

Allocation of resources within couples: some new evidence about the sharing rule*

Claire Thibout[†]

January 2016

Preliminary draft, please do not quote

Abstract

This paper investigates the causes of "who gets what" within couples; that is, the determinants of the so-called sharing rule. Using a rich French time-use dataset, I construct a measure of the sharing of time and money between partners, taking into account personal expenditures and leisure time of both the man and the woman. According to this measure, women receive on average 45 percent of the couple's full expenditures. I then show that, except for wages and the presence of children, classical factors used in household studies, such as education or non-labour income, have a weak impact on the sharing of resources within couples. Furthermore, factors related to biographic characteristics of both partners, such as the labour market participation of their mothers, or children from previous partnerships, matter for the sharing of resources.

Keywords: Intra-household allocation, sharing rule, collective model, relative expenditure, time use.

JEL classification: D13, J21, J22

*I am indebted to Catherine Sofer, Anne Solaz, Benoît Rapoport, Pierre-André Chiappori, Olivier Donni, David Ribar, and Steven Stillman for stimulating research comments. I also thank participants at the congress of the EEA 2014 (Toulouse), SOLE-EALE 2015 (Montréal), ACE 2015 (Brisbane), LEW 2015 (Sydney), the Melbourne Institute and INED (Paris) seminars, for useful comments and suggestions.

[†]Melbourne Institute of Applied Economic and Social Research, The University of Melbourne, Level 5, FBE Building, 111 Barry Street, Victoria 3010, Australia (Tel: +61 3 8344 4979), claire.thibout@unimelb.edu.au.

1. Introduction

Decision making within couples has been widely studied by economists within the framework of the collective model (Chiappori, 1988, 1992, Apps and Rees, 1988). This theoretical representation allows for different preferences concerning the allocation of time and money within the family. The considerable advantage of the collective model consists in minimalist assumptions: the decision-making process is only assumed to be Pareto-optimal, and the only observation of individual labour supplies (in the case of the collective model of labour supply) allows estimation of individual shares of the household income, according to the so-called sharing rule. Actually this notion in a sense captures the idea of respective decision powers of each partners. The sharing rule is a very useful measure as it can be estimated through empirical data, so we are able to recover information about the economic well-being of household members. Implications are very informative, as for example, the sharing rule allows to study inequalities across individuals rather than across households (Lise and Seitz, 2011), especially as inequalities have been found to be most of the time understated if we neglect intra-household inequalities (e.g. Haddad and Kanbur, 1990). This is particularly relevant for policy makers, especially in the introduction on targeting benefits or taxes to particular household members, as we have now tools to understand how reforms may increase the members negotiation weight and the impact on decisions (Lundberg et al, 1997; Duflo, 2003).

However, this sharing rule is most of the time identified up to a constant, given that private expenditures of each partners are generally unknown. Indeed, consumption information contained in household surveys are generally collected only at the household level but not at the individual level, making impossible to assign expenditures to each partner. Thus most papers cannot retrieve the exact level of this sharing rule but rather its derivatives. Chiappori (1992) demonstrates that the unidentified constant is welfare irrelevant, in the sense that changing the constant affects neither the comparative statics nor the welfare analysis derived from the model. However, if the objective is to study the intrahousehold inequality, the collective model can identify the changes affecting intrahousehold inequality, but not its initial level, which can be useful. Indeed, many of the uses of sharing rule estimates, such as calculation of poverty lines, indifference scales, and distributions of income and welfare, depend on the level of the sharing rule (Cherchye et al., 2012).

Very recently, four main household surveys have tried to go beyond this difficulty, by asking precisely the amount of personal expenditure to each partner. The first two surveys are based on

the Danish population: a supplement to the Danish Household Expenditure Survey (DHES) was added by Browning and Bonke for 1999 to 2005, and the Danish Time Use Survey (DTUS) of 2001 was mainly used by Browning and Gørtz (2012). Then Cherchye, De Rock and Vermeulen (2012) used the new LISS (Longitudinal Internet Studies for the Social sciences) Panel representative of the Dutch population, in which they added a module on time use and consumption. Finally, the last survey is based on the French population: the new French Time Use Survey of 2010. Since expenditures are allocated in these data, a sharing rule can be constructed for each household. This allows for the identification of the location of the sharing rule as well as its dependence on distribution factors.

Furthermore, consumption and time use information usually make the object of two different surveys. Collecting both types of information for the same household, which is the case in the French Time Use Survey, the DTUS and the LISS, has the great advantage to model and estimate together the allocation of expenditures and time within couples, and investigate very precisely "who gets what" within couples.

In addition to personal expenditures, a notable feature of the new French Time Use survey and the DHES is that they contain very precise and innovative information on decision process for the surveyed households, providing a rich set of potential distribution factors. Consequently it is now possible to study the allocation of resources within couples using a large set of sociological and psychological determinants.

In this paper, I exploit the richness of the last French Time Use Survey conducted in 2009-2010, which gathers these three types of information (individual expenditures, time use, large set of potential determinants), to analyze intra-household allocation of both money and time. This paper contains three main ideas.

The first idea is to describe the level of a sharing rule directly observable from the data, that is the partners' share of the household full income¹, allowing me to take into account the sharing of both time and money. The wife's [husband's] share is the sum of her [his] personal expenditures plus her [his] leisure time valued at her [his] own wage rate. I examine the distribution of the observed sharing of resources within households, allowed by the richness of the data. In a second specification, I will study the allocation of monetary expenditures only, to make comparisons.

¹The full income is defined as the sum of non-labour income plus the maximum amount of labour income that could be earned by partners if they would spend all their available time working on the labour market.

Indeed, the exact level of the sharing rule has already been computed in some previous works, but only considering the sharing of monetary expenses. Browning and Bonke (2009) measure the level of the sharing rule, based on individual expenditures only, using the supplement they added to the DHES in which respondents record for every expenditure in an expenditure diary for whom the item was bought. To my knowledge, this is the only paper measuring a sharing rule directly from a survey. Without information about individual expenditures, the level of the sharing rule can be retrieved, at the price of some assumptions: Browning, Chiappori and Lewbel (2009), Couprie (2007), Lewbel and Pendakur (2008) estimate the location of the sharing rule, making the strong assumptions that the preferences of singles and married people are the same. Kalugina et al. (2009a, 2009b) retrieve the sharing rule itself using subjective data on income satisfaction or life satisfaction in Russia, by assuming a correspondence between, first, the perception of income that household members report and their true income sharing, and, second, between their answer to a satisfaction question and their utility. Alessie, Crossley, and Hildebrand (2006), Bonke and Browning (2009) use answers to financial satisfaction questions as direct measures of the utility derived from consumption to estimate parameters of the sharing rule. The novelty of my approach here is to take into account, in a simple way and directly from the data, both the allocation of time and money, leading to a more complete and precise representation of decision-making within families.

The second idea of this paper is to study the determinants of the sharing rule, so what's driving the allocation of resources within couples. Particularly, I investigate whether the variables usually used in household studies, and that have been found to have an impact on the allocation of monetary expenditures, exert similar effects on the share of the full expenditures including both money and time.

Finally, the third idea consists in including some new variables to the analysis, named as "non-traditional" or "non-monetary" variables, and testing the relevance of these variables compared to more classical determinants usually used in household studies, to explain the sharing rule. This is now possible with the innovative module of the French time-use survey, entirely focused on decision-making inside couples, with questions about financial arrangements, negotiation between partners, and biographic characteristics (about parents of the partners, conjugal past, beginning of the partnership). This amounts to introduce more distribution factors

(variables that influence ‘who gets what’ but only through their impact on relative power within the household) not necessarily related to the marriage market or the relative economic situation of partners as it is usually done. I include variables similar to those used by Browning and Bonke in 2009 (whether the mother of each partner worked full time when they were 16 years old, whether the partner has a child from a past partnership), and some new distribution factors about the level of education of the mother of each partner, the distribution of personal assets between partners, and the professional situation of the partners when they met for the first time.

Leading such a synthesis about the sharing rule appears really important since as explained by Browning, Chiappori and Weiss (2011), there is no coherent theory of the sharing rule. Indeed, potential distribution factors differ widely across different data sets and the excluded distribution factors could be correlated with the included ones. The new French time-use survey solves in a sense this difficulty, as the "Decision-Making Module" includes a broad set of variables, among them most of distribution factors previously used in other studies and new ones. Comparisons across countries and surveys become now possible, providing a quite good test of the validity of these new kind of distribution factors.

This paper is organized as follows. The first part presents the theoretical sharing rule, which incorporates both money and time. I use a collective model of labour supply with household production and public goods, that I modify to result in a sharing rule defined on the household full income. Indeed, most of collective models result in a sharing rule defined on the household non-labour income only, leading to study how the non-labour income is shared between partners. In a second part, I measure the sharing rule directly from the data, and I examine its distribution. I find that the woman’s share represents 45 % of the household full income, on average. In a third part, I present the empirical methodology and the ‘traditional’ and ‘non-traditional’ determinants. Then in the fourth part, I study whether the classical economic determinants exert an impact on the observed sharing of resources, as male’s and female’s wage, household non labour income, number of children, sex ratio, age difference and relative level of education of partners. I show that the presence of children remains the principal determinant of the sharing rule.

The fifth section is devoted to the new distribution factors. I test the relevance of these non-traditional variables compared to more classical variables. Main results show that variables related to family background of both partners, personal history, differences in economic role matter

for the household decision process, and in a higher extent compared to the 'classical' variables. Finally, the last part presents the robustness checks, in which I vary the definition of leisure time [FORTHCOMING].

2. The theoretical sharing rule

2.1. General considerations and specific assumptions

This section presents the sharing rule I consider in this paper, and the household decision process that generates it. I use the collective approach (Chiappori, 1988, 1992, Apps and Rees, 1988), the most widespread representation of household decision-making. This model has the great advantage to avoid making strong *ad hoc* assumptions on the household decision process. The only assumption consists in assuming that decisions are Pareto efficient, which means that whatever the way couples make decisions (bargaining, formal rules or others), the resulting choices are Pareto efficient. Moreover, a very interesting result is that the decision process can be decentralised. Indeed, thanks to the Second Fundamental Theorem of Welfare Economics, any efficient outcome can be decentralized by a choice of prices and the (re)distribution of income. According to the decentralization procedure, each person is given a share of the total household income and allowed to spend it on their own private goods, using their own private sub-utility function. More precisely, when all commodities are privately consumed, the decision process can be decomposed into two phases: a sharing phase in which partners determine the sharing rule and a consumption phase, in which they allocate their share between the various commodities available. Thus only the second phase relates with efficiency: whatever the sharing rule, the resulting allocation will be efficient provided that agents maximize their utility during the consumption phase. The first stage relates with the collective part of the process (a review about the collective approach is found in Browning, Chiappori, Weiss, 2011).

I develop here a collective model of labour supply including household production, based on Rapoport, Sofer, Solaz (2011). I also use some of the literature on collective models including public goods (Donni, 2009, Couprie, 2007). However, in Rapoport, Sofer, Solaz (2011), but also in most of empirical applications of the collective model, the sharing rule is defined on the "non-labour income", which means that in the first stage of the decision process, the couple agrees on the sharing of the non-labour income between them. But rather than considering the

allocation of the non-labour income, I will consider here the allocation of the full income, in order to take into account both time and money. The full income is defined as the sum of the non-labour income plus the maximum amount of labour income that could be earned if spouses would spend all their available time working on the labour market. In the case of the collective model with household production, the profit from this production is also included in the full income.

As is usually done, I assume here that the household production function exhibits constant returns to scale. Indeed, a standard problem in household economics is that the production function cannot be estimated independently of the utility function unless the home produced commodities are independently observable (Pollak and Wachter, 1975, Gronau, 2006). The output may be observable in agricultural production or children's health and education, but it is impossible for domestic tasks, as cleaning for instance. Nevertheless, when outputs are not observable, under the assumption of constant returns to scale and no joint production (in the sense that partners' domestic times do not appear directly in the utility function), we are able to recover information about the technology provided that the input supply (as a function of relative wages) are observed (Pollak and Wachter, 1975, Gronau, 2006).

In addition, as in Chiappori (1997), Chiappori et al. (2002), and Rapoport et al. (2011), I make the assumption that household production is marketable. This means that domestic goods have perfect market substitutes and that domestic production in any quantity can be bought and sold at market prices by all households. Thus the price of the domestic good is exogenous for the household.

In the alternative situation, the non-marketable case, the price of the household commodity is endogenous to household decisions and has to be estimated (as a function of wages and incomes). Actually, a consequence of missing markets is that the separability property, which implies that the demand side is totally divorced from production, no longer holds. Estimation of non-separable models is much more difficult. Particularly, Chiappori (1997) shows that in this case, if the household production exhibits constant returns to scale, the sharing rule can be recovered only up to an additive function of wages. Thus endogeneity of the domestic price has a cost in terms of identification.

Admittedly, the marketability assumption is quite strong, at least in developed market

economies. Indeed, a majority of the population of a developing economy typically work in agriculture, often producing marketable commodities at the household level, but in other contexts, it appears quite unusual that people think of selling their domestic production, as cleaning services for instance. Nevertheless, almost all usual domestic goods produced within the household have nearly perfect market substitutes that are widely bought by households. But if domestic goods can only be purchased but not sold, some households may reach a corner solution, in which the market purchase of domestic goods is nil, and the normalized marginal productivity of a person's domestic work exceeds the person's wage. This is equivalent to the domestic good not being marketable (Browning and al, 2011).

To conclude, from a theoretical point of view, not to make the assumption of marketable domestic production strongly complicates the analysis. With the objective to measure a sharing rule in a simple form directly from the data, I assume in the following that household production is marketable, as it is usual in the literature.

Finally, I assume that goods can be either public or private, and a fundamental assumption in this paper consists in assuming a separability in the individual utilities between the public goods and the private sphere that involves consumption and leisure (Donni, 2009, Couprie, 2007). The maximization of the utility on private goods conditionally to public goods is the same than the maximization of the non-conditional utility on private goods². This assumption allows me to not explicitly take into account the presence of public good that are bought on the market or produced at home and publicly consumed within the household, since my data do not contain information about partners' contribution to the public good. In addition, including public goods within the collective framework much more complicates the analysis. When a good is private, all agents face the same price and choose different quantities, while with public goods, they all consume the same quantity but would be willing to pay different marginal prices for it.

However, I do not observe in my data expenditures regarding goods bought for the family and that are privately consumed (food is the typical example), and savings. So in addition to the assumption that the public goods are separable from the other goods, I will also assume that the sum of the "other" goods (including public goods, expenditures for the family, and savings) is separable from exclusive goods.

²In the labor supply context, Fong and Zhang (2001) and Blundell et al. (2005) also assume that individual preferences are such that public goods are separable from other goods. This assumption is certainly restrictive, but as emphasized by Donni (2009), to the best of his knowledge, such separability has never been tested in the literature until now.

2.2. The framework

The household consists of two individuals i , male ($i = m$) and female ($i = f$). The total time available by each individual T is divided between labour market time H_i , domestic work time D_i , and leisure time L_i , such that we have the time constraint:

$$T = H_i + D_i + L_i$$

Then, the household non-labour income is denoted y , and w_f and w_m are the wage rates of f and m , respectively. The quantity of home-produced goods is denoted by Q and produced by time inputs of household members (D_i), according to the production function $F(D_f, D_m)$. As discussed in the previous section, I assume that this household production function exhibits constant returns to scale. Also, p is the price of Q , which is the same for all households as domestic production is assumed to be marketable. Note that the domestic goods are publicly consumed within the family. Profit from household production, Π , or net value of domestic production, is given by:

$$\Pi = pQ - w_f D_f - w_m D_m$$

Household members consume several types of goods. Personal (or individual) consumptions are denoted C_i (a Hicksian composite good bought on the market, whose price is assumed to be equal to 1). This is an "assignable good", in the sense it is bought by i for himself/herself. The household also makes expenditures for the community that are privately consumed (food is the typical example), expenditures for market public goods (such as housing, insurance payments, heating, etc.), and savings S^3 . I then define A as the sum of the expenditures for the community, market public goods, savings, and the domestic goods pQ . We have the following monetary

³I do not model intertemporal behavior in this paper. Contributions extending the collective model to an intertemporal setting are mainly due to Mazzocco (2004, 2007).

constraint:

$$\begin{aligned}
& \sum_{i=f,m} C_i + A = \sum_{i=f,m} H_i w_i + y + pF(D_f, D_m) \\
\Leftrightarrow & \sum_{i=f,m} C_i + A = \sum_{i=f,m} H_i w_i + \sum_{i=f,m} D_i w_i + y + \Pi \\
\Leftrightarrow & \sum_{i=f,m} C_i + \sum_{i=f,m} L_i w_i + A = \sum_{i=f,m} T w_i + y + \Pi \\
\Leftrightarrow & \sum_{i=f,m} C_i + \sum_{i=f,m} L_i w_i + A = Y
\end{aligned}$$

Thus the full household income $Y = \sum_{i=f,m} T w_i + y + \Pi$, is used for assignable monetary expenditures of both partners C_i , individual leisure expenditures $L_i w_i$ (leisure time of each partner valued at its price, the own wage rate⁴), and the other goods A .

2.3. Development of the collective model

The individual utility function of each partner $U_i(L_i, C_i, A; \mathbf{z})$ is defined over own leisure time L_i , consumption of the assignable good bought on the market C_i , usually unobserved in most surveys, and the "other" goods A (that includes goods for the community, market public goods, savings and the domestic good produced at home and publicly consumed). \mathbf{z} is a vector of individual and household characteristics.

A major assumption is to assume a separability in individual utilities between the private sphere (consumption of the assignable good and leisure) and the "other" goods. The marginal rate of substitution between personal consumption and leisure is not affected by the level of "other" consumptions. Separability imposes:

$$U_i(L_i, C_i, A) = W_i[u_i(L_i, C_i), A]$$

where u is the individual's sub-utility from exclusive goods consumption.

Conditional on expenditures for the "other goods", the allocation of exclusive expenditures is Pareto-optimal. The household maximizes a generalised weighted utilitarian household welfare

⁴Indeed, the opportunity cost of a person's time is determined by the person's wage.

function:

$$(P0) \quad \max_{L_i, C_i} \mu(\cdot) u_f(L_f, C_f; \mathbf{z}) + (1 - \mu(\cdot)) u_m(L_m, C_m; \mathbf{z})$$

subject to the constraint

$$\sum_{i=f,m} C_i + \sum_{i=f,m} L_i w_i + A = Y$$

$\mu = \mu(w_f, w_m, y, s_1, \dots, s_r, \dots, s_R; z_1, \dots, z_n, \dots, z_N)$ is a continuously differentiable weighting factor contained in $[0,1]$. \mathbf{s} is a R-vector of distribution factors. By definition, the vector \mathbf{s} only appears in $\mu(\cdot)$, such that these factors influence the decision process but do not affect preferences or the budget constraint. As such, changes in the \mathbf{s} variables do not affect the Pareto frontier but only the equilibrium location on it, through the resulting changes in shares of full income.

Let us describe formally each step of the decision process. Assuming that good Q is marketable, efficiency and further separability between consumption and production have an immediate implication, namely profit maximization. Specifically, D_f and D_m must solve

$$(P1) \quad \max_{t_f, t_m} \Pi = pQ - w_f D_f - w_m D_m$$

which gives solutions:

$$D_f = D_f(w_m, w_f)$$

$$D_m = D_m(w_m, w_f)$$

$$\Pi^* = \Pi(w_m, w_f)$$

According to Donni (2009) and Couprie (2007), in a decentralized fashion, we obtain that each individual maximises his/her individual sub-utility, given the conditional sharing rule Ψ_i :

$$\max_{L_i, C_i} u_i(L_i, C_i; \mathbf{z})$$

under the member-specific budget constraint:

$$w_i L_i + C_i = \Psi_i$$

where Ψ_i is the sharing rule, i.e. the proportion of exclusive expenditures (total full income minus

"other" expenditures) going to individual i within the family, such that $\Psi_f + \Psi_m = Y - A$.

The separability principle implies that the demand side is totally separated from production and "other" goods consumption decision. All occurs *as if* the household maximizes the profit from household production on one hand, makes decisions about the "other" expenditures A on the other hand, and then each partner separately chooses his/her consumption of exclusive good and leisure time.

The shares are a function of wages, non-labour income, preferences and distribution factors. Thus there exists two functions $\Psi_f(w_f, w_m, y, \mathbf{s}; \mathbf{z})$ and $\Psi_m(w_f, w_m, y, \mathbf{s}; \mathbf{z})$, where Ψ_f is the share of the full income minus other expenditures allocated to the wife, and Ψ_m is the share allocated to the man.

2.4. Discussion about the sharing rule

In this paper, I am interested in the allocation of exclusive expenditures between the man and the woman in a couple, and I do not address how the amount of public expenditures, and more generally the amount of other goods A , is decided within the family and what's the individual contribution of each partner. This is a very important question that I can not handle directly here, given that data limitation. Nevertheless, given the richness of the French data, it may be possible to develop a structural collective model leading to estimate partners' contribution to the public good. This is led for further research⁵.

In the case where all the goods are private, the relation between the functions $\mu_i(w_f, w_m, y, \mathbf{s}; \mathbf{z})$ and $\Psi_i(w_f, w_m, y, \mathbf{s}; \mathbf{z})$ is bijective, such that they represent in an equivalent manner the distribution of powers within the household⁶. Nevertheless, the sharing rule is not an adequate indicator of power distribution as soon as some goods are public (Chiappori and Donni, 2006). Even if I do not explicitly represent the decision process relative to the public goods, they are included in my model. One could argue that this sharing rule represents individual well-being, if both partners get the same level of utility above the other goods. This is of course a very strong

⁵Some recent research has tried to incorporate public goods within a collective model, see for instance Blundell, Chiappori, and Meghir (2005), Matteazzi and Picard (2010), Donni (2002), Couprie (2007), Donni (2009).

⁶The sharing rule representation is often preferable because it is expressed in monetary terms, such that the sharing rule is invariant to an increasing monotonous transformation of the utility functions.

assumption. Another difficulty relies on the fact that the sharing rule considered in this paper includes a price (the hourly wage), making it difficult to interpret directly the sharing rule in terms of distribution of negotiation powers. Consequently, a more parsimonious interpretation of the sharing rule considered in this paper is the following: once the couple agreed on the amount of the full income spent for the "other goods", how do partners allocate the remaining income between them. Answering this question from direct survey evidence is an important step, and as explained before, this may be also very useful in a second step, in terms of identifying the public sphere of the household decision process.

Note that in order to make direct comparisons with the results found in Browning and Bonke (2009), I will also look at the allocation of monetary personal expenditures only, allowing me to investigate what happens if one considers income shares that does not include a price.

Finally, the share received by each partner, through the sharing rule, is equal to his/her personal expenditures plus his/her leisure time valued at his/her wage rate. To measure the individual shares, I need data about personal monetary expenditures, leisure time, and hourly wage, that all come from the French time-use survey.

3. Level and distribution of the sharing rule

3.1. Data: the French Time Use Survey

Time-use surveys are now generalised in more and more countries, and European countries have led a harmonization work to make cross-country comparison more relevant. These surveys consist in collecting very precise information about daily activities. Interviewed household members write down their activities in a booklet, indicating the time spent on each activity, according to a certain time periods (10-minutes in France for example). In France, time use surveys are implemented almost every each ten years. The last survey (on which this paper is based) is very recent and has been developed in 2009-2010. This new French time-use survey contains a traditional section common to each existing time-use survey, plus a very innovative section called "Couple Decision-Making Module" (*Module Décision dans les Couples*).

The classical part of the survey is composed of a "household" questionnaire, collecting information at the household level, for instance total income of the family, socio-demographic

characteristics, place of residence and its characteristics, etc. The survey also includes one "individual" questionnaire for each member of the couple, with many information about their professional situation, wages, education, official hours of work, etc. This classical part of the survey contains 12069 households and 18521 individuals. Information are collected through two visits of an interviewer. The "household" questionnaire and the "individual" questionnaire of the partner n° 1 are filled in during the first visit, and the "individual" questionnaire of the partner n° 2 can be filled in either during the first or the second visit.

Respondents filled in two daily time-use booklets, one on a week day, the other on a week-end day. But if the household agrees to answer the "Couple Decision-Making Module", they only fill one time-use booklet, during a day of the week or the week-end. On the day(s) of the survey, respondents wrote down their activities, indicating the time spent on each activity, according to 10-minutes time periods. 27 903 booklets have been completed⁷. Booklets are given to the partners during the first visit, filled in during one or two days between the two visits, and collected by the interviewer during the second visit. Leisure time information used to measure the sharing rule comes from the time-use booklet.

As for the "Couple Decision-Making Module", it deals with financial arrangements, daily family management, sharing of responsibilities and decisions, and biography elements. Only a sub-sample of couples replied to this module: those having accepted to answer it, and on this basis, three conditions had to be satisfied: both partners live in the same housing since at least one year; neither of the two is a student; and at most one of them is retired. Thus 2349 households and 4371 individuals answered the "Couple Decision-Making Module", which contains four parts. A "household level" questionnaire includes information about couple formation and financial arrangement between spouses. This questionnaire is asked during the first visit of the interviewer. An "individual level" questionnaire, separately asked to each spouse, collects biography items, personal activities and social relations information, relations with partner, decision-making on several areas, independence in money use. Information are collected through the visit of the interviewer, during the first or the second visit for the partner n° 1, and during the second visit or through a telephone interview for the partner n° 2. The partner not questioned was kept away during the interview, in another room, or even better, absent from the home. This was managed

⁷A sub-sample of time use booklets has been enriched with the evaluation by individuals about the pleasant or unpleasant nature of the moment, but I do not use this information here.

at the time the appointment was made, but also thanks to the possibility of interrogation by phone.

Last but not least, a self-administered questionnaire (one part at the couple level, the other part at the partners level) gathers information about individual and common property, and bank organisation of the couple. Self-administered questionnaire are given to the partners during the first visit, filled in between the two visits, and collected by the interviewer during the second visit. To ensure confidentiality, three envelopes were provided to receive completed questionnaires. The question about personal expenditures is included in the "partner level" self-administered questionnaire.

In this paper, I use the sample of individuals who answered the "Couple Decision-Making Module". I select people living in a couple (married or not), with or without children, reporting a professional activity, that is 1163 households, so 2326 spouses. I drop 77 couples in which at least one of the spouses did not report monthly wage or hours of work per week, making it impossible to compute an hourly wage for them. In addition, in 124 couples, at least one of the members did not report the amount of monthly personal purchases, so that I drop these households. I also drop 22 couples for which personal expenditures were excessively high. In all, my final sample contains 940 couples, so 1880 individuals.

3.2. Monetary assignable expenditures

In the French time-use survey, respondents to the "Couple Decision-Making Module" recorded the amount of their personal expenditures during the last month. This question was addressed to both spouses in the "partner level" self-administered part of the module. Instruction was given to couples to fill in the questionnaire separately, and each partner had his own envelope to insert the document.

The question was the following: "Last month, how much did you spend on your personal purchases?". Another question asked whether this amount is representative of his/her usual monthly expenditures, and possible answers was: Yes / More than usual / Less than usual. Complementary instructions were given: "Only consider what you have bought for yourself, not all of what you have spent. For instance: you have bought some shoes, this is for yourself ; you have paid the rent, or food, this is for the community". Apart from that, no particular instruction was given to respondents to record their purchases, meaning that they take into account all items

they feel they bought for themselves, without any restriction.

In order to estimate a sharing rule, we need expenditures that are *assignable* to husband and wife. As in Browning and Bonke (2009), I define as *assignable* any expenditure that respondents say was bought for himself or herself. This excludes all items bought for the household, even if they are privately consumed. Consequently, the formulation of the question and specific instructions given entirely correspond to the definition of an assignable good.

Also, the general formulation of the question in the survey is very convenient for me, because it avoids the problem of the classification of some goods in a precise category, as assignable or not: respondents make that imputation themselves in the survey. For example, food is likely to be bought for the household, even if it is strictly a private good in the sense that there is rival consumption, so food should be considered as a non assignable good. However, it does not exclude that sometimes in a couple, food is bought for oneself (at home or in a restaurant), and that the respondent considers this purchase as a personal expenditure. Thus private goods that are bought exclusively for one person or another are defined to be assignable goods, whereas private goods that are bought for the household are defined to be non-assignable (Browning and Bonke, 2009).

For all these reasons, I believe that the expenditure variable of the French time-use survey represents quite well the sharing of assignable monetary expenditures between partners.

The Danish surveys including assignable expenditures use different methods to collect this information. The Danish Household Expenditure Survey (DHES), mainly used by Browning and Bonke (2009), takes the form of respondents recording for every expenditure in a conventional expenditure diary for whom the item was bought: mainly for the household, for the husband, for the wife, for the children and outside the household. In the Danish Time Use Survey of 2001 (DTUS), mainly used by Browning and Gørtz (2012), the following questions were asked to the respondent: "When you think of your own personal expenditures, how much do you estimate it is normally on the following items during one month: clothing and shoes; leisure activities, hobbies, etc. (e.g., sports, sports equipment and club membership); other personal consumption (e.g., cigarettes, perfumes, games, magazines, sweets, bars, and cinema)". The respondent was then asked the same questions for their spouse/cohabitant.

One advantage of the French survey consists in each spouse reporting his own expenditures, very

likely reducing measurement errors. In addition, the amount of assignable expenditures is not delimited by particular categories. On one hand, reporting expenses in a broad category appears quite difficult as it requires to remember all expenses during the last month, and breaking down in several items eases the task, but on the other hand, answers of respondents are not constrained by specific categories.

Table 1: Monthly Monetary Assignable Expenditures (in Euros)

	French survey 2009-10 <i>940 couples</i>		DHES 1995-05 <i>1537 couples</i>		DTUS 2001 <i>615 couples</i>	
	Men	Women	Men	Women	Men	Women
Mean (Std Err)	190.1 (202.0)	197.6 (201.1)	183.3	192	163,5	161,2
Proportion of couple's total assignable expenditures in the household income	10.6%		11%			

Table 1 shows that on average, the amount of assignable expenditures reported in the French time-use survey is very close to amounts recorded in the two Danish surveys, particularly in the DHES. These figures are obviously not comparable as they are collected in different time periods and different countries. Nevertheless, we observe an identical pattern across these surveys: men and women spend on average the same amount, which is a strong finding. In addition, if we look at the share of personal expenses in the total household budget, we observe that according to the French data, total assignable expenditures of men and women represent 10,6 % of the total household income (non-labour income + both monthly wages). Assignable goods accounts for 11 % of disposal income according to the DHES. In all, personal expenditures collected in the French time-use survey seem to be in the range of earlier Danish studies.

Another way to check the validity of expenditure responses would be to compare them to the French Family Budget Survey (*Budget des familles*, 2011). [*Forthcoming*]

Despite this equality between partners at the mean, there is a very large dispersion for both groups according to French data, and the distribution of expenditures for men and women is very similar (see the Kernel densities in Figure 1 at the top left).

Regarding the intra-household allocation of expenditures, we observe that the more one partner spends, the more the other spends (see Figure 1 at the top right), with a correlation of

Figure 1: The distribution of monthly monetary assignable expenditures (in Euros)



Relative expenditures graphic: to get a better picture, couples whose relative expenditures are above 5 are not displayed, that is 97 couples.

0.49 and a t-value of 17.03. However, this graph also shows that the distribution of expenditures within couples is very dispersed.

The distribution of the proportion of wife's assignable expenditures in couple's total assignable expenditures ($\frac{expenditure_{wife}}{expenditure_{wife}+expenditure_{husband}} \times 100$), and relative expenditures ($\frac{expenditure_{wife}}{expenditure_{husband}}$), are shown in Figure 1 and Table 2⁸. Two highlights appear. First, the mode is unity for relative expenditures, reflecting the high proportion of households reporting the same value of expenditures⁹. Indeed, in 177 couples, the man and the woman report the same amount of personal expenditure, that is 18.8 % of the sample. Does it mean that expenditures are really

⁸87 men and 38 women report a monthly personal expenditure equal to 0. In 22 couples, both members report a nil personal expenditure. In order to compute the wife's proportion of expenditures and relative expenditures of couples, I set a purchase of 1 Euro for these individuals reporting no purchase.

⁹Browning and Gørtz (2011) find a similar pattern.

Table 2: Allocation of monetary assignable expenditures within couples

Percentile	Proportion of wife's expenditures	Relative expenditures (wife/husband)
1 %	0.0 %	0.01
5 %	17.6 %	0.2
10 %	28.6 %	0.4
25 %	40.0 %	0.7
50 %	50.0 %	1
75 %	66.7 %	2
90 %	83.3 %	5
95 %	100.0 %	50
99 %	100.0 %	150
Mean	53.4 %	9.7
(Std Err)	(22.0 %)	(44.4)

Number of couples: 940

shared in an equality way in these couples? This variable comes from the self-administered questionnaire. As said before, separate questionnaires were addressed to the man and the woman in the couple and they had to fill in it separately. Actually we have no information whether they respected instructions or not. Perhaps some couples answered together to this part of the survey, and there is a bias towards equality. But reporting the same expenditures could also reflect a global equal sharing within the couple, or at least a feeling of equality between partners.

At the same time, we observe a large dispersion of expenditure shares and a wide variety of situations among couples, depicting large inequality within some households. Indeed, in 25 percent of couples, the wife receives twice as much as her husband or more, and in 20 percent of couples, the husband receives twice as much as his wife or more¹⁰. Globally, the repartition of assignable expenditures is slightly in the favour of women, as they receive on average 53.4 % of the assignable expenditures in the couple.

3.3. Imputed expenditures for leisure

Let's remind that individual leisure expenditures are measured as individual time spent on leisure valued at its opportunity cost, which is the hourly wage. According to the theoretical sharing rule presented in Section 2, leisure time is the remaining time after physiological time, market labour time, domestic work time and childcare. So it excludes total working time (at home

¹⁰Browning and Bonke (2009), and Browning and Gørtz (2012) also find a large variety of situation within couples.

or on the market), sleeping, personal and medical care, but it includes, among other, meals (at home, at work, outside), breaks and social events at work, and commuting from home to work. This explains why hours spent on leisure activities are quite high: 7 hours and half for men, and 6 hours and 45 minutes for women (see Table 3). Leisure time data come from the time-use booklet, and they are collected during one day, a week day or a week-end day. As personal expenditures information are collected for one month, I will measure the sharing rule above one month, and I simply multiply the hours per day of leisure by 30.5. As the proportion of week days and week-end days are correctly represented in the survey, and as I will include in the estimations a control indicating whether the booklet has been filled in during a week day or a week-end day, this procedure appears appropriate. Note that several other measures of leisure time will be tested as a robustness check in Section 7 of the paper, and particularly time spent in leisure activities in a week-end day will be predicted for people having filled in the booklet during a week day, and conversely, using an endogenous switching model [FORTHCOMING].

We observe that contrary to assignable expenditures, the distribution of leisure time within couples seems to be slightly in favour of men since on average, the proportion of the wife's leisure time in the couple's total leisure time represents 47.4 %. We also observe that leisure times of both partners are strongly correlated (see Figure 2): the ordinary least-squares (OLS) value is 0.58 and the t-value of 19.48. This could be the result of assortative mating on wages (so that two partners with high wages will both take more or less leisure), or assortative mating on preferences for leisure. The correlation of male and female leisure could also be explained by complementarities in leisure or publicness of leisure, that is time that partners enjoy together (Fong and Zhang, 2001)¹¹.

Men earns on average 1.58 Euros per hour more than women on the labour market. Regarding the imputed expenditures in leisure per month (leisure time multiplied by the hourly wage), inequalities are exacerbated as women receive on average 44.4 % of the total couple's expenditures in leisure, with 557 Euros less for women. Finally, leisure expenditures are shared in a slightly more inequality way than personal expenditures, in favour of the man in the couple.

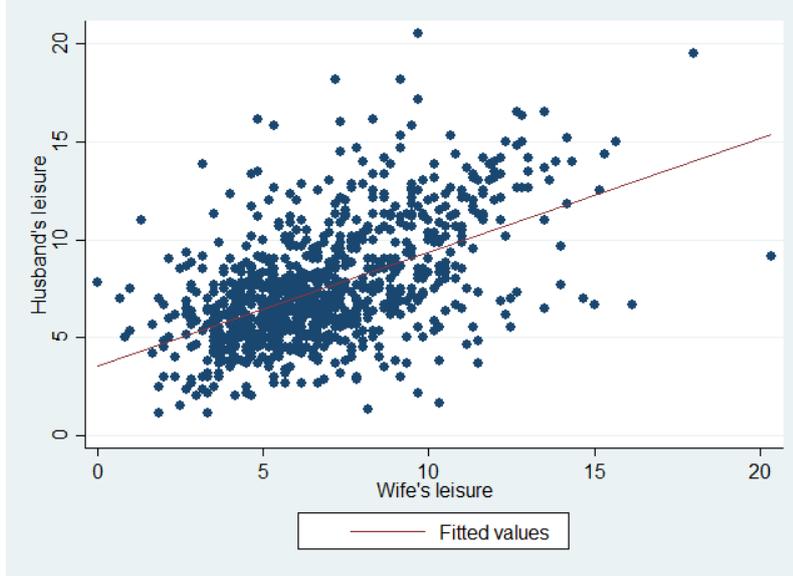
¹¹Browning and Gørtz (2012) also find that male and female leisure time are positively correlated, and suggest these following explanations.

Table 3: Imputed expenditures for leisure

	Men		Women		Wife's Proportion	
	Mean	(Std Err)	Mean	(Std Err)	Mean	Median
Leisure time L_i (hours/day)	7.49	(2.90)	6.77	(2.68)	47.4 %	47.7 %
Hourly wage w_i	12.80	(10.28)	11.22	(12.10)		
Leisure expenditure $L_i w_i$ (Euros/month)	2955.4	(3105.1)	2398.4	(3174.1)	44.4 %	44.9 %

Number of couples: 940

Figure 2: Female versus Male Leisure Time (in Hours per Day)



3.4. The partners' shares of the full expenditures

The individual full expenditures are measured as the sum of the monetary assignable expenditures of the partner plus his/her leisure expenditures, each component having been described in the two previous subsections. The shares of the full expenditures received by each partner are the result of the sharing rule presented in Section 2. Contrary to Browning and Bonke (2009) who measure a sharing rule based on the monetary assignable expenditures only (corresponding to the shares presented in Section 3.2 according to the French data), I consider here a sharing rule taking into account both the division of time and money between partners, leading to a more complete representation of the allocation of resources within couples.

Table 4: The partners' shares of the full expenditures (Euros/month)

	Men	Women
Mean	3145.5	2596.0
(Std Err)	(3114.2)	(3185.5)
Median	2507.8	2038.9

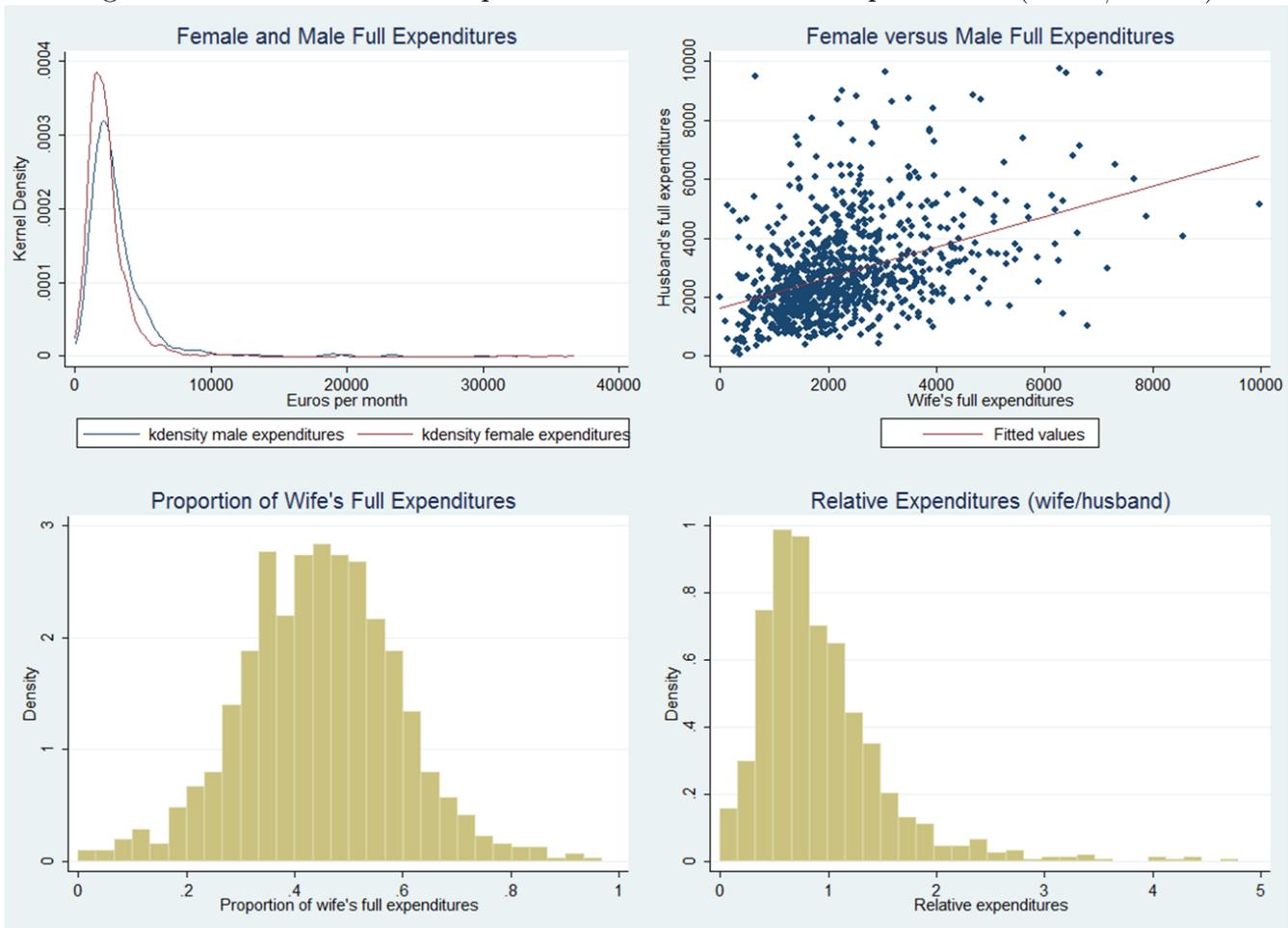
Number of couples: 940

Table 5: Allocation of the full expenditures within couples

Percentile	Proportion of wife's full expenditures	Relative full expenditures (wife/husband)
1 %	9 %	0.10
5 %	20 %	0.25
10 %	26 %	0.36
25 %	35 %	0.54
50 %	45 %	0.81
75 %	55 %	1.21
90 %	63 %	1.67
95 %	69 %	2.22
99 %	84 %	5.19
Mean	45 %	1.05
(Std Err)	(15 %)	(1.45)

Number of couples: 940

Figure 3: The distribution of partners' shares of the full expenditures (Euros/month)



Relative expenditures graphic: to get a better picture, couples whose relative full expenditures are above 5 are not displayed, that is 8 couples.

Men receive on average a higher share of the full expenditures than women, of about 550 Euros more per month (Table 4). Women receive on average 45 percent of the couple's total full expenditures, and in half of households they receive 45 % or less (Table 5), while I previously showed that if we restrict to the monetary expenditures only, women receive on average 53.4 percent and in half of households, they receive half of monetary expenditures or less (Table 2). In addition, in 20 % of couples, the husband receives twice as much as his wife or more of the couple's full expenditures, while in only 6 % of couple, the wife receives twice as much as her husband or more.

Figure 3 at the top right shows that the partners' shares of the full expenditures are still positively correlated within the household (OLS value of 0.14 and $t=4.3$), but in a weaker extent compared to the shares of monetary expenditures.

Finally, results largely differ depending whether the sharing rule is measured above monetary expenditures only, or above full expenditures including leisure, since the first sharing rule depicts a slightly better position for women in the couple on average, while the second one suggests a better position for men. Not taking into account time dimension into the analysis may lead to misleading interpretations.

Now that we have a whole picture about the level and the distribution of the sharing rule, the three next parts focus on its determinants and investigate in what extent its predictors are different whether we take into account time dimension or not.

4. The determinants of the sharing rule

This section presents the methodology used to investigate the factors determining the level of the shares received by each partner, and then what are the potential predictors I take into account.

4.1. Econometric methodology

4.1.1. Econometric models

In a first specification, I estimate simultaneously the logarithm of the male share and the female share (amounts in Euros per month) of monetary expenditures only, then of full expenditures,

corresponding to the following models:

$$\begin{cases} \ln(C_m) = m_0 + m_1 \ln w_f + m_2 \ln w_m + m_3 \ln y + \mathbf{m}_4 \mathbf{z} + \mathbf{m}_5 \mathbf{s} + \epsilon_m \\ \ln(C_f) = f_0 + f_1 \ln w_f + f_2 \ln w_m + f_3 \ln y + \mathbf{f}_4 \mathbf{z} + \mathbf{f}_5 \mathbf{s} + \epsilon_f \end{cases} \quad (1)$$

$$\begin{cases} \ln(\Psi_m) = n_0 + n_1 \ln w_f + n_2 \ln w_m + n_3 \ln y + \mathbf{n}_4 \mathbf{z} + \mathbf{n}_5 \mathbf{s} + \epsilon_n \\ \ln(\Psi_f) = g_0 + g_1 \ln w_f + g_2 \ln w_m + g_3 \ln y + \mathbf{g}_4 \mathbf{z} + \mathbf{g}_5 \mathbf{s} + \epsilon_g \end{cases} \quad (2)$$

As before, w_m and w_f are the wage rates of respectively the man and the woman, y is the household non-labour income, \mathbf{z} is a vector of socio-demographic characteristics, and \mathbf{s} a vector of distribution factors. This specification allows to study the effect of the different variables on the amount received by each partner (in Euros per month). I do not include any control related to the total amount of assignable expenditures of the couple, to take into account the fact that this total amount may vary following a variation in the different explanatory variables. For instance, a rise in the non-labour income increases the household total income, which may lead spouses to increase their assignable expenditures, but it could be also the case that they decide to increase expenditures for the family or for children specifically, or even decrease their assignable expenditures in favour of more expenses for the family. It may be also the case that the assignable expenditures of one partner increase, but decrease for the other partner. This specification allows me to take into account such kind of transfers within the family, but not to get a picture of how the share of the woman varies compared with the share of the man, following a change in the different variables, allowing to capture more precisely the distribution of power within couples. That's why in a second specification, I estimate the relative share of the partners, considering the total amount of assignable expenditures of the couple constant, corresponding to the following models:

$$\ln\left(\frac{C_f}{C_m}\right) = h_0 + h_1 \ln \frac{w_m}{w_f} + h_2 \ln y + \mathbf{h}_4 \mathbf{z} + \mathbf{h}_5 \mathbf{s} + h_6 (C_f + C_m) + \epsilon_h \quad (3)$$

$$\ln\left(\frac{\Psi_f}{\Psi_m}\right) = p_0 + p_1 \ln \frac{w_m}{w_f} + p_2 \ln y + \mathbf{p}_4 \mathbf{z} + \mathbf{p}_5 \mathbf{s} + p_6 (\Psi_f + \Psi_m) + \epsilon_p \quad (4)$$

I use the generalised method of moments (GMM) to estimate all these models. An advantage of this method is that GMM computes efficient estimators even when errors are heteroskedastic of an unknown form (which is not the case for 3SLS). Regarding the simultaneous equations models (1 and 2), GMM allows to take into account the possibly correlation between the error terms of

the two equations.

4.1.2. Treating endogeneity of wages and non-labour income

Furthermore, individual wages and household non-labour income may be endogenous, as unobserved individual and couple characteristics explaining partners' shares may also be correlated with wages and non-labour income. This is especially true for the own hourly wage in models based on the full expenditures, as by definition, the hourly wage is a direct component of the partner's share (so the dependent variable). Consequently, unobserved characteristics explaining the wage also explain the share of the full expenditures, such that the wage rate (as an explanatory variable) is correlated with the error term of the equation, and this variable has to be instrumented. Finding good instruments is not an easy task in such a model; nevertheless some variables appear to be good candidates.

I include as instruments, variables that are generally found to be correlated both with wages and non-labour income, but which are unlikely to exert an influence on the shares received by the partners: years of professional experience and its square, number of employees in the institution, dummies for the region of residence, and dummy variables for living in a rural area and a small town (living in a rural area also appears as an explanatory variables of the shares) as opposed to live in a big city in which wages are higher on average.

I include new specific instruments for household non-labour income. The first instrument is related to the assets of the household, which are correlated with higher non-labour income. The new French time-use survey includes unique information about the amount of household common assets, and the amount of personal assets of each partner. These three variables include real properties (except main housing), savings account, equity savings plan, life assurance, investment security, work of art and jewels etc. These assets bring information about general wealth of the couple and thus explain well the level of non-labour income. They are given in brackets, so I use for each of them the middle of the bracket. Then I use the logarithm of the sum of the three amounts to instrument the non-labour income. Later I will use information about the division of personal assets as a distribution factor. I also include a more flexible functional form of age in specifying the equations for wages and non-labour income than for the shares (a fourth-order polynomial of age), as a proxy for asset accumulation in explaining non-labour income.

One concern with assets is that they seem to be good instruments for non-labour income in a higher

extent for wealthy households, who are more likely to have income from capital than other households. For more modest couples, non-labour income is more likely to come from state allowances and benefits. So I add as an instrument a dummy variable indicating whether the household receives benefits or not. These benefits include child benefit or sickness allowance for example. Finally, information about parents are generally good instruments for non-labour income. Unfortunately, the survey does not include variables about inheritance. Information about the level of education of the father of both partners are provided, but this does not significantly explain household non-labour income. Instead, the sector of employment of the father (public, private, or self-employed) exerts an impact on household non-labour income, and is unlikely to be correlated with the shares. So I also include dummies about the employment sector of the father of each partner as an instrument. In addition, I also include a dummy indicating whether the partner experienced unemployment or bankruptcy of one of his/her parents or general financial problem in the family before he/she was 18 years old, which also significantly explains non-labour income. The Hansen test does not reject the over identification restrictions, for each of the specifications I present in the following sections. Descriptive statistics about the instruments of wage and non-labour income are presented in Appendix 1.

4.1.3. Interpretation of wage coefficients

Male and female wage variables, as explanatory variables in the models based on the monetary expenditures only, have a straightforward and usual interpretation. Nevertheless, in the second model, as the wage is a direct component of the partner's share of the full expenditures, we expect that the own wage coefficient (female wage in explaining the share of the woman, and male wage in explaining the share of the man) to be strongly significant and very close to unity. These coefficients have no economic meaning, such that this specification does not allow me to study the effect of an increasing in the wage of a partner on his/her share of full expenditures, and taking into account the endogeneity of the wage does not solve this problem. This problem occurs both for the 'share in level' and 'relative share' specifications (models 2 and 4). A structural modelling should be employed, which is left for future research. However this specification allows to examine the effect of the crossed wage (the impact of the male wage on the female share of the full expenditures, and conversely), and the estimations of the shares of monetary expenditures still allow to investigate the effect of both the own wage and the partner's wage. Note that as my objective is to study the determinants of both monetary and leisure expenditures together, I

nevertheless include the own wage variable as a control in models 2 and 4 to neutralize the effect of the different variables on the wage.

4.2. The potential determinants of the sharing rule

All along the result sections, two types of determinants will be considered: the 'general determinants' and the 'distribution factors'. The distinction between both is fundamental for the interpretation of the results. As said before, distribution factors are very specific variables in the sense that they affect bargaining powers but not the preferences of household members or the household budget set. In other words, they influence 'who gets what' but only through their impact on relative power within the household (Browning, Bourguignon, Chiappori, and Lechene, 1994 ; Bourguignon, Browning and Chiappori, 2009). In the collective model, changes in distribution factors lead to variations in outcomes while the set of efficient allocations remains unchanged. Thus distribution factors provides very useful information on decision process within the household. On the other hand, the general determinants are variables that do not satisfy these properties.

4.2.1. Some 'traditional' determinants

Until now, most of distribution factors used in the literature refer to "pure" economic variables (as relative wages of partners, relative income or unearned income, relative education) or to the marriage market. Indeed, according to Becker (1991), marriage market is an important determinant of intra-household decision process, in the sense that negotiation powers are linked to the situation outside the couple. If the situation in case of divorce is more favorable for one partner than the other, this confers to the first partner a higher negotiation power, as his/her divorce threat becomes more credible. That's why the sex ratio has been largely used in the literature as it summarizes the state of the marriage market for a man and a woman, with the advantage to be exogenous and easily available. If for instance, the number of women is lower than the number of men in the society, then women are "scarce" and it is more difficult for a man to find a partner, but easier for a woman. This confers to women a stronger divorce threat (Browning et al., 1994, Chiappori, Fortin, Lacroix, 2002). Legislation governing divorce has also been used as a distribution factor to represent the situation of partners outside the couple: for instance Chiappori, Fortin, Lacroix (2002) use an aggregate index in which a larger value indicates laws that are more favorable to women, in the United States.

As in many studies in the literature, I use the sex ratio, which is computed here at the "departmental" level from the French National Statistics in 2009. Considering X_m , the number of men in the department of the same age (in 5-years intervals) as the husband in a couple, and X_f , the number of women of the same age as his wife, the sex ratio is equal to $\frac{X_m}{X_m+X_f}$.

As it is also generally done, I include as "economic" distribution factors the ratio of years of education ($\frac{Educ_f}{Educ_m}$) and the age difference between partners ($age_f - age_m$). In the 'relative share' specification, I will also include the logarithm of relative wages ($\ln \frac{w_m}{w_f}$).

As 'general determinants', which may be related to powers, but also to the budget constraint and preferences, I add a dummy for living in a rural area. This variable may influence the level of the assignable expenditures, but also negotiation powers (a sex ratio favorable to women may have a stronger impact on decision powers for women living in an urban area than in the countryside for instance). I also include the number of very young children (less than 3 years old) and older children (between 3 and 18 years old), which may have an impact both on the level of the share (we expect less assignable expenditures for couples with children) and on decision powers. I add the logarithm of the hourly wage of both partners and the logarithm of household non-labour income¹², a dummy indicating whether the couple is homeowner, the age of the partner, a control whether partners filled in the time-use diary during a week-day or a week-end day, and two dummies whether the monetary assignable expenditures of both partners are higher or lower than usual¹³.

Descriptive statistics about the 'traditional' determinants are shown in Table 6.

4.2.2. Introducing new determinants

Including only distribution factors related to divorce threat appears quite restrictive. Indeed, it seems quite unexpected that negotiation involves systematically divorce threat, except for couples in which harmony between partners is bad and the last alternative of divorce could be

¹²Information about total income in the family is only collected at the household level, that's why I am not able to use information about the division of non-labour income between partners. Indeed, I compute monthly non-labor income as the difference between total household income minus monthly spouses' earnings on the labor market. If the difference was found to be negative, I set the non-labour income equal to 0 (this is the case for 100 households, that is 10,6% of the sample).

¹³These indicators do not allow to capture in what extent assignable expenditures are different than usual, but at least add raw information about what are their usual level.

Table 6: Descriptive statistics: the 'traditional' determinants

Individual level				
	Men		Women	
	Mean	(Standard deviation)	Mean	(Standard deviation)
Age	41.88	(9.49)	40.02	(9.56)
EDUCATION				
Without diploma	9.93 %		9.19 %	
Brevet	3.87 %		5.79 %	
CAP/BEP (Before Bac)	41.49 %		28.95 %	
Bac (general & technical)	10.47 %		14.77 %	
Bac + 2	16.39 %		19.53 %	
Bac + 3	6.76 %		11.99 %	
Master and PhD	11.10 %		9.78 %	
Household level				
	Mean	(Standard deviation)		
Non-labour income (€/month)	259.01	(480.39)		
Sex ratio $\frac{X_m}{X_m+X_f}$	0.495	(0.020)		
Ratio hourly wages $\frac{w_m}{w_f}$	1.48	(1.74)		
Age difference $age_f - age_m$	-1.86	(4.20)		
Ratio education $\frac{Diploma_f}{Diploma_m}$	1.06	(0.30)		
Number of children (<3 years)	0.15	(0.36)		
Nb of children (3-18 years)	0.88	(0.97)		
Rural			27.43 %	
Homeowner			70.26 %	

Number of couples: 940.

really considered. But in most cases, threats and processes at stake could be not too extreme and perhaps more internal to the household and related to cultural determinants, more precisely habits, elements of context and biography of each partner. In addition, summarizing decision making and distribution of powers only with 'economic' outcomes (particularly their division between partners, as relative wages, education and age) seems quite restrictive, as non-economics factors are likely to influence intra-household decision-making.

In order to go beyond the sex ratio and 'economic' outcomes as distribution factors, the household black-box has to be opened to find information that could proxy the way partners negotiate. This becomes possible with the new French time-use survey as these data contain a rich set of potential distribution factors. Information are collected about current partnership (harmony within couples, financial arrangement), health information, details about beginning of the relationship, fertility histories of the two partners, division of assets, information about education and labor force participation of mothers' partners, etc.

Browning and Bonke (2009) were the first to test some new "non-economic" distribution factors on the level of a sharing rule defined on the allocation of monetary expenditures, using data from the DHES. The novelty of my approach is to test the relevance of new variables on the level of a sharing rule defined not only on the allocation of money but also of time.

I test here similar distribution factors as in Browning and Bonke (2009), but also new factors related to the division of assets, if he/she worked or not when the couple met for the first time, and the level of education of the mother of each partner¹⁴. A 'good' distribution factor should impact in the opposite direction the share received by the woman and the share received by the man, or at least impact one partner's share without influencing the other.

Note that some potential distribution factors I test (particularly the first and the last variables) may be finally though in term of (indirect) economic or divorce determinants in a sense. These factors are the following:

- The repartition of personal assets between partners. Usually, the repartition of non-labour income is included to study the allocation of resources within couples, but the repartition of assets is an original measure. I use the ratio of the logarithm of female assets on the logarithm of male assets. This variable is related to economic determinants of powers, but also to divorce as the share of assets each partner keeps in case of divorce may matter.
- Two variables about the mother of each partner: the mother worked full time or not when the partner was 16 years old, and the level of education of the mother¹⁵. I add interaction terms of man and woman variables. Browning and Bonke (2009) also used full time employment of the mother, but not her diploma. These two variables may impact partners' values, particularly opinion about women independence. Thus a man or a woman (or both) having

¹⁴Many other types of information are given in our data, but they are likely to suffer from an endogeneity bias, so I do not include them: financial arrangement (income is pooled or not, they do accounts regularly or not, they make precise budgets, they have a joint account), possession of a common real property, global harmony between partners and frequency of quarrels, if he/she feels one makes more concessions than the other, frequency of contacts with friends. Other variables could have constituted good exogenous distribution factors, but as they appear insignificant to explain the empirical sharing rule or are highly correlated with other distribution factors, I do not include them in this analysis: partners lived with family when they met, religious ceremony for the marriage if any, they moved in the woman's housing when they began to live together / man's housing / a new housing, Body Mass Index, he/she has already lived in a couple before the current partnership, the number of years since they first met until the moved together.

¹⁵As in the level of education of partners, the level of education of the mother is expressed in years of education.

a mother with a high level of education and who worked full time may be a characteristics in favour of the woman, perhaps because the man is less reluctant to "give more" to his wife, and/or this confers a higher decision power to the women. On the other hand, men in this situation may be more desirable partners (perhaps because they contribute more to domestic work) and receive a higher share of household income (Browning and Bonke, 2009, Fernandez et al., 2004).

- A dummy variable for children from past union + an interaction term for the man and the woman. This is also a variable used by Browning and Bonke (2009). There is no theory providing explanation whether this variable may be related with decision powers of each partner. Actually, previous children of a woman are more likely to live with her, so with the current couple, while previous children of the man are likely to live with the ex-wife. Consequently, a man having a child from a past union is likely to pay an alimony, but if this is his wife who has a previous child, the man is more likely to live with this child. Thus we may think that having previous child does not exert the same impact for men and women. In addition, this may increase conflicts within couples. In all, this variable may exert a different impact on decision powers of the man and the woman.
- A dummy whether the partner had a stable job when the couple first met + an interaction term for the man and the woman; a dummy whether the partner was a student (or training, internship) at this time + an interaction term for the man and the woman. The idea here is to capture some information about the beginning of the relationship, that may create habits for future and become rooted with impact on decision powers.

The exogeneity question of some of these distribution factors deserves a special discussion. Indeed, the mother's professional situation may have impacted preferences, which contradicts one of the two properties of a distribution factor. In addition, the professional situation of partners when they met for the first time may also reflect characteristics of partners rather than negotiation powers, raising selection issues. Some unobserved characteristics may have impacted both their professional situation at this time, and the level of their assignable expenditures now, making this variable endogenous. Furthermore, the professional situation of partners at this time may be related to their actual level of wages, and thus this variable may have an impact on the budget constraint they face, which is not adequate with the definition of a distribution factor. Consequently, these two sets of variables have to be interpreted cautiously in the results section.

Globally, this kind of analysis is marked by a trade-off between some pure exogenous factors as the sex ratio for instance, and more precise variables about negotiation, more closely related to the couple, but that may suffer from an endogeneity bias.

I will also include two variables which have been little used in this kind of analysis: the number of children above 18 years old, and the number of children who have left the household, that are likely to have an impact on the shares, even if they are not distribution factors of course.

Descriptive statistics about these new determinants are given in Table 7.

Table 7: Descriptive statistics: the new determinants

Individual level				
	Men		Women	
	Mean	(Standard deviation)	Mean	(Standard deviation)
Personal assets, in €	48409.1	(120703.9)	35939.9	(91805.9)
Mother worked full time	47.09 %		47.72 %	
Both mothers worked full time	26.13 %			
MOTHER EDUCATION				
No diploma	43.40 %		36.06 %	
Primary educ	25.39 %		25.57 %	
Brevet	5.98 %		5.97 %	
CAP/BEP	10.70 %		15.77 %	
Bac (General or Techn)	6.48 %		7.00 %	
Bac +2	3.50 %		3.56 %	
Bac >2	4.55 %		6.07 %	
Children from past union	11.49 %		11.97 %	
Both had children	6.50 %			
PROFESSIONAL SITUATION WHEN PARTNERS MET FOR THE FIRST TIME				
Stable job	59.03 %		42.25 %	
Both stable job	36.12 %			
Student	31.13 %		45.28 %	
Both student	26.96 %			
Household level				
Number children >18 years	0	88.71 %		
	1	9.69 %		
	>1	1.60 %		
Number children left home	0	79.53 %		
	1	6.54 %		
	2	11.03 %		
	>2	2.90 %		

Number of couples: 940

In the two next sections, I will estimate the dependence of the sharing rule on the 'traditional'

determinants, then on the 'non-traditional' distribution factors.

5. Results: 'traditional' determinants of the sharing rule

Let's now investigate the effect of traditional variables usually found to exert an influence on the sharing rule, and especially whether their impact differ considering only the monetary expenditures or the full expenditures.

Table 8 shows the results of the GMM simultaneous estimation of the shares in level (in Euros per month) received by the husband and the wife. The first two columns present the estimation result when considering only monetary expenditures, then columns 3 and 4 display estimation result when considering the shares of the full expenditures.

Regarding the shares of monetary expenditures, only the wage of the woman exerts a significant impact on the shares received both by the man and the woman, and the effect is higher for the man: an increasing in the wage of the wife by 1% increases the share received by her husband by 0.8%, and her own share by 0.4%. So the increasing in the total assignable expenditures of the couple is higher than the increasing in the wage, meaning that there are less expenditures for the other goods A (as public goods, common goods, etc.). As a rise in the man's wage has no effect on the level of assignable expenditures of both the wife and himself, this extra money is certainly used for the other goods A , maybe because his wage is perceived as the main part of the household income (breadwinner role). On the other hand, an increasing of the woman's wage may be perceived as a supplement that the partners can enjoy for themselves.

An increasing in the household non-labour income has no impact on the shares of monetary assignable expenditures, meaning that it is used for the other goods. The presence of children of any age exerts a strong negative impact on both shares, and in a higher extent when the children are very young. This is not surprising as a higher part of the household income is devoted to the children, especially when they are below 3 years old, where childcare expenses are higher.

The more the man is old, the less he gets for himself, but the age of the woman has no impact on the amount she spends. A woman living in a rural area will spend less for herself than a similar woman who does not live in a rural area, but this characteristic has no impact for the man's share.

Regarding the 'traditional' distribution factors, the coefficient of sex ratio has the theoretical

Table 8: GMM simultaneous estimation of the husband's and wife's share (Absolute shares, in Euros per month)

Model:	Shares of monetary expenditures		Shares of full expenditures (The sharing rule)	
	$\ln (C_m)$	$\ln (C_f)$	$\ln (\Psi_m)$	$\ln (\Psi_f)$
$\ln w_m$	-0.011 [0.340]	0.325 [0.261]	1.028*** [0.076]	0.169** [0.086]
$\ln w_f$	0.790*** [0.270]	0.406** [0.188]	-0.021 [0.064]	0.916*** [0.065]
\ln (non-labour income)	0.014 [0.019]	0.013 [0.013]	0.006 [0.004]	0.009* [0.005]
Number children <3	-0.466*** [0.147]	-0.568*** [0.125]	-0.122*** [0.040]	-0.122*** [0.042]
Number children 3-18	-0.229*** [0.066]	-0.149*** [0.043]	-0.040*** [0.014]	-0.065*** [0.015]
Age (m;f)	-0.020*** [0.007]	-0.005 [0.005]	0.002 [0.001]	-0.001 [0.002]
Rural	-0.072 [0.129]	-0.157* [0.094]	0.008 [0.028]	-0.003 [0.031]
Owner	0.099 [0.136]	-0.065 [0.091]	-0.044 [0.031]	-0.061* [0.033]
Sex ratio	-1.108 [3.130]	3.38 [2.237]	0.755 [0.630]	0.725 [0.660]
Age difference (f-m)	-0.044*** [0.014]	-0.006 [0.010]	0.001 [0.003]	-0.001 [0.004]
Ratio education (f/m)	-0.209 [0.200]	-0.16 [0.140]	-0.028 [0.041]	0 [0.043]
Constant	4.700** [1.867]	2.193* [1.301]	5.322*** [0.375]	5.186*** [0.397]
Observations	940	940	940	940

Robust standard errors in (), * significant at 10%; ** at 5%; *** at 1%

Other controls: 'expenditures more than usual', 'expenditures less than usual', 'weekday' (only for the shares of full expenditures).

expected sign (the wife receives more and the husband receives less as the proportion of men increases), but these effects are not significant. The more the wife is old compared to him, the less he gets, but there is no effect on her share, meaning that there is more expenses for the family. Browning and Bonke (2009) did not find any significant effect of the difference in age, while Browning et al. (1994) found that older partners receive more of total expenditure. Finally, relative education has no impact.

Results are different if we look at the shares of the full expenditures, which includes also leisure expenditures. As expected, partner's own wage is associated with a higher own share

with a coefficients very close to 1, but as explained in the previous section, this is not surprising given that the hourly wage directly enters the share (so the dependent variable). By contrast, the impact of the wage of one partner on the share received by the other has a meaning, and we find that only an increasing in the man's wage has a positive effect on the share of the full expenditures received by the woman: if his wage rises by 1%, she receives 0.17% more.

A higher non-labour income increases slightly the share received by the woman but not the man's share. Then, except for the number of children which also exerts a strong negative impact on the share of the full expenditures, and for homeowner couples in which the woman receives slightly less compared to a similar women who is not homeowner, the other variables do no influence the sharing rule.

These results suggest that 'classical' determinants exert an impact on the shares of the monetary expenditures, but as soon as time dimension is introduced, these variables have a very weak impact.

Table 9 presents the results from the relative shares estimation, in which the level of the total assignable expenditure is considered as a constant. Regarding the relative shares of monetary expenditures (column on the left), we observe that the wife receives less compared to her husband when they have children below 3, but the effect is not significant. On the contrary, she receives a higher share compared to him as the number of children between 3 and 18 years increases. Regarding the 'traditional' distribution factors, only the sex ratio exerts a significant impact, in the 'right' direction according to the theory. If we look at the relative shares of the full expenditures now, only the relative wages have an influence on the relative shares, but as before, there is no meaningful interpretation since wages directly enter the measure of the shares of full expenditures.

Finally, the 'classical' determinants have very little influence on the relative shares of both monetary and full expenditures, except for the sex ratio in explaining the relative shares of monetary expenditures. Thus French data confirms the use of the sex ratio as a distribution factor, but only when considering monetary expenditures. Note that the lack of significant results might be due to the fact that this specification is restricted on the assignable expenditures of the partners, contrary to the 'shares in level' specification in which I take into account (indirectly) the other expenditures.

Table 9: GMM estimation of the relative shares of the wife and the husband

Model:	Relative shares of monetary expenditures	Relative shares of full expenditures (The sharing rule)
	$\ln \left(\frac{C_f}{C_m} \right)$	$\ln \left(\frac{\Psi_f}{\Psi_m} \right)$
ln (non-labour income)	0.001 [0.018]	0.003 [0.006]
Number children<3	-0.158 [0.141]	0.015 [0.046]
Number children 3-18	0.099* [0.059]	-0.023 [0.017]
Age (m)	0.004 [0.006]	-0.003 [0.002]
Rural	-0.134 [0.114]	-0.017 [0.032]
Owner	-0.07 [0.113]	-0.009 [0.034]
$\ln \left(\frac{w_m}{w_f} \right)$	0.242 [0.254]	-0.899*** [0.075]
Sex ratio	5.873** [2.989]	0.125 [0.661]
Age difference (f-m)	0.02 [0.013]	-0.004 [0.004]
Ratio education (f/m)	0.02 [0.156]	0.018 [0.047]
Constant	-2.770* [1.585]	-0.074 [0.357]

940 obs. Robust standard errors in (). * significant at 10%; ** at 5%; *** at 1%

Other controls: 'expenditures more than usual', 'expenditures less than usual', 'weekday' (only for the shares of full expenditures), 'total couple's expenditures' (monetary or full).

Globally, the 'traditional' distribution factors have a weak impact, especially to explain the sharing rule based on the full expenditures. Looking for new distribution factors will be the next step, in order to attempt a better understanding of the decision process within couples.

6. Results: new determinants of the sharing rule

Tables 10 and 11 show results when adding the new distribution factors to the analysis, first considering the shares of the full expenditures (10), then the shares of monetary expenditures only (11), to make comparisons. Even if the effects are not strongly significant (most of the time at the 5 or 10% level), these new variables affect more often the shares of the full expenditures rather than the share of monetary expenditures.

Table 10: GMM estimation of the husband's and wife's share of the full expenditures (Absolute shares, in Euros per month)

	$\ln(\Psi_m)$	$\ln(\Psi_f)$		$\ln(\Psi_m)$	$\ln(\Psi_f)$
Number children >18	-0.076*** [0.028]	-0.046* [0.028]	Previous children (m)	-0,089 [0.067]	0,038 [0.057]
Number children left home	-0.048** [0.021]	-0.078*** [0.021]	Previous children (f)	-0,013 [0.061]	0.105* [0.057]
Ratio ln(assets) (f/m)	-0.007* [0.004]	-0,004 [0.005]	Previous children (m*f)	0,057 [0.092]	-0.240*** [0.101]
Education mother (m)	0 [0.004]	0,005 [0.004]	Student 1 st meeting (m)	0.123** [0.062]	-0,075 [0.077]
Education mother (f)	-0.005* [0.003]	-0,001 [0.003]	Student 1 st meeting (f)	0,069 [0.048]	-0,028 [0.049]
Mother worked full time (m)	-0,032 [0.033]	-0,015 [0.034]	Student 1 st meeting (m*f)	-0.177** [0.077]	0,002 [0.088]
Mother worked full time (f)	-0.055* [0.031]	-0.068* [0.036]	Worked 1 st meeting (m)	-0,077 [0.056]	-0.114*** [0.049]
Mother worked full time (m*f)	0.084* [0.047]	0,051 [0.050]	Worked 1 st meeting (f)	-0,02 [0.063]	-0,117 [0.072]
			Worked 1 st meeting (m*f)	0,065 [0.072]	0.153* [0.079]
All of the 'traditional determinants' are included in the estimation.					
Only coefficients of the new distribution factors are displayed.					
940 observations. Robust standard errors in (), * significant at 10%; ** at 5%; *** at 1%					
Test of the fit of the models with and without the new distribution factors (χ^2 statistic): 75.35					

Regarding the sharing of the full expenditures (Table 10), we observe that the number of children older than 18 years or who have left home are associated with lower shares for both the man and the woman. Interestingly enough, the man's share decreases more than the woman's share due to the presence of older children, while we observe the contrary if the couple has children who left the household. The more the personal assets of the wife are high compared to those of her husband, the less he receives (the effect is significant at the 10% level), while the share received by the woman is not impacted. Such a situation might confer to the woman a higher decision power, allowing her to convince the man to get a lower share in favour of more expenses for the family.

Then, the more the mother of the woman is educated, the less her partner gets, but there is no impact on her own share. Thus having a high educated mother might confer to the woman a higher impact on decisions, maybe because of a better perception about the economic role of women in those couples. In addition, if the mother of the woman worked full time when she was 16 years, but not the mother of the man, both the man and the woman receive less compared to

a couple in which the mother of the woman did not worked full time: at the mean of the sample, the man receives 173 Euros less and the woman 177 Euros less per month compared to a couple in which none of the mothers worked full time. This result suggests that since both partners get less, expenditures for the family are higher in those couples. This might be an effect of preferences: as her mother worked full time, maybe she grew up in a family that spent a lot for domestic help and childcare, which might lead the woman to reproduce this organization in a sense. At the same time, this might also confer her a higher negotiation power (as for the education of the mother, the opinion about the economic role of women might be better in those couples), leading her to convince her partner to make more expenditure for the family as well. However, if the mother of the husband worked full time too, this negative effect disappears for him, but not for her. More precisely, if the mothers of both partners worked full time, he receives 264 Euros more compared to a similar couple in which both mothers did not worked full time, but this has no impact on her share. These men may be more desirable partners, perhaps because they contribute more to domestic work (Browning and Bonke, 2009, Fernandez et al., 2004), which lead them to make better in the sharing of resources. This higher negotiation power for men exceeds the effect of the woman having a mother working full time (higher power for the woman, or preferences).

Then, if the woman has a child from a previous partnership, she receives a higher share of the full expenditures: in the case her partner has no previous child, she receives 273 Euros more if she has a previous child than a similar woman who has not this characteristics. This might confer more power to the woman, perhaps because as she had another partner she left, the divorce threat is more present or credible in those couples in case of disagreement. Or maybe she is a 'high quality' woman, as her partner has accepted to be with her while she already has a child. However, if they have both a previous child, she gets 350 Euros less than a comparable woman who had a previous child but not her husband. She also gets 252 Euros less if they both have a previous child compared to a situation in which none of the partners have this characteristics. So the positive effect for the woman disappears if her partner also has a previous child, leading her to get a lower share of full expenditures, maybe because there are more expenses for these children, or an alimony to pay. Having a previous child for a man might also confer him a higher negotiation power, leading the woman to receive less for herself in favour of the family. A previous child of the man and/or the woman has no effect on the share received by the man. Interestingly enough, considering monetary expenditures only, Browning and Bonke (2009) found that a wife who had a previous child and is married to a man who also had a previous child receives a share

that is about 9% points lower than an otherwise comparable woman in which neither partner has children from before the marriage. But on the other hand, if the wife has a child who is not the natural child of her partner then she receives 6% points of assignable monetary expenditures less than an otherwise comparable woman. These are the largest effects they find in their analysis.

If we look at the professional situation of the partners when they met for the first time, we find that the characteristics of being a student has an effect on the share received by the man, while having a stable job impacts more the share received by the woman. More precisely, in couples in which none of the partners had a stable job and the woman were not a student, if the man was a student, he receives 387 Euros more than an otherwise comparable man who were not a student (maybe because he had good perspective of a future wage, and this was less the case for her). I do not find a similar effect if the woman were a student at this time but not the man. In contrast, this effect disappears if they were both a student at this time compared to a situation in which none of them were a student. Furthermore, I find that a woman who was not a student and had no stable job when she met her husband, while he had a stable job, receives 296 Euros less than an otherwise comparable woman who had a stable job. By contrast, this negative effect disappears if she also had a stable job at this time. These results might suggest that this inegalitarian situation at the beginning of the relationship, to the disadvantage of women, might create habits in terms of the allocation of resources, and lasts for the future. But as expressed before, these variables might also capture some characteristics of the partners not necessarily related to decision powers, who have an impact on their present full expenditures.

Finally I run a Wald test to test the null hypothesis that these new distribution factors are simultaneously equal to zero. The χ^2 statistics (bottom of Table 10) shows that the null hypothesis is rejected, so that including these variables create a statistically significant improvement in the fit of the model.

Do these variables also exert an influence on the allocation of the monetary assignable expenditures between partners? Table 11 shows that a small number of these new distribution factors have an impact. The presence of children older than 18 years still lowers the shares of both the man and the woman, while the number of children who have left home is associated with lower expenditures only for the woman (the coefficient is also negative for the man, but not significant). The level of education of the mother of the man is positively associated with a higher share for the woman, while the level of education of her mother has no impact. So a

woman whose the partner has a highly educated mother does better in the allocation of monetary expenditures. If the mother of the man worked full time when he was 16 years, she receives less. Even if this finding is a little different from our previous result regarding the shares of the full expenditures, this goes in the sense of Browning and Bonke (2009) and Fernandez et al. (2004) findings that these men may be more desirable partners, leading them to do better in the allocation of resources. In this case, the woman receives less than an otherwise comparable woman, and a transfer from her personal expenditures to expenses for the family may happen. Surprisingly, results show that in couples in which the man has a child from a past partnership, the share of monetary assignable expenditures of the woman is lower, while we found a positive effect on her share when she has a previous child, considering the shares of the full expenditures. The woman also receives a lower share of monetary expenditures if she has a previous child, but the coefficient is not significant. On the other hand, these results entirely go in the sense of the findings in Browning and Bonke paper's (2009).

Regarding the professional situation of the partners when they met for the first time, we only find that a man who had a stable job at this time but not her wife (and she was not a student as well) receives a lower share, which is surprising.

Finally, even if some distribution factors lead to similar conclusions between the results based on the full expenditures and those based on the monetary expenditures only, few variables appear significant in the second specification. Globally, these new variables matter in the allocation of the full expenditures between partners, although the effects are not strongly significant.

What happens now if we analyse how the share of the woman varies compared to the share of the man, considering the total of the assignable expenditures as a constant (Table 12). Regarding the relative shares of the full expenditures (column 2), as in the estimation without the new distribution factors, only relative wages have an influence among the 'traditional' determinants (but this effect is straightforward). Regarding the new distribution factors, the number of older children and the number of children who have left home do not influence the relative shares, as the relative personal assets. The more the education of the mother of the man is high, the more the share of the woman is high compared to her partner. This effect is interesting because when we looked at the shares in level, only the level of education of the mother of the man had a negative effect on the share he receives. The employment status of the mothers of the partners

Table 11: GMM estimation of the husband's and wife's share of monetary expenditures (Absolute shares, in Euros per month)

	$\ln(\Psi_m)$	$\ln(\Psi_f)$		$\ln(\Psi_m)$	$\ln(\Psi_f)$
Number children >18	-0.255** [0.118]	-0.254** [0.107]	Previous children (m)	-0,579 [0.364]	-0.311* [0.168]
Number children left home	-0,129 [0.086]	-0.121** [0.062]	Previous children (f)	-0,137 [0.224]	-0,241 [0.167]
Ratio ln(assets) (f/m)	-0,026 [0.022]	-0,016 [0.021]	Previous children (m*f)	0,149 [0.461]	0,146 [0.290]
Education mother (m)	0,012 [0.014]	0.021* [0.011]	Student 1 st meeting (m)	-0,101 [0.253]	0,037 [0.221]
Education mother (f)	-0,011 [0.014]	-0,002 [0.010]	Student 1 st meeting (f)	-0,147 [0.192]	-0,215 [0.147]
Mother worked full time (m)	-0,158 [0.142]	-0.192* [0.110]	Student 1 st meeting (m*f)	0,127 [0.296]	0,248 [0.249]
Mother worked full time (f)	-0,12 [0.140]	-0,108 [0.097]	Worked 1 st meeting (m)	-0.319* [0.185]	0,218 [0.177]
Mother worked full time (m*f)	0,221 [0.187]	0,099 [0.144]	Worked 1 st meeting (f)	-0,094 [0.258]	0,06 [0.224]
			Worked 1 st meeting (m*f)	0,374 [0.282]	-0,052 [0.247]
All of the 'traditional determinants' are included in the estimation. Only coefficients of the new distribution factors are displayed. 940 observations. Robust standard errors in (), * significant at 10%; ** at 5%; *** at 1%					

has no effect on the relative shares, which is quite surprising at first sight, given previous results regarding the shares in level, but remember that the direction of the effects was in the sense of more expenses for the other expenditures (public goods etc.), that we can't capture using the 'relative shares' specification.

The effect of having a previous child remains, which confirms the power interpretation we gave. Indeed, we observe here that a woman who has a previous child while her partner has not receives 14% more than her partner, compared to a comparable woman who has no previous child. However, a woman who has a child from a past partnership and who is in a couple with a man who also has a previous child receives 4.2% less than her partner, compared to a similar woman whose neither herself and her husband has a previous child. This last finding is different from Browning and Bonke as they find an increasing in her relative share by 9% in this situation.

Finally, results show that the woman gets a lower relative share in several situations: her share is decreasing compared to her partner in the case he was a student but not her when they met for the first time, but also in the opposite case (she was a student but not him), and if both partners were a student in comparison with a situation in which both partners were not a student, which is quite surprising. But let's remember that these results have to be

interpreted when neither of the two had a stable job at this time, which means that globally, the woman receives on average a lower share when the partners were students or had no stable job.

If we look at the sharing of the monetary expenditures only, very few variables have a significant impact. As in the specification without these new distribution factor, the woman receives a higher relative share of the monetary expenditures when the couple has children from 3 to 18 years. Her share is decreasing compared to her partner when the couple has little children below 3 years, but the effect is not significant. The sex ratio still has the 'right' theoretical effect. Also, difference in age now appear to be significant when adding the new distribution factors: the more she is old compared to her partner, the higher is the relative share. Regarding the new distribution factors, only the fact to have a stable job when the couple met has an influence: if the man or both the man and the woman had a stable job, the relative share is increasing in favour of the woman. Interpreting these last effects in terms of power appears difficult as these variables certainly capture other characteristics of the partners.

To summarize, regarding the allocation of monetary expenditures only, the traditional variables have more impact than the new ones to explain their division between partners. We observe the opposite when looking at the shares of the full expenditures: the classical distributions factors do not explain the sharing of the full resources, while the new ones have an influence. Finally, if we concentrate on the sharing of monetary expenditures, the 'classical' determinants might be sufficient to represent decision making, but as soon as we add the time dimension to the analysis, these 'traditional' factors do not offer a good explanation and adding variables related to personal history, family background variables, and differences in economic role appears important to better understand the sharing of resources between partners. Also, all these estimations suggest that considering a sharing rule defined above only money or above both time and money leads to different conclusions. Monetary expenditures represent only a part of the allocation of the resources within couples, and a more global representation help to provide a better understanding of decision-making within couples.

Table 12: GMM estimation of the relative shares of the wife and the husband

Model:	Relative shares of monetary expenditures	Relative shares of full expenditures (The sharing rule)
	$\ln \left(\frac{C_f}{C_m} \right)$	$\ln \left(\frac{\Psi_f}{\Psi_m} \right)$
ln (non-labour income)	0.007	0.003
Number children <3	-0.203	0.006
Number children 3-18	0.102*	-0.027
Age (m)	0.002	-0.002
Rural	-0.129	0.002
Owner	0.012	-0.007
$\ln \left(\frac{w_m}{w_f} \right)$	0.36	-0.860***
Sex ratio	5.816*	-0.081
Age difference (f-m)	0.034**	-0.003
Ratio education (f/m)	0.067	0.035
Number children >18	-0.009	0.011
Number children left home	-0.043	-0.026
Ratio ln(assets) (f/m)	0.018	0.005
Education mother (m)	0.013	0.006*
Education mother (f)	0.012	0.005
Mother worked full time (m)	-0.031	0.007
Mother worked full time (f)	0.011	-0.019
Mother worked full time (m*f)	-0.123	-0.017
Previous children (m)	0.411	0.099
Previous children (f)	-0.095	0.133**
Previous children (m*f)	-0.15	-0.274**
Student 1 st meeting (m)	0.144	-0.192**
Student 1 st meeting (f)	-0.064	-0.096*
Student 1 st meeting (m*f)	0.251	0.190**
Worked 1 st meeting (m)	0.646***	-0.03
Worked 1 st meeting (f)	0.227	-0.111
Worked 1 st meeting (m*f)	-0.470*	0.104
Constant	-3.372**	-0.033
940 obs. * significant at 10%; ** at 5%; *** at 1%		
Other controls: 'expenditures more than usual', 'expenditures less than usual', 'weekday' (only for the shares of full expenditures), 'total couple's expenditures' (monetary or full).		

7. Robustness check

Varying the measure of leisure time:

Taking into account only 'pure' leisure time (without meals, commuting from work to home, breaks at work) does not change the results.

FORTHCOMING

8. Conclusion

The aim of this paper was to measure a sharing rule taking into account both the allocation of time and money within the household, and directly from the data. Comparisons with the division of the monetary expenditures only were also provided. Then, I investigated the potential determinants of the sharing rule, particularly to analyse in what extent adding new distribution factors to the analysis help to better understand the allocation of resources within the family.

The results suggest that considering a sharing rule based on the full expenditures or only monetary expenditures leads to different conclusion, in terms of the level of the sharing rule but also its determinants. Indeed, French data show that women receive on average 45 percent of the couple's full expenditures, while if we focus on the monetary expenditures only, she receives 53.4 percent of the total monetary assignable expenditures of the couple. Do not take into account time dimension when studying intra-household sharing of resources leads to overestimate the share got by the woman.

Regarding the determinants of the sharing rule, the 'traditional' distribution factors (mainly difference in age and the sex ratio) have an influence on the allocation of monetary expenditures, while they do not explain the sharing of the full expenditures. Finding new distribution factors appears necessary in this context. I investigate the impact of 'non-traditional' distribution factors, and I find that they impact the decision process. Interestingly, different distribution factors impact the level of the share received by the man and the woman. The level of education and the employment status of the mothers of the partners, the gap between the personal assets of the man and the woman, and whether they were student when they met mainly influence the share of the full expenditures received by the man. The presence of a child from a previous partnership and whether partners had a stable job when they met have an impact on the level of the share of the full expenditures got by the woman.

Differences in negotiation powers might be due to the results of social norms (linked to family background and especially the professional situation of the mothers of the partners), differences in economic role (mainly their employment status when they met for the first time), or differences in personal and fertility history.

Finally, the collective model is built on minimalist assumptions, but taking into account some

'non-monetary' aspects into the analysis appears important to better understand the division of resources between partners. This is a difficult task as it requires to open the household black box, but improvements can be done with more and more datasets, as the French time-use survey.

The next step will be to attempt to explicitly take into account household decision-making regarding the other expenses for the family, as the public goods, and to develop and estimate a global model, knowing that the sharing rule above time and monetary assignable expenditures is directly observed from the data.

Appendix 1: Descriptive statistics about the instruments for wages and non-labour income

Table 13: Descriptive statistics: instruments of wages and non-labour income

Individual level		
	Men	Women
Personal assets (in Euros)	48409.1 (120703.9)	35939.9 (91805.9)
Professional experience (in years)	TO ADD	TO ADD
Number of employees in the institution	TO ADD	TO ADD
SECTOR OF EMPLOYMENT OF THE FATHER		
Public	TO ADD	TO ADD
Private	TO ADD	TO ADD
Self-employed	TO ADD	TO ADD
Financial problem before 18 years	TO ADD	TO ADD
Household level		
Common assets (in Euros)	73991.6 (146126.4)	
Benefits	44.9 %	
Little town	16.59 %	
REGION		
1: Paris and its region	37.90 %	
2: North	6.20 %	
3: East	8.75 %	
4: West	13.87 %	
5: Southwest	11.79 %	
6: Center East	11.59 %	
7: Mediterranean	9.90 %	

Number of couples: 940

Values in (.) are standard errors.

9. Bibliography

Alessie, R., Crossley, T., & Hildebrand, V. (2006). "Estimating a collective household model with survey data on financial satisfaction". Working Paper 06/19. London: Institute for Fiscal Studies.

Apps, Patricia F. & Rees, Ray, (1988). "Taxation and the household," *Journal of Public Economics*, Elsevier, vol. 35(3), pages 355-369, April.

Becker, Gary S. (1991). "A Treatise on the Family," *Cambridge, Mass.: Harvard Univ. Press*.

Blundell Richard & Chiappori Pierre-André & Meghir Costas, (2005) "Collective Labor Supply with Children" *Journal of Political Economy*, University of Chicago Press, vol. 113(6), pages 1277-1306, December.

Bonke, J., & Browning, M. (2009). "The distribution of financial well-being and income within the household". *Review of Economics of the Household*, 7, 31-42. doi:10.1007/s11150-008-9044-3.

Bourguignon François & Martin Browning & Pierre-André Chiappori, (2009). "Efficient Intra-Household Allocations and Distribution Factors: Implications and Identification," *Review of Economic Studies*, vol. 76(2), pages 503-528.

Browning, Chiappori, Weiss, (2011). "Economics of the Family", *Cambridge Surveys of Economic Literature*.

Browning Martin & Bonke Jens, (2009). "Allocation within the household: direct survey evidence," *University of Oxford, Working Paper No. 429*.

Browning, Martin, Bourguignon, Francois, Chiappori, Pierre-André, and Lechene Valérie, (1994). "Income and Outcomes: A Structural Model of Intrahousehold Allocation", *Journal of Political Economy*, 102, 1067-1096.

Browning, Martin, Chiappori, Pierre-André and Lewbel Arthur (2013). "Estimating Consumption Economies of Scale, Adult Equivalence Scales, and Household Bargaining Power", *Review of Economic Studies* 80 (4): 1267-1303.

Browning Martin & Gørtz Mette, (2012). "Spending Time and Money within the Household," *Scandinavian Journal of Economics*, Wiley Blackwell, vol. 114(3), pages 681-704, 09.

Cherchye, Laurens, Bram De Rock, Arthur Lewbel and Frederic Vermeulen. (2012). "Sharing Rule Identification for General Collective Consumption Models." *CentER Discussion Paper Series* No. 2012-041

Cherchye, Laurens, Bram De Rock, and Frederic Vermeulen. (2012). "Married with Children: A Collective Labor Supply Model with Detailed Time Use and Intrahousehold Expenditure Information." *American Economic Review*, 102(7): 3377-3405.

Chiappori, Pierre-André & Donni, Olivier, (2006). "Les modèles non unitaires de comportement du ménage : un survol de la littérature," *L'Actualité Economique*, vol. 82(1), pages 9-52.

Chiappori, Pierre-André, Bernard Fortin, and Guy Lacroix. (2002) "Marriage Market, Divorce Legislation, and Household Labor Supply." *Journal of Political Economy*, vol. 110, no. 1 (February): 37-72.

Chiappori, Pierre-André. (1997). "Introducing Household Production in Collective Models of Labor Supply", *Journal of Political Economy*, 105: 191-209.

Chiappori, Pierre-André. (1992). "Collective Labor Supply and Welfare." *Journal of Political Economy*, 100: 437-467.

Chiappori, Pierre-André. (1988). "Rational Household Labor Supply", *Econometrica*, 56: 63-89.

Couprie Hélène, (2007). "Time allocation within the Family: Welfare implications of life in a couple," *Economic Journal*, Royal Economic Society, vol. 117(516), pages 287-305, 01.

Donni O., (2009), "A Simple Approach to Investigate Intrahousehold Allocation of Private and Public Goods," *The Review of Economics and Statistics*, vol. 91(3), pages 617-628, August.

Donni O. (2002). "A Collective Model of Labor Supply and Child Care Demand". *Document de travail. Université de Cergy-Pontoise*.

Duflo Esther, (2003). "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa," *World Bank Economic Review*, World Bank Group, vol. 17(1), pages 1-25.

Fernandez, Raquel, Alessandra Fogli and Claudia Olivetti (2004). "Mothers and sons: preference formation and female labour force dynamics", *Quarterly Journal of Economics*, 119, 1249-1299.

Fong Yuk-fai & Zhang Junsen, (2001). "The Identification of Unobservable Independent and Spousal Leisure," *Journal of Political Economy*, vol. 109(1), pages 191-202.

Fortin, Bernard & Lacroix, Guy, (1997). "A Test of the Unitary and Collective Models of Household Labour Supply," *Economic Journal*, Royal Economic Society, vol. 107(443), pages 933-55, July.

Gronau Reuben, (2006). "Home Production and the Macro Economy-Some Lessons from Pollak and Wachter and from Transition Russia," *NBER Working Papers 12287*, National Bureau of Economic Research, Inc.

Haddad, Lawrence & Kanbur, Ravi, (1990). "How Serious Is the Neglect of Intra-Household Inequality?," *Economic Journal*, vol. 100(402), pages 866-81.

Kalugina, E., Radtchenko, N., & Sofer, C. (2009a). "How Do Spouses Share Their Full Income? Identification Of The Sharing Rule Using Self-Reported Income," *Review of Income and Wealth*, vol. 55(2), pages 360-391, 06.

Kalugina, E., Radtchenko, N., & Sofer, C. (2009b). "Intra-household inequality in transitional

Russia," *Review of Economics of the Household*, Springer, vol. 7(4), pages 447-471, December.

Lewbel, Arthur & Pendakur, Krishna (2008). "Estimation of collective household models with Engel curves," *Journal of Econometrics*, vol. 147(2), pages 350-358.

Lise, J. and S. Seitz (2011). "Consumption inequality and intra-household allocations", *Review of Economic Studies*, 78, 328-355.

Lundberg Shelly J. & Robert A. Pollak & Terence J. Wales, (1997). "Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit," *Journal of Human Resources*, vol. 32(3), pages 463-480.

Matteazzi Eleonora and Picard Nathalie (2010). "Collective Model with Children: Public Good and Household Production", *document de travail*.

Mazzocco, Maurizio, (2007). "Household Intertemporal Behaviour: A Collective Characterization and a Test of Commitment", *Review of Economic Studies*, 74, 857-895.

Mazzocco, Maurizio, (2004). "Saving, Risk Sharing, and Preferences for Risk", *American Economic Review*, 94, 1169-1182.

Pollak, Robert A & Wachter, Michael L, (1975). "The Relevance of the Household Production Function and Its Implications for the Allocation of Time," *Journal of Political Economy*, vol. 83(2), pages 255-77, April.

Rapoport Benoît, Sofer Catherine and Solaz Anne, (2011). "Household production in a collective model: some new results", *Journal of Population Economics*, Volume 24, Number 1, 23-45.

10. Database

Emploi du temps - 2010 - (2010), INSEE, Centre Maurice Halbwachs (CMH)