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Does job insecurity affect household consumption?

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This paper confronts implications of precautionary saving models with micro-data on British households. The results provide support for the central proposition that unemployment risk leads households to defer consumption. A one standard deviation increase in unemployment risk for the head of household is estimated to reduce household consumption by 1.6%. Taking the spread of the distribution of job insecurity to consist of four standard deviations, this indicates that moving from the bottom to the top of the distribution of job insecurity implies a reduction in consumption of 6.4%. This effect is still greater for the young, those without non-labour income and manual workers–for whom precautionary effects might be expected to be stronger *a priori*. A further job insecurity effect from the head of household's partner is estimated. Euler equation estimates further support this conclusion. Consumer durables purchases are also examined and found to be deferred by greater unemployment risk.

JEL classification: D12, E21.

1. Introduction

The risk of job loss is among the most important sources of income uncertainty facing most households. The hypothesis that such uncertainty gives rise to a precautionary motive for saving has been put forward as a development of the standard life-cycle model of consumption (e.g. Carroll, 2001a). Models of precautionary saving have many attractive features. In principle, they are able to account for a number of stylised facts associated with consumption over the life-cycle, such as the apparent excess sensitivity of consumption to anticipated income, that the canonical life-cycle model cannot explain.[1] However, the attempts that have been made to identify evidence of a precautionary motive have produced mixed results. The issue of job insecurity has also attracted increasing attention, particularly in Britain (e.g. Nickell *et al.*, 2002).[2] But what are the effects of job

[1] Pemberton (1997) calibrates the standard life-cycle model under perfect capital markets and argues that the results are inconsistent with the basic stylised facts of consumption.

[2] Job insecurity also appears strongly related to individual well-being (Blanchflower and Oswald, 1999).

insecurity? Might job insecurity affect consumption behaviour as implied by the precautionary motive for saving?

This paper confronts implications of the precautionary model of consumption with micro-data for British households. Specifically, the hypothesis considered is whether consumption levels are depressed by the risk of losing one's job.[3] Carroll *et al.* (2003) construct individual-level predicted probabilities of job loss and find evidence of additional saving by those households whose head of household faces greater job insecurity. Lusardi (1998) instead employs a self-reported likelihood of job loss for a sample of men in the United States and also finds that saving is positively related to the indicator of job insecurity.[4] The present paper borrows from both approaches, employing a model-based, predicted likelihood of job loss and a subjective job insecurity measure for households in Britain. The paper makes three main contributions. The first contribution is to provide evidence of significant precautionary saving effects associated with unemployment risk in shaping non-durable consumption. The measure of non-durable consumption used is food consumption. This follows a large number of US panel data studies which employ a similar measure of consumption (e.g. Hall and Mishkin, 1982; Altonji and Siow, 1987; Zeldes, 1989a; Runkle, 1991).[5] Second, in order to broaden the measure of consumers' expenditure the paper also studies the propensity to delay purchases of consumer durables as a function of unemployment risk. Evidence of heightened unemployment risk leading to a delayed purchase of durables is presented. Third, variation across households in the effect of job insecurity on consumption is examined and found to be consistent with buffer stock behaviour. In particular, the effect of job insecurity is estimated to be significantly stronger for younger households and those households without non-labour sources of income.

The remainder of the paper is organized as follows. Section 2 provides some further economic and theoretical background to the paper. Section 3 sets up the econometric model and presents the hypotheses of interest. Section 4 discusses the data and estimation results derived from the British Household Panel Survey. Section 5 concludes.

[3] This risk is referred to as unemployment risk or job insecurity below. Nickell *et al.* (2002) discuss other interpretations of job insecurity including wage flexibility. Guariglia (2001) examines the link between savings and earnings uncertainty.

[4] Other studies find little or no such evidence (e.g. Dynan, 1993; Starr-McCluer, 1996).

[5] Although subject to obvious deficiencies, an advantage of using food consumption data is that this measure excludes expenditures on durables which produce a service flow over time. Formal justification for the use of food consumption requires the utility function to be additively separable in food and other consumption. As noted by Zeldes (1989a) this requirement is probably less strong than the common requirement in aggregate studies of separability between non-durables or services and durables and perfect substitutability between non-durables and services.

2. Economic background

Precautionary saving models extend the standard life-cycle approach to allow for undesirable (and uninsurable) income uncertainty. Maximizing (discounted) lifetime utility subject to the intertemporal budget constraint generates the following first-order condition or Euler equation:

$$E_t u'(c_{t+1}) = \left[\frac{1+\delta}{1+r}\right] u'(c_t)$$

where E_t denotes the expectations operator conditional on information at time t; u is the one-period utility function which is a function of consumption, c. δ is the rate of time preference and r is the interest rate. This equilibrium condition states that the utility foregone in sacrificing a unit of current-period consumption is equal to the expected marginal benefit of consuming additional consumption in the future, appropriately discounted. Precautionary saving effects are witnessed when we take a second-order Taylor series expansion around $u'(c_t)$

$$E_t(\ln c_{t+1} - \ln c_t) \approx \underbrace{\left(\frac{1}{\xi(c_t)c_t}\right)\left(\frac{1+\delta}{1+r} - 1\right)}_{CEQ} + \underbrace{\frac{1}{2}\left(\frac{\Psi(c_t)}{c_t}\right)E_t\left[(c_{t+1} - c_t)^2\right]}_{precautionary} \quad (1)$$

where $1/\xi(c_t)c_t = u'(c_t)/u''(c_t)c_t$ is the elasticity of substitution. The term $\Psi(c_t) = -(u'''(c_t)/u''(c_t))$ scales up or down the strength of the precautionary saving motive associated with the variance of future consumption growth term. Convex marginal utility $u''' > 0$ implies stronger consumption growth than under quadratic utility (i.e. certainty equivalence, *CEQ*, where $u''' = 0$). The higher the growth of consumption, the lower the current level of consumption and this extra saving is precautionary saving. This is the key implication to be confronted with data below.

This implication for the level of consumption is clearest under the conditions of a result derived by Caballero (1990). With (constant) coefficient of absolute risk aversion κ, and assuming $r = \delta$ and income, y, takes the form $y_t = \lambda y_{t-1} + (1-\lambda)\hat{y} + \varepsilon_t$, where $\varepsilon_t \sim N(0,\sigma^2)$, $\hat{y}$ is the deterministic component of income and λ measures the degree of persistence in income shocks, ε_t,[6] Caballero (1990) shows that the solution to this problem is given by

$$c_t = c_t^{CEQ} - \frac{\kappa\sigma^2}{(R-\lambda)}$$

[6] The income process is assumed exogenous. This may be an issue when estimating reduced-form equations in a world where individuals engage in job search.

The first component is the certainty equivalence level of consumption, whilst the second is that associated with the precautionary motive for saving. Precautionary saving is increasing in the variance of shocks to income, σ^2, the degree of persistence of income shocks, λ, and the degree of risk aversion, κ. The level of consumption is decreasing in each of these terms. The assumption of exponential utility is of course, special, but under more general conditions it can be shown that greater income uncertainty lowers the optimal level of consumption.[7]

The relation between consumer durables purchases and unemployment expectations is considered by Carroll and Dunn (1997) using aggregate US data. They develop an (S, s) model of consumer durables purchasing with a role for income uncertainty.[8] An increase in unemployment risk leads to the postponement of the purchase of consumer durables as households instead opt to add to their precautionary assets which are used as a buffer-stock. That is, the lower trigger of the (S,s) rule for the ratio of the value of durable goods to permanent labour income falls. Households instead wish to accumulate more savings which they use as a buffer against the higher level of uncertainty resulting from job insecurity. In this way, those facing greater job insecurity should be less likely to have recently purchased household consumer durables. This is an additional hypothesis confronted with data below and follows a small number of previous studies in examining the adjustment of durables purchases using micro-data. Foote *et al.* (2000) emphasized the lack of previous micro-based studies of durables purchases and estimate reduced-form probit models for automobile purchases. They found the probability of purchase is lower for households with higher imputed variance of household income, a result they interpreted as consistent with a precautionary saving-type influence. Bertola *et al.* (2003) find evidence of similar effects in a sample of Italian households.

3. Estimation strategy

The estimation strategy is largely geared towards addressing issues which relate to the construction of permanent income from cross-sectional data, the grouped nature of the data on consumption, and identification. The basic model for consumption involves estimating the following reduced-form consumption function:

$$c_{it} = \alpha_i + \theta_1 y_{it}^P + \theta_2 y_{it}^T + \theta_3 y_{it}^W + \delta_1 \hat{u}_{it}^{HOH} + \delta_2 \hat{u}_{it}^{SEC} + X_{it}\beta + \gamma_t + \varepsilon_{it} \qquad (2)$$

[7] Skinner (1988) assumes constant relative risk aversion (CRRA) utility and finds optimal consumption is a negative function of income uncertainty. This result is also found using numerical methods by Zeldes (1989b) for the CRRA case. In models of precautionary saving such as Carroll (1992), it is the probability of a near-zero income that is the key determinant of the precautionary saving motive. Carroll (1992) suggests that unemployment comes closest to such an event.

[8] Caballero (1994) discusses the theoretical and empirical literature on durable goods purchases.

where i indexes households, $i = 1, 2 \ldots N$ and t indexes waves of the survey, $t = 1992 \ldots 1998$. c is log household consumption, y^P is permanent labour income, y^T is transitory labour income and y^W is investment income.[9] α_i are household-specific random effects, which are assumed normally distributed and orthogonal to the set of regressors. $\hat{u}$ is the measure of job insecurity which in the case of the predicted probability of job loss is considered for both the head of household ($\hat{u}_{it}^{HOH}$) and for his/her partner, if employed ($\hat{u}_{it}^{SEC}$). The subjectively-perceived degree of job insecurity for the head of household is also considered.[10] X_{it} represents a vector of regressors with associated parameter vector, β. The regressor set X includes controls for household demographics and characteristics of the head of household and their partner (family size, composition, educational attainment, occupation etc.; see Table 3 for more details). γ_t denotes a set of common year effects with error term, ε_{it}.

3.1 Permanent income

Following King and Dicks-Mireaux (1982) and Guiso *et al.* (1992) permanent labour income y^P, is defined as normal (weekly) labour income adjusted for age and cohort effects. Transitory income y_{it}^T, is defined as the difference between current and permanent labour incomes. Non-human wealth is not measured explicitly here and its role is captured through the investment income term, y^W, as in Miles (1997). This excludes housing wealth. The calculation of permanent income involves taking the predicted values from a random effects equation for log household labour income as a function of household demographic variables and then obtaining a 'permanent' value from a projection of this value forwards until retirement (assumed 65 for men, 60 for women) also using estimates of how household incomes vary with age. The estimation of the age effects d uses separate age dummies in a cohort/age quasi-panel constructed from Family Expenditure Survey data for the years 1972 to 1998.[11] Mean (median) weekly permanent income (1995 prices) is calculated as £438.61 (£399.83), transitory income, £59.41 (£51.39) and investment income £12.19 (£2.26).[12]

The estimating equation is similar to that of Carroll (1994) and Guiso *et al.* (1992). The use of consumption data for the dependent variable avoids specification issues arising in studies that have employed net worth data as the dependent

[9] The income terms are considered in levels rather than logs since transitory income takes on negative values. Consumption is considered in logs since in levels its distribution is skewed.

[10] The self-reported measure is not considered for the household head's partner since with the variable being binary and around 90% reporting it unlikely that they will lose their job the two binary measures are close to colinear and therefore only that of the head of household is used.

[11] The identifying restriction imposed consisted of assuming that the year effects for the period 1972 to 1998, intended to reflect cyclical factors, averaged zero. The age and cohort effects on income were unrestricted.

[12] The definition of transitory income does not require that it is mean zero.

variable, in particular where this possesses negative values but a log specification seems justified. Data for specifically food and groceries expenditures would not be the preferred measure of consumption. However, as in studies such as Guariglia and Rossi (2002), Kuehlwein (1991), and Hall and Mishkin (1982), its use can be justified as an empirically important component of non-durable expenditure and by an assumption of separability of utility from food and other forms of consumption. Nevertheless, to the extent that uncertainty leads households to cut back on expenditures and in particular on those items that are not essentials, the use of food and grocery expenditure as the dependent variable will bias the results against finding evidence of precautionary saving. Further analysis below will also consider the relation between consumer durables purchases and unemployment risk.[13]

3.2 Grouped consumption data

The data on consumption are grouped, specifying a particular interval or range for the level of weekly expenditure on food and groceries.[14] To explicitly allow for this grouped nature, a maximum likelihood method is employed that allows for the fact that the actual level within each band (with one open-ended category) is unobserved (see Stata Corporation, 2003). A common alternative, that of using the mid-points to the bands, and then treating the variable as if it were continuous, will not in general provide consistent parameter estimates (Stewart, 1983). A potential drawback of the grouped dependent variable (GDV) estimator relative to employing OLS applied to interval mid-points is the sensitivity to distributional assumptions including normality. The estimator employed in this study also allows for household-specific heterogeneity through the random effects term α_i in eq. 2.

3.3 Identification

This paper employs two approaches to consider the role of job insecurity. These differ in their construction of the job insecurity term, $\hat{u}$. The first takes head of household responses to a question concerning the likelihood that they will become unemployed in the next twelve months (see below). The second approach estimates the individual probability of becoming unemployed in 12 months for the sample of employed heads of households. This is derived as the predicted probability from a probit model:

$$u_{it} = 1\{Z_{it}\varpi + \upsilon_{it} > 0\} \tag{3}$$

[13] Carroll (1992, p.107) reports results suggesting that aggregate food consumption in the US is as sensitive to unemployment expectations as total non-durable expenditures. Browning and Crossley (1999) find that households cut back on 'small' durables (e.g. clothing) to a greater extent than food during an actual unemployment spell.

[14] The bands are the following: below £10; £10 to £19; £20 to £29; £30 to £39; £40 to £ 49; £50 to £59; £60 to £79; £80 to £99; £100 to £119; £120 to £139; £ 140 to £159; above £160.

where $1\{A\}$ is an indicator function of the event A such that $u_{it} = 1$ if the individual becomes unemployed at the time of the subsequent BHPS interview and zero otherwise. As noted above, a predicted probability of job loss of both the head of household and of any partner is considered in this way. The set of regressors, Z_{it} includes a set of regional and year dummies to control for regional and aggregate effects as well as the other individual and household characteristics contained in X_{it} in (2). Under the probit assumption, $\nu_{it} \sim N(0, \sigma_u^2)$, the predicted probabilities are then calculated as $\Phi(Z_{it}\hat{\varpi})$ where $\Phi(\cdot)$ is the standard normal distribution function and $\hat{\varpi}$ are the maximum likelihood probit estimates of (3). The predicted probabilities provide more variation in job insecurity levels compared to the dummy for subjective sentiment of job insecurity. The complication it introduces is that associated with identification.

A number of alternative instrument sets are considered below. The favoured instrument set for both income and job loss risk consists of the experience of unemployment in the previous year, the size of the household head's employer, and his/her union status, although alternatives and sensitivities will be considered. Unemployment experience has 'scarring' effects on subsequent employment and re-employment earnings (e.g. Arulampalam *et al.*, 2000, 2001). This leads us to expect significant effects from experience of unemployment in the previous year on the probability of job loss and household income, which is confirmed below. If unemployment adversely affects human capital, it should not be correlated with consumption behaviour independent of its effect on human capital and thereby on job insecurity and income. Nevertheless, it may be that not all of the role for previous unemployment experience is due to scarring-type effects. Excluding this term from the instrument set is therefore considered.

A favoured interpretation of the workplace size earnings differential is one of (dynamic) monopsony associated with labour turnover costs such that larger employers bid up wage rates (Green *et al.*, 1996). There seems no reason why the resulting differential should be related to consumption behaviour. In terms of the risk of job loss equation, it may also be that jobs at larger establishments are more secure, due to larger employers possessing greater market power or that for a given employer the closure of smaller establishments incurs lower re-organisation costs. Again, it seems unlikely that this characteristic should be related to consumption independent of any effect via income or job insecurity.

Union status is also considered as a zero restriction. Unions raise earnings, with this differential being associated with coverage and individual membership. Union emphasis on 'due process' should improve job security. Again it seems highly unlikely that these characteristics should be related to consumption independent of the effects through household income and/or risk of job loss. A number of other candidates for valid instruments are also available and several of these are considered below. In addition to these terms, job loss risk from the probit model is also identified through the non-linear functional form of the probit model.

4. Data and estimation results

4.1 Data description

The paper employs data from the BHPS for the years 1992 to 1998.[15] Since the key variable of interest concerning self-reported job insecurity was only asked of respondents in waves six and seven of the survey, the data employed for the specifications using self-reported job insecurity are restricted to those two cross-sections of data. The specifications that employ the estimated probability of job loss do not require this restriction.

In the BHPS, each household is asked how much (approximately) the household spends each week on food and groceries. Responses to the consumption question were banded into 12 intervals (at source), giving rise to the use of the grouped dependent variable estimator referred to in Section 3.

For self-reported unemployment expectations, in waves six and seven of the survey each employed individual is asked:

> "In the next twelve months, how likely do you think it is that you will become unemployed?"

Responses fall into one of four categories, 'very likely' (2.7%), 'likely' (7.0%), 'unlikely' (51.4%), and 'very unlikely' (38.8%). In view of the small proportion that respond in the 'very likely' group, for subsequent analysis this is merged with the 'likely' response thereby forming a 'likely or very likely' group.

The sample of households is selected on the basis of having employed household member(s), of working age and providing the necessary information for each of the variables used in the analysis. This produces a sample of 11,156 households available for the analysis of household-level consumption functions. In the raw data (see Table A1), those at greater risk of becoming unemployed typically have lower incomes, are less highly educated, have less tenure, are less likely to be covered by a union collective bargaining agreement, are more likely to have some experience of unemployment in the previous year and are more likely to have a temporary contract. For both sub-samples, the mean value of (banded) food consumption is in the interval £50 to £59 per week but for the high risk sample it is estimated at £59 whilst for the low risk sample it is £55.

4.2 Estimation results

Before examining the consumption functions, the models for unemployment risk are first considered. The specifications reported differ in their definition of the job insecurity term–whether this is the self-reported measure or the estimated risk of job loss.

[15] The survey question concerning consumption was slightly different in 1991 so this year is omitted from the analysis. Details of variable construction are available from the author on request.

4.2.1 *Job insecurity* Table 1 presents probit estimates for the propensity for individuals' self-reported job insecurity based on 'likely or very likely' versus 'unlikely or very unlikely' unemployment responses for 12 months hence.

Individuals on temporary or seasonal contracts, those with experience of unemployment in the previous year, and those with poor health, all have a higher propensity for feeling insecure about their jobs, controlling for the other

Table 1 Self-reported job insecurity

	Coefficient (standard error)	Marginal effect
Education (highest qualification)		
Degree	−0.262 (0.113)	−0.035
Other higher QF	−0.210 (0.087)	−0.029
A-levels	−0.132 (0.100)	−0.019
O-levels or equivalent	−0.179 (0.087)	−0.025
CSEs, commercial QF or other	−0.108 (0.104)	−0.015
unemployed in previous year	0.487 (0.109)	0.098
temporary contract	1.004 (0.091)	0.255
aged 30 to 39	0.157 (0.084)	0.024
aged 40 to 49	0.386 (0.084)	0.065
aged 50 or more	0.448 (0.089)	0.081
poor health	0.480 (0.097)	0.096
covered union member	0.071 (0.061)	0.011
covered non-union member	−0.012 (0.072)	−0.002
married	−0.027 (0.092)	−0.001
white	−0.207 (0.135)	−0.035
male	−0.036 (0.059)	−0.005
tenure:	0.115 (0.096)	0.018
7–12 months		
1–2 years	0.199 (0.089)	0.033
2–4 years	0.235 (0.087)	0.039
4 years or more	0.109 (0.082)	0.017
Workplace size:		
10 to 24 employees	−0.083 (0.086)	−0.016
25 to 49 employees	−0.033 (0.091)	0.001
50 to 99 employees	−0.134 (0.096)	−0.020
100 to 199 employees	−0.010 (0.095)	−0.005
200 to 499 employees	0.024 (0.086)	0.007
500 to 999 employees	−0.170 (0.114)	−0.023
1000 or more employees	−0.136 (0.097)	−0.017
occupation dummies	yes (8)	
region dummies	yes (18)	
wave dummy	yes	
log-likelihood	−1,713.444	
pseudo R-squared	0.090	
observations	5,932	

Note: Table reports maximum likelihood probit estimates for self-reported job insecurity. Standard errors corrected for multiple observations in parentheses. The reference groups are no qualifications; aged 21–29; 1–6 months' tenure with a workplace size of 1–9 employees; Other higher QF refers to teaching, nursing or other higher qualifications.

characteristics, whilst the degree-educated have a significantly lower probability of job insecurity. The marginal effects reported for the probit model indicate that the variables with the strongest relationship to job insecurity are being on a temporary contract, being in poor health and having experienced unemployment over the previous year. Being on a temporary contract increases the probability of feeling insecure about one's job over the subsequent year by 0.26; poor health increases this probability of job insecurity by 0.10, and a recent spell of unemployment also by 0.10.

The results for the probability of becoming unemployed in one year are reported in Table 2. Unemployment risk is considerably higher amongst those who have previous experience of unemployment and those on temporary contracts. A spell of unemployment in the previous year increases the probability of becoming unemployed by 0.02 (t-ratio = 4.10), whilst being on a temporary contract has a marginal effect of 0.025 (t-ratio = 5.11). Given that the raw probability of entering unemployment is 0.021, these are large effects. Larger employers are associated with greater job security. The employer size variables are jointly significant ($\chi^2(7) = 21.99$, p-value = 0.00). Unemployment risk is lower among the degree-educated, with a degree being associated with a decline in the probability of entering unemployment of 0.01 (t-ratio = −2.06) relative to having no qualifications. Union presence through union recognition, but not individual union membership, is also significantly and inversely related to the propensity of entering unemployment, and also has a marginal effect close to −0.01. Higher levels of tenure are associated with lower unemployment risk.[16]

4.2.2 *Consumption* Column 1 in Table 3 presents results for the specification of consumption that considers the job insecurity variable as the self-reported measure. A standard set of controls is employed for educational attainment, number of household members in employment, family size, and composition. The results in column 1 do not reject the null hypothesis that job insecurity has no influence on household consumption, contrary to the precautionary saving model. The coefficient (standard error) on the job insecurity term is −0.025 (0.022). Employing a slightly modified definition of self-reported job insecurity that distinguishes between three different responses in terms of the level of job insecurity does not alter this result. Although negatively signed, the results fail to indicate that job insecurity depresses consumption significantly.

The limited degree of variation in the categorical variable for self-reported job insecurity may mitigate against finding a significant relation between this variable and consumption. Less than 10% of the sample reports that becoming unemployed is either likely or very likely. Since there will be degrees of job insecurity a case

[16] The predicted probability of becoming unemployed is increasing in the self-reported job insecurity measure. The mean predicted probabilities by subjective chance of becoming unemployed during the years that those data are available are 0.010 (very unlikely), 0.011 (unlikely) and 0.019 (likely or very likely).

Table 2 Unemployment risk

	Coefficient (standard error)	Marginal effect
Education (highest qualification)		
Degree	−0.240 (0.116)	−0.007
Other higher QF	−0.069 (0.087)	−0.002
A-levels	0.070 (0.094)	0.003
O-levels or equivalent	0.013 (0.084)	0.001
CSEs, commercial QF or other	0.069 (0.087)	0.003
unemployed in previous year	0.353 (0.086)	0.018
temporary contract	0.436 (0.085)	0.025
Covered union member	−0.185 (0.054)	−0.007
Covered non-union member	−0.254 (0.070)	−0.008
aged 30 to 39	−0.016 (0.066)	−0.001
aged 40 to 49	0.097 (0.069)	0.004
aged 50 or more	0.224 (0.076)	0.010
poor health	0.212 (0.097)	0.010
married	−0.185 (0.067)	−0.008
white	−0.262 (0.119)	−0.013
male	0.100 (0.052)	0.004
tenure:		
7–12 months	0.002 (0.080)	0.000
1–2 years	−0.051 (0.086)	−0.002
2–4 years	−0.118 (0.085)	−0.004
4 years or more	−0.232 (0.079)	−0.008
workplace size:		
10 to 24 employees	−0.208 (0.078)	−0.006
25 to 49 employees	−0.146 (0.078)	−0.005
50 to 99 employees	−0.225 (0.088)	−0.007
100 to 199 employees	−0.020 (0.079)	−0.001
200 to 499 employees	−0.285 (0.080)	−0.008
500 to 999 employees	−0.190 (0.100)	−0.006
1000 or more employees	−0.268 (0.101)	−0.008
occupation dummies	yes (8)	
region dummies	yes (17)	
wave dummies	yes (6)	
log-likelihood	−1,711.391	
pseudo R-squared	0.089	
Observations	18,615	

Note: Table reports maximum likelihood probit estimates for risk of job loss. Standard errors in parentheses.

can be made for attempting to exploit such variation in the estimation. There is significant variation in the predicted risk of becoming unemployed with a coefficient of variation that exceeds one. Using the latter term also means that the analysis is no longer restricted to the 1996 and 1997 waves of the survey.

Column 2 reports results for the benchmark case where zero restrictions are imposed on the unemployment experience in the previous year, employer size and union status terms. These instruments are jointly significant in the income equation (see Appendix) and in the unemployment risk equation (Table 2).

Table 3 Consumption

	Self-reported job insecurity	Estimated unemployment risk				
	[1]	[2]	[3]	[4]	[5]	Fixed effects GMM
lagged consumption, $C_{it}-1$						0.271 (0.035)
permanent income, y^{P}_{it}	0.418 (0.053)	0.367 (0.036)	0.355 (0.027)	0.386 (0.036)	0.353 (0.035)	
transitory income, y^{T}_{it}	0.113 (0.030)	0.094 (0.013)	0.094 (0.013)	0.095 (0.013)	0.092 (0.013)	
investment income, y^{W}_{it}	0.416 (0.153)	0.382 (0.089)	0.392 (0.090)	0.372 (0.091)	0.391 (0.090)	
job insecurity, $\hat{u}-HOH_{it}$	−0.025 (0.022)	−0.698 (0.222)	−0.587 (0.233)	−0.616 (0.229)	−0.482 (0.259)	−6.308 (2.597)
job insecurity, $\hat{u}-SEC_{it}$		−0.964 (0.311)	−0.957 (0.312)	−0.967 (0.309)	−1.176 (0.267)	3.078 (3.162)
Test: $\theta_1=\theta_2$; $\chi^2(1)$	23.70 (p = 0.000)	51.48 (p = 0.000)	46.98 (p = 0.000)	58.38 (p = 0.000)	48.97 (p = 0.000)	
Test: $\theta_1=\theta_3$; $\chi^3(1)$	0.01 (p = 0.99)	0.02 (p = 0.884)	0.14 (p = 0.705)	0.02 (p = 0.887)	0.14 (p = 0.708)	
Test: $\delta_1=\delta_2$ $\chi^2(1)$		0.48 (p = 0.488)	0.90 (p = 0.343)	0.82 (p = 0.366)	3.50 (p = 0.062)	
log-likelihood	−6,143.414	−19,168.312	−19,165.543	−19,185.404	−19,168.387	
s.e.	0.235 (0.006)	0.254 (0.002)	0.253 (0.003)	0.254 (0.002)	0.253 (0.002)	
ρ	0.615 (0.020)	0.549 (0.010)	0.549 (0.010)	0.552 (0.010)	0.549 (0.010)	
Sargan (p-value)						0.452
Difference Sargan (p-value)						0.536
Instruments						$\Delta t-2\,..\,\Delta t-4;\ t-1$
M1						0.000
M2						0.176
Observations	3,360	11,156	11,156	11,156	11,156	5,503

Notes: Estimates for grouped dependent variable model with random effects, except for the final column which reports fixed effects estimates by GMM (see notes to Table 4). Dependent variable is log household consumption on food and groceries (weekly). Standard errors in parentheses. $\hat{u} - HOH$ refers to job insecurity of the head of household and $\hat{u} - SEC$ to that of any secondary worker. Coefficients and standard errors on y^P, y^T and y^W multiplied by 1000. *s.e.* is the standard error of the regression. $\theta_1 = \theta_2$ (θ_1) is a $\chi^2(1)$ test of the hypothesis that the permanent and transitory (investment) income coefficients are equal. $\delta_1 = \delta_2$ is a test of the equality of the job risk effects for the head of household and his/her partner. ρ represents the proportion of the total variance accounted for by the panel individual-specific component. Other controls included are whether married, number of children, number of employed adults, age dummies (3), education (5), male, poor health, white, tenure (4), occupation (8) all for the household head, and educational qualifications (5) and occupation of the household head's partner. Year dummies (6) also included.
Instrument sets:
[1] unemployed previous year, employer size, union status.
[2] unemployed previous year, employer size, union status.
[3] unemployed previous year, employer size.
[4] unemployed previous year, employer size, and region.
[5] employer size, and union.

The coefficient (standard error), multiplied by 1000, on permanent income is 0.367 (0.036) and compares to 0.094 (0.013) on transitory income and 0.382 (0.089) on investment income. A test of the equality of the permanent and transitory labour income coefficients easily rejects the null, $\chi^2(1) = 51.48$ (p-value = 0.00). The estimate of θ_1 corresponds to an elasticity of food consumption with respect to permanent income of 0.16, evaluated at mean permanent income. This compares to permanent and transitory income elasticities estimated by Miles (1997) of 0.82 and 0.61, respectively. The lower elasticities here likely reflect the fact that the measure of consumption, of necessity, is restricted to food and grocery expenditures which are likely to be less income elastic. The results generally do not suggest a different responsiveness of consumption to permanent and investment incomes.

Crucially, the unemployment risk term for the head of the household is now significantly negative, attracting a t-ratio of −3.14.[17] A one percentage point increase in the probability of becoming unemployed for the head of household reduces household consumption by 0.7%. For a one standard deviation increase in unemployment risk, consumption declines by 1.6%. Although not directly comparable, Carroll (1994) estimates that a one standard deviation increase in predicted future income uncertainty reduces consumption by around 3%, although in several of Carroll's (1994) specifications this was not statistically significant. A one standard deviation change in unemployment risk more than doubles the average predicted probability of becoming unemployed so that a reduction in consumption of 1.6% seems plausible. There is evidence of a further depressing effect from unemployment risk of the household head's partner as this term is also significantly negative with a t-ratio of −3.09. The point estimate two job insecurity terms are not significantly different from one another ($\chi^2(1) = 0.48$; (p-value = 0.49)).[18]

Columns 3 to 5 consider various alternative specifications of the instrument set in order to consider the robustness of the results. These results are also favourable to the precautionary saving hypothesis that unemployment risk depresses consumption at the micro-level, as well as further supporting the hypothesis that consumption responds more strongly to permanent income than to transitory income.

As a test of the robustness of the results to the probit or normality assumption for the unemployment risk terms, these probabilities are re-calculated using a linear probability model. In this case the coefficient (standard error) on the unemployment risk of the household head is −1.072 (0.331) whilst that on the secondary worker is −0.903 (0.295). Thus the results continue to suggest an important

[17] The standard errors are not adjusted for the presence of a generated regressor (Pagan, 1984). As in Miles (1997), it is unlikely that this would render the key terms insignificant.

[18] One possible explanation for this is that in addition to a consumption response to job security of the household head, households may also adjust their labour supply encouraging participation of a secondary worker when unemployment risk is high.

role for job insecurity in shaping household consumption and the two effects are insignificantly different from one another ($\chi^2(1) = 0.14$ (p-value = 0.71)) although the point estimate in this case is larger (in absolute terms) for the household head than for his/her partner.[19]

A further issue of robustness is to consider relaxing the random effects assumption for the unobserved heterogeneity and instead controlling for household specific heterogeneity in the form of household fixed effects. In addition to the fixed effects, the estimates in the final column of Table 3 also control for the lagged level of consumption, perhaps owing to habits. This reduces the sample size as we require at least 4 consecutive observations per household for estimation by GMM. Instruments are dated $t-2$ to $t-4$ in the first-differenced equation and $\Delta t-1$ in the levels equation. The use of these instruments requires the absence of second-order serial correlation in the first-differenced residuals for which the test statistic of Arellano and Bond (1991) is reported alongside a Sargan test statistic. The results provide further evidence that there is a depressing effect from the job insecurity of the head of household to the current level of consumption, controlling for household fixed effects (which will help control for permanent income) and for the lagged level of consumption. The household head unemployment risk term attracts a t-ratio of −2.43. The point estimate indicates an even larger effect than under the random effects estimates. A one percentage point increase in unemployment risk reduces current consumption by 6.3%; although it is not particularly well-determined it seems very large.[20]

The estimate of permanent income does not allow for the fact that an unemployment spell will have an effect on permanent income. This implies that the estimated unemployment risk effect could be picking up a permanent income effect. However, the estimated job insecurity effect appears much too large to be accounted for by an implied reduction in permanent income. Taking an estimated food elasticity with respect to permanent income of 0.16, moving from someone with zero unemployment spells to someone who spent only 2.3% of their time unemployed would need to imply a reduction in permanent income of 19% (i.e. 0.030/0.16) to account for the estimated reduction in consumption.[21] More plausible estimates of the likely effect on permanent income suggest that this

[19] When the job insecurity term is replaced by a term which reflects whether the individual does actually lose their job over the next year, this attracts a significantly negative coefficient with a point estimate (standard error) of −0.067 (0.024).

[20] Although the random effects specification is not well-suited to the inclusion of a lagged dependent variable, the robustness of the results to its inclusion was also considered. In this specification, the unemployment risk term for the head of household attracted a coefficient (standard error) of −0.495 (0.232) with that for the secondary worker −0.976 (0.261), showing the results remain robust. Estimating fixed effects models, using mid-points for the consumption data and omitting the lagged dependent variable, generates very similar results to those using the random effects assumption.

[21] It is more difficult to defend any effect associated with the subjective measure of job insecurity along these lines. The latter may instead reflect a 'saving for a rainy day' influence on consumption.

could account for around one-fifth of the estimated effect associated with unemployment risk.

4.2.3 *The Euler equation* An alternative to estimating the reduced-form equation for the level of consumption is to estimate the Euler equation for consumption growth. There is some controversy in the literature concerning the usefulness of estimating Euler equations in the presence of buffer stock/precautionary saving effects. Carroll (2001b) argues that such equations are essentially invalid. However, Attanasio and Low (2004) suggest that given most parameter estimates, this is not the case and GMM estimation of the Euler equation can proceed. The theory also makes predictions for the level of consumption and, not least in order to address the question posed in the paper, this explains the present focus on the level of consumption. Nevertheless, our confidence in what we have estimated would be further enhanced if we were able to uncover estimates of the Euler equation which showed a positive relation between consumption growth and unemployment risk. The Euler equation to be estimated is the following

$$\Delta c_{it+1} = \alpha \Delta c_{it} + \beta \Delta y_{it} + \lambda_1 \hat{u}_{it}^{HOH} + \lambda_2 \hat{u}_{it}^{SEC} + X_{it}' \gamma + \omega_i + \phi_t + \varepsilon_{it} \qquad (4)$$

where the interest rate term is subsumed into the time effects ϕ_t. The fixed effects ω_i control for unobserved heterogeneity. This is similar to the approach of Guariglia and Rossi (2002) who focus on the estimation of such Euler equations and derive a role for the lagged dependent variable reflecting habit formation.[22] The vector X_{it} includes variables for the change in the number of adults and children in the household. The income term, y, is log total real household income which in Table 4 is considered both contemporaneously to the dependent variable and lagged one period. Estimation by the GMM-System estimator of Blundell and Bond (1998) requires a minimum of 4 consecutive observations per household which reduces the number of households to 1,211. Instruments are dated $t-2$ to $t-4$ in the first-differenced equation and $\Delta t-1$ in the levels equation.[23] The use of these instruments requires the absence of second-order serial correlation in the first-differenced residuals for which the test statistic of Arellano and Bond (1991) is reported alongside a Sargan test statistic.

The results in Table 4 provide some support for the notion of deferred consumption in response to job insecurity through the Euler equation estimates. The two job insecurity terms for the head of household and secondary worker attract positively signed coefficients that are jointly significant at the 5% level. The term for the head of household's unemployment risk is individually significant at the 5%

[22] As in Guariglia and Rossi (2002) the growth in consumption is constructed as the difference in the log of the mid-points for the banded consumption level.

[23] One issue for these models concerns the fact that, given the grouped nature of the consumption data, a lot of variation in the data is lost when estimating these in first-differences.

Table 4 Euler equation estimates

$\Delta\, c_{it+1}$	[1]	[2]
$\Delta\, c_{it}$	−0.221 (0.022)	−0.245 (0.024)
$\Delta\, y_{it}$	−0.160 (0.108)	
$\Delta\, y_{it+1}$		0.386 (0.291)
job insecurity, $\hat{u} - HOH_{it}$	1.965 (1.074)	2.189 (1.129)
job insecurity, $\hat{u} - SEC_{it}$	3.739 (2.449)	3.759 (2.464)
Sargan (p-value)	0.153	0.175
Difference-Sargan (p-value)	0.210	0.224
Instruments	$t-2\,..\,t-4,\ \Delta t-1$	$t-2\,..\,t-4,\ \Delta t-1$
M_1 (p-value)	0.000	0.000
M_2 (p-value)	0.095	0.111
households	1,211	1,211
observations	5,211	5,211

Notes: Table shows GMM estimates using the GMM-System estimator with robust one-step standard errors in parentheses (Blundell and Bond, 1998). Also included are controls (as taste shifters) for changes in the number of adults and number of children in the household, age and time dummies. All models also control for fixed effects. Sargan is a Sargan Test of over-identifying restrictions (p-value reported). Difference-Sargan is a Sargan Test of the validity of the additional moment conditions associated with the levels equations (p-value reported). M_j is a test of jth-order serial correlation in the first-differenced residuals.

level (p-value = 0.033). As households depress their current consumption they defer consumption to the future. The coefficient on the lagged dependent variable, around −0.25, is similar to that obtained by Guariglia and Rossi (2002), with the negative coefficient suggesting that habits take the form of 'durability' in the utility derived from consumption carrying over across periods. The test statistic indicates the absence of second-order serial correlation in the first-differenced residuals, a key criterion for the validity of the instrumentation strategy. Support for the specification is also found in the insignificant Sargan test statistics.[24]

A number of further experiments are considered. The first examines variation in the effect by age of the household head. In a precautionary saving model, unemployment risk should have a greater effect for the young than the old. As individuals age they accumulate liquid assets which in part act as a buffer to unemployment and their consumption should therefore be less sensitive to unemployment risk. Carroll (1994, p.140) maintains that 'young and middle-aged households are trying to build up a buffer stock, but by the time they have reached their peak earning years, 45–54, they have achieved a large enough buffer and so do not need to continue depressing consumption to continue building up the stock further' (see also Gourinchas and Parker, 2002). To consider this, the unemployment risk term is interacted with the age of the household head.

[24] The first-order serial correlation test for the first-differenced residuals is significant which is what we should expect if the errors in the levels equation are not serially correlated (Arellano and Bond, 1991).

The interaction term attracts a significantly positive coefficient, indicating that the negative effect of unemployment risk upon consumption lessens with age. The estimates imply that at age 25 a one standard deviation increase in unemployment risk reduces consumption by 2.3%, whilst at age 60, the effect is zero.

Household consumption may be less sensitive to unemployment risk where households have other sources of income in addition to labour income (see also Zeldes, 1989b). An interaction term between unemployment risk and a dummy for whether the household reports having positive investment income is therefore added: 72.7% of households indicate that they have investment income. The interaction term is positively signed and statistically significant. The negative impact of unemployment risk on households' consumption is muted where households possess other sources of income and the difference in the effect is estimated to be large. For those without investment income, the one standard deviation increase in unemployment risk lowers household consumption by 3.1%, with an effect estimated at close to zero for those with investment income.[25] The possession of liquid assets (for which investment income serves as a proxy) is therefore important in influencing the consumption response to job insecurity.

The expected duration of any unemployment spell and the wage at which re-employment occurs will be key factors influencing the value of λ, the persistence of an income shock (such as unemployment), in Section 2. As an, albeit somewhat crude, attempt to pick up any such tendency, the impact of unemployment risk is estimated separately for manual and non-manual employees. Intuition suggests that the precautionary motive may be stronger for manual workers, partly since unemployment durations are typically longer for manual workers. The coefficient (standard error) on the unemployment risk term for manual workers is -0.773 (0.301), whilst for non-manual workers it is at the margin of significance, with a coefficient (standard error) of -0.530 (0.344). The point estimate for the unemployment risk term for manual workers implies that a one standard deviation increase in unemployment risk, reduces consumption by 1.8%, whilst that for non-manual workers implies a 1.2% fall in consumption.

4.2.4 *Durables purchases* It may be that unemployment risk is more likely to cause households to cut back or delay durables purchases than non-durables consumption, particularly food consumption, the case considered above. The BHPS includes information on whether the household has purchased nine listed consumer durables in the past year.[26] The propensity for a household to have

[25] In a similar vein, the possibility that multiple earner households' consumption might be less sensitive to the unemployment risk of the household head was considered. No evidence for such variation was found however.

[26] The consumer durables are the following: colour TV, VCR, freezer, washing machine, tumble dryer, dish washer, microwave, home computer, and CD player. The proportion of households that undertake any such purchase in the previous year is 0.465.

purchased any of these consumer durables in the previous year is considered as a function of the job insecurity of the household head and that of any partner, according to both the self-reported and estimated unemployment risk, and the full set of household- and individual-level controls. This is estimated as a probit model with the results presented in Table 5. A similar approach is adopted by Foote *et al.* (2000) applied to US data.[27]

The probability of having recently purchased consumer durables for the household varies inversely with job insecurity. Using the self-reported measure of job insecurity for the head of the household, this is at the margin of significance, attracting a coefficient (standard error) of −0.144 (0.079). The marginal effect implies that reporting some level of job insecurity is associated with a 0.06 lower probability of having recently purchased a consumer durable. Relative to an overall proportion of households that report any consumer durable purchase in the past year of 0.465, this is by no means a small effect. Employing the model-based predicted risk of unemployment, the term for the household head's predicted risk of job loss is significant with a t-ratio of −2.20.

5. Conclusion

This paper has confronted several implications of precautionary savings models with micro-data on British households. By relating consumption to unemployment risk, controlling for other characteristics including estimated permanent income, evidence in favour of a precautionary motive for saving associated with unemployment risk has been found.

A one standard deviation increase in unemployment risk for the household head is estimated to lower household (food) consumption by 1.6%. Taking the spread of the distribution of job insecurity to consist of four standard deviations, this indicates that moving from the bottom to the top of the distribution implies a reduction in consumption of 6.4%. Further support for the notion that job insecurity leads a household to defer consumption from the present to the future was found by Euler equation estimates which showed job insecurity raising the growth rate of consumption.

Variation in the estimated effect on the level of consumption was then considered, to examine whether the pattern was consistent with that implied by precautionary saving models. It was estimated that the unemployment risk effect is stronger for the young as implied by a buffer-stock model of saving such as Carroll (1994). Those that are more reliant upon labour income, that is do not have investment income, are also found to be more sensitive in terms of their

[27] An attempt was also made to estimate the models including a lagged dependent variable, estimated as a linear probability model by System-GMM. This resulted in insignificant coefficients on the estimated job insecurity terms. This may reflect the relatively low degree of time-series variation in these variables making the pooled cross-sectional probit models preferable. The use of lags as instruments also requires a significantly smaller dataset.

Table 5 Further Experiments

	Consumption				Pr(any durables purchased in year)	
	Age interaction	y^W interaction	Manual	Non-manual	Self-reported $\hat{u}$	Model-based $\hat{u}$
permanent income, y_{it}^P	0.368 (0.036)	0.363 (0.036)	0.445 (0.064)	0.373 (0.044)	0.195 (0.159)	0.313 (0.086)
transitory income, y_{it}^T	0.094 (0.013)	0.093 (0.013)	0.311 (0.043)	0.075 (0.014)	0.254 (0.119)	0.099 (0.054)
investment income, y_{it}^W	0.383 (0.089)	0.353 (0.089)	0.133 (0.257)	0.401 (0.099)	−0.234 (0.524)	−0.061 (0.310)
job insecurity, $\hat{u} - HOH_{it}$	−1.836 (0.572)	−1.334 (0.251)	−0.773 (0.301)	−0.530 (0.344)	−0.144 (0.079)	−1.599 (0.728)
job insecurity, $\hat{u} - SEC_{it}$	−0.961 (0.311)	−0.976 (0.312)	−0.847 (0.446)	−0.942 (0.433)		0.474 (1.099)
job insecurity (HOH) × age	0.028 (0.013)					
job insecurity (HOH) × ($y^W > 0$)		1.182 (0.218)				
Test: $\theta_1 = \theta_2$; χ^2 (1)	51.69 (p = 0.000)	50.29 (p = 0.000)	3.48 (p = 0.062)	42.72 (p = 0.00)	0.08 (p = 0.779)	4.09 (p = 0.043)
Test: $\theta_1 = \theta_2$; χ^2 (1)	0.02 (p = 0.884)	0.01 (p = 0.925)	1.35 (p = 0.246)	0.06 (p = 0.805)	0.58 (p = 0.447)	1.26 (p = 0.262)
Test: $\delta_1 = \delta_2$	1.80 (p = 0.180)	0.80 (p = 0.370)	0.02 (p = 0.891)	0.57 (p = 0.452)		2.49 (p=0.115)
log-likelihood	−19,165.975	−19,153.665	−7,693.874	−11,460.947	−2,216.495	−8,378.193
s.e.	0.253 (0.002)	0.253 (0.002)	0.241 (0.003)	0.258 (0.003)	–	–
ρ	0.549 (0.010)	0.549 (0.010)	0.533 (0.017)	0.557 (0.013)		
observations	11,156	11,156	4,558	6,598	3,360	12,440

Notes: See notes to Table 3. All consumption equations use predicted unemployment risk as the measure of job insecurity. Instruments are unemployed previous year, employer size dummies and union status.

Any durables purchase refers to the purchase of consumer durables in the previous year, estimated as a probit model.

consumption to unemployment risk as we would expect, and the estimates here suggest that the difference is quite large. The paper has also explored the relation between consumer durables purchases and job insecurity. The probability of a household having recently purchased consumer durables varied inversely with the job insecurity of the household head.

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Table A1 Summary statistics

Variable	All	High job loss risk	Low job loss risk
estimated unemployment risk	0.019 (0.023)	0.032 (0.026)	0.005 (0.004)
self-reported job insecurity (binary coding)	0.097	0.132	0.071
current income	505.50 (182.32)	448.80 (254.81)	592.81 (318.49)
permanent income	438.61 (213.67)	389.80 (192.39)	511.96 (222.92)
transitory income	59.41 (182.32)	48.29 (157.48)	76.11 (213.23)
investment income	12.19 (37.06)	10.78 (34.62)	14.34 (40.41)
Education (highest qualification)			
Degree	0.154	0.081	0.228
Other higher QF	0.260	0.230	0.290
A-levels	0.123	0.144	0.102
O-levels or equivalent	0.220	0.234	0.205
CSEs, commercial QF or other	0.087	0.103	0.071
unemployed in previous year	0.042	0.067	0.017
temporary contract	0.042	0.060	0.024
covered union member	0.390	0.331	0.451
covered non-union member	0.161	0.125	0.199
aged 30 to 39	0.330	0.293	0.368
aged 40 to 49	0.289	0.292	0.286
aged 50 or more	0.177	0.221	0.132
poor health	0.040	0.049	0.032
married	0.817	0.748	0.887
white	0.969	0.954	0.984
male	0.597	0.700	0.492
number of children	0.681 (0.963)	0.729 (1.010)	0.633 (0.911)
number of employed adults in household	1.911 (0.712)	1.794 (0.725)	2.031 (0.677)
tenure:	0.155	0.177	0.132
1–6 months			
7–12 months	0.093	0.107	0.078
1–2 years	0.137	0.143	0.130
2–4 years	0.194	0.187	0.201
4 years or more	0.422	0.386	0.458

continued.

Table A1 Continued

Variable	All	High job loss risk	Low job loss risk
workplace size:			
10 to 24 employees	0.141	0.140	0.142
25 to 49 employees	0.131	0.141	0.121
50 to 99 employees	0.128	0.119	0.137
100 to 199 employees	0.117	0.147	0.086
200 to 499 employees	0.157	0.127	0.188
500 to 999 employees	0.080	0.070	0.090
1000 or more employees	0.111	0.080	0.143

Note: Table reports sample means (standard deviations in parentheses, where applicable) for sample used in the unemployment risk regression (n = 18,615). High and low risk of job loss are relative to the median value.

Table A2 Household labour income

	log current household income
Education (highest qualification)	
Degree	0.424 (0.020)
Other higher QF	0.216 (0.015)
A-levels	0.183 (0.018)
O-levels or equivalent	0.132 (0.017)
CSEs, commercial QF or other	0.057 (0.022)
unemployed in previous year	−0.080 (0.012)
temporary contract	−0.063 (0.013)
covered union member	0.086 (0.009)
covered non-union member	0.016 (0.009)
poor health	−0.036 (0.012)
married	0.195 (0.014)
white	0.0811 (0.030)
male	0.195 (0.014)
number of children	−0.023 (0.004)
number of employed adults	0.292 (0.004)
tenure:	
7–12 months	0.001 (0.009)
1–2 years	0.001 (0.008)
2–4 years	0.006 (0.008)
4 years or more	0.017 (0.008)
workplace size:	
10 to 24 employees	0.030 (0.010)
25 to 49 employees	0.057 (0.010)
50 to 99 employees	0.073 (0.011)
100 to 199 employees	0.076 (0.011)
200 to 499 employees	0.081 (0.010)
500 to 999 employees	0.102 (0.012)
1000 or more employees	0.108 (0.012)

continued.

Table A2 Continued

	log current household income
occupation dummies	yes (8)
region dummies	yes (18)
wave dummies	yes (7)
R-squared	0.529
ρ	0.684
observations	16,292

Note: Table reports maximum likelihood estimates of a random effects model. ρ represents the proportion of the total variance accounted for by the panel individual-specific component. Standard errors in parentheses.