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ABSTRACT

Labour as a Buffer: Do Temporary Workers Suffer?*

In this paper, we investigate whether or not there is an equal opportunities dimension to regulating equal pay and conditions for temporary work. We develop a "buffer stock" model of temporary work that suggests a number of reasons why ethnic minorities and women may be more likely to be on fixed-term contracts than comparable white males. Using three different British datasets (a random representative survey of households and two data sets of specific labour market groups), we then estimate the degree to which women and/or ethnic minorities are more likely to be on temporary contracts and estimate any associated wage differentials.

JEL Classification: J21, J30, J63

Keywords: wages, temporary employment, agency and fixed-term work, equal opportunities

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Labour as a Buffer

Under a European directive put into force in the UK in October 2002, firms are required to offer fixed-term workers the same treatment with regard to pay and benefits (including, for example, holiday pay and maternity benefits) as permanent workers, along with the same rights to be protected against discrimination. After a year, fixed-term workers also gain redundancy and unfair dismissal rights. The Commission has now proposed (March 2002) that equal treatment be extended to agency workers as well. The UK government Department of Trade and Industry (DTI) estimates that there are perhaps 700,000 agency workers in the UK. One possible rationale for these extensions of employment rights is that fixed-term and agency workers (as well as part-time workers, also covered by European directives) are predominantly women. Differential pay and benefits for fixed term and agency workers might therefore be viewed as a form of gender discrimination, *ceteris paribus*. Another rationale for employment rights is to improve the training of temporary workers. The DTI consultative document on agency workers estimates a productivity gain from improved training (required by the directive) of between £98 million and £272 million per year.

In this chapter, we investigate two issues. First, are fixed-term workers disproportionately female or from other "equal opportunities" groups such as ethnic minorities? Second, do fixed-term workers receive less pay than comparably qualified permanent workers? To answer these questions, we use three data sets: a representative panel survey spanning ten years and two cross-sectional surveys specifically addressed to eliciting information about (un)equal opportunities. The British Household Panel Survey (BHPS) is a representative survey of British households and we use information from the first ten waves collected over the period

1991-2000. These data allow us to examine temporary work across the entire economy, covering the range of experience from that of casual and seasonal low-skilled workers to highly-educated consultants in information technology. The other two data sets are from the UK university sector. One was collected by the Royal Economic Society (RES) Working Party on Ethnic and Other Minority Representation. By restricting attention to a relatively homogeneous group – academic economists – we are able to gain good measures of ability and productivity to see if earnings effects can be explained by these objective factors. The final data set was collected by the Association of University Teachers (AUT) Equal Opportunities Committee. These data include university employees from both the academic and administrative side, and also include workers in all disciplines. As with the Royal Economic Society data, the AUT survey provides relatively good measures on individuals (although – since all disciplines are covered – productivity measures are less clear), but over a broader span of university workers. Importantly, we can compare individuals holding similar posts (for example, university lecturer) but under a different form of contract (fixed-term or permanent). A further interest in using university data is that this sector is generally perceived to be enlightened. Thus discrimination in who holds fixed-term contracts, and in the terms and conditions of those contracts, is likely to be at a relatively low level in this market. Estimated effects will be expected to represent a lower bound for the economy as a whole.

Section 1 of the chapter outlines a simple theoretical model to inform our analysis of the data. We are interested in investigating the conditions under which certain groups (such as women or ethnic minorities) are more likely to hold fixed-term jobs and if these jobs pay less than permanent posts. Section 2 examines the evidence from our three surveys about who holds these jobs. In particular, we

investigate whether or not fixed-term jobs are disproportionately held by women and by ethnic minorities. Section 3 examines the pay obtained in these jobs. Are these low paid relative to comparable permanent jobs and does the pay differ by gender or ethnic group? Section 4 extends the analysis to types of temporary employment other than fixed-term jobs, such as agency temping, and compares the wages in such jobs to the wages earned in full-time and part-time jobs. Section 5 draws our main conclusions.

1. A 'Buffer Stock' Model of Temporary Jobs, Wages and Regulations

In this section, we develop a model of temporary jobs to guide our empirical analysis. Temporary workers can serve as a buffer stock of employees to be discharged in adverse economic environments.[1] Recognising that these workers are more likely to be laid-off, the firm will invest less in their training. Insofar as training has a general as well as specific component, temporary workers will have fewer outside opportunities, and hence will be paid a lower wage. We construct this model and consider its implications for gender and ethnic minority discrimination, as well as the effects of regulation.

There is an *ex ante* hiring cost h per worker.[2] Permanent and temporary workers differ only *ex post,* in that the firm provides permanent workers with training at a cost c in an instantaneously short training period. There is a specific human

[1] Booth, Dolado and Frank (2002: F182) suggest that in principle there are at least three types of temporary work: (i) employment under probation where the temporary contract is by way of a period of probation; (ii) replacement contracts for workers who are on leave; and (iii) fixed term contracts that may provide a 'buffer stock' of workers (allowing the firm to adjust to changes in the business environment owing to seasonal and/or other transitory causes). It is the third type that we consider in the model developed in this chapter.

[2] In the absence of hiring or firing costs for temporary workers, the firm would have an infinitely large buffer stock. Firing costs for either permanent or temporary workers, or both, would not change the conclusions of the model, and are ignored for simplicity. In the usual way, firing costs would lead to fewer redundancies but also fewer initial hires.

capital component to this training that raises the worker's productivity by $s > 1$. There is also a general human capital component to the training. Without training, workers who are hired by the firm and then separate (either by quitting or by redundancy) have an opportunity wage w; with training, their opportunity wage is gw where $s > g > 1$. That is, the training has a large specific component and a smaller general component. Thus permanent and temporary workers are substitutes in production but the former are characterised by higher *ex post* productivity through their acquisition of work-related training. The number of workers hired *ex ante* forms a pool of potential workers who can be employed *ex post* once the market state is revealed. This assumption captures in a simple fashion the fact that, in the real world, hiring takes time and thus the firm wants its workforce in place before the state is revealed. Note that in this model there is no legislated difference between permanent and temporary workers. The difference arises only insofar as the firm chooses to train some of its workers (permanent workers) and not others (temporary workers), and then chooses to treat them differently in wages and in redundancy in adverse market environments.

Output at the firm is $m_i Q(sN_p^i + N_t^i)$ where m_i represents the market environment (state i having probability p_i) and N_p^i and N_t^i are the permanent and temporary workers employed *ex post* in market state i. The production function Q(.) is strictly concave. The firm chooses *ex ante* how many workers to hire on each contract, $\hat{N}_p$ and $\hat{N}_t$, and how many of each type to make costlessly redundant $(\hat{N}_j - N_j^i \geq 0_j,\ j = p,t)$ in different market environments i. Although the firm in principle chooses how much to pay each type of worker, the outside opportunity levels w and gw effectively determine the wage rates for temporary and permanent

workers.[3] There is no incentive for the firm to pay more in any market state, and – if it paid less – all the workers would quit.

The firm chooses *ex ante* hires $\hat{N}_p, \hat{N}_t$ and state-dependent *ex post* employment levels N_p^i, N_t^i to maximise expected profits:

$$\sum_i [m_i Q(sN_p^i + N_t^i) - gwN_p^i - wN_t^i - c\hat{N}_p - h(\hat{N}_p + \hat{N}_t)]p_i$$

subject to the constraints:

Writing the multipliers $\hat{N}_p \geq N_p^i$ and $\hat{N}_t \geq N_t^i$

l_p^i and l_t^i on these constraints, we have first order conditions:

(1.i) $\partial L / \partial \hat{N}_p = -c - h + \sum_i l_p^i p_i = 0$

(1.ii) $\partial L / \partial \hat{N}_t = -h + \sum_i l_t^i p_i = 0$

(1.iii) $\partial L / \partial N_p^i = m_i s Q'(.) - gw - l_p^i = 0$

(1.iv) $\partial L / \partial N_t^i = m_i Q'(.) - w - l_t^i = 0$

From (iii) and (iv), the firm will retain all of its permanent workers (if m_i is sufficiently large) before employing any of its temporary workers, even in the absence of any regulatory firing costs. This is because $s > g$, so that the firm makes a greater *ex post* gain on its permanent workers – the difference in productivity between trained permanent workers and untrained temporary workers exceeds the wage differential It retains its permanent workers to the point where the marginal product equals the wage

[3] In a more complicated model, both permanent and temporary workers might draw from a distribution of outside offers, as in Booth, Frank and Blackaby (2002). Even if the distribution was the same for both types, the firm would offer permanent workers a higher wage given the greater loss in productivity if they were to quit.

and – if these are fully employed – retains temporary workers to the point where their (lower) marginal product equals their (lower) wage.[4]

To determine the numbers of workers hired under each type of contract, substitute from (iii) and (iv) into (i) and (ii):

(2.i) $$-c-h+\sum_i [m_i sQ'(.)-gw]p_i = 0$$

(2.ii) $$-h+\sum_i [m_i Q'(.)-w]p_i = 0$$

Suppose the firm only hired permanent workers. Then, by (2.i), it would hire them to the point where the expected marginal product, net of the wage, equalled the hiring and training costs. The expression inside the summation (the marginal product net of wage) is strictly positive in market states where the firm would like to employ more workers than the number originally hired. It is for these states that the firm keeps a buffer stock of temporary workers who are retained if a high m_i is drawn and otherwise discharged. Even though the expression inside the summation is larger for permanent workers, temporary workers will still be hired if c is relatively high (so there are not that many permanent workers) and h is relatively low (so that it is not costly to build the buffer stock of temporary workers). Indeed, if hiring costs are very low, the firm will hold a very large buffer stock of temporary workers (such that $m_i Q'(.)-w \sim 0$ in every state).

This simple framework allows us to isolate three reasons why women might be disproportionately in temporary jobs. The first is similar to that in Lazear and Rosen (1990). Some women may have better non-market outside opportunities than men. Suppose that there is an exogenous probability δ that a woman will leave for

[4] If there were firing costs for permanent workers, then the firm would retain workers until the marginal product plus firing cost equals the wage. Fewer permanent workers would be made

non-market work after the firm incurs hiring and (in the case of permanent workers) training costs. Then the firm loses the expected value $d\sum_i [m_i sQ'(.) - gw]p_i = d(c+h)$ if the firm trains a woman rather than a man, and the smaller sum $d\sum_i [m_i Q'(.) - w]p_i = dh$ if the woman is untrained.[5] The firm will find it profitable to offer women temporary contracts rather than make the investment c in training.

Women are also offered temporary rather than permanent contracts if, alternatively, firms have a taste for discrimination. As described in the context of promotion by Booth, Francesconi and Frank (2001), this can be viewed as the firm treating women as if they had a lower productivity than men by the factor d. If the taste for discrimination is specific to the firm (so that outside wages are the same for men and women), the firm loses the expected value $d\sum_i m_i sQ'(.)p_i h_i^p$ if it trains a woman rather than a man, and the smaller value $d\sum_i m_i Q'(.)p_i h_i^t$ if it hires a woman rather than a man to a temporary post, where $h_i^j, j = p,t$ is the proportion of permanent or temporary workers employed by the firm in market state i.[6] Note that $h_i^p \geq h_i^t$ since the firm (for reasons discussed above) retains all permanent workers before retaining any temporary ones.

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redundant in those very bad states of nature where all temporary workers were laid-off and, in addition, some permanent workers were discharged.

[5] This calculation supposes that women are such a small fraction of the work force that the firm's hiring rules do not change. Otherwise, while the result remains true that women are assigned to temporary contracts, the firm hires fewer temporary workers than by the rule of comparing expected marginal product less wage to the value *h*, to allow for the lost investment on exogenously separated women.

[6] This assumes that the only discrimination is in assigning women to contracts and that – within a contract – they are treated equally to men. Otherwise, women would suffer disproportionate layoffs, in either permanent or temporary contracts. Also, if discrimination occurs throughout the economy, the firm would be able to pay women – within a contract – lower wages than men, given their lower opportunity costs.

The third reason why women may be disproportionately allocated to temporary contracts is due to a different form of a taste for discrimination. Trained permanent workers gain rents in this model. Although they do not contribute to the cost of training, their wage rises by the factor g since the firm pays them more for retention purposes. Even if the firm believes that women (or ethnic minorities, for example) are just as productive as men, managers can choose without cost the recipients of these rents, and may discriminate in favour of white males.

What would happen if legislation – as in the European directives – required equal treatment in wages between temporary and permanent workers? Unless the firm moved to having only temporary workers[7], it would have to pay gw to its temporary workers as well as to its permanent ones. In any given state, by (1.iv) but replacing w by gw, the firm employs *ex post* fewer of the originally-hired temporary workers. From (2.ii), the firm would also hire *ex ante* fewer temporary workers. However, because of this, the expected marginal product of permanent workers in (2.i) rises, and the firm hires *ex ante* more permanent workers. Note that it typically still pays to hire some temporary workers as a buffer stock (even though they have to be paid the same wages if employed as permanent, more productive workers) for very good market states, since the firm avoids the training cost c. The imposition of equal pay regulations entails that, while total expected employment goes down, temporary workers receive higher wages, and there is some substitution of the hiring of additional trained permanent workers in place of untrained temporary workers.

[7] The possibility of avoiding the impact of equal pay provisions between temporary and permanent workers can explain the use of agency workers. This is a rationale for the proposed extension of the European directives to agency temporary workers.

2. The Data

From our 'buffer stock' model outlined above, temporary workers have lower human capital than permanent workers and, as a consequence, lower wages. Temporary jobs are, in this sense, bad jobs; there may therefore be a social interest in encouraging the substitution of permanent jobs by requiring equal wages and conditions of work. Further, either because of a taste for discrimination or because it is believed that some women will find better non-market opportunities than men, these jobs will be held disproportionately by women. A taste for discrimination would also explain why these jobs might be held disproportionately by ethnic minorities. We now investigate these bases for intervention by using our three data sources. Are temporary jobs disproportionately held by women and ethnic minorities? Are they poorly paid?

The British Household Panel Survey (BHPS) is a nationally representative random sample. We use the first ten waves (1991-2000) and have a longitudinal sub-sample of 3122 male and 3401 female workers.[8] The precise form of the question in waves 1-8 of the BHPS is as follows: "Is your current job: A permanent job; A seasonal, temporary or casual job; Or a job done under contract or for a fixed period of time?" These data are discussed in greater detail in Booth, Francesconi and Frank (2002).[9] From wave 9 onwards, this question was expanded to include an additional question on agency workers. This information will be exploited in Section 4 of this chapter, while Section 3 will specifically focus on fixed-term contracts. Note that, because of the small representation of ethnic minorities, and the heterogeneity of jobs,

[8] Further information on the BHPS can be obtained at http://www.iser.essex.ac.uk/bhps/doc/index.htm.

[9] Using the first seven waves of the BHPS, Booth, Francesconi and Frank (2002) provide an overall picture of temporary jobs in Britain and examine the future career development of workers who hold temporary jobs.

we cannot use these data to investigate the relationship between temporary work and ethnicity in great detail.[10]

In 1999, the Royal Economic Society (RES) Working Party on the Representation of Ethnic and Other Minorities in the Economics Profession surveyed 516 UK academic economists holding full-time posts in universities. These cross-sectional data cover a homogeneous group and, in particular, allow us to measure productivity across academics. These data are discussed in greater detail in Blackaby and Frank (2000). Respondents are asked 'What is your current rank?' and choose from a number of alternatives, including 'Fixed term lecturer', 'Senior researcher, fixed term' and 'Researcher, fixed term'. These three options are viewed as fixed term contracts, while the other posts are viewed as permanent.[11]

The Association of University Teachers (AUT) Equal Opportunities Committee surveyed 813 university employees in 2000/01 in six representative English universities. The six universities are a mix of traditional and new universities, in different regions of the country. In contrast to the RES survey, these data include academics across different disciplines as well as employees on the administrative side of the universities. These data are discussed in greater detail in Frank (2002). Respondents were asked 'What type of contract do you have?' and asked to choose from 'Fixed Term' and 'Permanent'.

What do the raw data tell us about who holds temporary jobs rather than permanent jobs? The top panel of Table 1 (panel A) shows that women are

[10] The BHPS collects information on ethnic group membership distinguishing between seven groups: White, Black-Caribbean, Black-Other, Indian, Pakistani, Bangladeshi, Other ethnic group. On average, every year, only 5% of the sample is made up of individuals from all 'nonwhite' groups. Although the labour market heterogeneity within the nonwhite group is probably as large as the heterogeneity between the nonwhite and the white groups, the sample size is too small to analyse each nonwhite group separately.

[11] Probationary lecturers, for example, are viewed as permanent since they do not form a 'buffer stock' of easily-dismissed employees for the purposes of redundancy.

significantly more likely to hold fixed-term contracts than are men in the academic data, but not in the BHPS data on the British economy as a whole. There is no significant difference between ethnic minorities and white employees.

Table 1. Percentage Holding Fixed-term contracts and Wage Differences

	Men	Women	Ethnic Minorities	White
A. Percentage Holding Fixed-term contracts				
BHPS	3.3%	3.4%	4.0%	3.3%
RES	7.1%**	19.8%**	8.2%	9.5%
AUT				
Researchers	96.1%	98.6%	100%	97.4%
Other Posts	27.9%**	40.8%**	41.7%	34.2%
B. Percentage Wage Differences Between Permanent and Fixed-term Workers				
BHPS	18.5%**	-8.3%**	-4.6%	6.0%**
RES	37.4%	31.4%	14.5%*	41.4%*
AUT	37.1%*	24.6%*	38.5%	34.0%

Notes:
(a) The BHPS data are for fixed-term contracts (and not for seasonal and casual workers) and refer to waves 1 through 10 (1991-2000). The number of person-wave observations are: 18349 (men), 21273 (women). There are 513 observations in the RES data and 813 in the AUT.
(b) We test for significant differences (in the first two columns) between the percentages for men and women and (in the last two columns) between ethnic minorities and whites. This is shown by: ** significantly different at the 1% level, * significantly different at the 5% level.
(c) The following coefficients are significantly different from 0 and therefore show a significant difference between permanent and fixed-term workers within the dataset: BHPS, RES and AUT men and women (1%), BHPS white workers, RES white workers, and AUT white and ethnic minority workers (5%).

Now consider wages, reported in the bottom panel (panel B) of Table 1. With the exception of women in the BHPS data, where there is a significant negative relationship (and the BHPS and RES ethnic minorities where there is no significant relationship), permanent workers are paid significantly more than temporary workers, at significance levels shown in note (c) to the Table. Interestingly, this wage gap is greater for men than for women from all three data sources, although – as shown by the asterisks within the body of the Table – this is not significant for the RES data.

3. Wages, Gender and Ethnicity

Do the raw data results hold when we add controls for individual characteristics such as age and education and workplace characteristics? Each of the data-sets has different variables, but nonetheless it is instructive to compare the results.

The top panel (panel A) of Table 2 shows estimated marginal effects obtained from estimation of a simple probit model of the determinants of the probability of being on a fixed term contract.[12] Men and women and all ethnic groups are pooled, for each data set, so that we can estimate the impact of gender and ethnicity on the fixed-term contract probability. The additional explanatory variables used for each data set are reported in notes of the table. From these estimations, there is evidence that, after controls, women in the RES sample are more likely to hold fixed-term posts, although this is not confirmed in the BHPS, where in fact men are about 1% more likely to be observed in a fixed-term job. There is no evidence that ethnic minorities are more likely to be on fixed-term contracts.

[12] To ease the interpretation of the results, the table reports marginal effects. These are calculated as the derivative of the conditional expectation of the observed dependent variable, and evaluated at the sample means, following the procedure in Greene (1997).

What about wages? The bottom panel of Table 2 reports the estimated coefficient to the fixed term contract variable included as an exogenous regressor obtained from ordinary least squares (OLS) estimation of the natural logarithm of hourly wages (BHPS) or annual salary (RES and AUT).[13] This time, each dataset was stratified into two groups – men and women. There is evidence that being on a fixed-term contract lowers wages for both men and women, although tests do not show a differential effect between men and women, except in the case of the BHPS where the more negative effects for men are statistically different than those for women ($p<0.01$).

In summary, the estimated results support the idea – consistent with the buffer stock model – that fixed-term jobs are poorly paid.[14] Regulations to require equal pay across types of contract, fixed-term or permanent, will clearly have an effect. However, there is no clear evidence that – having accounted for individual and workplace characteristics – women or ethnic minorities suffer disproportionately from fixed-term contracts.

[13] The OLS estimates from the BHPS shown in Table 2 are very close to random-effects (RE) estimates, which account for the longitudinal nature of the BHPS data. We also estimated fixed-effects (FE) models, which provide us with point estimates that are similar to (albeit quantitatively smaller than) those reported in Table 2. For simplicity and comparability with the estimates from the RES and AUT samples, these additional results are not shown, but can be obtained from the authors upon request. Notice also that the BHPS sample sizes reported in panel B of Table 2 are different from those reported in Table 1 (and Table 3 below). This is because the regressions estimates in Table 2 are obtained from models that control for a large number of variables for which there may be missing values, which do not affect the computations reported in Tables 1 and 3.

[14] Booth, Francesconi and Frank (2002) provides independent evidence that there is lower training in these jobs.

Table 2. Gender, Ethnicity, Fixed-term Contracts and Wages

	BHPS	RES	AUT (all)	AUT (acad.)
A. Probability of being on a fixed-term contracts (%)[a]				
Men	0.007**	-0.038**	-0.007	-0.065
	(3.08)	(-2.96)	(-0.17)	(-1.10)
White	-0.001	0.002	-0.053	-0.137
	(-0.30)	(0.47)	(-0.59)	(-1.00)
Pseudo R-square	0.113	0.552	0.229	0.32
N	36850	320	756	409
B. The effect of fixed-term contracts on wages[b]				
Men	-0.147**	-0.160**	-0.235**	-.321**
	(-8.18)	(-3.59)	(-5.43)	(-6.53)
R-square	0.544	0.620	0.410	0.438
N	16646	291	345	205
Women	-0.076**	-0.174**	-0.170**	-.208**
	(-4.82)	(-2.88)	(-4.95)	(-4.28)
R-square	0.527	0.778	0.398	0.403
N	19278	60	386	192

[a] Additional controls included in the BHPS data analysis are: age, labour market experience in part-time and full-time employment, part-time status, number of children by age group, marital status, disability status, housing tenure, education, cohort of entry in the labour market, industry (1-digit SIC), occupation (1-digit SOC), employing sector, trade union coverage, firm size, local unemployment- to-vacancy ratio. Additional controls included in the RES data analysis are: marital status, age, degree class, PhD, publications, research, teaching, RAE scores, region, old or new university, career break. Additional controls included in the AUT data analysis are: age, experience, region, degree class, PhD.

[b] Additional controls included in the BHPS data analysis are: nonwhite ethnicity, labour market experience in part-time and full-time employment, part-time status, number of children by age group, marital status, disability status, housing tenure, education, industry (1-digit SIC), occupation (1-digit SOC), employing sector, trade union coverage, firm size, local unemployment- to-vacancy ratio For the RES and AUT data, the same controls are used as in (a).

Note: The difference in sample size in the AUT data arises since not all respondents reported their salary. The z- and t-statistics are reported in parentheses. In the regressions that use BHPS data, these statistics have been computed with robust standard errors.

* significant at 5% level ** significant at 1% level

4. Types of Temporary Work

A new European directive requires the extension of equal terms and benefits to agency workers, as well as employees holding a fixed-term contract at the firm where they are actually working. This extension is important since it potentially limits the extent to which firms can substitute low paid agency workers for low paid fixed-term contract workers, now covered by new regulations. While earlier waves of the BHPS only distinguish between fixed-term contract workers and seasonal/casual workers, the latest waves 9 and 10 include a separate category of agency work. In this section, we examine – using the BHPS data – differences in gender representation and wages across the types of temporary work. Note that none of the regulations requiring equal treatment for fixed-term contract workers, much less agency workers, were in place during the sample period. The other data sources do not distinguish between types of temporary workers, so they are not used in this section. Due to small sample sizes, there are no meaningful results for workers of different ethnicity across the different types of temporary work, so issues of ethnicity are not examined in this section. However, we do investigate the incidence and wages of part-time work compared to full-time. Equal treatment of part-time work is also covered by European directives, and it is interesting to see whether there is a greater or lesser disparity along that dimension than in comparing temporary to permanent jobs.

Table 3 shows the raw data percentages of men and women in each type of temporary work, and the average hourly pay associated with that type of contract, using the data from waves 9 and 10 only. The table also reports standard equality tests by gender to detect the presence of any significant differences in representation

or wages between men and women. The data and gender equality tests for part-time working use the full set of BHPS data from 1991 to 2000.[15]

Table 3. Worker Distribution (%) and Gross Hourly Wages (£) by Contract Type, Employment Status, and Gender, BHPS Data

	Men		Women	
	%	Hourly pay	%	Hourly pay
Contract				
Permanent	0.941	9.557	0.916	7.465
Seasonal/casual	0.022	6.095	0.033	7.610
Fixed-term contract	0.020	7.770	0.027	8.434
Agency temping	0.017	5.962	0.025	6.061
Equality tests by gender (male – female):				
Permanent (% ; £)	0.026 (t-stat 4.603) ; 2.092 (t-stat 17.021)			
Seasonal/casual (% ; £)	-0.011 (t-stat -2.965) ; -1.515 (t-stat -0.395)			
Fixed-term contract (% ; £)	-0.007 (t-stat -2.241) ; -0.664 (t-stat -0.695)			
Agency temping (% ; £)	-0.008 (t-stat -2.539) ; -0.099 (t-stat -0.047)			
N	3715		4224	
Employment status				
Part-time	0.048	6.179	0.267	5.802
Full-time	0.952	9.069	0.733	7.519
Equality tests by gender (male – female):				
Part-time (% ; £)	-0.219 (t-stat -69.935) ; 0.377 (t-stat 1.806)			
Full-time (% ; £)	0.219 (t-stat 69.935) ; 1.550 (t-stat 25.996)			
N	18389		21273	

Note: Figures for "Contract" are from waves 9 and 10 (1999 and 2000) of the British Household Panel Survey. Figures for "Employment status" are from waves 1 through 10 (1991 to 2000). N=number of person-wave observations. Gross hourly wages are in constant (2000) prices.

As seen from the table, men are significantly more likely than women to hold a permanent contract, and significantly less likely to have any of the three types of

[15] Similar figures emerge when the sample is restricted to the most recent period 1999-2000.

temporary contracts.[16] These differences, however, are small compared to the large difference in representation of men and women in part-time work. As in our earlier analysis, there are also major differences in wages. The differences by gender emerge quite strikingly among permanent workers, with permanent men earning about £2 per hour more than women do, as well as among full-timers, with men earning £1.55 per hour more than women do. Interestingly, there is no significant gender pay gap among workers on any of the three types of temporary contracts. Men on temporary contracts earn significantly less than men on permanent contracts, while women on fixed-term contracts actually earn significantly more than women on permanent contracts. In contrast, there is a significant gender pay gap favouring men among part-time workers.

Do these differences in wages hold after controlling for other characteristics? Table 4 presents wage estimates from the BHPS using waves 9 and 10. For both men and women, there are significant differences – in either the OLS or RE estimates – between permanent workers and seasonal/casual workers, and between permanent workers and agency temping workers. For example, compared to their permanent counterparts, men in seasonal/casual jobs earn at least 16% lower wages, while the wage penalty for male agency workers is of the order of 18-20%. The pay differentials for women are smaller but still sizeable and significant. In contrast, for both men and women, we cannot detect any significant difference in pay between permanent workers and workers on fixed-term contracts Part-time women suffer a significant wage penalty compared to full-time women. Part-time men suffer a

[16] This information is revealed by the equality tests by gender reported in the top part of the table for contract types. The figures show, for example, that there is a difference of (0.941-0.916=0.025) between the proportions of men and women on permanent contracts and that this difference is statistically significant (t-statistic of 4.603).

significant wage penalty compared to full-time men using the random effects estimator, but not under OLS.

Table 4. Estimations of Log Gross Hourly Wages

	Men		Women	
	OLS	RE	OLS	RE
Contract				
Seasonal/casual	-0.160**	-0.188*	-0.041*	-0.071*
	(0.049)	(0.087)	(0.020)	(0.028)
Fixed-term contract	-0.034	-0.051	-0.010	-0.018
	(0.058)	(0.040)	(0.039)	(0.037)
Agency temping	-0.206**	-0.182*	-0.075**	-0.040*
	(0.057)	(0.084)	(0.027)	(0.018)
Employment status				
Part-time	-0.006	-0.065*	-0.041*	-0.033*
	(0.035)	(0.032)	(0.016)	(0.017)
R^2	0.543	0.535	0.489	0.488
N	3715		4224	

Note: Figures are estimates obtained from ordinary least squares (OLS) and random-effects (RE) models. The base for contract type is permanent employment. Other controls are: education, marital status, number of children by age group, full-time and part-time work experience, housing tenure, industry, occupation, employing sector, firm size, local unemployment/vacancy ratio, trade union coverage, and a constant. Robust standard errors in parentheses.
** significant at 0.01 level, * significant at 0.05 level

The results in this section are consistent with those in Sections 2 and 3. Recall that (with respect to temporary contracts) there is a smaller sample here, since there are only two waves of data, but that there is greater detail as to the actual form of temporary contract held by workers (and thus less measurement error). As with the earlier BHPS results, men suffer a greater wage penalty than do women when holding temporary jobs. There are differences in results with respect to representation by gender in temporary jobs. While the raw BHPS data in Section 2 show an

(insignificantly) higher representation of women in fixed-term contracts, the break-down into types of contracts in waves 9 and 10 leads to *significantly* higher representation of women in each type. Recall that, in Table 2, men were actually more likely than women to hold fixed-term contracts in the BHPS data, after controlling for individual and workplace characteristics. We have estimated relative risk ratios, using waves 9 and 10, of holding each of the three types of temporary jobs relative to holding a permanent job, by gender, using the same controls as in Table 2.[17] The estimated coefficients (t-statistics) for the effect of being male is: fixed-term contract, 1.037 (0.21); seasonal/casual job, 0.814 (-2.12); and agency temping, 1.022 (1.11). Only the coefficient on seasonal/casual is significant (at the 5% level), and it shows that men are less likely to hold these jobs. These results – which are more in line with the other data sets – may arise because of the more accurate assignment of workers to type of contract in the later waves, or because there has been a shift over time in representation.

Our main interest in this section was to try and compare the importance of equal treatment regulations for different types of contracts and employment status.[18] While there is a similar gender difference in representation across the three types of temporary contracts, the large gender difference concerns part-time working. The major wage gaps concern seasonal/casual work, agency temping and part-time work. There is no significant difference, for either men or women, in pay estimations for fixed-term contracts compared to permanent jobs. Indeed, the biggest gaps concern agency temping, suggesting the importance of extending equal treatment regulations to that class of workers. Recall that this result holds in this data collected before

[17] The relative risk ratios are obtained from multinomial logit regressions, in which N = 7937, with a resulting pseudo $R^2 = 0.140$.

[18] Dolado, Garcia-Serrano and Jimeno (2002: F290) provide some evidence of gender differences in coverage by temporary contracts in Spain over the past decade.

regulations were in effect for fixed-term workers. Therefore, it is not a product of any improvement in wages for fixed-term workers subsequent to regulation. The gap between fixed-term workers and agency temps can be expected to have increased as fixed-term workers came under the directive that effectively treats them in a comparable way to permanent workers.

5. Conclusions

In this chapter, we have presented a buffer stock model of temporary workers. Even if – as in the model – all workers are *ex ante* identical, it is still optimal for the firm to offer some of its new hires permanent contracts with high training, and to offer others temporary contracts with low training. Permanent workers receive higher wages in light of their additional training. The model also suggests a number of reasons why ethnic minorities and women may be more likely to be on fixed-term contracts than comparable white males. For both groups, discrimination may lead to an under-evaluation of their productivity leading to a disincentive to invest in their training. Alternatively, discrimination may take the form of allocating rents (received by permanent workers) to preferred groups such as white males. A further reason for allocating female workers to temporary jobs is the possibility that they will leave for non-market opportunities.

We examined empirically the contract types offered by gender and ethnicity, and the wage differentials associated with temporary work in Britain. We used three different sources of data: the BHPS panel data on a random representative selection of households; the RES data on academic economists; and the AUT data on university employees, covering all disciplines and both academic and administrative workers. The BHPS data gives a broader picture of the prevalence and wage implications of

temporary work in Britain, while the other data sources allow us to focus on more homogeneous groups of workers to isolate gender, ethnicity and wage effects. For comparative purposes, we use the full set of waves of the BHPS – along with the RES and AUT data – for an initial examination of gender, ethnicity and wage effects of fixed-term contracts. As a further exercise, we use the last two waves of the BHPS to examine more closely different types of temporary work, since these are the only waves that distinguish agency temping from other forms of temporary work.

We find – in the raw data – evidence that women (but not ethnic minorities) are more likely to be employed on a fixed-term basis. We find generally that there is a positive wage differential favouring permanent employees over fixed-term ones, although – interestingly – this differential seems to be greater for male than for female workers. Indeed, in the BHPS data (but not the RES and AUT data) there is a negative differential for permanent female employees over fixed-term female employees.

After controlling in the different data sets for a wide range of individual and workplace characteristics, the evidence on representation in fixed-term work by gender is less clear. In the RES data, women are significantly more likely to hold fixed-term posts, while there is an insignificant relationship of the same sign in the AUT data. In the BHPS, men are actually significantly more likely to hold fixed-term posts. As with the raw data, there is no evidence that ethnic minorities are either more or less likely to hold temporary jobs. We find strong support for the existence of a positive wage differential favouring permanent employees over fixed-term ones. The effect is larger for men than for women. Finally, from the last two waves of the BHPS, we find that agency temping work has the largest negative estimated impact on wages of any of the forms of temporary jobs.

From the raw data on representation by gender in temporary jobs, it is clear that there is an important equal opportunities dimension to regulating equal pay and conditions for temporary work. This holds even if – as in the BHPS data – the higher representation of women in fixed-term posts can be explained by observable individual and workplace characteristics. There is clear evidence in our results that there is a pay gap – allowing for individual and workplace characteristics – between temporary and permanent jobs, so effective regulation will have an impact. Our results also show the importance of extending the regulation to agency temping, since these are the jobs with the highest pay gap. This pay gap, and the use of agency workers, is likely to increase as fixed-term posts (but not yet agency work) becomes covered by equal treatment rules.

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