemes also provide lump sum payments upon reaching NPA in addition to a stream of pension income until death. Where scheme rules apply, a proportion of the pension income will continue to be paid to the partner of the member, as survivor's benefits. If an employee leaves the scheme early and defers taking a pension until NPA, then the annual pension income that they will receive from NPA will depend on the salary they received when they left up-rated by the Retail Price Index (RPI). Beyond NPA, the pension received is also increased in line with inflation each year.

[4] We follow Disney's et al. (2007b) assumption that the annuity rates that will be available when the individual annuitises will be the second-best currently available age and sex-specific individual life annuity rates. As quoted by the Financial Services Authority (FSA) on 13 March 2007 on the basis of a £100,000 fund, www.fsa.gov.uk/tables. The assumption used of investment return that individuals receive on their pension funds is real 2½% a year.

[5] There is an important interaction between the investment return, x, and the discount factor, $\delta(r)$. If $\delta(r)(1+x)r > 1$ then the scheme member would gain utility by investing a sum from now until time r.