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Market and Public Organisation

Working Mums: What Impact on Children's Early Years Development?

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*Much controversy surrounds the effects that mothers who go back to work early have on their children's cognitive development. Research by **Paul Gregg** and **Liz Washbrook** provides new insights on the links between maternal employment and child outcomes through the experiences of 12,000 children born in the 1990s.*

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The last two decades have seen dramatic increases in employment among mothers with very young children in the UK: the proportion of women in paid work 8-11 months after childbirth rose from 24% in 1979 to 67% in 1996. It is no exaggeration to say that the norm for women with a child less than a year old has shifted from non-employment to employment in a period of less than 20 years.

This change in behaviour has left a concern that early post-natal employment may have adverse effects on children's development. For example, a number of US studies have concluded that maternal employment in the first year of life is associated with poorer outcomes later in childhood and, in particular, poorer cognitive outcomes. But patterns of employment after childbirth are very different in the UK where mothers' use of maternity rights legislation means that return occurs later than in the United States, and where far more women return part-time.

Using data from the ALSPAC (Avon Longitudinal Study of Parents and Children) cohort of 12,000 children born in 1991 and 1992, we set out to answer a number of questions about the relationship between maternal employment in the three years postbirth and subsequent child outcomes up to the age of 8. Our central findings are that:

- There are negative effects only for the relatively unusual group of children whose mothers return to full-time work before they are 18 months old. The magnitude of these effects is small, and only 14% of mothers do go back to full-time work this early.

- It is only those children of full-time working mothers whose non-parental care consists solely of unpaid care by a friend, relative or neighbour – such as a grandparent – who experience significant detrimental effects. This group accounts for 40% of the mothers who return to full-time work early or 5% of all mothers. Short periods of care by relatives appear not to be damaging; it is sole reliance on relatives to cover full-time working that appears harmful.

- Although mothers who return early to full-time work engage in fewer interactions with their children, overall their children receive no less active parental involvement. This is because fathers are substantially more involved in parenting in households where mothers return to work early.

- Mothers who return to work soon after the birth are no less likely to breast-feed their children than those who stay at home. And although among women who start breast-feeding working mothers do so for a shorter time, what matters most for child outcomes is whether the mother initiates breastfeeding at all. Working and non-working mothers are little different in this respect.

For the majority of children, maternal employment in the first three years of life is not associated with any adverse effects on later cognitive outcomes

Is early maternal employment bad for children?

The fundamental question is whether maternal employment has a *causal* effect on children's development between the ages of 2 and 8. It is possible that an observed negative relationship between maternal employment and child outcomes in fact reflects other factors that affect both maternal labour supply and children's development. For example, if a mother works because household income is very low, we may be observing the effect of poverty on child outcomes rather than the effect of maternal employment. In these circumstances, it would be completely wrong to conclude that the child would be better off if the mother did not work.

Controlling for as many of these 'confounding influences' as possible, our results indicate that it is only full-time work begun in the 18 months after childbirth that has any negative effects, and the magnitude of these effects is small. Neither employment begun later than 18 months nor part-time work undertaken at any time have any negative effects.

Are some children more vulnerable?

It is possible that some groups of children are more vulnerable to the effects of early maternal employment and that these effects are disguised by the average. To explore this, we investigate whether the estimated impact varies with a number of different characteristics. We find that children of the least educated mothers, of lone mothers and those in the poorest households appear to *benefit* when their mothers work, leaving the negative effects concentrated among the children of the more advantaged. Our results also provide tentative support for the hypothesis that boys are more adversely affected than girls.

The type of childcare a family uses will clearly be a crucial determinant of whether the child benefits or is harmed by the mother's absence due to paid work. If the quality of care provided while the mother is working is lower than that she herself would provide, then we might expect the child to suffer from her absence. Conversely, if the relative quality of non-maternal care is higher, the child may be better off if she is in work.

We explore whether the impact of full-time maternal employment before 18 months varies with the family's childcare arrangements. It turns out that only those children whose non-parental care consists solely of unpaid care by a friend, relative or neighbour experience significant detrimental effects. The use of paid childcare seems to protect children from any negative effects, and attendance at a nursery may actually lead to better cognitive outcomes than for children at home with a non-working mother.

How might maternal employment affect children?

Intuitively, we can think of a number of potential 'mechanisms' through which maternal employment might affect children. These may be either harmful or beneficial. For example, it may be that working mothers are less likely to breast-feed and that this is damaging to children. But it also may be that the additional income from mothers' work has a positive impact on development. Our findings suggest that the balance of these effects is different in different families and that, for the majority, the overall negligible effects may reflect the 'cancelling out' of a number of opposing mechanisms.

First, perhaps the most compelling hypothesis is that the children of working mothers will be harmed because they receive less parental attention. In fact, we find that although mothers who return early to full-time work do engage in fewer interactions with their children, overall their children receive no less active parental involvement. This is because fathers compensate by being substantially more involved with their children.

This more equal division of parenting has strongly beneficial effects on later child outcomes, and hence works to minimise the effect of the mother's employment. The impact of more equal parenting is reinforced by the contribution of the mother's earnings to household income, which is positively associated with children's cognitive outcomes and so again helps to offset any negative effects of maternal employment.

A third potential mechanism concerns breast-feeding. We find that mothers who return to work early are no less likely to start breast-feeding than those who stay at home. But they do breast-feed for a shorter time. This seems to make a very small negative contribution to the overall effect of early full-time work. Our results suggest, however, that what really matters is initiation of breast-feeding and, as working and non-working mothers do not differ here, this cannot be a mechanism through which maternal employment disadvantages children.

The final hypothesis we explore is that the attempt to combine work and motherhood results in greater tiredness and stress, which in turn leads to less nurturing. We find that although early full-time work *is* associated with greater maternal tiredness and stress, there is no evidence that this leads to poorer child outcomes. In fact, the children of mothers who report that they are often tired or exhausted score significantly higher on cognitive measures than children whose mothers are rarely or never tired. This suggests that tiredness is a reflection of effort devoted to raising children – an outcome of beneficial behaviours rather than a cause of difficulties.

Full-time work begun prior to 18 months has harmful consequences if the family relies solely on unpaid childcare by a friend or relative; the use of formal paid care, however, protects children from these negative effects

The implications for policy

These results have a number of policy implications. Maternal employment has harmful effects on children only if certain 'risk factors' are present and virtually all of these factors can potentially be manipulated by appropriate policy interventions:

- Our finding that it is only early full-time work that may be a problem suggests that policies that encourage the adoption of flexible and part-time working practices (and also that enable mothers to remain at home for longer after a birth) will minimise any negative effects of maternal employment.

- The importance of the father's parenting role opens up other potential ways of influencing children's development. On the basis of our results, policies relating to paternity leave and flexible working for fathers as well as mothers could have quite strong effects on child outcomes.

- Finally, we emphasise the importance of access to inexpensive and high quality childcare, particularly for very young children. Relatively few mothers in our study made use of paid care before their children reached the age of 2, probably due to the prohibitive costs. The recent increases in financial support for childcare may lead to a shift towards paid care by working mothers.

Parenting tasks are more equally divided in households where mothers return to work early and children appear to benefit from this greater degree of father involvement

This article summarises 'The Effects of Early Maternal Employment on Child Development in the UK' by Paul Gregg and Liz Washbrook, CMPO Discussion Paper No. 03/70. For the full paper, see: http:/www.bris.ac.uk/cmpo/wp70.pdf

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Lone Mums Going Back to Work: How Effective are Current Policies?

A key element of the government's strategy for reducing child poverty is to get more lone parents into work. ***Paul Gregg*** *and* ***Susan Harkness*** *evaluate the effectiveness of the welfare reforms introduced since 1998.*

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Roughly one in four children in the UK are being brought up by lone parents – and, until recently, these families faced extremely high rates of poverty and worklessness by international standards. However, our research indicates that the employment rates of lone parents have increased significantly over the last five years as a result of the government's welfare reforms, notably the Working Families Tax Credit (WFTC) and the New Deal for Lone Parents (NDLP).

Since 1992, there has been an increase of 11 percentage points in the rate of employment of lone parents – to 53% in 2002. Of this increase, around 80,000 more lone parents are now working as a result of the reforms introduced since 1998. Policy changes have also increased working hours among lone parents, as more of them are working at least 16 hours a week so as to be eligible for the tax credits. These employment gains have been achieved despite generous increases in benefit payments for lone parents who do not work and the fact that participation in the NDLP remains entirely voluntary.

The last 30 years have seen dramatic increases in the employment rates of married (and cohabiting) mothers. Yet the employment rates of lone mothers were lower in the early 1990s than in the late 1970s (at just under 40%) and 25 percentage points lower than those of married mothers. Even in the late 1990s, the UK had the biggest gap between the employment rates of lone and married mothers among OECD countries. Around half of OECD countries had employment rates of lone mothers *above* those of their married counterparts. And as Figure 1 shows, only in Australia, Ireland and Poland were employment rates lower than in the UK, while in many other countries, employment rates were over 65%.

There has not always been an employment gap between single and married mothers. The employment rates of married mothers were only marginally higher that those of lone parents in the late 1970s. But while employment rates of lone parents fell in the 1980s, for married mothers, employment rates grew steadily from around 1984 so that by the mid-1990s, employment rates of single childless women and married mothers were broadly similar – see Figure 2. Since 1992, the employment rates of lone parents have risen sharply, from 42% to 53%, with the rate of increase accelerating after 1998 when a new phase of policy reforms came into effect.

In 1997, the incoming Labour government initiated a series of policy reforms aimed at reducing child poverty, a key element of which was to increase employment among families with children. The reforms introduced since 1998 have had a 'twin track' strategy: improving financial incentives to work through the WFTC; and introducing case-managed welfare systems via the NDLP.

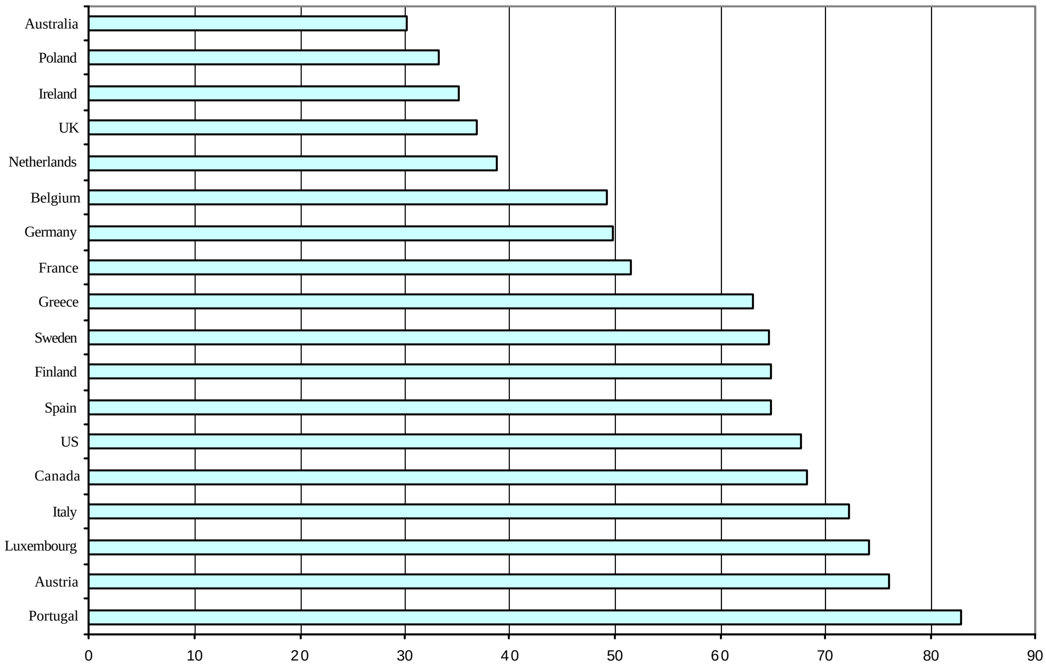

Figure 1: International comparisons of the employment rates of lone parents, 1999 (Source: *OECD Economic Outlook*, 2001)

The WFTC replaced Family Credit in October 1999, and raised both the maximum benefit payable to working lone parents, and reduced the rate at which the tax credit was withdrawn. The increased generosity of the WFTC meant that it was available much further up the earnings distribution, while the generosity of support for childcare was also increased.

The NDLP, which was rolled out nationally from April 1998, was aimed at encouraging job search and easing the transition into work among lone parents who volunteer to participate. More recently, Job Centre Plus has increased the extent of contact with lone parents, requiring them to attend an interview.

So what impact have these policy changes had on employment of lone parents? To answer this question, we need to strip out the effects of the general economic recovery. To do this, we take a 'difference-in-difference' approach. This builds a counterfactual of what would have happened to employment in the absence of policy reform by making a comparison with a benchmark population. The ideal counterfactual group *should not* have experienced any policy shocks affecting their employment, but *should* have the same characteristics that affect their employment chances.

The 'difference-in-difference' approach asks how lone parents were performing in terms of employment compared to the benchmark population before and after the policy reforms. We address this question using data from the Labour Force Survey, taking single people without children to construct a counterfactual group (as this group was least affected by the tax and benefit reforms) and then matching them to our lone parents using a set of characteristics that influence employment, such as age, education, housing tenure and region of residence. From this, we find that since 1998, lone parent employment has risen by six percentage points more than would have been predicted from a population of single people without children with the same characteristics as lone parents.

Increased employment and hours of work mean higher earnings for lone parents – together with more generous benefits, they are raising incomes among lone parent families

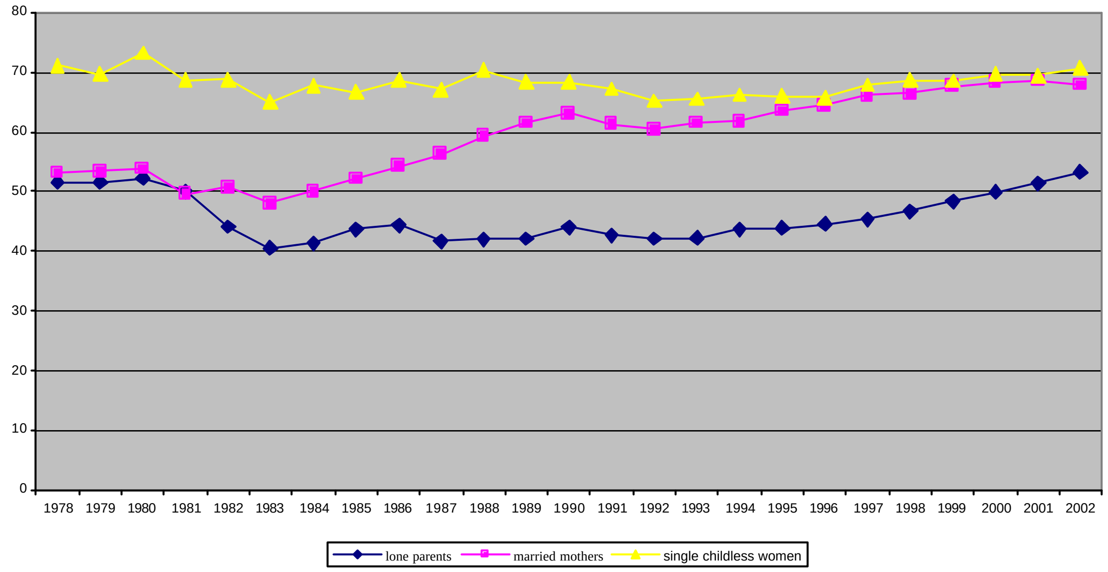

Figure 2: UK employment rates of single mothers, married mothers and single women without children, 1978-2002
(Data sources: General Household Survey, 1978-91; Labour Force Survey, 1992-2002)

But to estimate the impact of policy change, we need to take account of any relative gains in employment of lone parents in the period prior to policy reform. Lone parents were making very small employment gains relative to the benchmark population between 1992 and 1998. Projecting this small rate of improvement forward beyond 1998 suggests that policy change has led to a gain of five percentage points in employment, which translates into around 80,000 more lone parents in work.

Using the same methodology, we also estimate that employment of at least 16 hours a week, the requirement for receiving the WFTC, has risen by seven percentage points (or 120,000 people) as a result of the policy changes. The remaining non-working lone parents are increasingly less skilled and concentrated in rented housing, a group for whom work incentives still remain weak. This suggests that it may get harder to achieve further gains in employment of the same magnitude.

The government's package of welfare reform neither requires job search nor limits the time for which benefits may be received. It has also been accompanied by generous increases in benefit payments. This is in sharp contrast to US policy, where welfare generosity has not increased and time limits and mandatory job search have been employed alongside tax credits to get lone parents back to work. In the United States, in-work benefits were introduced with a clear primary motivation of welfare caseload reduction. In the UK, in contrast, the main aim has been to raise incomes both for those in and out of employment – and the goal behind that is to meet the government target of reducing the number of children living in relative poverty by a quarter by 2004/5.

So increased employment and more generous welfare payments are making rapid progress in reducing poverty among lone parent families. Nevertheless, progress is a not yet on a sufficient scale for it to be likely that the government's target of getting 70% of lone parents into work by 2010 will be achieved.

This article summarises 'Welfare Reform and Lone Parents Employment' by Paul Gregg and Susan Harkness, CMPO Discussion Paper No. 03/72. For the full paper, see: http://www.bris.ac.uk/cmpo/wp72.pdf

Going the Extra Mile: Can 'Not-for-Profits' Deliver Better Public Services?

The UK is seeing the emergence of a new breed of private 'not-for-profits' – organisations like Network Rail, Glas Cymru and the proposed foundation hospitals whose financial position and sphere of activity are still determined largely by the government. ***Paul Grout*** *and* ***Michelle Yong*** *investigate their potential effectiveness in the private provision of public services.*

A new breed of private 'not-for-profits' (NFPs) is supplying public services that have traditionally been the preserve of the public sector. These organisations are distinct from the typical charitable NFPs in several respects. In the case of the Welsh water utility, Glas Cymru, and Railtrack's successor, Network Rail, they are monopoly suppliers of public services whose NFP status has arisen from the financial weakness or bankruptcy of their predecessors. More importantly, their income is strongly influenced by the government, something that will be particularly true for foundation hospitals.

Discussion of NFPs has thus far ignored the role of powerful purchasers of their services. Our research examines the potential impact of the government as dominant purchaser on the well-documented benefits of NFPs, particularly in relation to their receipt of 'donated labour', the extra effort put in by employees who care enough about their work to 'go the extra mile' without financial reward. We demonstrate that the presence of a powerful purchaser like the government erodes and may even negate the advantage that NFPs have over 'for-profit' firms (FPs). This has potentially serious implications.

To date, the main type of organisation between conventional public sector provision and privatised industries has been public-private partnerships (PPPs). So what benefits can NFPs offer? Judging from the debate on foundation hospitals, the government itself appears to be divided in its attitude towards the potential role of NFPs in the delivery of public services. While many claims have been made for the virtues of NFPs, we believe that the only really significant one lies in their ability to pre-commit credibly to not exploiting the contributions of their stakeholders, notably their customers and employees. This gives them a competitive advantage over FPs.

The defining characteristic of NFPs is their 'non-distribution constraint', which prohibits the distribution of any 'profit' or surplus to those who have direct influence over the firm. Instead, these surpluses are reinvested in the firm. As a consequence, NFPs have no owners in the traditional sense and are instead 'owned' by members who have no immediate financial interest in the company.

A powerful purchaser erodes the key advantage of 'not-for-profits' – their motivated workforce willing to 'go the extra mile'

The lack of a profit motive combined with this constraint makes it inherently unlikely and difficult for an NFP to take advantage of its stakeholders by expropriating surpluses away from its intended mission. In contrast, FPs are unable to pre-commit not to manipulate their stakeholders. For example, they have strong incentives to cut costs at the expense of quality and possess no such mechanisms to prevent them doing so. We call this the problem of 'expropriation'.

This problem is particularly important where employees care about some aspect of their institution's output even though they do not directly benefit from it. Consider an example of the type of unpaid work effort usually known as 'donated labour': a situation in which nurses care strongly about the quality of patient care in their hospital and decide that they will never leave a shift if there is nobody else to take over.

In this situation, the very strength of the FP form is the feature that makes it ill-suited to harnessing the goodwill of such a person. FPs have powerful incentives to convert this donated labour into additional profit by hiring fewer nurses. But, of course, the nurses realise this and so will not 'go the extra mile' because their extra effort does not improve the quality of patient care.

In contrast, the non-distribution constraint forces the NFP to invest its surplus within the business, which generally means that the donated labour improves the quality of patient care. Furthermore, if it boosts the income the organisation receives, then this generates even more money to be reinvested, which further improves the output.

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Not only do NFPs get the best out of motivated employees, but they also attract more employees who care. This self-selection effect further helps NFPs to produce higher quality at a cheaper price. As a result, purchasers who find it hard to assess quality may prefer to purchase from NFPs. In other words, NFP status serves as a trust signal.

Similarly, consumers may favour NFPs if they believe that NFPs have fewer incentives to misrepresent quality and may be more willing to pay higher prices upfront in expectation of higher quality. Employees in NFPs may also be more willing to invest in firm-specific training if they perceive NFP firms as having fewer financial incentives to cut their wages or benefits later on.

Of course, this view of NFPs assumes some kind of well-functioning competitive purchase market with price typically equal to purchasers' valuation of the output. But it ignores the role of purchasers as power-brokers in the distribution of surpluses, and it is unrealistic in the context of NFPs at the interface between the public and private sectors.

If the purchasing market is not perfectly competitive, then purchasers will have some monopoly power, which will be reflected in the price paid for the output. The greater the purchaser's bargaining power and the fewer the alternative purchasers, the greater is the opportunity for the purchaser to expropriate donated labour through reductions in the price.

In the extreme situation where there is a single very powerful purchaser (the government), who can drive the price so low that the NFP has no alternative but to cut back on other inputs, this cash starvation can essentially negate the gains that would otherwise arise from donated labour. Whether the purchaser wishes to do so depends on the valuation structure. If the purchaser values the additional quality more than the money saved by expropriation, then it will have no incentive to drive down the price.

But it is unlikely that the purchaser will not wish to indulge in some degree of expropriation. And if expropriation is the best strategy for the purchaser, it may face exactly the same problem faced by FPs: it cannot pre-commit to not expropriating the donated labour so none may be offered. In this case, whether any is offered depends on the attitude of the employees to the diverted funds.

If the powerful purchaser is the government and the income saved through expropriation is applied in areas that the employees still care about, then they may continue to donate labour. For example, if nurses care about the overall quality of health services and not just the quality of patient care in their hospital, they may not mind that the surpluses they generate are channelled to other hospitals. Indeed, perhaps it is the overall level of public services that they care about. In practice, though, this is unlikely.

We believe that expropriation by the government is a potentially big problem for the public sector. In the case of Glas Cymru, the industry regulator, Ofwat, sets its prices based on efficiency considerations. With Network Rail, the government is also more than likely to play a large role in its financial position having previously provided two-thirds of Railtrack's revenue. As such, Network Rail faces even greater opportunities for expropriation than Glas Cymru since it is squeezed on both the purchaser and funding ends.

Foundation hospitals probably have a greater chance of avoiding the expropriation problem. Instead of being commissioned on historic funding patterns and locally negotiated annual increases, health services will soon be contracted on volume using a standard national price tariff. This will help limit the possibility of expropriation at the individual unit level. But where certain targets are not met, commissioners are able to claw back the corresponding funds, thereby permitting a degree of specific treatment.

Furthermore, the question we should really be asking is whether NFP status will generate more donated labour than under state ownership. We think this unlikely because the current reforms that shift power away from central bureaucracy (and hence serve to curtail potential expropriation by the government) are a general policy, not one confined to foundation hospitals. In addition, if employees believe that aggregate donated labour will be expropriated, then it will not be forthcoming, irrespective of institutional form. The creation of NFP foundation hospitals will not help to sidestep this problem.

What are the implications for PPPs? There is a common view that PPPs work well in 'infrastructure heavy, employee light' sectors such as transport and less well in people-intensive ones like health. Our expropriation analysis explains why. Where donated labour is a significant issue and the activity is people-intensive, then collaboration with FPs brings considerable disadvantages through the impact of potential expropriation of work effort. In contrast, where donated labour is expected to be minimal and the activity is infrastructure heavy, the negative effects of a shift to a FP structure in terms of forsaken donated labour are likely to be outweighed by the efficiency benefits of profit-maximisation.

Our research suggests that the government's role as purchaser poses potentially significant problems for the success of NFPs as providers of public services. Already, we see many instances where employees feel they have invested heavily in activity-specific skills – teachers are a good example, nursing possibly another – and where the state is able to change the ground-rules and yet retain its workforce. The introduction of NFPs will not resolve this unless careful attention is paid in setting strict rules to prevent state expropriation. But is the government prepared to relinquish power?

This article summarises "The Role of Donated Labour and Not-for-Profits at the Public/Private Interface" by Paul Grout and Michelle Yong, CMPO Discussion Paper No. 03/74. For the full paper, see: http://www.bris.ac.uk/cmpo/wp74.pdf

Annuities: Are People Who Retire Today Getting a Bad Deal?

*Are current annuity rates - the flows of income that someone retiring today can expect to receive on their pot of pension savings - unfairly low? Not according to research by **Edmund Cannon** and **Ian Tonks**. Indeed, the pension income from an annuity - compared to an individual's final salary - looks as good as ever.*

As talk of a pensions crisis gets louder and annuity rates fall along with interest rates, there is growing interest in the workings of annuity markets. In February 2002, the Department for Work and Pensions and the Inland Revenue tried to define the terms of the debate in their consultative document 'Modernising Annuities'. More recently, Norwich Union have raised new fears with their proposals to tailor annuity rates to the life expectancy of individual savers as suggested by their postcodes: under this scheme, healthier people living in more upmarket areas would receive lower pensions.

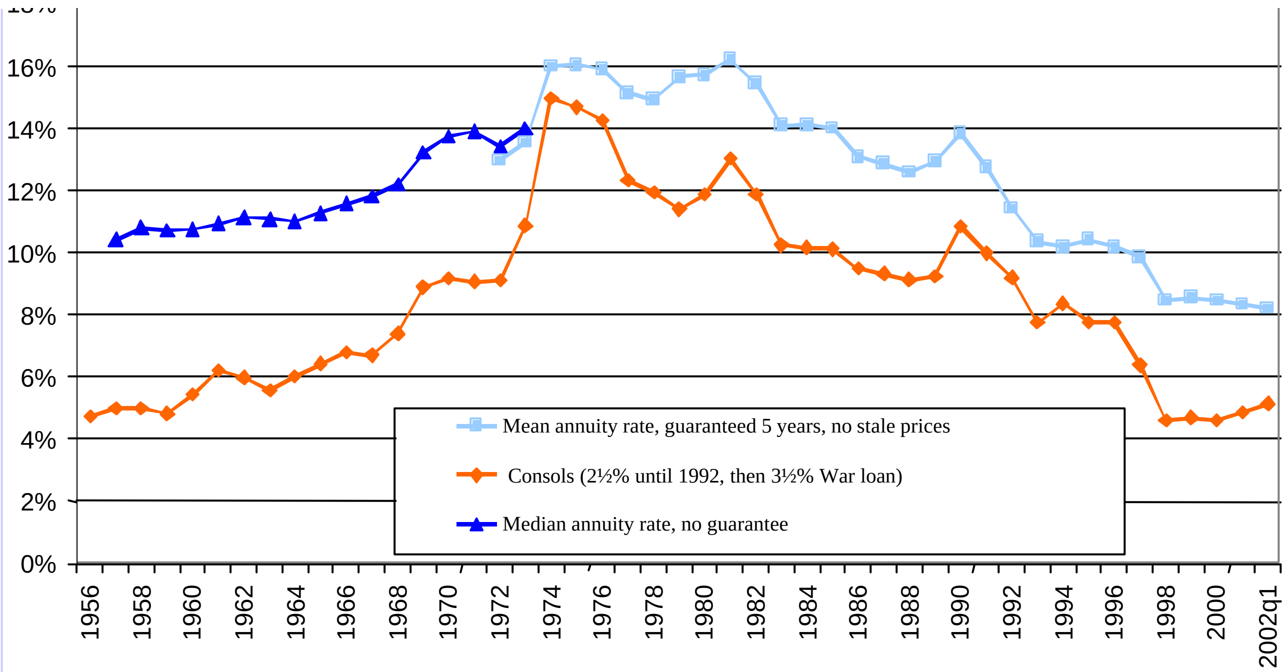

Figure 1: Annuity rates and consol rates (male 65, level)
(Data sources: *Pensions World, Money Management* and *Money Facts*)

lthough annuity ates have fallen ·om a high of 8% in the 1970s) rates of 8%)day, the current eneration is no ·orse off than its redecessors

Our research examines trends in annuity prices over the last 45 years and calculates whether annuities are correctly priced. We focus on two key questions: are annuity rates unfairly low; and are annuity rates in themselves an important measure of pensioners' welfare?

The findings confirm that annuity rates have declined in recent years: for 65 year old men, they rose from about 11% throughout the 1960s, and have subsequently fallen from a high of 18% in the late 1970s through 15% a decade or so ago to current rates of around 8%. Nevertheless, the current generation is no worse off than its predecessors since the low level of current annuity rates has been offset by increases in the value of pension funds over the last 45 years. Quite apart from the fact that people retiring today expect to live longer, their pension income (compared to their final salary) looks as good as ever.

Figure 1 shows average annuity rates since 1956 for men aged 65 (comparable figures for women are similar). For comparison with other interest rates, we also plot the rate of interest on consols, UK government bonds with no redemption date. The average annuity rate over the period has been just over 12%, 3.53 percentage points above the consol rate.

Part of the explanation for the fall in annuity rates over the past 20 years is that longevity has increased. As people live longer, a given sum of money paid for an annuity has to finance a longer stream of income and so income per year has had to fall. But the decline is far too large to be due to changes in longevity alone.

A straightforward way to calculate the value of an annuity is to use a measure called the 'money's worth' – the ratio of the expected present value of the flow of annuity payments to the money paid for an annuity. In order to calculate the money's worth of the annuities in Figure 1, we calculate the expected annuity payments promised at future dates by multiplying the promised annuity payments by the respective survival probabilities for that age group (taken from the Continuous Mortality Investigation Committee of the Institute of Actuaries) and then discounting these expected cash flows back to the present using the relevant expected interest rates.

We estimate expectations of future interest rates from the term structure of interest rates. This means that the 1958 interest rate used to value an annuity sold in 1957 is the implicit rate in the 1957 yield curve, and the 1957 survival probability is for a 65 year old man who retired in 1957 at 65, using the life expectancy tables available in 1957.

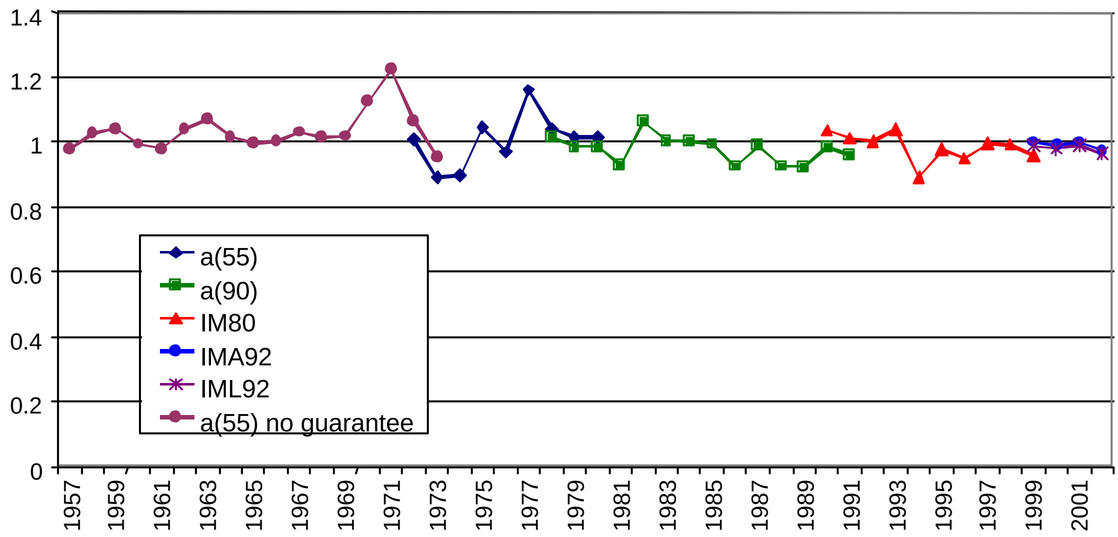

Figure 2: Money's worth (male 65), contemporary *ex ante* estimates
Money's worth is calculated using Life Tables produced at irregular intervals by the Continuous Mortality Investigation Committee; a(55) is the name of the table produced in 1953; a(90) was produced in 1978; IM/80 was produced in 1990; and IML92/IMA92 were produced in 1999.

Figure 2 illustrates the money's worth over the period 1957-2002. It indicates that, on average, annuities have been fairly priced: the ratio moves around one with an average value of 99p in the pound. (Note that when the money's worth is above one, the implication is that the annuity provider is losing money on the transaction.) Relative to some financial products, this seems surprisingly good value. The money's worth is not particularly poor at the moment. Certainly, there have been times when it was worse, notably the 1970s.

Perhaps more important to annuitants than the actuarial fairness of annuity contracts is the actual pension that they receive, regardless of how long they live. This means that we need to consider both the annuity rate and the accumulation of pension funds

The value of the pension received by a pensioner is *A*, the annuity rate, multiplied by *V*, the value of the pension fund at the point of retirement (assuming that the whole pension fund is 'annuitised'). For a pension fund invested predominantly in the stock market, *V* effectively represents the stock market index, which tends to be negatively correlated with interest rates. Thus, it is quite possible for the annuity rate to be relatively low while '*A* times *V*' is close to its long-run value. For this reason, no discussion of annuity rates can be divorced from a wider discussion of financial markets.

The low level of current annuity rates has been offset by increases in the value of pension funds ove the last 45 years

We combine the accumulation and decumulation phases of a pension plan by calculating the 'replacement ratio' – the ratio of the pension income to income from working (net of pension contributions) in the final year of employment. If the savings rate is 10% and pension income is 60% of income from work, then the replacement ratio is 60/90 or two-thirds. Empirically, such replacement ratios are common in UK company pension schemes where employees have completed their full set of contributions

We consider a series of hypothetical individuals whose income from work is proportional to the UK average earnings index in each year of their lives. From the age of 26 to 65, they save 10% of their income from work and invest it in the stock market (with all dividends reinvested). To account for charges, we assume that there is a 5% charge for purchasing shares, so that the effective savings rate is 9.5% instead of 10%, that there is a 2% charge every year on the capital invested, and that the spread is zero. At 65, the individuals purchase an annuity at the prevailing annuity rate.

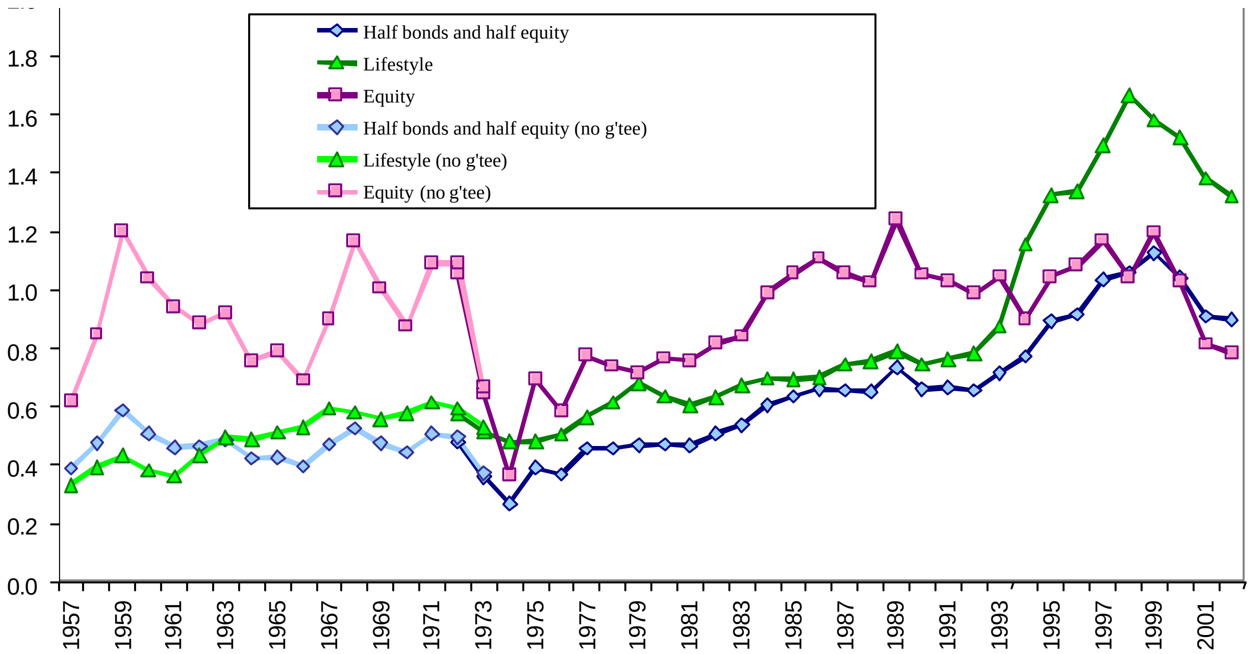

Figure 3: Replacement ratios for different portfolios of bonds and equity

Figure 3 shows the replacement ratio under a number of different pension plan investments. The general trend is upwards in each case though it is clear that the last few years have been a less favourable time to retire than in 1999, when the stock market was at its peak. But even after the fall in the stock market, the replacement ratio does not appear particularly bad, certainly not as bad as in the mid-1970s. Even compared with the period 1982-2000, when the replacement ratio averaged just over one, the replacement ratio does not appear disastrously low.

It should be noted that the steady growth in the replacement ratio since 1980 is despite increases in longevity over the last 20 years, which is ignored in Figure 3. Thus, individuals retiring in 2002 on the same replacement ratio as people 20 years earlier are better off, since they live longer and have a similar annual income.

In summary, our research finds no evidence that the average annuity rate is unfairly low. Depending on the assumptions we make about future longevity, the present value of an annuity is of the order of 90-100% of the purchase price. Compared with the typical costs of buying financial services, this figure looks suspiciously good: annuity providers must earn a profit and cover the real resource costs of annuity provision.

Perhaps even more worrying is the fact that annuity providers appear to have no cushion if longevity rises as fast as more optimistic projections allow. The insurance provided by annuity markets is intended to smooth longevity risk between individuals. But there is an additional risk of underestimating average longevity, which is faced either by insurance companies or, if the companies fail, by the annuitants themselves.

The article summarises and updates 'Annuity Prices, Money's Worth and Replacement Ratios: The UK Experience, 1972-2002' by Edmund Cannon and Ian Tonks, CMPO Discussion Paper No. 02/51. For the full paper, see: http://www.bris.ac.uk/cmpo/wp51.pdf

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