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Abstract

This study investigates the effects of perceived unemployment risks on the distribution of bargaining power between spouses in a household context. As the replacement ratio is rarely above 50%, becoming unemployed has serious consequences on an individual's consumption, savings and wealth. The risk of losing the job is shown to be a pertinent consideration when household members make consumption and labour supply decisions. This work sheds light on how unemployment risk may affect the interaction between spouses and their decision structure within the Collective model.

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1. Introduction

A major risk encountered by workers in the labour market is the possibility of losing their job. The effects of unemployment risks may be more relevant if household formation were thought in economics terms: people form households because they want to share the possible risks they could encounter throughout their lives. Unemployment risk represents one of those risks. This study investigates the effects of perceived unemployment risks on the distribution of bargaining power between the members of the couple in a particular type of household.

As the replacement ratio (i.e. the percentage of the wage that is covered by unemployment benefits during periods of unemployment) is rarely above 50% (see Berloffa and Simmons, 2003), becoming unemployed has serious consequences on individual's consumption, savings and wealth, implying that the risk of losing the job should be taken into consideration when individuals make consumption and labour supply decisions.

The role played by unemployment risks on the decision structure of the individual is more complex when the individual is placed within a household context. The literature on the Collective model (see Chiappori, 1988, 1992) has shown how the decision structure of the individual is affected by family participation, so whenever possible, this household dimension should be taken into consideration.

In this work, job insecurity is framed within a particular version of Collective models (see Chiappori *et al.*, 2001). This choice is motivated by the failure of Unitary models (see Browning and Meghir, 1991; Thomas, 1990; Phipps and Burton, 1992) that had previously dominated household modelling. Unitary models considered the household as a single economic unit, with a single utility function and a single budget constraint. However, what happened within the household was obscure. Many of the hypotheses of the Unitary model (e.g. income pooling) were tested by the empirical literature and shown to be invalid, implying that the decisions made by the household may be the outcome of an interaction between its members.

Intra-household interaction is a focus of the Collective model literature. In this framework, the household is not an economic agent, but is an environment where the individuals first interact and agree upon some sharing rule (i.e. the sharing of the household total non-labour income between the couple) and then maximize their own utility functions subject to their own budget constraints.

This work tries to shed some light on how unemployment risk may affect the interaction between the spouses. This is achieved by first introducing job insecurity elements into the sharing rule and then estimating to what extent job insecurity affects the distribution of bargaining power between the two members of the couple. In order to capture this effect, a specific version of the Collective model proposed by Chiappori *et al.* (2001) is estimated.

The following material is organized as follows. Section 2 discusses the theoretical model developed by Chiappori *et al.* (2001). Section 3 describes the data and the sample's characteristics. Section 4 describes the econometric approach and presents the results. Section 5 concludes with a summary of the results.

2. Model

Collective models appeared in the literature of household consumption and labour supply with the works by Chiappori (1988, 1992). They were introduced as an alternative to the Unitary models that dominated the scene for a long time but proved to be unrealistic in some of the baseline hypotheses, namely the income pooling hypothesis and the symmetry of the Slutsky matrix. Studies such as Blundell *et al.* (1993) and Browning and Meghir (1991) provide evidence against the symmetry of the Slutsky matrix and Thomas (1990), Shultz (1990), Bourguignon *et al.* (1993), Phipps and Burton (1992), and Lundberg *et al.* (1997) provide evidence against the "income pooling" property.

Collective models can be thought as a class of models that share some common features but are nevertheless different from each other in terms of the required restrictions and the population of interest. Some examples of different settings are provided by Blundell *et al.* (2007), Browning and Chiappori (1998) and Donni (2001).

The first distinctive feature of Collective models is given by the Pareto efficiency of household behaviour. As reported in the original work by Chiappori (1988), the household consists of two individuals with separate utility functions and the decision process leads to Pareto-efficient agreements. There has been a long debate in the literature on whether households behave efficiently or not. The efficiency assumption becomes plausible if, for example, one thinks that after some years of interaction the spouses get to know each other's preferences well. This implies that after an interaction period all the Pareto-improving outcomes are exploited.

As just mentioned, the Collective models share a common decision structure. The members' decision process is given by a two-step procedure. In the first phase the members of

the couple agree upon some sharing rule and they split the total household non-labour income. This sharing is affected by the individual's bargaining strength. In the second phase the two individuals separately maximize their utility functions subject to their own budget constraints.

Following Chiappori *et al.* (2001), the model can be presented formally: let h^i and C^i , for *i*=1,2 denote member *i*'s labour supply (where $0 \le h^i \le 1$) and consumption of a private Hicksian composite good whose price is set equal to 1. In addition, **x** denotes a *K*-vector of preference factors such as age, gender, and education of the two agents. Also, let w_1 , w_2 , *y* represent the members' wage rates and the household non-labour income. Finally, let **s** be an *L*-dimension vector of distribution factors.

In the most general framework member *i*'s preferences are represented by some utility function of the form $U^i(1-h^1, C^1, 1-h^2, C^2, \mathbf{x})$ and the household is assumed to maximize a General Household Welfare Function (GHWF) that can be explicitly written as $H^c = \mu U^1 + (1-\mu)U^2$. Formally, given $(w_1, w_2, y, \mathbf{s}, \mathbf{x})$ there exists a weighting factor $0 \le \mu(w_1, w_2, y, \mathbf{s}, \mathbf{x}) \le 1$ assumed continuously differentiable in its arguments such that (h^i, C^i) is a solution to the program:

$$\max_{\{h^{1},h^{2},C^{1},C^{2}\}} \mu U^{1} + (1-\mu)U^{2}$$
subject to
$$w_{1}h^{1} + w_{2}h^{2} + y \ge C^{1} + C^{2},$$

$$0 \le h^{i} \le 1, \quad i = 1, 2.$$
(1)

It is important to note that a change in **s** does not affect the Pareto frontier but only the final location of the optimal solution on it.

What should be recalled at this point is the form of the individual preferences used in program (1), namely, $U^i(1-h^1, C^1, 1-h^2, C^2, \mathbf{x})$. Whenever the individual utilities are of this form, then the general version of the Collective model – program (1) – cannot be uniquely identified from knowledge of just the labour supplies. This implies that there is a continuum of different structural models generating the same labour supply functions. Additional identifying assumptions have to be made and imposed on the model in order to estimate the Collective model. As proved by Chiappori (1992), the main identifying assumption for a Collective model to be estimated is given by the individual preferences being either egoistic – i.e. $U^i(1-h^i, C^i, \mathbf{x})$, for i=1,2 – or "caring" in a Beckerian sense – i.e. $u^i = F^i[U^i(1-h^i, C^i, \mathbf{x}), U^j(1-h^j, C^j, \mathbf{x})]$ with i=1,2 and $i \neq j$.

Both kinds of preferences are admitted in Chiappori *et al.* (2001). The Beckerian Caring Preferences impose an additional restriction on the household members' labour supply functions (see equation (9)).

The egoistic assumption plays a key role in the formulation of the maximization problem. Chiappori (1992) proved that whenever individual utilities are of the form $U^i(1-h^i, C^i, \mathbf{x})$, then (1) can be reformulated in the way shown in the following Proposition 1 (2), whose result is a direct consequence of the Second Fundamental Welfare Theorem. According to this theorem, any Pareto optimum can be decentralized in a two-person economy, like the one represented by the household.

Proposition 1 Whenever individual preferences are egoistic, then, there exists some function $\phi(w_1, w_2, y, \mathbf{s}, \mathbf{x})$ such that (h^1, h^2, C^1, C^2) is the solution to the program:

$$\max_{\{h^{i}, C^{i}\}} U^{i} (1 - h^{i}, C^{i}, \mathbf{x})$$
subject to
$$w_{i}h^{i} + \phi^{i} \geq C^{i},$$

$$0 \leq h^{i} \leq 1,$$

$$\phi$$

$$(2)$$

where $\phi^1 = \phi$ and $\phi^2 = y - \phi$.

The two individuals have to first agree upon $\phi(w_1, w_2, y, \mathbf{s}, \mathbf{x})$. As shown by (2), the sharing rule ϕ^i , represents the link between the two individuals who would otherwise behave independently, like in an individual model of labour supply (or consumption). More importantly, ϕ^i is not observable from the data that usually report the total non-labour income and not the shares.

In the Collective model it is possible to identify $\phi(w_1, w_2, y, \mathbf{s}, \mathbf{x})$ by looking at the response of labour supply functions of the two individuals to variations in w_1, w_2, y and \mathbf{s} . The labour supply functions are assumed to be continuously differentiable and can be written as:

$$h^{1} = H^{1}(w_{1}, \phi(w_{1}, w_{2}, y, \mathbf{s}, \mathbf{x}), \mathbf{x});$$
(3)

$$h^{2} = H^{2}(w_{2}, y - \phi(w_{1}, w_{2}, y, \mathbf{s}, \mathbf{x}), \mathbf{x}).$$
(4)

where $H^i(\cdot)$ represents member *i*'s Marshallian labour supply function. The partial derivatives of the two labour supply equations with respect to w_1, w_2, y and \mathbf{s} , generate a system of partial differential equations. The sharing rule $\phi(w_1, w_2, y, \mathbf{s}, \mathbf{x})$ is then obtained by integrating this system. Given the nature of the solution, $\phi(w_1, w_2, y, \mathbf{s}, \mathbf{x})$ is identifiable only up to an additive constant $\kappa(\mathbf{x})$. This means that $\sum_i \hat{\phi}^i \approx y$, that is, the sum of the two estimated nonlabour income shares is "roughly" equal to total non-labour income, and will differ by the additive constant $\kappa(\mathbf{x})$ that depends on the household heterogeneity and cannot be empirically identified.

2.1 Labour Supplies: Functional Form and Parametric Specification

Before proceeding with the estimation of the Collective model, it is necessary to specify the functional form of the spouses' labour supply functions. In this work the 4 distribution factors, namely, the elements of the **s** vector that appears in $\phi(w_1, w_2, y, \mathbf{s}, \mathbf{x})$ are: the individual's expected job insecurity; the individual's past employment insecurity; the individual's concern about his/her future job security; a variable capturing any recent job conditions improvement. The unrestricted semi-log system of equations is given by

$$h^{1} = \alpha_{0} + \alpha_{1} \log w_{1} + \alpha_{2} \log w_{2} + \alpha_{3} y + \alpha_{4} \log w_{1} \log w_{2} + \alpha_{5} s_{1} + \alpha_{6} s_{2} + \alpha_{7} s_{3} + \alpha_{8} s_{4} + \boldsymbol{a}_{9}' \mathbf{X}_{1};$$
(5)

$$h^{2} = \beta_{0} + \beta_{1} \log w_{1} + \beta_{2} \log w_{2} + \beta_{3} y + \beta_{4} \log w_{1} \log w_{2} + \beta_{5} s_{1} + \beta_{6} s_{2} + \beta_{7} s_{3} + \beta_{8} s_{4} + \beta_{9}' \mathbf{X}_{2}.$$
(6)

Equation (5) – namely, the parameterized version of equation (3) – represents the labour supply function of the female spouse and α_i 's, for $i = 1, \dots, 8$, are scalars, while α'_9 is a *K*-

vector of parameters. The variables s_1 , s_2 , s_3 and s_4 represent the distribution factors. Equation (6) – namely, the parameterized version of equation (4) – represents the labour supply function of the male spouse and similarly to (5), the β_i 's, for $i = 1, \dots, 8$, are scalars and β'_9 is a *K*-vector of parameters. Moreover, \mathbf{X}_1 is a matrix consisting of a set of sociodemographic variables describing the wife and \mathbf{X}_2 is a matrix consisting of a set of sociodemographic variables describing the husband.

2.2 Sharing Rule

Assuming the Collective restrictions are satisfied, and given the spouses' labour supply equations (3) and (4) and their empirical counterparts (5) and (6), the partial derivatives of ϕ are:

$$\begin{cases} \phi_{w_1} = \frac{1}{\Delta} \frac{(\alpha_4 \beta_1 + \alpha_4 \beta_4 \log w_2)}{w_1} \\ \phi_{w_2} = \frac{1}{\Delta} \frac{(\beta_4 \alpha_2 + \beta_4 \alpha_4 \log w_1)}{w_2} \\ \phi_{y} = \frac{\alpha_3 \beta_4}{\Delta} \\ \phi_{s_1} = \frac{\beta_4}{\Delta} \alpha_5 \\ \phi_{s_2} = \frac{\beta_4}{\Delta} \alpha_6 \\ \phi_{s_3} = \frac{\beta_4}{\Delta} \alpha_7 \\ \phi_{s_4} = \frac{\beta_4}{\Delta} \alpha_8 \end{cases}$$

where $\Delta = (\alpha_3 \beta_4 - \alpha_4 \beta_3)$.

Solving this system of seven differential equations system, the sharing rule equation is obtained as

$$\phi = \frac{1}{\Delta} \begin{pmatrix} \beta_1 \alpha_4 \log w_1 + \alpha_2 \beta_4 \log w_2 + \alpha_4 \beta_4 \log w_1 \log w_2 \\ + \alpha_3 \beta_4 y + \beta_4 \alpha_5 s_1 + \beta_4 \alpha_6 s_2 + \beta_4 \alpha_7 s_3 + \beta_4 \alpha_8 s_4 \end{pmatrix} + \kappa(x).$$
(7)

Following the approach used by in Chiappori et al. (2001) the model restrictions are:

$$\frac{\beta_5}{\alpha_5} = \frac{\beta_6}{\alpha_6} = \frac{\beta_7}{\alpha_7} = \frac{\beta_8}{\alpha_8},\tag{8}$$

in the case of pure Egoistic Preferences, and:

$$\frac{\beta_4}{\alpha_4} = \frac{\beta_5}{\alpha_5} = \frac{\beta_6}{\alpha_6} = \frac{\beta_7}{\alpha_7} = \frac{\beta_8}{\alpha_8},\tag{9}$$

in the Beckerian Caring Preference case.

3 Data

3.1 Survey

This study exploits data collected by the Household, Income and Labour Dynamics in Australia (HILDA) survey. This dataset was chosen because HILDA is the only survey that collects job insecurity measures at a household level. The household dimension is important since perceived job insecurity may have important effects on the other members of the household.

The HILDA survey started in 2001 and is an annual nation-wide household panel survey focussing on issues concerning families, income, employment and well-being. The panel design is based on the British Household Panel Survey (BHPS). Similar to the BHPS, the sampling unit is the household and the members of the household are tracked over an indefinite life. Assuming participants cooperate each year, individuals drop out of the sample in the case of death, emigration from Australia, incarceration or acquisition of forms of disability that prevent participation².

The reference population is represented by all residents of Australia who live in private households. While the information collected by the survey refers to all members of the

² See HILDA Discussion/Technical Paper Series at "http://www.melbourneinstitute.com/hilda/hdps.html" for discussions on response and attrition rates.

household, only individuals who are at least 15 years of age can take part to the interview. Moreover, interviews are conducted on an annual basis. Obviously, the main weakness of annual surveys is given by the incapability of capturing within-the-year dynamics. In order to handle this problem, at each wave, respondents are asked questions – especially on issues involving labour market and social security histories – over the course of the previous year.

The reason why HILDA has been chosen for this work is due to the presence of direct and subjective job insecurity measures. HILDA represents quite a unique survey on the scene of economic surveys. The only other surveys containing information on employment prospects are: the Health and Retirement Survey (HRS), conducted at the University of Michigan since 1992; the Survey of Economic Expectations (SEE), conducted at the University of Wisconsin-Madison since 1994; and the Survey on Household Income and Wealth (SHIW) conducted at the Bank of Italy during the years 1995 and 1998. The problem with these latter three surveys, for the purposes of this study, is that they either collect information only at an individual level or they collect information only for a random sample within each household. All the information and mechanisms going on within the household remain obscure for lack of complete information. This leaves HILDA as the preferred survey for this study.

3.2 Sample Selection and Descriptive Statistics

As discussed in Section 2, Collective models are a class of generally non-nested models. It means that each Collective model, while sharing some common features with the others, is unique in terms of the model restrictions and population of interest.

The reference population analysed in this work is given by Collective model developed by Chiappori *et al.* (2001). The selection criteria are³: being an employee; being one of the two members of what is called a "couple family" (with or without children); being legally married or "de facto".

The last five waves of the HILDA survey were pooled together (the first two waves were not used because in those waves the survey was at a pilot stage, and not all the areas and sections of the population were covered). After pooling the five waves together, a sample of 1,686 households is obtained.

³ The estimation of this particular version of the Collective model requires both members of the household to supply a positive number of hours of work. This means that any issue related to non-participation is ruled out.

Variables definitions are provided in Appendix-Table 1 and summary statistics are reported in Tables 1 to 2 (according to gender).

On average, men work more than women and in both cases their desired number of hours of work is less than their actual hours of work (Table 1). In contrast, women are largely employed in part time jobs (Table 2). Comparing responses to desired weekly hours of work questions indicates that women are more willing to be employed in part-time jobs than men and then that both men and women would supply a smaller amount of hours of work if they were allowed to do so.

Considering wages, men show on average higher wages than women. The difference of 17 log points between men's and women's wages is consistent with the empirical literature on the labour market in Australia. This gap in the sample can be partly explained by the larger proportion of men in managerial occupations. Table 2 shows that a relatively large proportion of women are employed on casual basis, and this is typical of occupation categories like retail services for which the wage rates are much lower than other occupations.

Women are more commonly employed on a fixed-term contract or on a casual basis while men instead are employed more often on a permanent basis. It is also worth stressing that whilst casual-basis contracts are typically offered to students, in the sample under analysis in this work there are no students.

An interesting feature is given by the expected job insecurity measure – a value of 0 means the individual is certain of not losing his/her job in the next 12 months, a value of 100 means the individual is certain of losing his/her job in the next 12 months. Men perceive their employment prospects to be (slightly) but significantly more uncertain than women. In order to check whether this difference is statistically significant a two-group mean comparison test is conducted for each wave. The necessity of conducting this test for each wave is due to the observations not being independent. In fact, the sample under analysis was obtained by pooling the waves together. This means that several individuals may belong to several waves at the same time giving rise by construction to dependent observations. These differences are, however, found to not be statistically significant across the two genders except for the first wave – see Table 3.

Another measure that could reflect job insecurity is given by the "past job insecurity" variable. This represents the proportion of the last financial year spent in unemployment by the individual. Whilst differences between the two genders are not remarkable, women show a bigger proportion than men.

In terms of job insecurity, it is also interesting to look at distribution of industries across the two genders. What can be noticed at first glance is that both genders have a substantial proportion of individuals working for the Public Administration, and for the Education and Health Care related sectors.

An important issue involving the theoretical models and the estimation methodologies used in section 4 concerns the time dimension. The selected sample is obtained by pooling different waves across different years into one dataset. The Collective model used in this work is typically estimated without taking into account any time dependent dynamics. Despite introducing dummy variables controlling for the different waves used in the estimation, the time dimension could potentially still matter – theoretically and empirically – in periods where the economy is very unstable. Moreover, people's perceptions about their job (in)security is an element that is strongly related to the "state of health" of an economy. The waves used in this work refer to the period from 2002 to 2007, a period of stable economic growth in Australia. It is assumed that the asymmetries connected to the business cycle can be disregarded and time dependent dynamics both in the theoretical and estimation model can be ignored.

4 Estimation and Results

4.1 Constrained Estimation

Before proceeding with the estimation, it should be remembered that the sharing rule plays a crucial role in Collective Labour Supply models. This rule is recovered if the Collective restrictions (either (8) or (9)) are satisfied. In this work, individual utilities are modelled as Caring in a Beckerian sense.

In this section, equations (5) and (6) are estimated subject to the restrictions reported in equation (9). The non-linear constraints as specified in equation (9), can be dealt with in the usual manner by algebraic substitution. Thus rather than estimating the parameters β_4 , β_5 , β_6 and β_7 the following quantities are estimated:

$$\gamma_1 = \frac{\beta_8 \alpha_4}{\alpha_8}; \quad \gamma_2 = \frac{\beta_8 \alpha_5}{\alpha_8}; \quad \gamma_3 = \frac{\beta_8 \alpha_6}{\alpha_8}; \quad \gamma_4 = \frac{\beta_8 \alpha_7}{\alpha_8}. \tag{10}$$

This reduces the dimensionality of the parameter vector by 4 (as 4 constraints are imposed on the problem). The two labour supply equations can then be reformulated as:

$$h^{1} = \alpha_{0} + \alpha_{1} \log w_{1} + \alpha_{2} \log w_{2} + \alpha_{3} y + \alpha_{4} \log w_{1} \log w_{2} + \alpha_{5} s_{1} + \alpha_{6} s_{2} + \alpha_{7} s_{3} + \alpha_{8} s_{4} + \boldsymbol{\alpha}_{9}' \mathbf{X}_{1} + \varepsilon_{1};$$

$$(11)$$

$$h^{2} = \beta_{0} + \beta_{1} \log w_{1} + \beta_{2} \log w_{2} + \beta_{3} y + \gamma_{1} \log w_{1} \log w_{2} + \gamma_{2} s_{1} + \gamma_{3} s_{2} + \gamma_{4} s_{3} + \beta_{8} s_{4} + \beta'_{9} \mathbf{X}_{2} + \varepsilon_{2};$$
(12)

where $\gamma_1, \gamma_2, \gamma_3$ and γ_4 as given by (10) are estimated in place of $\beta_4, \beta_5, \beta_6$ and β_7 . Equations (11) and (12) are estimated simultaneously and the restrictions are imposed directly in the estimation process. The (asymptotic) standard errors $se(\hat{\gamma}_1), se(\hat{\gamma}_2), se(\hat{\gamma}_3)$ and $se(\hat{\gamma}_4)$ needed for constructing confidence intervals, conducting tests and making inference are computed using the Delta Method.

The two labour supply functions are estimated using the Generalized Method of Moments (GMM). This approach is preferred since it is able to consistently estimate the standard errors even in the presence of heteroskedasticity of unknown form (unlike Maximum Likelihood). The GMM estimator exploits the assumption that the instruments are exogenous. The orthogonality conditions needed in order to identify the parameter vector generate the following two sets of moments:

$$\mathbf{m}_1 = E[\mathbf{g}_1] = E[\mathbf{Z}_1 \boldsymbol{\varepsilon}_1] = 0;$$
$$\mathbf{m}_2 = E[\mathbf{g}_2] = E[\mathbf{Z}_2 \boldsymbol{\varepsilon}_2] = 0;$$

where \mathbf{m}_1 and \mathbf{m}_2 are $L_1 \times 1$ and $L_2 \times 1$ vectors of moments. The corresponding empirical moments can be defined as:

$$\widetilde{\mathbf{m}}_{1}(\mathbf{X}_{1}, \mathbf{Z}_{1}, \boldsymbol{\alpha}) = \overline{\mathbf{g}}_{1} = \left[\frac{\mathbf{Z}_{1} \boldsymbol{\varepsilon}_{1}}{N}\right] = \left[\frac{\mathbf{Z}_{1} \left[h^{1} - \psi_{1}(\mathbf{X}_{1}, \boldsymbol{\alpha})\right]}{N}\right] = 0;$$
$$\widetilde{\mathbf{m}}_{2}(\mathbf{X}_{2}, \mathbf{Z}_{2}, \boldsymbol{\alpha}, \boldsymbol{\beta}) = \overline{\mathbf{g}}_{2} = \left[\frac{\mathbf{Z}_{2} \boldsymbol{\varepsilon}_{2}}{N}\right] = \left[\frac{\mathbf{Z}_{2} \left[h^{2} - \psi_{2}(\mathbf{X}_{2}, \boldsymbol{\alpha}, \boldsymbol{\beta})\right]}{N}\right] = 0;$$

where $\psi_1(\cdot)$ is linear in α and $\psi_2(\cdot)$ is non-linear in α and β . This generates the estimating equations $\tilde{\mathbf{m}}_1(\mathbf{X}_1, \mathbf{Z}_1, \hat{\alpha})$ and $\tilde{\mathbf{m}}_2(\mathbf{X}_2, \mathbf{Z}_2, \hat{\alpha}, \hat{\beta})$ which implicitly define $\hat{\alpha}$ and $\hat{\beta}$ as functions of $(\mathbf{X}_1, \mathbf{Z}_1)$ and $(\mathbf{X}_2, \mathbf{Z}_2)$.

By first expanding the functions $\psi_1(\cdot)$ and $\psi_2(\cdot)$, and then redefining two $N \times 1$ vectors of errors⁴ in terms of :

$$\mathbf{q_1}(\mathbf{X_1}, \mathbf{Z_1}, \boldsymbol{\alpha}) = \boldsymbol{\varepsilon_1} = h^1 - \alpha_0 - \alpha_1 \log w_1 - \alpha_2 \log w_2 - \alpha_3 y - \alpha_4 \log w_1 \log w_2 - \alpha_5 s_1 - \alpha_6 s_2 - \alpha_7 s_3 - \alpha_8 s_4 - \boldsymbol{\alpha'_9} \mathbf{X_1};$$

$$\mathbf{q}_{2}(\mathbf{X}_{2},\mathbf{Z}_{2},\boldsymbol{\alpha},\boldsymbol{\beta}) = \boldsymbol{\varepsilon}_{2} = h^{2} - \beta_{0} - \beta_{1} \log w_{1} - \beta_{2} \log w_{2} - \beta_{3} y - \gamma_{1} \log w_{1} \log w_{2} - \gamma_{2} s_{1} - \gamma_{3} s_{2} - \gamma_{4} s_{3} - \beta_{8} s_{4} - \boldsymbol{\beta}_{9}' \mathbf{X}_{2};$$

the following empirical moment conditions are obtained:

$$\widetilde{\mathbf{m}}_{1}(\mathbf{X}_{1},\mathbf{Z}_{1},\boldsymbol{\alpha}) = \overline{\mathbf{g}}_{1} = \frac{\mathbf{Z}_{1}\mathbf{q}_{1}}{N} = 0;$$
$$\widetilde{\mathbf{m}}_{2}(\mathbf{X}_{2},\mathbf{Z}_{2},\boldsymbol{\alpha},\boldsymbol{\beta}) = \overline{\mathbf{g}}_{2} = \frac{\mathbf{Z}_{2}\mathbf{q}_{2}}{N} = 0.$$

In order to derive the objective function minimized by the GMM estimator and its asymptotic variance, the two vectors of errors are stacked together, obtaining the $2N \times 1$ vector:

$$\mathbf{q}(\mathbf{\theta}) \equiv \left[\mathbf{q}_1'(\boldsymbol{\alpha}), \mathbf{q}_2'(\boldsymbol{\alpha}, \boldsymbol{\beta})\right]'.$$

Given the $2N \times (L_1 + L_2)$ block-diagonal matrix of instruments

$$\mathbf{Z} = \begin{bmatrix} \mathbf{Z}_1 & 0 \\ 0 & \mathbf{Z}_2 \end{bmatrix},$$

⁴ Again, $\gamma_1, \gamma_2, \gamma_3$ and γ_4 are given in (10).

the efficient GMM estimator then solves

$$\min_{\boldsymbol{\theta} \in \boldsymbol{\Theta}} \left\{ \left[\mathbf{Z}' \mathbf{q}(\boldsymbol{\theta}) \right]' \left(\frac{\mathbf{Z}' \hat{\mathbf{e}} \hat{\mathbf{e}}' \mathbf{Z}}{N} \right)^{-1} \left[\mathbf{Z}' \mathbf{q}(\boldsymbol{\theta}) \right] \right\};$$
(13)

whose asymptotic variance is given by the $P \times P$ variance-covariance matrix:

$$Asy.Var(\hat{\boldsymbol{\theta}}) = \left\{ \left[\mathbf{Z}' \nabla_{\theta} \mathbf{q}(\boldsymbol{\theta}) \right]' \left(\frac{\mathbf{Z}' \hat{\mathbf{e}} \hat{\mathbf{e}}' \mathbf{Z}}{N} \right)^{-1} \left[\mathbf{Z}' \nabla_{\theta} \mathbf{q}(\boldsymbol{\theta}) \right] \right\}^{-1};$$
(14)

where $P = \dim(\mathbf{\theta})$, $\nabla_{\theta} \mathbf{q}(\mathbf{\theta})$ is the $2N \times P$ gradient matrix and

$$\hat{\mathbf{e}} = \mathbf{q}(\mathbf{X}, \mathbf{Z}, \hat{\mathbf{\theta}})$$

is a $2N \times 1$ vector of residuals. As shown by the asymptotic variance in (14), the estimator in (13) is robust to heteroskedasticity (of unknown form) and allows for any possible correlation between ε_1 and ε_2 .

Table 4 provides the results for the Collective model with Caring which is represented as a system of non-linear equations and estimated with non-linear GMM.

5. Results

The first two columns of Table 4 report the parameter estimates of (11) and (12). The third column reports the implicit parameter estimates of the sharing rule (7). It is worth stressing that the implicit parameters of the sharing rule are obtained as non-linear combinations of the previously estimated (constrained) parameters derived from the estimation of (11) and (12). The (asymptotic) standard errors of the sharing rule parameter estimates are computed using the Delta Method.

Whenever dealing with labour supply, the possible endogeneity of the wages should be considered. The set of (excluded) instruments consists of time dummies and second order polynomial in age and education⁵.

As shown by Table 4, the set of instruments passes the over-identifying restrictions test. Moreover, given the weighting matrix used in equation (14), the GMM estimator used for the estimation is the efficient one among the class of GMM estimator, and is also robust to heteroskedasticity (of unknown form) and to any possible correlation between the two errors in the labour supply equations.

The dependent variable and the non-labour income were rescaled – they were divided by 100 and 1000 respectively. This rescaling is necessary in order to make the scale of the sharing rule and the scale of household non-labour income match each other. As explained in Section 2 and as represented in (2) the sharing rule function $\phi(\cdot)$ gives the household nonlabour income share that goes to the individual and adds up to his/her own individual labour income before the spouses maximize their utilities. While household non-labour income is an information that is usually available, the share ϕ^i that goes to the individual (as represented in (2)) is not available and is computed according to the sharing rule $\phi(\cdot)$ (7). This implies the scale of the household non-labour income share ϕ^i must match the scale of the household non-labour income y.

The distribution factors (i.e. the elements of the s vector) used in this model were briefly presented in Section 2 and 3, they are: expected job insecurity; past employment insecurity; future employment worry and employment conditions improvement.

The control variables included in the analysis are: age; number of dependent children; binary variables for industries and occupation; and general health condition.

The first two columns of Table 4 report the parameter estimates of (11) and (12). The estimates of the structural components (i.e. wage rates, non labour income, dependent children) of the two labour supply equations can be compared with those obtained by Chiappori *et al.* (2001). While the estimates for the wife's labour supply equation obtained in this work are similar to those obtained in Chiappori *et al.* (2001), the results related to the husband's labour supply equation are quite different. In particular, in this work, the estimates

⁵ As discussed in Pencavel (1986), there is a debate in the labour supply literature whether education variables should be used as instruments for the wage rates or as exogenous regressors in the labour supply equation. It is common practice to use schooling as instrument for wage rates whenever other instruments are not available. This approach has been followed in this work, and education has been used as an instrument for the wage rates.

related to the wage rates are negative, as opposed to Chiappori's estimates that are positive. The negativity of the wage rates also contrasts with the empirical literature on male labour supply according to which the response of labour supply to increase in wages is positive. To check the robustness of the estimates for the male equation, different specifications of the male labour supply equation have been estimated (both individually and jointly with the wife's labour supply). In all the specifications the labour supply response to increase in wages is negative. This result may be explained by the specific features of the selected sample. Table 1 indicates that men would rather supply less hours of work if allowed to do so. This might suggest that their position on the labour supply curve is on the backwards sloping section.

The effect of dependent children on the wife also differs between the two works. While the parameter estimate obtained by Chiappori is positive, the results in Table 4 suggest a negative labour supply effect that is consistent with the labour supply literature on female labour supply.

What it is interesting to notice is the effect of the "Future Employment Worry" variable on the sharing rule. The implicit parameter of the sharing rule suggests that when the perceived employment prospects of the wife changes, and she becomes concerned about the future security of her job, she faces a loss of bargaining power within the household. This means that after splitting the non-labour income the husband gets an additional portion – in the order of \$525 AUD – from the wife's share whenever she starts to be concerned for the future security of her job.

Another interesting result, though perhaps counterintuitive is related to the employment condition improvement. While one might expect an improvement in the employment condition to translate in an increase of bargaining power, the result seems to suggest the opposite. This result may be explained by the type of utility function chosen for this work, namely, "caring in a Beckerian sense". Since the members of the couple operate in a "caring" context it is plausible to think that the effects of a promotion (in terms of granting the other spouse with a larger portion of non-labour income) may be shared with the other spouse.

Overall, job insecurity seems to matter both directly and indirectly. The direct effect is on the spouses' labour supply. When individuals worry about the future security of their jobs they increase their labour supply as if they wanted to earn more and insure themselves against the possibility of facing periods of unemployment without labour income sources. This could be interpreted in terms of precautionary behaviour that is triggered by an increase in the individual job insecurity. The indirect effect instead works through the sharing rule. The sharing rule parameters can be interpreted in terms of redistribution of bargaining power between the two spouses. An increase in bargaining power can be thought in terms of additional shares of household non-labour income that go to the individual as a result of a change in one of the variables that are incorporated into the sharing rule. The results of the Collective model imply that the individual's concern with his/her job security may be associated with a change in his/her bargaining position within the household.

5. Summary

This study exploited the Collective model of labour supply developed by Chiappori *et al.* (2001) to explore the effects of (perceived) job insecurity on the household members' labour supplies and especially on the bargaining positions of the spouses. The job insecurity measures have been incorporated into the model under the form of distribution factors. An increase in job insecurity is accordingly expected to modify the bargaining power distribution between the two spouses.

The model was estimated with a Generalised Method of Moments (GMM) estimator and the non-linear Collective model restrictions were directly imposed on the GMM objective function in the estimation process. The main results indicate that a perceived worsening of employment prospects gives rise to a risk coverage mechanism or precautionary behaviour resulting in both spouses working more.

This could be interpreted in terms of a risk coverage mechanism; as a precautionary behaviour arising within the household.

As shown by the sharing rule, perceived job insecurity also matters indirectly. A worsening in the perceived job security seems to generate a loss in terms of the bargaining power of the spouse within the household.

Bibliography

Berloffa G. and Simmons, Peter, J (2003), "Unemployment Risk, Labour Force Participation and Savings" *Review of Economic Studies*, 70, 3, 521-539.

Blundell, R., Pashardes, P., Weber, G., (1993), "What Do We Learn About Consumer Demand Patterns From Micro-Data?" *American Economic Review*, 83, 570–597.

Bourguignon, F., M. Browning, P.-A. Chiappori and V. Lechene (1993), "Intra-Household Allocation of Consumption: a Model and some Evidence from French Data" *Annales d'E'conomie et de Statistique*, 29, 137–156.

Browning, M. and Meghir, C. (1991), "The Effects of Male and Female Labor Supply on Commodity Demands" *Econometrica*, 59, 925-51.

Chiappori, P.-A. (1988), "Rational Household Labor Supply" Econometrica, 56, 63-89.

Chiappori, P.-A. (1992), "Collective Labor Supply and Welfare" Journal of Political Economy, 100, 437–467.

Chiappori, P.A., B. Fortin and G. Lacroix (2001), "Marriage Market, Divorce Legislation and Household Labor Supply" *Journal of Political Economy*, 110, 37-72.

Donni, O. (2003), "Collective Household Labor Supply: Nonparticipation and Income Taxation", *Journal of Public Economics*, 87, 1179-1198.

Lundberg, S., R. Pollak and T. Wales (1997), "Do Husbands and Wives Pool Their Resources: Evidence from the U.K Child Benefit" *Journal of Human Resources*, 32, 463-480.

Pencavel, J. (1986), Handbook of Labour Economics Chapter 01, pages 3-102.

Phipps, S. A., & Burton, P. S. (1992), "What's Mine is Yours? The Influence of Male and Female Incomes on Patterns of Household Expenditure" *Economica*, 65, 599-613.

Schultz, T.P., (1990), "Testing The Neoclassical Model Of Family Labor Supply And Fertility" Papers 601, Yale - Economic Growth Center.

Thomas, D. (1990), "Intrahousehold Resource Allocation: an Inferential Approach" *Journal* of Human Resources, 25, 635-664.

TABLES

	INDIVIDUA	L AND HOUS	SEHOLD CH	IARACTERISTI	CS [†]			
	Men				Women			
Individual Variables	Mean	Sd	Min	Max	Mean	Sd	Min	Max
Age	40.47	9.58	18	71	38.69	9.21	18	64
Weekly Hours of Work	44.71	10.01	3	90	31.58	13.18	1	89
Desired Weekly Hours of Work	40.87	9.45	0	90	29.01	10.98	0	70
Log Wage Rate	3.24	0.42	1.26	4.8	3.07	0.4	1.36	5.74
Job Insecurity Opinion	0.76	0.43	0	1	0.76	0.43	0	1
Expected Job Insecurity	7.8	17.53	0	100	6.05	15.81	0	100
Past Job Insecurity	0.65	5.41	0	100	1.24	7.61	0	100
Schooling (Years)	18.22	2.75	13	26	18.26	2.58	10	26
Actual Work Experience	22.12	10.03	0.75	53.89	17.53	8.64	0.14	46.72
Household Variables	Mean	Sd	Min	Max				
Household Size	3.4	1.16	2	7				
Total Children	1.4	1.15	0	5				
Children (<=4)	0.28	0.58	0	3				
Children (5-14)	0.69	0.93	0	5				
Children (15-24)	0.38	0.71	0	3				
Household Nonlabour Income	88076	40595.6	13375	635742				

TABLE 1

HILDA Dataset – Pooled Sample (Wave 3 to Wave 7)

		Men	Wa	men
Employment Contracts	Frea.	Percent.	Freq.	Percent.
	1104	i er centu	rieqi	I ci conti
Employed on a Fixed-term Contract	151	8.96	149	8.84
Employed on a Casual Basis	122	7.24	320	18.98
Employed on a Permanent Basis	1413	83.81	1217	72.18
Trade Union Membership	674	39.98	614	36.42
Occupation	Freq.	Percent.	Freq.	Percent.
	220	20.05	107	7.50
Managers	338	20.05	127	/.53
	447	26.51	654	38.79
Technicians and Trades	272	16.13	60	3.56
Community-Personal Service	147	8.72	218	12.93
Clerical-Administrative	190	11.27	412	24.44
Sales	70	4.15	119	7.06
Machinery Operators and Drivers	133	7.89	7	0.42
Labourers	89	5.28	89	0
	_		_	_
Industries	Freq.	Percent.	Freq.	Percent.
Agriculture Eiching Forestry	20	2 21	17	1.01
Mining	59	2.31	17	0.12
Manufacturing	210	5.02 12.02	52	2.08
Flastrisity Cas Supply	210	2.95	52	5.08
Construction	30 116	2.23	26	0.42
Whaterels Trade	56	0.00	20	1.54
Detail Trade	30	5.52	30	2.23
	80	5.1	158	9.37
Accomodation-Resturants	30	2.14	52	3.08
Iransport	105	6.23	28	1.66
Communication	51	3.02	49	2.91
Finance	85	5.04	86	5.1
Rental-Hiring-Real Estate	26	1.54	14	0.83
Professional-Scientific-Technical	94	5.58	104	6.17
Administrative-Support	19	1.13	47	2.79
Public Administration	284	16.84	123	7.3
Education-Training	222	13.17	423	25.09
Health Care	86	5.1	410	24.32
Recreation Services	23	1.36	22	1.3
Other	51	3.02	28	1.66
Location - Regions	Freq.	Percent.		
New South Wales	478	28.35		
Victoria	446	26.45		
Queensland	381	22.6		
South Australia	156	9.25		
Western Australia	102	6.05		
Tasmania	58	3.44		
Northern Territory	11	0.65		
Australian Capital Territory	54	3.2		

TABLE 2 INDIVIDUAL AND HOUSEHOLD CHARACTERISTICS – FREQUENCY TABLE †

HILDA Dataset – Pooled Sample (Wave 3 to Wave 7)

			TABLE 3			
	TWO-GRO	UP "EXPECTED JOB I	NSECURITY" MEA	N-COMPARISON	TEST	
Wave	Mean Men	Mean Women	Mean Diff	Std Error	t	Pr(T > t)
1	10.53	5.37	5.16	1.51	3.42	0.001
2	8.29	6.63	1.66	1.49	1.11	0.266
3	7.38	7.36	0.01	1.26	0.01	0.991
4	7.17	5.59	1.59	1.14	1.39	0.164
5	6.23	5.22	1.02	1.07	0.95	0.344

HILDA Dataset – Pooled Sample (Wave 3 to Wave 7)

PA	RAMETER ESTIMATES†		
			Sharing Rule
	Wife	Husband	with Caring
$\log \omega_{f}$	-1.252	662	1784.79
C)	(.557)**	(.271)**	(1082.72)*
$\log \omega_m$	-1.365	651	1757.73
	(.512)**	(.267)**	(1058.57)*
$\log \omega_f \times \log \omega_m$.413	.197	-531.818
	(.166)**	(.083)**	(327.435)*
Nonlabour income	.781314E-04	.408826E-03	100
	(.169502E-03)	(.152496E-03)	(.243)
Distribution Factors			
Expected Job Insecurity	011	-0.005	150.267
	(.010)	(0.005)	(177.224)
Past Employment Insecurity	037	017	479.916
	(.019)**	(.009)*	(333.861)
Future Employment Worry	.040	.026	-524.986
	(.011)***	(.005)***	(255.784)**
Employment Conditions Improvement	.055	.026	-709.357
	(.013)***	(.005)***	(341.200)**
Number of Dependent Children	038	.004	
	(.006)***	(.002)*	
Age	.0004	-0.0007	
	(.0005)	(.0003)**	

TABLE 4

Over-identifying restrictions (13 d.f.): 13.5590 (p = 0.410)

Source: HILDA (Wave 3 to Wave 7). Significance Levels: 10% (*), 5%(**), 1%(***).

 \dagger *Control variables (included in the* \mathbf{x}_i *vectors in appearing in (3) and (4)) are: age; number of dependent children; industry* variables; occupational variables; and general health condition.

APPENDIX

	APPENDIX TABLE 1
Sacia Domographia Variables	VARIABLES DEFINITIONS
Age	Age last hirthday at June 30^{th}
State	1 New South Wales: 2 Victoria: 3 Oueensland: 4 South Australia: 5 Western Australia: 6 Tasmania: 7
State	Northern Territory: 8 Australian Capital Territory.
City-size	Section of State: 0 Major Urban; 1 Other Urban; 2 Bounded Locality; 3 Rural Balance;
Country of birth	Country of birth: 1Australia; 2 Main English Speaking; 3 Other.
Gender	Binary Variable.
Language	"Is English the first language you learned to speak as a child?" [1yes - 2no].
Household Composition And	
<u>Characteristics</u>	
Bedrooms-number	"How many bedrooms are there [here / in the home in which you live]? Count all bedrooms even if they are
Children number	not currently used as a bedroom (e.g., a study)."
Children 04 number	Number of own resident children aged 0.4 years
Children514-number	Count of own resident children aged 5-14 years.
Children1524-number	Count of own resident children aged 15-24 years
Child-care	Child Care Benefit (\$) financial year (NOTE: Child Care Benefit is a payment from the Australian
	Government to the family to offset the costs of child care. Payments are made up to a maximum rate for
	approved or registered care. An estimate is made at family level based on the number of children, number of
	hours of care, parental incomes, income thresholds and taper rates. If there are 2 parents, half of the family's
	CCB is assigned to each).
Dependent-children	"Are there any children less than 15 years of age living in the household?" [1yes - 2no].
House-property	1 Own/currently paying off mortgage; 2 Rent (or pay board); 3 Involved in a rent-buy scheme; 4 Live here
** • • • • • •	rent free/Life Tenure.
Household-relationship	Relationship in household:
	1 Couple with child < 15 ; 2 Couple with dependent students (no child < 15); 5 Couple with no dependent child (no child < 15 or dependent students); 4 Couple without child < 15 ; 5 Couple with no dependent
	clind (ii) clind < 15 of dependent students), $+$ Couple without clind, 5 Lone parent with dependent students (no child < 15). To parent with dependent child (no child < 15).
	dependent students) & Child < 15: 9 Dependent student: 10 Non-dependent child: 11 Other family member:
	12 Lone person: 13 Unrelated to all HH members.
Household-size	Number of in-scope persons in household.
Household-type	Household type:
	1 Couple family without children or others; 2 Couple family without children with other related; 3 Couple
	family without children with other not related; 4 Couple family with children < 15 without others; 5 Couple
	family with children < 15 with other related; 6 Couple family with children < 15 with other not related; 7
	Couple family with dependent students without others; 8 Couple family with dependent students with other
	related; 9 Couple family with dependent students with other not related; 10 Couple family with no dependent
	cmid without others; 11 Couple family with no dependent child with other related; 12 Couple family with no dependent child with others not related; 12 Long arguert with children < 15, without others 14 Long arguert with the set of
	dependent child with other hot related, 15 Lone parent with children $<$ 15 with other not related. 15 Lone parent with children $<$ 15 with other not related. 15 Lone parent with children $<$ 15 with other not related. 15 Lone parent with children $<$ 15 with other not related. 16 Lone parent with
	dependent students without others: 17 Lone parent with dependent students with other related. 18 Lone parent with
	with dependent students with other not related: 19 Lone parent with no dependent child without others: 20
	Lone parent with no dependent child with other related: 21 Lone parent with no dependent child with other
	not related; 22 Other related family without children < 15 or others; 23 Other related family without children
	< 15 with others; 24 Lone person; 25 Group household; 26 Multi-family household.
Marital-status	Marital status: 1 Legally married; 2 De facto; 3 Separated; 4 Divorced; 5 Widowed; 6 Never married and not
	de facto.
Satisfaction	
Community	Feeling part of your local community: 0 [totally dissatisfied] – 10 [totally satisfied].
Home	The home in which you live: 0 [totally dissatisfied] – 10 [totally satisfied].
Neighbournood Einengiel situation	I ne neighbourhood in which you live: 0 [totally dissatisfied] = 10 [totally satisfied].
Financial situation	To a mount of froe time you have 0 [totally dissatished] - 10 [totally satished].
Health	The amount of the time you have, 0 [totally dissausted] -10 [totally dissausted].
Hours worked	The hours you work satisfaction: 0 [totally dissatisfied] = 10 [totally satisfied]
Housework fairness	Share of work around the house - "Do you think you do your fair share around the house?" 1 [] do much
	more than my fair share] – 5 [I do much less than my fair share].
Job	Overall job satisfaction: 0 [totally dissatisfied] – 10 [totally satisfied].
Job flexibility	The flexibility to balance work and non-work commitments satisfaction: 0 [totally dissatisfied] - 10 [totally
	satisfied].
Job opportunity	Your employment opportunities: 0 [totally dissatisfied] - 10 [totally satisfied].
Job security	Job security satisfaction: 0 [totally dissatisfied] – 10 [totally satisfied].
Life	"All things considered, how satisfied are you with your life?" 0 [totally dissatisfied] – 10 [totally satisfied].
Partner	Satisfaction with your partner: 0 [totally dissatisfied] -10 [totally satisfied].
ray Safaty	1 otal pay saustaction: 0 [totally dissatisfied] – 10 [totally satisfied]. "How safe you feel?": 0 [totally dissatisfied] – 10 [totally satisfied]
Work	The work itself satisfaction: 0 [totally dissatisfied] = 10 [totally satisfied]
Education	The work used satisfied on a clothing dissatisfied = 10 [totally satisfied].
Education-left	Age left school.
Education-degree	Highest education level achieved: 1 Postgrad masters or doctorate; 2 Grad. diploma, grad. Certificate: 3

	Bachelor or honours;4 Adv. diploma, diploma; 5 Cert. III or IV;6 Cert. I or II; 7 Cert. not defined; 8 Year 12;
	9 Year 11 and below.
Education (Years of)	"Education-left" + "Education-degree" (converted in years).
<u>Health</u>	
Health	1 Excellent; 2 Very good; 3 Good; 4 Fair; 5 Poor.
Disability-a	Long term health condition, disability or impairment: [1yes - 2no].
Disability-b	"Do you have any long-term health condition, impairment or disability (such as these) that restricts you in
	your everyday activities, and has lasted or is likely to last, for 6 months or more?" [1yes - 2no].
Tenure and Experience	
Tenure-occupation	Tenure in current occupation in years.
Tenure-employer	Tenure with current employer in years.
Experience	"Now of these [years / months], how many [years / months] in total have you spent in paid work?"
Training	
Training	"During the last 12 months, have you taken part in any education or training schemes or courses, as part of
	vour employment?" [1yes - 2no]
Training-general	Aim of this training (employees only) – To develop your skills generally: [1yes - 2no]
Training-specific	Aim of this training (employees only) $-$ To improve your skills in your current job: [] yes - 2no]
Employment	
Contract	Employment contract – current job: 1 Employed on a fixed-term contract: 2 Employed on a casual basis: 3
Contract	Employed on a permanent or oppoint basis
Employment status a	Current amployed on a permanent of ongoing basis.
Employment-status-a	family mambar
Employment status h	Taining memoer.
Employment-status-0	current employment status. 1 Employee; 2 Employee of own business; 5 Employer/Sen-employed; 4 Unpaid
Hours all	Idning worker.
Hours desired	Hours per week usually worked in an jobs.
Hours-desired	riours would like to work.
Hours-main	Hours per week usually worked in main job.
industry	Current main job industry. 1-digit AINZSIC: 1 Agriculture, Forestry and Fishing; 2 Mining; 3 Manufacturing;
	4 Electricity, Gas, Water and Waste Services; 5 Construction; 6 Wholesale Trade; 7 Retail Trade; 8
	Accommodation and Food Services; 9 Transport, Postal and Warehousing; 10 Information Media and
	Telecommunications; 11 Financial and Insurance Services; 12 Rental, Hiring and Real Estate Services; 13
	Professional, Scientific and Technical Services; 14 Administrative and Support Services; 15 Public
	Administration and Safety; 16 Education and Training; 17 Health Care and Social Assistance; 18 Arts and
	Recreation Services; 19 Other Services.
Job-size	"Approximately how many people (including yourself) are employed [at the place at which you work/ in your
	business]? (Include all employees, including part-time workers and casuals. Do not include contractors.)"
Labour-force-status	Labour force status – broad: 1 Employed; 2 Unemployed; 3 Not in the labour force.
Maternity-paid	"For each, please indicate whether you, or other employees working at a similar level to you at your
	workplace, would be able to use these if needed. a) Paid maternity leave;" [1yes - 2no].
Maternity-unpaid	"For each, please indicate whether you, or other employees working at a similar level to you at your
	workplace, would be able to use these if needed. b) Unpaid maternity leave;" [1yes - 2no].
Occupation	Occupation 1-digit ASCO: 1 Managers; 2 Professionals; 3 Technicians and Trades Workers; 4 Community
1	and Personal Service Workers: 5 Clerical and Administrative Workers: 6 Sales Workers: 7 Machinery
	Operators and Drivers: 8 Labourers.
Union	"Belong to trade union or employee association?" [1ves - 2no].
Job Insecurity	
Insecurity-lose	"What do you think is the per cent chance that you will lose your job during the next 12 months? (That is get
insecurity lose	retrenched or fired or not have your contract renewed" 0% [certain of working] – 100% [certain of not
	working]
Job Insecurity Opinion - Future	
Employment Worry	1 [Secure-future $<$ 4] and 0 [otherwise].
Linemployment_percentage	Per cent time spent unemployed in last financial year
Inch-Balatad Opinions	i ei cont unic spont unemproyeu in fast financiar year.
Complexity	My job is complex and difficult: 1 [Strongly disagree] 7 [Strongly agree]
Erondom horr	Inty job is complex and difficult. I [Subligity disagree] - / [Subligity agree].
Freedom when	I have a lot of freedom to decide when I do my own work: I [Strongly disagree] - / [Strongly agree].
Himoso	I have a lot of needoni to decide when I do my work. I [Strongly disagree] – $/$ [Strongly agree].
mness	i rear una une amount or stress in my job will make me physically ill: I [Strongly disagree] – 7 [Strongly
	agreej.
Pay-fairness	I get paid fairly for the things I do in my job: I [Strongly disagree] -7 [Strongly agree].
C C	
Say	I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future	I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future Skills-new	I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future Skills-new Skills-old	I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future Skills-new Skills-old Stress	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future Skills-new Skills-old Stress <u>Financial - Income Related</u>	I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future Skills-new Skills-old Stress <u>Financial - Income Related</u> <u>Information</u>	I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree].
Say Secure-future Skills-new Skills-old Stress <u>Financial - Income Related</u> <u>Information</u> Household-disposable-income-p	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values.
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year disposable income (\$) Negative values.
Say Secure-future Skills-new Skills-old Stress <u>Financial - Income Related</u> <u>Information</u> Household-disposable-income-p Household-disposable-income-n Household-gross-income-p	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year gross income (\$) (excl. windfall) Positive values.
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n Household-gross-income-p Household-gross-income-n	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year disposable income (\$) Negative values. Household financial year gross income (\$) (excl. windfall) Positive values. Household financial year gross income (\$) (excl. windfall) Negative values.
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n Household-gross-income-p Household-gross-income-n Household-gross-income-n	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year gross income (\$) Negative values. Household financial year gross income (\$) (excl. windfall) Positive values. Household financial year gross income (\$) (excl. windfall) Negative values. Household current weekly gross wages & salary - all jobs (\$).
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n Household-gross-income-p Household-gross-income-n Household-gross-income-n Household-taxes	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year disposable income (\$) Negative values. Household financial year gross income (\$) (excl. windfall) Positive values. Household financial year gross income (\$) (excl. windfall) Negative values. Household current weekly gross wages & salary - all jobs (\$). Household financial year taxes - total (\$)
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n Household-disposable-income-n Household-gross-income-n Household-gross-income-n Household-taxes Household-taxes Household-taxes	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year disposable income (\$) Negative values. Household financial year gross income (\$) (excl. windfall) Positive values. Household financial year gross income (\$) (excl. windfall) Negative values. Household current weekly gross wages & salary - all jobs (\$). Household financial year taxes - total (\$) Household financial year windfall income (excl resident parent transfers) (\$).
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n Household-disposable-income-n Household-gross-income-p Household-wage Household-taxes Household-taxes Household-taxes Household-taxes	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year gross income (\$) (excl. windfall) Positive values. Household funancial year gross wages & salary - all jobs (\$). Household financial year total (\$) Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values. Household financial year strong (\$) (excl. windfall) Negative values.
Say Secure-future Skills-new Skills-old Stress Financial - Income Related Information Household-disposable-income-p Household-disposable-income-n Household-disposable-income-n Household-gross-income-p Household-gross-income-n Household-taxes Household-taxes Household-taxes Household-taxes Household-windfall Individual-gross-income-p Individual-gross-income-n	 I have a lot of say about what happens on my job: 1 [Strongly disagree] – 7 [Strongly agree]. I have a secure future in my job: 1 [Strongly disagree] – 7 [Strongly agree]. My job often requires me to learn new skills: 1 [Strongly disagree] – 7 [Strongly agree]. I use many of my skills and abilities in my current job: 1 [Strongly disagree] – 7 [Strongly agree]. My job is more stressful than I had ever imagined: 1 [Strongly disagree] – 7 [Strongly agree]. Household financial year disposable income individual estimate (\$) Positive values. Household financial year disposable income (\$) Negative values. Household financial year gross income (\$) (excl. windfall) Positive values. Household current weekly gross wages & salary - all jobs (\$). Household financial year windfall income (excl resident parent transfers) (\$). Individual financial year gross income (\$) (excl. windfall) Positive values.

Tax-benefit

Source: HILDA (Wave 3 to Wave 7).