Employment Contract Matching:

An Analysis of Dual Earner Couples and Working Households

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Abstract: We explore the significance of intra-couple and intra-household influences on three broad types of employment contracts: self-employment, performance related pay, and salaried employment. Individuals may pool income risk with their partners by holding a diversified portfolio of employment contracts, introducing intra-household risk pooling. Alternatively, employment contract matching may occur whereby individuals within couples or households are employed under similar contracts. Our empirical analysis, based on cross-section data drawn from the British Family Expenditure Surveys 1996 to 2000, provides evidence of employment contract matching both within dual earner couples and, to a lesser extent, in the context of working household members.

Key Words: Dual Earner Couples; Employment Contract Matching; Self-employment; Assortative Mating.
JEL Classification: J23, J24, J12.

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I Introduction

The nature of the employment contract has long attracted the attention of economists. Particular emphasis has recently focused on the implications of different types of employment contract such as fixed wages, self-employment and performance related pay.[1] Most of the research in this area has explored such implications from the perspective of the individual. One theme that has dominated research into employment contracts focuses on what type of individual is likely to enter a particular type of employment contract. Recent research has, for example, focused on the attributes of the self-employed concentrating on characteristics such as gender, ethnicity and father's occupation – see Le (1999) for a comprehensive survey of this area.

Hence, family background and individual characteristics appear to be important determinants of an individual's observed employment status. One might also predict that intra-household influences such as the employment status of one's spouse may also affect an individual's observed employment status. Individual characteristics such as marital status, for example, have been incorporated into some empirical studies of self-employment. Blanchflower and Oswald (1990) and Bernhardt (1994), for instance, find that having a working spouse enhances the probability of self-employment.

In a similar vein, recent literature has focused on the similarity of employment status within couples [see, for example, Bradbury et al (1986) and Dawkins et al (2001)]. These studies suggest that the phenomenon of 'assortative mating' may offer an explanation. The assortative mating theory states that individuals are more likely to match with individuals with similar characteristics to themselves such as age and

[1] The efficiency wage hypothesis, for example, has examined the notion that the firm's production costs might be inversely related to fixed wages and, in so doing, provides an explanation for equilibrium unemployment [Shapiro and Stiglitz (1984)]. The analysis of self-employment has focused on its potential as a means of alleviating unemployment [Taylor (1996)]. Perhaps most controversial of all has been the academic interest in PRP where attention has focused on its microeconomic benefits [Blinder (1990)].

education levels and this explains why they have similar labour market experiences.[2] In general, this literature has concentrated on exploring the growing phenomenon of jobless households.

We aim to extend this concept further by exploring contract type matching within dual earner couples as well as across the extended household by focusing on all working members of the household.[3] We aim, therefore, to ascertain whether intra-couple and intra-household employment contract type matching is prevalent or whether holdings of diversified portfolios of employment contracts within couples/households – thereby implying informal insurance arrangements – are more common.

In contrast to the limited amount of existing research in this area which focuses on self-employment, we set our analysis within a wider framework by focusing on a range of employment contract types (such as self-employment, contracts characterised by bonus schemes and fixed wage contracts) whereby these employment contracts are explored collectively rather than in isolation.[4] Contracts characterised by bonus schemes are regarded here as a hybrid of self-employment and fixed wage employment such that there is a fixed and a variable component to remuneration. Our data which is drawn from the British Family Expenditure Surveys 1996 to 2000 is particularly appropriate for our purpose since it harbours the key facets required for our analysis, containing detailed information on employment contracts as well as individual and household characteristics.

Our modelling strategy is to present three different statistical frameworks; multinomial logit analysis, ordered probit analysis and random effects ordered probit analysis. For the latter two models, we order employment contract types according to the

[2] Indeed, it may be the case that such people are likely to meet their partners in the workplace.
[3] We use the term couples to refer to individuals who are either married or cohabiting.
[4] The bonus schemes include Christmas bonuses, productivity bonuses, profit related bonuses, loyalty bonuses, dividends, incentive schemes and performance/sales bonuses.

implied degree of 'income risk' associated with each contract. We assume that fixed wage employment is characterised by the least income risk and self-employment characterised by the most income risk with bonus employment lying somewhere between these extremes. Given the general consensus that self-employment is inherently more risky than fixed wage employment, our ranking in terms of income risk seems appropriate.

Our empirical evidence lends support for the phenomenon of employment contract type matching within couples and households. It may be the case that the benefits of matching with 'like-minded' people (those with similar tastes, preferences or degrees of risk aversion) may simply outweigh the benefits of income risk pooling. Alternatively, transfers of specialised human capital within dual earner couples and within households may increase the associated benefits of holding matched contract types. Moreover, transfers of human capital within couples and within households enhance earnings potential via enhanced productivity. Thus, it is apparent that employment contract type matching may have significant implications for the productivity of matched individuals and, hence, for the economy as a whole.

The paper proceeds as follows: Section II presents the background to our analysis whilst Section III describes the data and Section IV presents a detailed discussion of our statistical framework. Section V presents our findings and Section VI concludes our analysis.

II Background

The idea that economic man is far from the myopic individualist so commonly assumed in contemporary analysis is not new. In his Theory of Moral Sentiments, the founding father of economic science observed:

> How selfish, soever, man may be supposed, there are evidently some principles in nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it.... Every man feels his own pleasures and his own pains more sensibly than those of other people. The former are the original sensations; the latter the reflected or sympathetic images of these sensations. After himself, the members of his own family, those who usually live in the same house with him, his parents, his brothers and sisters are naturally the objects of his warmest affections... his sympathy with them is more precise and determinate, than it can be with the greater part of other people. It approaches, nearer, in short, to what he feels for himself. [Smith 1759)].

Similar sentiments were echoed by another great mind in his classic study of consumer preferences some two centuries later:

> Who after all is the consumer in the theory of consumer's (not consumers') behaviour? Is he a bachelor? A spinster? Or is he a 'spending unit' as defined by statistical pollsters and recorders of budgetary spending. [Samuelson (1956)].

Indeed, it should not be surprising that individuals, who generally live in some form of social unit, take into account the preferences and utilities of other members of their family. Perhaps less obvious is the idea that individuals might take into account the nature of the employment contract of other family members. For example, individuals on 'high risk' employment contracts might be attracted to individuals on 'low risk' contracts. Alternatively, individuals within family units might be inclined to search for complementary employments – one partner might pursue satisfying, but relatively risky, self-employment bolstered in the comforting security of the other partner's weekly pay cheque.

Our focus in this paper is the possibility that intra-couple and / or intra-household influences exist over individuals' optimal choice of employment contract. Individuals may pool income risk with their partner – a self-employed person alleviating the intrinsic risks associated with self-employment by marrying a fixed wage partner.

On the other hand, it may be the case that contract matching exists with individuals within a family unit being employed under similar contracts.

These possibilities were alluded to by Becker (1974) in his treatise on the economics of marriage. Becker suggested that high earning males might optimally match with females specialising in home production, a phenomenon he referred to as 'negative assortative mating on the basis of earnings'. More recent research on spousal selection and marital sorting has proffered support for positive earnings matching. Nakosteen and Zimmer (2001), for example, find that individuals whose earnings are above average tend to marry individuals with similar earnings traits.

There is some evidence that self-employment propensity acts as a sorting mechanism, with individuals similarly inclined to self-employment more likely to marry ceteris paribus [Bruce (1999)]. Bruce finds evidence that a husband's experience of self-employment increases the probability that his wife will become self-employed. Moreover, the effect of a husband's self-employment is found to be largest if he is self-employed when the wife is considering the transition to self-employment. This could be indicative of the importance of intra-household transfers of human capital, such transfers raising the productivity and, thereby, the earning capacity of self-employment.

Similar evidence highlighting the importance of inter-generational transfers of human capital is provided by Dunn and Holtz-Eakin (2000) who find evidence of inter-generational transfers of human capital, the existence of a self-employed parent having a larger effect on a child's self-employment transition probability than the financial wealth of the parent.[5] In a similar vein, De Wit and van Winden (1989) find that an individual's propensity to become self-employed is enhanced if his father was self-employed or commenced self-employment at a later stage whilst Lindh and Ohlsson (1996) find that

[5] See Blanchflower and Oswald (1998) for a detailed discussion of the link between family assets and self-employment.

having a self-employed father (mother) impacts positively (insignificantly) on the probability of self-employment. Indeed, the latter results suggest that the larger the business owned by the father, the more likely is self-employment. Thus, it may be the case that the children of self-employed parents have the opportunity to acquire the necessary human capital from a relatively young age resulting in them setting up their own businesses or becoming involved in the family business.

Similar arguments for the transmission of valuable work experience, reputation or managerial human capital from parent to offspring can be made across partners and, in addition, across household members in general. Lombard (2001) analyses wage residuals as measures of observed characteristics of spouses before and after marriage; the assumption being that individuals harbour characteristics not captured in the data but are observed by peers prior to marriage.[6] The results suggest that the probability of being self-employed is higher with a self-employed husband and lower if married to a wage/salary worker. Moreover, the results also indicate that having a self-employed husband exerts a large and positive influence on the earnings of self-employed females highlighting the importance of intra-couple transfers of human capital.

The evidence summarised above alludes to a matching of employment contracts, especially for the case of self-employment. Schiller and Crewson (1997), on the other hand, find evidence of intra-couple risk pooling with a husband's primary employment increasing the probability that a wife will be observed in self employment. As argued by Le (1999), marriage is assumed in the economics literature to represent

[6] Such findings introduce an additional dimension to the debate over whether marriage is productivity enhancing which centres around the evidence suggesting that married men earn more than unmarried men. Korenman and Neumark (1991) present evidence suggesting that marriage is productivity enhancing whilst Cornwell and Rupert (1997) present evidence to the contrary. It may be the case that any productivity effects may be enhanced if partners match on employment contract type.

stability and, as such, may provide a suitable background for risky self-employment.[7] Given that Blanchflower and Oswald (1990) and Bernhardt (1994) find that having a working spouse enhances the probability of self-employment, this may include financial stability.

To summarise, it appears to be the case that the incidence of self-employment within a couple has significant implications for the observed employment status of the other party. The existing literature has focused almost exclusively on the case of self-employment vis a vis fixed wage employment. We set our analysis within a more general framework by focusing on a range of employment contract types namely self-employment, contracts characterised by bonus schemes and fixed wage contracts whereby these employment contracts are explored collectively.

III Data

Our data is drawn from the Family Expenditure Survey (FES) for Great Britain, which is a nationally representative survey that has been conducted on an annual basis since 1957. Some 10,000 households are selected each year to take part in the FES, and the average response rate is around 70%. The main aim of the survey is to provide a reliable source of information on household expenditure, income and other aspects of household finances. To account for seasonal differences in expenditure, face-to-face interviews are spread evenly over the year. Each individual aged 16 or over in the households visited is asked to keep diary records of daily expenditure for two weeks. Respondents are also asked to complete an income questionnaire. The FES is especially appropriate for our

[7] If this is true, the risk preferences of couples may be different from those of the rest of the population and this raises concerns about potential selection bias when we look at our sample of dual earners. However our data set is not rich enough to allow us to model the selection into marriage. If marriage is seen as risk pooling behaviour then our sample of dual earners are likely to be more risk averse than the general population and thus our results will underestimate the desire to match employment contract types within the wider population.

purposes since it harbours the key facets required for our analysis. It contains detailed information on employment contracts, individual specific characteristics and household specific characteristics. We use data from 1996 to 2000[8] and include working adults aged between 16 and 65 who are employed under either a fixed wage contract, a contract characterised by a bonus scheme or are self-employed.[9] From this data we generate two samples, initially we concentrate on matched working couples (i.e. we have observations on both partners). This gives us a sample of 9276 working couples yielding a total of 18552 observations. Secondly, we extend our analysis by exploring correlations across working members of households – this gives us a sample of 31862 workers living in 19604 households.

Table One in the Appendix presents the distribution of employment contracts across the sample by various individual and household characteristics for the sample of dual earner couples. Table Three in the Appendix presents the same information as Table One for the sample of working household members whilst Table Two in the Appendix presents information pertaining to the distribution of contract type within dual earner couples.

III.I Duel Earner Couples

We can see from Table One that men are more likely to hold employment contracts associated with income risk, but the majority of employed men (and women) hold fixed wage contracts. Hence, fixed wage contracts are the dominant form of employment contract across the individual and household specific characteristics but there are interesting differences in the relative incidence of employment contract types given these characteristics.

[8] Prior to this period the dataset had a slightly different structure and some of the variables required for our analysis are not available.

[9] A small number of individuals with more than one job, individuals employed by the armed forces and agricultural workers were excluded from the analysis.

The proportion of individuals in self-employment increases across the age groups, which is consistent with the hypothesis that older people who find themselves out of employment often turn to self-employment given that their chance of re-employment is low. Alternatively, this is also consistent with the hypothesis that older people face less liquidity constraints perhaps due to the accumulation of wealth/savings and are therefore better able to absorb the income uncertainty associated with self-employment.[10] Moreover, they may also have the capital necessary to start a business.

The age profile of people employed on bonus pay contracts is n-shaped – this may be due to that fact that such contracts have been more widely introduced over the last decade. Thus, we may be observing a cohort effect rather than a true age profile. The age profile of people on fixed wage contracts, on the other hand, is skewed towards the youngest age group (i.e. those less than twenty), suggesting that the income uncertainty associated with bonus pay contracts and self-employment may be prohibitively high for individuals with little labour market experience. In addition, they are less likely to have acquired the necessary capital to become self-employed.

Individuals in self-employment have a high probability of having no formal qualifications. Bonus employment contracts, on the other hand, are concentrated amongst people with formal school qualifications and above, whilst individuals holding fixed wage contracts are evenly spread across all levels of schooling. Hence education appears to be an important factor in explaining the probability of holding bonus contacts or being self-employed but may not be an important factor in explaining why individuals hold fixed wage contracts.

With respect to the occupational class variables, we find that the incidence of fixed wage employment increases as the level of skill associated with the job falls, being

[10] See Blanchflower and Oswald (1998) for a detailed analysis of the importance of capital constraints for the probability of becoming self-employed.

concentrated in the partly skilled and unskilled categories. Bonus contracts are most common among professionals, managers and skilled workers and the incidence of self-employment is high for professional and unskilled workers.

In relation to household characteristics, we find that the correlation with household income suggests that bonus contract employees live in the richest households and fixed wage employees live in the poorest households. It should, however, be noted that different contract types may be characterised by different levels of average income. This issue will be discussed further in Section IV.

One might also hypothesise that the number of children and the age of children could affect their parent's willingness to take on income risk, we therefore look at the number of pre-school and school age children in the household. Pre-school children are distributed evenly across employment contracts, but the average number of school age children is higher for self-employed workers, this is probably due to the fact (highlighted earlier) that self-employed workers are on average older than workers on bonus or fixed wage employment contracts.

In relation to housing tenure, fixed wage employees are most likely to be found living in rented accommodation (local authority and private rented). The incidence of self-employment is lowest for individuals living in local authority rented properties. This may be associated with a lack of collateral with which to secure loans necessary to start up a small business given that housing equity is often used as collateral. The incidence of bonus pay contracts, on the other hand, is highest amongst owner-occupiers.

Finally we explore the employment status of other members of the household. We find that the presence of an unemployed, sick or a fixed wage person in the household is higher for people holding fixed wage contracts. Having a retired person in the household is more likely for self-employed workers – this might be related to the fact

that self-employed people are on average themselves older. Unoccupied people are less common in the households of bonus contract employees who are most likely to reside with another bonus contract employee. Being self-employed is more highly correlated with having a person in the household who is in full-time education, but this might be explained by the fact that the self-employed tend to be older and therefore are more likely to have children in further education. The presence of another self-employed person in the household is higher for the self-employed people in our sample. This might be due to the fact that household members may become absorbed into the family business.

Table Two presents the distribution of employment contract type within dual earner couples where both partners are working. It is apparent that regardless of partner 1's contract type, partner 2 is most likely to be a fixed wage employee given that this is the most common contract type. This suggests that couples may be pooling their income risk. If partner 1 has a contract type characterised by income risk, i.e. a bonus pay contractor is self-employed, he/she can offset that risk by having a partner with a fixed wage contract.

Thus, the patterns in the raw data provide some preliminary evidence of intra-household risk pooling. However, closer examination also reveals a high level of contract type matching within couples. Fixed wage employees are more likely to be paired with another fixed wage employee and the incidence of bonus worker couples and self-employed couples is also relatively high.

III.II Working Household Members

Table Three differs from Table Two in as much as the sample now contains all working members of the household, thus we have included marital status variables and the variables for the contract type of other household members are clearly no longer

necessary. We still, however, consider the economic status of household members who are out of the workforce.

The story remains virtually unchanged, so we will concentrate on the differences only. With respect to marital status, we find that fixed wage employees are most likely to be separated, widowed, divorced or single as opposed to being married. Bonus contract employees more likely to be single and self-employed individuals are most likely to be married. The patterns in the status of other household members now change; whilst the unemployed and the sick household members are still concentrated among fixed wage employees, retired household members also join this group. The incidence of unoccupied people in the household becomes more frequent for the self-employed.

The discussion above is based on relationships observed in the raw data. Detailed econometric analysis is necessary to substantiate the robustness of these findings. To summarise, our preliminary review of the raw data suggests that some of the determinants of employment contract type are likely to be observable individual and household characteristics such as those illustrated in Tables One, Two and Three. A detailed discussion of our statistical framework is presented in the following section.

IV Statistical Framework

Our dependent variable is categorical in nature, i.e. taking the value of 1 if the individual is a fixed wage worker, 2 if she/he is a bonus contract worker and 3 if she/he is self-employed. We expect that individual attributes and household characteristics will be important in explaining variations in individuals' probabilities of holding a specific type of employment contract. Our modelling strategy is to present three different statistical frameworks; multinomial logit analysis, ordered probit analysis and random effects ordered probit analysis.

The first approach is to specify a multinomial logit model in order analyse what type of individual is likely to be employed under each contract type without imposing any ordering on the three types of employment. We specify the model as follows; $Y_{ij} = j$ if the i^{th} individual is characterised by employment contract type j where $j = 1, 2$ or 3 and i is the individual subscript such that $i = 1,..,I$. Let $p_{ij} = P(Y_{ij} = j)$ denote the probability that individual i is employed under contract type j where $p_{i1} + p_{i2} + p_{i3} = 1$. Hence, the multinomial logit model is given by:

$$\ln\left(\frac{p_{ij}}{p_{i1}}\right) = b_j' X_i \qquad (1)$$

where X_i is a vector of individual specific characteristics thought to be correlated with employment contract type.

Our second approach is to reconsider what type of individual is likely to be employed under each contract type whilst imposing an ordering that reflects their relative income uncertainty. The ordering of contract types in the ordered probit analysis is based on the implied degree of 'income risk' associated with each contract. Bonus contracts, comprising a component of both fixed and variable pay, offer a middle road between the two extremes of fixed wage and self-employment.[11] In the context of this paper, we focus primarily on the risk of income and so presume that self-employment is relatively more risky than bonus contract employment, which is itself relatively more risky than fixed wage employment. Rees and Shah (1986) adopt a similar approach except that their analysis only considers the choice between risky self-employment and fixed wage employment.[12] Here, we apply an ordered probit model assuming that fixed

[11] The hypothesis that PRP generates a relatively risky stream of income accords with the results of Seiler (1984) who finds that 'incentive' workers in the US manufacturing sector experience higher yet more dispersed earnings than 'time rate' workers.

[12] Rees and Shah (1986) find that the variance of earnings for the self-employed is over three times that of paid employees.

wage employment is characterised by the least income risk and self-employment characterised by the most income risk with bonus emplobyment lying somewhere between these extremes.

The ordered probit model is based on a latent regression framework where:

$$Y_i^* = b'X_i + e_i \quad (2)$$

Although, Y_i^* is unobserved, we observe Y_i such that:

$$Y_i = 1 \quad \text{if} \quad Y_i^* \leq m_1 \quad (3)$$

$$Y_i = 2 \quad \text{if} \quad m_1 < Y_i^* \leq m_2 \quad (4)$$

$$Y_i = 3 \quad \text{if} \quad m_2 \leq Y_i^* \quad (5)$$

where the m's and b are the unknown parameters to be estimated. Assuming that e_i is normally distributed across observations with a mean of zero and a variance of one, we obtain the following probabilities:

$$P(Y_i = 1) = \Phi(m_1 - b'X_i) \quad (6)$$

$$P(Y_i = 2) = \Phi(m_2 - b'X_i) - \Phi(m_1 - b'X_i) \quad (7)$$

$$P(Y_i = 3) = 1 - P(Y_i = 1) - P(Y_i = 2) \quad (8)$$

where $\Phi(.)$ denotes the cumulative standard normal distribution.

Finally, we wish to explore the importance of unobservable intra couple preferences in determining the choice of employment contract across dual earner couples. In order to do this, we adopt the following random effects ordered probit model where the panel dimension of our model arises from the fact that we observe both members of each working couple. Given that the sampling frame of the FES is at the household level, we are able to create a balanced panel of data for working couples. The model is specified as follows:

$$Y_{ic}^{*} = b'X_{ic} + n_{ic} \quad (9)$$

$$n_{ic} = a_c + h_{ic} \quad (10)$$

where Y_{ic}^{*} is the unobservable propensity for income risk of individual i in couple c; Y_{ic} is the individual's observed employment contract type; X_{ic} is a vector of exogenous characteristics which are expected to influence Y_{ic}^{*}; b is the associated vector of coefficients; a_c is the 'couple' specific unobservable effect which captures differences in preferences towards income risk across working couples; and h_{ic} is a random error term. We assume a random effects specification, where $h_{ic} \sim IN(0, s_c^2)$, and in order to marginalise the likelihood it is assumed that, conditional on the X_{ic}, a_c are $IN\left(0, s_a^2\right)$ and are independent of the h_{ic} and the X_{ic}. This implies that the correlation between the error terms of individuals who are married/cohabiting is a constant given by:

$$r = corr(n_{il}, n_{ik}) = \frac{s_a^2}{s_a^2 + s_h^2} \qquad l \neq k \quad (11)$$

Thus, r represents the proportion of the total variance contributed by the panel level variance component. A fuller discussion of the random effects probit model and the associated likelihood function can be found in Arulampalam (1999). The likelihood is computed using 20 point Gauss-Hermite quadrature [see Butler and Moffitt (1982)].

Finally, we explore the possibility of employment contract type correlation in a wider context by exploring the importance of intra-household preferences across all working members of the household. The model is identical to that described by Equations (9) to (11) above with the c subscript replaced with a unique household identifier, h where h goes from 1 to H. Thus, for the analysis of all working members of the household, we create an unbalanced panel of data where the minimum number of working individuals in the household is one and the maximum number is seven.

Our set of explanatory variables (the vector X_i) contains a host of variables which represents individual attributes and household characteristics thought to be important in explaining variations in individuals' probabilities of holding a specific type of employment contract. The individual characteristics we investigate are the person's gender, age, and level of education.[13] In addition, we control for job specific characteristics such as occupation and industry. The household characteristics we control for are the household's level of income,[14] the number of preschool children in the household, the number of school age children, housing tenure, geographical regions, survey year and the economic status of other individuals aged 16 years and above living in the household, i.e. those who are unemployed, sick, retired, in further education or unoccupied. In the case of the analysis of dual earner couples, we also include a set of dummy variables which represents the employment contract type of other working members of the household. These are, however, omitted from the random effects model of all working household members since these individuals become observations within our working household members sample.

V Results

Our results are presented in Tables Four, Five and Six in the Appendix. Table Four presents the results from the multinomial analysis, Table Five presents results from the ordered probit analysis and, finally, Table Six presents results from the random effects ordered probit analysis.

V.I Multinomial Logit Analysis

[13] In the case of the random effects specification on the sample of all working members of the household, we also include dummy variables to capture marital status.

[14] We use household income rather than individual income given that individual income may be highly correlated with employment contract type.

Turning initially to the multinomial logit analysis of dual earner couples, we will begin by discussing the personal characteristics and then move on to consider household specific characteristics. It is apparent that age impacts concavely on the probability of being a bonus contract employee and on the probability of being self-employed relative to being in fixed wage employment. Our results pertaining to the relationship between age and the probability of self-employment accord with those of Rees and Shah (1986). The magnitude of the estimated coefficients on the age variable suggest that the self-employed are, on average, older than bonus contact employees who in turn are older than fixed wage employees. Women are less likely to be either a bonus contract employee or self-employed relative to fixed wage employment. It is interesting to note that the self-employed are more likely to have higher education whilst bonus contract employees are more likely to have further education relative to their fixed wage counterparts.

It is apparent that bonus contract employees are less concentrated in the skilled, partly skilled and unskilled occupational categories relative to fixed wage employees whilst the self-employed are less commonly found in the managerial and technical, skilled and partly skilled occupational classes relative to fixed wage employees.

Our key variables of interest relate to the employment contract type of one's partner. It can been seen that bonus contract employees are more likely than fixed wage employees to be partnered with another bonus contract employee. Similarly, our results suggest that self-employed individuals are more likely to be partnered with another self-employee. The positive association between the probability of self-employment and having a self-employed partner appears to contradict the idea of intra-couple risk

pooling lending more support to the argument based on the importance of transfers of human capital between partners and/or the phenomenon of assortative mating.[15]

Turning to household characteristics, the findings presented in Table Four accord with our observations from the raw data discussed in Section III. Bonus contract employees appear to live in the richest households whilst fixed wage employees, on the other hand, appear to reside in the poorest households. Our findings related to housing tenure suggest that bonus contract employees are more likely to own their home via a mortgage relative to fixed wage employees whereas the large and highly significant estimated coefficient for the variable 'owned outright' suggests that the self-employed have greater wealth in the form of assets relative to fixed wage employees. In a similar vein, Kidd (1993) and Bernhardt (1994) find that the availability of capital plays a key role in models of self-employment. To be specific, Bernhardt (1994) finds working wives, home ownership and the availability of investment income to be positive and significant indicators of the probability of self-employment.

Turning to the variables representing the composition of the household, bonus contract employees (self-employees) are less (more) likely to have children (both pre-school and school age) relative to fixed wage employees. Regarding the employment status of adult household members other than one's partner, we find that bonus contract employees are less likely to reside with a fixed wage employee and more likely to reside with other bonus contract employees, relative to fixed wage workers. Self-employed individuals are less likely to have an unemployed individual in the household – it may the case that a self-employed individual is able to absorb other household members into

[15] It is apparent from Table Four that having a self-employed partner exerts a large and positive influence on the probability of being self-employed. It may be the case that this captures the effect of couples who jointly run family businesses. One proxy that has been used in the literature to identify such couples is to identify those couples who match identically on both self-employment type and the three digit industry classification [see, for example Bruce (1999) and Lombard (2001)]. Following this methodology, we find

his/her business. Moreover, Borjas (1986) argues that such an arrangement may minimise the risk of employees shirking given that family members employed within the family business may have the same incentive, i.e. to maximise family profit.

The self-employed are also less likely to reside with individuals employed under bonus contracts and more likely to reside with other self-employed individuals relative to fixed wage workers. In general, our findings related to the employment contract types of other working household members suggest that the phenomenon of employment contract type matching may also be true in the wider context of working household members as well as within dual earner couples.

V.II Ordered Probit Analysis

Table Five presents the results from the ordered probit analysis of dual earner couples where our dependant variable represents an ordering of the degree of income risk associated with each employment contract type. In general, the results from the ordered probit analysis accord with the results from the multinomial analysis presented above. For reasons of brevity, we will only comment on selected results.

The variables pertaining to the nature of the employment contract of the respondent's partner indicate that the degree of income risk associated with an individual's employment contract is positively correlated with the degree of risk associated with his/her partner's employment contract suggesting that employment contract matching is observed in dual earner couples rather than the holding of a diversified portfolio of emplobyment contracts. Thus, our results may be regarded as support for positive assortative mating whereby individuals similarly inclined to a particular degree of income risk are likely to marry/cohabit.

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that 173 out of 523 couples who are both self-employed may be regarded as running a family business together.

In addition, our results suggest that higher levels of human capital as proxied by education are associated with willingness to accept income risk. Similarly, evidence by Rees and Shah (1986), Borjas (1986), Borjas and Bronars (1989) and Evans and Leighton (1989) suggests that educational attainment is positively correlated with the probability of self-employment.

Finally, our findings related to the employment contract types of other working household members suggest that the phenomenon of employment contract matching in the wider context of working household members is dominated by the case of self-employment.

VII Random Effects Analysis

Our results so far support employment contract type matching within dual earner couples rather than income risk pooling via a diversified portfolio of employment contract types between partners. For this reason, we conduct random effects ordered probit analysis in order to capture the degree and significance of intra couple preferences in determining observed employment contract types. Here we are exploiting the panel element of our data, i.e. our observations can be grouped by couples in order to capture the presence of a couple specific unobservable effect pertaining to differences in preferences towards income risk across dual earner couples. The random effects framework allows us to establish how much of the variation in the data can be explained by unobservable intra-couple correlations.

The estimated coefficients presented in Table Six relate to the sample of dual earner couples and accord with our previous findings and, therefore, we centre our discussion on the value of r where r represents the proportion of the total variance in the dependant variable contributed by the panel level variance component. We find that r is highly significant and its magnitude suggests that 11% of the total variance in the

dependant variable is explained by an unobservable couple specific effect whilst the remaining variance is explained by unobservable individual specific effects.[16] Thus, given that the couple specific effect explains 11% of the unobserved variance and that the couple specific effect is based on correlations across the dependant variable within couples, our findings provide evidence of intra-couple correlation within the dependant variable lending further support for employment contract type matching.

Whilst our primary focus is on dual earner couples, for completeness given the evidence presented in Tables Four and Five pertaining to other working household members, we extend our panel analysis to all working household members. This allows us to consider the hypothesis that the phenomenon of employment contract type matching is prevalent in the broader context of the household rather than being confined to dual earner couples. Here, we find that the size of r is smaller (at 8%) than in the case of dual earner couples but is of similar significance. Hence, even within this broader grouping of individuals, the variance component specification is still appropriate, i.e. a significant household specific effect remains. These findings, thus, provide further evidence highlighting the importance of employment contract type matching.

The high degree of consistency across the results derived from the three statistical frameworks highlights the robustness of our findings. To summarise, our analysis provides evidence of employment contract type matching both within dual earner couples and, to a lesser degree, in the wider context of working household members.

[16] In the case where r equals zero, the panel level variance component is unimportant. In this case, the panel estimator is no different from the pooled estimator.

VI Conclusion

The aim of our paper was to explore the significance of intra-couple and intra-household influences for observed employment contract type by analysing a sample of working couples and an extended sample of working household members. To be specific, we have focused on the significance of employment contract type matching whereby individuals within a couple or household are employed under similar contracts.

From our analysis of the Family Expenditure Surveys 1996 to 2000, we present evidence suggesting that individuals are more likely to group with other individuals with similar (as opposed to diversified) employment contracts providing support for the phenomenon of employment contract type matching within couples and households. Two possible explanations for this phenomenon are as follows. Firstly, the benefits of matching with 'like-minded' people (those with similar tastes, preferences or degrees of risk aversion) may simply outweigh the benefits of income risk pooling. Indeed, the assortative mating literature suggests that people may find such 'like-minded' people in the workplace.[17] Secondly, transfers of specialised human capital within dual earner couples and within households may increase the associated benefits of holding matched contract types. Such transfers of human capital may enhance the earnings potential within couples and households. Furthermore, the benefits from enhanced earnings for couples and households matched on self-employment and bonus contracts may be of sufficient magnitude to offset the income risk associated with such contracts.

Unfortunately, whilst our data allows us to quantify the degree to which matching occurs within dual earner couples and within working household members, it does not allow us to differentiate between these two competing explanations. Moreover,

[17] Unfortunately, given that our data is a cross-section we are unable to investigate the employment contracts of our couples at the time when they met.

it is likely that both have a significant role to play in determining the degree of employment contract matching identified by our analysis.

Hence, one important area for future research concerns detailed analysis of the reasons why employment contract type matching occurs. It is apparent that if the two explanations put forward above are correct, then employment contract type matching has important implications. Transfers of human capital within couples and within households enhance earnings potential via enhanced productivity. In addition, if employment contract type matching with 'like-minded' individuals enhances utility or happiness within couples or within households, then this may have important implications for labour market behaviour such as reduced turnover and lower rates of absenteeism serving to further enhance productivity.[18] Thus, it is apparent that employment contract type matching may have significant implications for the productivity of matched individuals and, hence, for the economy as a whole.

[18] See Oswald (1997) for a detailed review of the role of happiness in economics.

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Appendix

Table One: Summary Statistics
Sample: Members of Dual Earner Couples[a]

	Fixed wage	Bonus	Self employed
Gender			
Males	58.78	25.05	16.17
Females	75.41	17.75	6.84
Age			
16 < Age < 19	92.68	4.88	2.44
20 < Age < 29	66.48	27.59	5.93
30 < Age < 39	66.81	22.52	10.66
40 < Age < 49	68.24	19.46	12.30
Age > 50	66.05	17.97	15.98
Education level			
Less than GCSE	67.47	18.42	14.12
GCSE	66.77	21.99	11.25
Further Education	66.71	23.73	9.56
Higher Education	67.63	21.08	11.29
Occupation			
Professional	54.42	25.72	19.86
Managerial & technical	67.91	22.79	9.29
Skilled	65.83	22.35	11.83
Partly skilled	70.79	17.35	11.87
Unskilled	76.24	11.74	12.02
Housing Tenure			
Rented local authority	73.05	17.76	9.19
Rented private	70.65	17.61	11.74
Owner occupier	66.73	22.56	10.72
Owned outright	63.62	17.00	19.38
Average Household income (£)	686.79	775.56	717.35
Children (Average Number)			
Preschool Children	0.25	0.26	0.22
Children aged between 5 and 16 years	0.59	0.50	0.64
Household composition[b]			
Unemployed person	0.020	0.014	0.014
Sick person	0.004	0.002	0.003
Retired person	0.006	0.005	0.009
Unoccupied person	0.007	0.004	0.008
Full-time education	0.054	0.038	0.060
Fixed wage person	0.148	0.125	0.158
Bonus contract person	0.033	0.039	0.030
Self employed person	0.006	0.006	0.015

a Numbers are expressed as a percentage of the total number of individuals across the three contract types for each individual characteristic.
b The following set of dummy variables refers to the presence or otherwise of at least one individual in the household 16 years of age and above (other than the respondent and his/her partner) exhibiting the stated characteristic e.g. being unemployed or in full time education. The figure represents the mean value of the dummy variable.

Table Two: Distribution of Contract Type within Dual Earner Couples

		Partner 1					
		Fixed wage		Bonus		Self-Employed	
		Number	Per Cent	Number	Per Cent	Number	Per Cent
Partner 2	Fixed wage	8862	71.20	2338	58.88	1246	58.36
	Bonus	2338	18.79	1276	32.13	357	16.72
	Self-employed	1246	10.01	357	8.99	532	24.92

Table Three: Summary Statistics
Sample: All Working Members of the Household[a]

	Fixed wage	Bonus	Self employed
Gender			
Males	60.19	24.79	15.02
Females	76.55	17.32	6.13
Marital status			
Married	66.48	21.40	12.12
Separated/widowed/divorced	71.67	18.10	10.23
Single	72.48	22.06	5.46
Age			
16 < Age < 19	84.47	13.79	1.74
20 < Age < 29	69.54	24.96	5.50
30 < Age < 39	66.56	23.05	10.39
40 < Age < 49	67.51	19.19	12.56
Age > 50	66.83	17.70	15.47
Education level			
Less than GCSE	68.35	18.24	13.41
GCSE	68.07	21.50	10.43
Further Education	67.69	23.50	8.81
Higher Education	67.65	21.44	10.90
Occupation			
Professional	56.81	25.34	17.85
Managerial & technical	67.23	23.29	9.47
Skilled	66.94	22.14	10.92
Partly skilled	72.41	17.01	10.58
Unskilled	78.27	11.70	10.03
Housing Tenure			
Rented local authority	76.01	16.77	7.22
Rented private	70.80	17.77	11.44
Owner occupier	66.43	23.15	10.42
Owned outright	77.23	17.44	15.32
Average Household income (£)	613.92	714.53	652.70
Children (Average Number)			
Pre school Children	0.21	0.24	0.23
Children aged between 5 & 16 years	0.48	0.40	0.58
Household composition[b]			
Unemployed person	0.043	0.038	0.031
Sick person	0.039	0.030	0.020
Retired person	0.046	0.036	0.039
Unoccupied person	0.080	0.100	0.138
Full-time education	0.054	0.039	0.059

a Numbers are expressed as a percentage of the total number of individuals across the three contract types for each individual characteristic.
b The following set of dummy variables refers to the presence or otherwise of at least one individual in the household 16 years of age and above (other than the respondent and his/her partner) exhibiting the stated characteristic e.g. being unemployed or in full time education. The figure represents the mean value of the dummy variable.

Table Four: Multinomial Logit Analysis:
Sample: Members of Dual Earner Couples

	Bonus Contract		Self-employed		Marginal Effects		
	b	t-stat	*b*	t-stat	Fixed wage	Bonus Contract	Self-employed
Female	-0.3957	-8.66	-1.1658	-18.08	0.1131	-0.0416	-0.0715
Age	0.0480	2.73	0.0849	3.62	-0.0107	0.0057	0.0050
Age squared	-0.0007	-3.38	-0.0007	-2.50	0.0001	-0.0001	0.0000
Cohabit/married to bonus	0.6678	14.07	0.2742	3.87	-0.1003	0.0903	0.0100
Cohabit/married to self-emp	0.1877	2.61	1.4316	20.08	-0.1007	0.0093	0.0913
GCSE	0.0554	0.92	0.1176	1.60	-0.0134	0.0064	0.0070
Further Education	0.1438	2.10	0.0943	1.08	-0.0235	0.0190	0.0045
Higher Education	0.1162	1.51	0.2196	2.31	-0.0266	0.0137	0.0130
Managerial & technical	-0.0877	-1.02	-0.5933	-5.86	0.0430	-0.0053	-0.0377
Skilled	-0.3324	-3.66	-0.3460	-3.18	0.0611	-0.0425	-0.0187
Partly skilled	-0.3430	-3.32	-0.2782	-2.27	0.0589	-0.0447	-0.0141
Unskilled	-0.6401	-4.75	-0.2560	-1.73	0.0958	-0.0866	-0.0092
Household income	0.0003	4.95	0.0002	2.51	0.0000	0.0000	0.0000
Preschool Children	-0.0882	-2.15	0.0996	1.79	0.0060	-0.0135	0.0075
Children aged 5-15 years	-0.0819	-3.26	0.1197	3.94	0.0041	-0.0129	0.0088
Rented private	-0.2414	-1.97	0.4612	2.98	0.0063	-0.0393	0.0330
Owner occupier	0.1472	1.77	0.3532	3.15	-0.0378	0.0164	0.0213
Owned outright	0.1618	1.47	0.7459	5.63	-0.0607	0.0138	0.0468
Unemployed person	-0.1779	-1.10	-0.5003	-2.34	0.0496	-0.0190	-0.0306
Sick person	-0.7319	-1.71	-0.4831	-1.05	0.1197	-0.0968	-0.0229
Retired person	-0.0668	-0.24	0.1580	0.55	0.0001	-0.0112	0.0111
Unoccupied person	-0.3343	-1.14	-0.2044	-0.68	0.0538	-0.0444	-0.0094
Full-time education	-0.1868	-1.80	0.0979	0.86	0.0187	-0.0273	0.0086
Fixed wage person	-0.1473	-2.30	0.0013	0.02	0.0188	-0.0206	0.0018
Bonus contract person	0.2299	2.13	-0.3624	-2.40	-0.0101	0.0365	-0.0264
Self-employed person	0.0740	0.28	0.6169	2.52	-0.0425	0.0031	0.0394
Constant	-1.4477	-3.59	-5.6530	-8.94			
Industry	Yes		Yes				
Region	Yes		Yes				
Sample Year	Yes		Yes				
Number of Observations	18552						
Log likelihood	-12771.02						
Pseudo R squared	0.1869						
Chi-Squared Statistic	5869.59 (106 d.f.)						

Table Five: Ordered Probit Analysis
Sample: Members of Dual Earner Couples

	b	t-stat	Marginal Effects[a]
Female	-0.4000	-18.05	-0.3994
Age	0.0197	2.37	0.0175
Age squared	-0.0002	-1.81	-0.0002
Cohabit/married to bonus employee	0.2521	10.67	0.2527
Cohabit/married to self-employee	0.5415	17.86	0.5408
GCSE	0.0513	1.80	0.0491
Further Education	0.0742	2.28	0.0722
Higher Education	0.1047	2.90	0.1030
Managerial & technical	-0.2243	-5.62	-0.2242
Skilled	-0.2065	-4.86	-0.2066
Partly skilled	-0.1926	-4.01	-0.1931
Unskilled	-0.2707	-4.55	-0.2716
Household income	0.0001	3.40	0.0001
Preschool Children	0.0035	0.18	0.0054
Children aged 5-15 years	0.0154	1.31	0.0224
Rented private	0.0722	1.26	0.0749
Owner occupier	0.1412	3.52	0.1433
Owned outright	0.2929	5.78	0.2958
Unemployed person	-0.1912	-2.49	-0.2004
Sick person	-0.3386	-1.86	-0.3375
Retired person	0.0224	0.18	0.0216
Unoccupied person	-0.1184	-0.94	-0.1202
Full-time education	-0.0017	-0.04	-0.0188
Fixed wage person	-0.0296	-1.00	-0.0376
Bonus contract person	-0.0409	-0.77	-0.0429
Self-employed person	0.2738	2.47	0.2726
Cutpoint1	1.0951		
Cutpoint2	1.9663		
Industry	Yes		
Region	Yes		
Sample Year	Yes		
Number of Observations	18552		
log likelihood	-13944.957		
Pseudo R squared	0.1121		
Chi-Squared Statistic	3521.71 (53 d.f.)		

a The marginal effects are based on the linear prediction from the estimated coefficients and are calculated at the mean values of the explanatory variables.

Table Six: Random Effects Ordered Probit Models

	Sample					
	Dual Earner Couples			Working Household Members		
	b	t-stat	Marginal Effects[a]	b	t-stat	Marginal Effects[a]
Female	-0.3365	-15.03	-0.3365	-0.3009	-17.46	-0.3011
Age	0.0216	2.42	0.0216	0.0472	9.04	0.0477
Age squared	-0.0002	-1.83	-0.0002	-0.0005	-7.05	-0.0005
Separated/widowed/divorced	–	–	–	-0.0320	-1.08	-0.0327
Single	–	–	–	-0.0976	-3.80	-0.0992
GCSE	0.0576	1.91	0.0576	0.0660	2.87	0.0667
Further Education	0.0818	2.37	0.0818	0.0947	3.62	0.0953
Higher Education	0.1123	2.93	0.1123	0.1439	5.01	0.1448
Managerial & technical	-0.2343	-5.55	-0.2343	-0.1463	-4.57	-0.1465
Skilled	-0.2146	-4.78	-0.2146	-0.1683	-4.99	-0.1685
Partly skilled	-0.2107	-4.16	-0.2107	-0.1953	-5.18	-0.1952
Unskilled	-0.3047	-4.85	-0.3047	-0.3186	-6.89	-0.3185
Household income	0.0001	3.83	0.0001	0.0000	2.68	0.0000
Pre school Children	0.0062	0.29	0.0062	0.0371	2.21	0.0372
Children aged 5-15 years	0.0186	1.47	0.0186	0.0121	1.26	0.0087
Rented private	0.0834	1.34	0.0834	0.1629	4.30	0.1620
Owner occupier	0.1625	3.73	0.1625	0.1739	6.27	0.1731
Owned outright	0.3554	6.44	0.3554	0.2708	7.88	0.2700
Unemployed person	-0.2447	-2.93	-0.2447	-0.1072	-2.68	-0.1099
Sick person	-0.4071	-2.06	-0.4071	-0.1696	-3.79	-0.1702
Retired person	0.0488	0.36	0.0488	-0.1102	-2.72	-0.1101
Unoccupied person	-0.1478	-1.09	-0.1478	0.0403	1.50	0.0407
Full-time education	-0.0127	-0.26	-0.0127	-0.0403	-1.10	-0.0477
Fixed wage person	-0.0397	-1.23	-0.0397	–	–	
Bonus contract person	-0.0488	-0.84	-0.0488	–	–	
Self-employed person	0.3466	2.87	0.3466	–	–	
Cutpoint1	1.1278	5.28		1.6531	11.85	
Cutpoint2	2.0374	9.51		2.5589	18.26	
r	0.1147	8.16		0.0768	8.11	
Industry	Yes			Yes		
Region	Yes			Yes		
Sample Year	Yes			Yes		
Number of Observations	18552			31862		
Log likelihood	-14089.011			-23844.285		
Chi-Squared Statistic	3158.97 (51 d.f.)			5242.03 (50 d.f.)		

a The marginal effects are based on the linear prediction from the estimated coefficients and are calculated at the mean values of the explanatory variables.