



UvA-DARE (Digital Academic Repository)

Labor supply and the welfare costs of marital conflict.

Maassen van den Brink, H.; Groot, W.N.J.

Published in:

Journal of Economic Psychology

DOI:

[10.1016/0167-4870\(94\)90025-6](https://doi.org/10.1016/0167-4870(94)90025-6)

[Link to publication](#)

Citation for published version (APA):

Maassen van den Brink, H., & Groot, W. J. N. (1994). Labor supply and the welfare costs of marital conflict. *Journal of Economic Psychology*, 15(3), 467-486. [https://doi.org/10.1016/0167-4870\(94\)90025-6](https://doi.org/10.1016/0167-4870(94)90025-6)

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <http://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

Labor supply and the welfare costs of marital conflict

Henriëtte Maassen van den Brink ^{a,*}, Wim Groot ^b

^a *Department of Economics, University of Amsterdam, Roeterstraat 11, 1018 WB Amsterdam, The Netherlands*

^b *Department of Economics, Leiden University, P.O. Box 9521, 2300 RA Leiden, The Netherlands*

Received 17 April 1993; revised 4 July 1994

Abstract

Marital conflicts can have negative welfare consequences. In this paper we use an equivalence scale approach to analyze the household labor supply and welfare effects of marital conflict. It might be assumed that there is a simultaneous relation between labor supply and marital conflict: increased labor force participation of women may increase marital conflict, while spouses may adjust their labor supply because of marital conflict. The empirical results show that such a simultaneous relation exists. Women who participate in the labor market have more conflicts about the division of household tasks and the care of children than non-participating women. On the other hand, marital conflicts cause women to reduce their labor supply. Finally, it is found that the welfare losses due to marital conflict are substantial.

1. Introduction

There are many sources of welfare differences between households. The most frequently studied are welfare inequalities generated by differences in household size and household composition. A great many studies have quantified cost of living indices for households of different composition (see, for example, Blundell and Walker, 1982; Ray, 1983; and Kooreman and Kapteyn, 1985). Within a dynamic context, demographic transitions

* Corresponding author. Tel: +31 20 525 4288.

such as marriage and marital disruptions (divorce or separation) or labor force transitions (employment, unemployment or non-employment) are also a source of life-time welfare differences (see Burkhauser et al., 1990). A third source of welfare differences can be found within the household itself. Inter-personal relations between household members affect the welfare of the household as a whole. Households in which personal relationships between household members are harmonious might be expected to enjoy higher welfare levels (*ceteris paribus*) than households affected by marital conflicts. So far, however, there have been no attempts to measure the welfare effects of marital conflicts within the household.

Until recently, little attention has been paid within economics to household decision-making and inter-personal relations within the household. Exceptions are Kooreman (1986) and Ott (1989). These studies use a game theory approach in which the bargaining power of the spouses in the household determines labor supply. However, they do not address the issue of the welfare aspects of the outcome of a particular division of bargaining power (i.e. marital conflict) within the household. Nor, to our knowledge, has any attention been paid to the direct labor supply effects of marital conflicts. Marital conflict might increase the labor supply of the spouses, since work provides an escape from home and from conflict. On the other hand, labor supply or the division of paid and unpaid work could itself be a source of marital conflict. If so, reducing labor supply might be a strategy to minimize conflict. In the field of social psychology more attention has been paid to the causes and consequences of inter-personal relations within the household. A short review of this literature is provided in the next section.

In this paper we use an equivalence scale approach to measure welfare differences between households resulting from marital conflict between husband and wife concerning the division of household work. (The terms husband and partner are used indifferently in this paper as mutual equivalents.) The degree of marital conflict is operationalized by a variable indicating the extent to which husband and wife argue about household tasks and child care. The focus of this paper is on the labor supply and welfare effects of marital conflict.

The outline of this paper is as follows. In Section 2 we give a brief review of the literature – mainly in the field of social psychology – on the causes and consequences of marital conflict. Section 3 presents a description of the equivalence scale approach to welfare measurement within a household labor supply model. The data used in the labor supply model are described

in section 4. Section 5 contains the estimation results of an ordered probit equation on marital conflict. The econometric analysis of the household labor supply model is presented in Section 6. The estimation results of the household labor supply model are in Section 7, and the last section draws some conclusions.

2. Causes and consequences of marital conflict: A review

The field of social psychology offers a comprehensive literature on marital conflict. The study by Harrell (1990) looks at the determining factors of marital conflict and fixes on three items as measures of such conflict: (1) "How often in the past twelve months have you and your spouse argued about demonstrations of affection?", (2) "How often in the past twelve months have either of you insulted or sworn at the other?", (3) "How often in the past twelve months have either of you stomped out of the room or house?". Harrell's study distinguishes five classes of explanatory variables: job and family life satisfaction, conversation with spouse, measures of sex role orientation, relative earnings and relative education. It finds that relative earnings (wife's annual income divided by the sum of her income and her husband's) – a proxy of the wife's labor supply – have no significant effect on marital conflict. This finding suggests that the causal relationship, if any, runs from marital conflict to labor supply, rather than vice versa. In contrast with the absence of an effect of relative earnings on marital conflict, the study finds that a relatively high level of education on the part of the wife clearly enhances the relationship and decreases marital conflict. Furthermore, the more liberated the view of masculinity ascribed to the husband, the greater his job satisfaction will be and the fewer arguments there will be with the spouse. Age and the "comfortable in conversation" variable both had strong direct negative effects on the number of times that husband and wife swore at or insulted each other, or stomped out of the room or house.

Quite similar conclusions can be drawn from the study by Markus (1990). This study analyzes the psychological and economic well-being of young families with working mothers. One of the dimensions of psychological well-being identified in the Markus study is marital quality: a composite index of self-reports of understanding, love, anger, mutual trust and enjoyment. The study identifies three labor force positions of the wife: house-

wife, employed intermittently, and employed. It finds that husband-wife relationships have no significant effect on the labor force status of the wife. This seems to indicate that there is no causal relation between marital quality and labor supply. The study does find, however, that employed women report fewer marital problems. A remarkable finding is that men too report psycho-social gains when their wives go out to work. The results even suggest that the contribution of women's work to the well-being of men is higher than its contribution to their own well-being. Markus (1990) further concludes that the occupational status of each spouse makes an independent contribution to the family's economic and psycho-social well-being.

Most of the research done in the field of social psychology focusses on the effect of wives' employment status on both their own and their husbands' well-being. In contrast to the findings of Markus (1990), Staines et al. (1978) found that the husbands of employed women did feel less adequate as breadwinners and that this feeling of inadequacy created a negative relationship between a woman's employment and her husband's well-being.

Parasuraman et al. (1989) investigated the relationships between women's employment and multiple indicators of husbands' well-being pertaining to work, family and overall quality of life. Small but significant negative relationships were observed between women's employment status and two indicators of their husbands' well-being: job satisfaction and overall quality of life. The study found that husbands of employed women reported slightly lower levels of job satisfaction, marital adjustment and quality of life than husbands of housewives. The data provided tentative evidence that dissatisfaction with child care arrangements mediated the relationships between wives' employment and husbands' marital adjustment in families with young children. Wife's employment was negatively related to husband's satisfaction with child care, which in turn was positively related to marital adjustment. This finding suggests that it is not merely the number of children in a family but also the satisfactoriness of child care arrangements that affects marital adjustment.

In a review of research on the effects of mothers' employment, Hoffman (1989) concludes that most studies investigating the effects of maternal employment on marital satisfaction find no effect. Hoffman (1989) explains this by reference to the complexities in the relationship between maternal employment and the satisfactions of each parent. This survey further concludes that attempts to examine specific aspects of the marriage have

also failed to reveal any clear pattern. Although several studies indicate better communication and agreement about values in dual-wage families, others have found the opposite.

The literature reveals no clear relationship between labor supply and marital conflict. However, there are reasons to doubt this evidence. For one thing, marital conflict and labor supply have not been analyzed within a framework of simultaneous equations. Most studies use some sort of partial correlation analysis to assess the relation between marital conflict and labor supply. Partial correlation analysis may be an ineffective tool for analyzing these relationships. With partial correlation analysis it is difficult to establish cause and effect. Some studies use multiple regression analysis to shed some light on the causal relations between labor supply and marital conflict. However, these studies either enter the marital conflict variable as an exogenous variable with labor supply as the dependent variable, or use female employment as an explanatory variable in a regression equation with marital conflict as dependent variable. If there is a simultaneous relation, both labor supply and marital conflict are endogenous. In that case, entering marital conflict directly in the labor supply model will produce biased and inconsistent estimates. The possibility of reciprocal causality is sometimes acknowledged (see for example Parasuraman et al., 1989, p. 199).

To overcome the problem of simultaneity, we use an instrumental variable technique in which the estimates of an ordered probit model are taken as instrumental variables for marital conflict. These instrumental variables are used through equivalence scales in a structural household labor supply model. Equivalence scales offer a way of comparing welfare levels between households. An equivalence scale represents the money equivalent needed for a household with marital conflict to be as well off as a household without marital conflict. The major strength of the present model compared to (partial) correlation or multiple regression analysis is twofold. First we use an explicit behavioral model to link marital conflict and labor supply (through the equivalence scale approach) and secondly we deal with the reciprocal causation problem.

3. The household labor supply model

Our analytical framework is derived from the micro-economic theory of consumer behavior. It is assumed that the household is the unit of decision

and that the household aims to attain the highest possible level of well-being. Well-being or utility of the household is derived from female and male leisure and consumption of commodities. In maximizing its utility the household is confronted with two restrictions: a time restriction and a budget restriction. The time restriction indicates that each individual can spend a maximum of 168 hours per week on leisure, and the budget restriction indicates that the total expenditure of the household should match its financial resources. The financial resources consist of labor earnings and non-labor income. Assuming optimizing behavior on the part of the household, it is possible to derive the female and male labor supply equations and a consumption equation. It is assumed that individuals can freely choose the number of hours they want to work in the labor market.

Marital conflicts create welfare or utility differences between households. Equivalence scales are used to specify the money equivalence of conflict.

We proceed by presenting a more formal description of our household labor supply model. The starting point is a three-good expenditure model, where total expenditures are allocated to male and female leisure and other consumption. The shadow price of male leisure – the male wage rate – is w_m , the female wage rate is w_f , while p is the price of the composite consumption good. The price of the composite good p is set at 1. We use an equivalence scale approach to incorporate marital conflict in the household expenditure model. Two different versions of the equivalence scale approach are used: a general approach (previously used by Ray, 1983) and the Barten (1964) approach (previously used by Kooreman and Kapteyn, 1985; Pollak and Wales, 1981; and Blundell, 1980). Like all previous applications of this equivalence scale approach, these papers relate to the cost of children, i.e. the calculation of the additional cost necessary to make a household with children as well off as a household without children.

Let D represent a measure of marital conflict within the household. If $D = 0$ there is no marital conflict and the household is in harmony. Let $C(p, w_m, w_f, D = 0; U)$ represent the minimum costs for a harmonious household to attain an arbitrary utility level U at given prices p , w_m , and w_f . The cost function for a household with marital conflict level Δ to attain the utility level U is: $C(p, w_m, w_f, D = \Delta; U)$.

The first technique used to measure the welfare costs of marital conflict is derived from the definition of the general equivalence scale, $M(D = \Delta)$, as the ratio of costs of obtaining the reference utility level U at given prices

(p, w_m, w_f) with marital conflict level Δ , and the costs of obtaining the same utility level at the same prices for a household with marital conflict level 0:

$$M(D = \Delta) = C(p, w_m, w_f, D = \Delta; U) / C(p, w_m, w_f, D = 0; U). \quad (1)$$

We can rewrite the cost function of a household with conflict level Δ in terms of the cost function of a harmonious household as:

$$C(p, w_f, w_m, D = \Delta; U) = M(D = \Delta)C(p, w_f, w_m, D = 0; U). \quad (2)$$

For the specification of the cost function for the reference household (with $D = 0$) we use the Almost Ideal Demand System (AID System) proposed by Deaton and Muellbauer (1980). In this System the cost function for the reference household ($D = 0$) is written as:

$$\log C(p, w_f, w_m, D = 0; U) = \log a(w_f, w_m, p) + U \log b(w_f, w_m, p), \quad (3)$$

where a and b are defined by Eqs. (4) and (5):

$$\begin{aligned} \log a(w_f, w_m, p) &= \alpha_1 \log w_f + \alpha_2 \log w_m + \alpha_3 \log p + 0.5\lambda_1 \log w_f \log w_f \\ &\quad + 0.5\lambda_2 \log w_m \log w_m + \lambda_3 \log w_f \log w_m \\ &\quad + 0.5\lambda_4 \log p \log p + \lambda_5 \log w_f \log p + \lambda_6 \log w_m \log p, \end{aligned} \quad (4)$$

and

$$\log b(w_f, w_m, p) = w_f^{\beta_1} w_m^{\beta_2} p^{\beta_3}. \quad (5)$$

The adding-up and homogeneity assumptions entail the following restrictions on the parameters: $\alpha_3 = 1 - \alpha_1 - \alpha_2$, $\lambda_5 = -\lambda_1 - \lambda_3$, $\lambda_6 = -\lambda_2 - \lambda_3$, $\lambda_4 = -\lambda_5 - \lambda_6 = \lambda_1 + \lambda_2 + 2\lambda_3$, and $\beta_3 = -\beta_1 - \beta_2$. Recall that the price p is set equal to 1.

We specify the following functional form for the general equivalence scale:

$$M(D = \Delta) = X^\delta, \quad (6)$$

where X is the indicator of marital conflict within the household with associated parameter δ .

In terms of budget shares, the proportions of income devoted to each good, the uncompensated demand functions become:

$$\begin{aligned} s_f &= \alpha_1 + \lambda_1 \log w_f + \lambda_3 \log w_m + (-\lambda_1 - \lambda_3) \log p \\ &\quad + \beta_1(\log Y - (\log M(D = \Delta) + \log a(p, w_f, w_m))), \end{aligned} \quad (7a)$$

and

$$s_m = \alpha_2 + \lambda_3 \log w_f + \lambda_2 \log w_m + (-\lambda_2 - \lambda_3) \log p + \beta_2(\log Y - (\log M(D = \Delta) + \log a(p, w_f, w_m))), \quad (7b)$$

where $s_f = w_f l_f / Y$ and $s_m = w_m l_m / Y$ are the budget shares of female and male leisure time (Y is the household's "full" or maximum attainable income, and l_f and l_m are the hours of leisure taken by females and males respectively). Eqs. (7) indicates that the budget share of female leisure is a function of the log of both female and male wage rates, the log of the price of consumption, the log of total household income, and the log of the equivalence scale; and similarly for the budget share of male leisure. From the demand Eqs. (7) we can see that the equivalence scale $M(\cdot)$ acts as a quasi price index or price effect. The coefficients in the two Eqs. in (7) are estimated in our empirical model, and the values of δ derived can be used to assess the costs of marital conflict in money terms.

To test the robustness of our model with respect to the way in which marital conflict is incorporated into the labor supply model, we also used the Barten (1964) approach to equivalence scales, where the household utility function is redefined in terms of a household without marital conflict:

$$U = U(l_f/M_f, l_m/M_m, q/M_q), \quad (8)$$

where l_i/M_i ($i = f, m$) is the equivalent consumption of leisure of a person in a household with marital conflict M_i , and q/M_q is the equivalent expenditures on other consumption goods q . The budget constraint is rewritten as:

$$\begin{aligned} Y &= w_f M_f (l_f/M_f) + w_m M_m (l_m/M_m) + p M_q (q/M_q) \\ &= w_f^* (l_f/M_f) + w_m^* (l_m/M_m) + p^* (q/M_q), \end{aligned} \quad (9)$$

where $w_i^* = w_i M_i$ ($i = f, m$) and $p^* = p M_q$. The difference between the Barten (1964) approach and the general equivalence approach described above is that Barten specifies separate equivalence scales for each of the expenditure categories, while in the general approach we specify only a single equivalence scale. For the expenditure category specific equivalence scales M_i we specify the following form:

$$M_i(D = \Delta) = X^{\delta_i}, \quad i = f, m, q. \quad (10)$$

The budget equations now become:

$$s_f = \alpha_1 + \lambda_1 \log w_f^* + \lambda_3 \log w_m^* + (-\lambda_1 - \lambda_3) \log p^* + \beta_1(\log Y - \log a(p^*, w_f^*, w_m^*)), \quad (11a)$$

and

$$s_m = \alpha_2 + \lambda_3 \log w_f^* + \lambda_2 \log w_m^* + (-\lambda_2 - \lambda_3) \log p^* + \beta_2(\log Y - \log a(p^*, w_f^*, w_m^*)), \quad (11b)$$

where a is defined by:

$$\begin{aligned} \log a(p^*, w_f^*, w_m^*) &= \alpha_1 \log w_f^* + \alpha_2 \log w_m^* + (1 - \alpha_1 - \alpha_2) \log p^* \\ &+ 0.5 \lambda_1 \log w_f^* \log w_f^* + 0.5 \lambda_2 \log w_m^* \log w_m^* \\ &+ 0.5(\lambda_1 + \lambda_2 + 2\lambda_3) \log p^* \log p^* + \lambda_3 \log w_f^* \log w_m^* \\ &+ (-\lambda_1 - \lambda_3) \log p^* \log w_f^* + (-\lambda_2 - \lambda_3) \log p^* \log w_m^*. \end{aligned} \quad (12)$$

The coefficients in the budget Eqs. (11) are also estimated in our empirical analysis.

4. Description of the sample used in the equivalence scale approach

In order to be able to investigate the relation between marital conflict and household labor supply properly we collected the data ourselves (Maassen van den Brink, 1992, 1994). The data collection was done in two parts. First, a telephone survey was conducted in the fall of 1991 among 6,000 women in the Netherlands aged between 18 and 64. This survey contains information on male and female earnings, female hours of work, child care use, and personal characteristics. A random dial technique was used to generate a random sample of the Dutch population. From the participants in the telephone survey stratified sub-samples were drawn. Stratification was done by labor force status, marital status, family composition, and use of non-parental child care. The second phase of the data collection process consisted of a written survey among the stratified groups. The written survey included, among others, questions on marital conflict about the division of household tasks and child care. The total number of observations in the written survey was 937.

Table 1
Description of the telephone survey sample used to estimate parameters of the labor supply model.
Entries are means

Net female wage rate (guilders per hour)	15.03	Years of education of woman	12.2
Net male wage rate (guilders per hour)	16.96	Presence of children	0.66
Full household income (guilders)	5,379	Labor force participation rate	0.604
Predicted marital conflict	1.756	Hours of work per week	14.8
Age of woman (years)	36	Number of observations	1,148

The data for the estimation of the labor supply model are taken from the telephone survey, drawing a sub-sample of women married or cohabiting. After discarding observations from which essential information could not be retrieved, we used information on 1,148 households. In 1991, 60.4 percent of these women were labor force participants. Some sample characteristics can be found in Table 1.

Information on marital conflict is available only from the written survey. Again we used data on women married or cohabiting. There were 323 usable observations for the explanation of marital conflict.

Marital conflict (the X variable in the model) was operationalized by the response to the following survey question: How often do you and your husband disagree about who has to do the household work and who has to take care of the children (if present)? There were five possible answers to this question: (1) never or hardly ever, (2) once in a while, (3) regularly, (4) often or (5) very often.

5. Ordered probit results on “marital conflict”

In Section 2 we argued that there is a simultaneous relation between marital conflict and household labor supply. On the one hand, there is a causal relation running from female labor supply to marital conflict: if the woman works this may give rise to marital conflict. On the other hand, we postulate a causal relation from marital conflict to household labor supply: if there is marital conflict within the household this may have an effect on (female) labor supply. We have no clear grounds for predicting the sign of the effect of marital conflict on labor supply.

Because of this hypothesized simultaneous relation, inclusion of the marital conflict variable in the labor supply model could result in inconsistent estimates. We therefore use an instrumental variable technique. As marital conflict is an ordered response set, we use estimates from an ordered probit model to derive the instrumental variables on marital conflict. For a description of ordered probit models see Maddala (1983, pp. 46-49).

The following instruments are used for marital conflict: virtual full household income, years of education, age, a dummy for the presence of young children (under 12 years of age), and a dummy for female labor force participation. Virtual full household income is defined as the sum of the female wage rate times 168, the male wage rate times 168, and non-labor income. Virtual full household income is the total weekly income that is available for allocation between male leisure, female leisure, and consumption. It is assumed that each individual can allocate 24 hours per day or 7 times 24 hours per week between leisure and paid labor.

The results of the ordered probit model are given in Table 2. Higher household income increases the probability of marital conflict, though this result is significant only at the 10% level. More highly educated women have more conflicts than their less well-educated counterparts, but not significantly more. The presence of children under the age of 12 increases the probability of marital conflicts as compared with households with older children, though only at the 10% level. Employed women also experience significantly more conflicts. We also calculated Spearman correlations between marital conflict and full income, age, years of education, children and participation. The same results were significant at a 5% level as shown in Table 2.

In the first row of Table 3 we have used the results shown in Table 2 to predict the probabilities of marital conflict for a representative woman in our sample. This representative woman is defined by the sample means and modal values of the explanatory variables used in the ordered probit model. The probability of a representative woman in the sample having no conflicts is 28.6%. Subsequent rows of Table 3 show the predicted effects of changes in the explanatory variables. Table 3 shows that participation in the labor market and the presence of children have a particularly marked effect on marital conflict. If this representative woman had had no children, the probability of her having no conflicts would have been 42.9%. Participation and children more than double the probability of having very frequent conflicts. The effects of income, years of education, and age on marital conflict are negligible.

Table 2
Parameter estimates from the ordered probit model predicting "marital conflict"

Variable	Parameter	<i>t</i> -value
Intercept	-0.844	1.299
Full income/1000	0.115 ^a	1.794
Age of woman/100	-0.743	0.513
Years of education of woman	0.027	1.203
Children present	0.384 ^a	1.681
Participation in the labor market	0.335 ^b	2.568
α_1	1.571 ^b	14.799
α_2	2.372 ^b	15.153
α_3	2.754 ^b	12.526
Log likelihood		-326.206

^a Significant at 10% level;

^b significant at 1% level.

The expected value of the marital conflict variable was calculated for each woman in the sample. These predicted values were used in the labor supply model. The expected value of the marital conflict variable is calculated by: $Pr(\text{never or hardly ever conflicts}) \times 1 + Pr(\text{occasional conflicts}) \times 2 + Pr(\text{regular conflicts}) \times 3 + Pr(\text{frequent conflicts}) \times 4 + Pr(\text{very frequent conflicts}) \times 5$. As marital conflict is an ordinal variable, this way of calculating the expected variable is a little arbitrary: there is no compelling and logical argument for using the values 1 to 5 to calculate the expected values. To test the sensitivity of our findings with respect to the values of

Table 3
Predicted probabilities of marital conflict (in percentages)

How often do you and your husband disagree about household work	Never or hardly ever	Once in a while	Regularly	Often	Very often
Reference individual	28.6	55.7	12.2	2.1	1.4
Income + 10 per cent	26.5	56.2	13.2	2.4	1.7
Age + 10 per cent	29.6	55.4	11.7	2.0	1.3
Years of education + 10 per cent	27.5	60.0	12.7	2.2	1.5
No children	42.9	48.9	6.8	0.9	0.5
Not employed	40.9	50.1	7.4	1.0	0.6

Note: The reference individual is defined as an employed woman, with children, of average age (36 years), average years of education (12 years), with average full household income (5,379 guilders per week).

The figures in each row of the table give the predicted percentage distribution over conflict levels by characteristics of the household. The percentages add to 100 in each row.

marital conflict, we experimented with different sets of values for the marital conflict variable. For all plausible sets of values, the results proved to be similar to the ones presented in Section 7.

6. Econometric analysis of the labor supply model

For the estimation of the demand systems we add normally distributed zero mean errors ϵ_1 and ϵ_2 to the demand Eqs. (7), where $\epsilon_1 = s_f - [\alpha_1 + \lambda_1 \log w_f + \lambda_3 \log w_m + \beta_1(\log Y - (\log M(D = \Delta) + \log a(p, w_f, w_m)))]$ and $\epsilon_2 = s_m - [\alpha_2 + \lambda_3 \log w_f + \lambda_2 \log w_m + \beta_2(\log Y - (\log M(D = \Delta) + \log a(p, w_f, w_m)))]$ in the general equivalence scale specification. For the Barten model we can specify error terms in a similar way, and add them to the demand Eqs. (11).

If we use a sample of both working and non-working mothers, the sample selection corrected likelihood function is:

$$L = \prod_{W=1} f(\epsilon_1, \epsilon_2, \rho) \prod_{W=0} \int_{-\infty}^J f(\epsilon_1, \epsilon_2, \rho) d\epsilon_1, \quad (13)$$

where $W = 1$ if the woman works and $W = 0$ if she does not, and $f(\cdot)$ is the bivariate density function, defined on the transformation J of the hours T worked by the woman, where $J = (w_f T - s_f) / \sigma_1$; and ρ is the correlation coefficient between ϵ_1 and ϵ_2 . The distribution is characterized by: $E(\epsilon_1)^2 = \sigma_1^2$, $E(\epsilon_2)^2 = \sigma_2^2$, and $E(\epsilon_1 \epsilon_2) = 2\rho_1 \sigma_1 \sigma_2$. Maximization of the likelihood function (13) yields the (sample selection corrected) parameter estimates of the demand equations for the total population.

As we have information on wages only for women in paid employment, we used predicted wages rather than actual wages for the women. Predicted wages are calculated by a wage equation, a description of which can be found in the Appendix. For men, we use information on actual wages.

7. Estimation results of the labor supply model

The estimation results of the household labor supply model are shown in Table 4. Because of non-linearities in the AID System there is no ready interpretation for most of the coefficients. The negative signs of the β 's show that both female and male leisure are necessities, since their budget shares decline with increasing income. The correlation coefficient between

Table 4
 Parameter estimates for the prediction of labor supply using the Almost Ideal Demand System (*t*-values in parentheses)

	General equivalence scale (Eqs. (7))	Barten scale (Eqs. (11))
α_1	0.867 ^b (4.022)	1.414 ^b (8.108)
α_2	1.428 ^b (39.107)	1.094 ^b (15.105)
λ_1	0.228 ^b (8.617)	0.096 ^b (2.727)
λ_2	0.095 ^b (11.219)	0.162 ^b (19.059)
λ_3	-0.259 ^b (14.078)	-0.266 ^b (21.108)
β_1	-0.118 ^a (2.540)	-0.240 ^b (5.063)
β_2	-0.200 ^b (19.987)	-0.159 ^b (8.737)
δ	0.013 (0.394)	
δ_q		-0.450 (1.301)
δ_f		0.788 ^b (5.249)
δ_m		0.328 ^b (2.740)
σ_1	0.034 ^b (36.173)	0.033 ^b (37.980)
σ_2	0.022 ^b (95.089)	0.022 ^b (96.039)
ρ	-0.027 (0.758)	-0.032 (0.901)
Log likelihood	4053.26	4121.82

^a Significant at 5% level;

^b significant at 1% level.

male and female leisure is not significantly different from zero. Similar results are reported in Kooreman and Kapteyn (1985).

In the general equivalence scale specification, the estimated coefficient of marital conflict is positive but not significant. The general equivalence scale model is a special case of the Barten model. The implied restriction in the general equivalence scale model is that $\delta_q = \delta_m = \delta_f = \delta$. A likelihood ratio test shows that the restrictions of the general equivalence scale model are rejected at the 1% level, and the Barten model is to be preferred

Table 5
Elasticities of budget shares of male and female leisure

	General equivalence scale	Barten scale
<i>Elasticity of female leisure</i>		
Female wage rate	-0.213	-0.226
Male wage rate	-0.352	-0.238
Income	0.707	0.391
Marital conflict	0.004	0.499
<i>Elasticity of male leisure</i>		
Female wage rate	-0.270	-0.318
Male wage rate	-0.271	-0.311
Income	0.504	0.603
Marital conflict	0.007	-0.036

Note: Elasticities are evaluated at mean values, viz. female wage rate 15.03 guilders/hour; male wage rate 16.96 guilders/hour; full household income is 5,379; marital conflict level is 1.756. The elasticities give the percentage change in leisure due to a percentage change in wage rates, income, and conflict level.

over this model (the likelihood ratio of the two models is 137.12). In the Barten model the coefficients of the equivalence scales for marital conflict defined on both male and female leisure time are significantly positive, while that of the equivalence scale defined on consumption goods is negative.

Some more insight into the results can be obtained by calculating the elasticities of male and female leisure with respect to wages, income and marital conflict. In Table 5 we have calculated these elasticities for a representative household in our sample. The representative household is defined by the average observed wage rates (15.03 guilders for the woman and 16.96 for her husband), and the average predicted full household income associated with these wage rates (5,379 guilders). It should be borne in mind that these elasticities refer to this representative household only and cannot be generalized to the total population.

The wage and income elasticities of male and female leisure are in accordance with the elasticities calculated elsewhere, for example by Killingsworth and Heckman (1986), Theeuwes and Woittiez (1992), and Kooreman and Kapteyn (1985). The most interesting results in Table 5 concern the elasticities with respect to marital conflict. For the general equivalence scale specification, the elasticities are both very small and the signs of the elasticities of leisure with respect to marital conflict are positive. Male and female leisure both increase in response to marital

Table 6
Equivalence scales for marital conflict (never or hardly ever conflicts = 100)

	Conflicts			
	Once in a while	Regularly	Often	Very often
General equivalence scale	100.9	101.4	101.8	102.1
Barten scale	119.7	136.1	149.8	161.3

Note: The equivalence scales represent the financial compensation necessary to obtain the same welfare level as a household with never or hardly ever conflicts, relative to this reference household.

conflict. This implies that both sexes reduce their labor supply if there are conflicts about the division of household work, but only by a tiny amount.

If we calculate the elasticities according to the Barten equivalence scales, they prove to differ between women and men. Female leisure increases substantially in response to marital conflict, while male leisure reduces very slightly. This implies that women reduce their labor supply where there are conflicts about the division of household work, while men if anything increase theirs. Furthermore, female leisure is much more responsive to marital conflict than male leisure.

In Table 6 we have calculated the compensation needed for a representative household in our sample with marital conflict level Δ to be as well off as the same representative household would have been if there were never or hardly ever any marital conflicts. The equivalence scales derived from the general approach are very small, but the Barten scales show that the welfare costs of marital conflict are substantial. To attain the same utility level as a household never or hardly ever experiencing marital conflicts, a household with occasional marital conflicts needs to have 19.7% more income. Households with regular, frequent or very frequent conflicts have to achieve 36 to 61% more income to attain the same utility level.

8. Conclusion

In this paper we have used an equivalence scale approach to ascertain the labor supply and welfare effects of marital conflict concerning the division of household and child care tasks. A survey of studies from the field of psychology gives no clear indication of the effect of marital conflict on labor supply, but these papers are weakened by treating either conflict

or employment as exogenous. We have overcome this difficulty by using instrumental variables. On our approach, the calculated elasticity of female leisure with respect to marital conflict in this paper indicates that women reduce their labor supply in response to marital conflict about the division of household tasks. The results from the psychology literature seem to suggest that women's labor supply or labor force participation has no effect on the amount of marital conflict. This finding is not confirmed by our results. We find that women who participate in the labor market and have children experience more conflicts concerning the division of household tasks than non-participants.

Our data only contains information on the woman's perception of conflicts in the household. Studies on the family performed in the fields of marketing and social psychology usually suggest that all family members should be investigated separately since information collected from one spouse is not necessarily reliable in describing the other spouse's perception of the situation. Ideally both husband and wife should be approached. In the case of marital conflicts in *the household*, however, one member of the household could be expected to give reliable information on the entire household.

The welfare consequences of marital conflict are severe. We estimate that the welfare losses from marital conflict amount to between 19 and 61% of full household income. It is difficult to assess plausible values for the equivalence scale of marital conflict. For households experiencing very frequent conflicts, the welfare loss might be comparable with the welfare effects of divorce, which are probably also severe.

The results do not tell us why households with marital conflicts incur higher costs in achieving a certain welfare level. One can think of two reasons why conflicts create welfare losses. First, conflicts are unpleasant in themselves, and this diminishes welfare. Secondly, households may incur higher costs to avoid or solve conflicts. For example, conflicts over housework may be solved by hiring a cleaner to do the work.

It may be argued that the marital conflict variable we used in the analysis is truncated from above. If the level of marital conflict exceeds a certain limit, the benefits of maintaining the marriage will no longer outweigh the costs for one or both of the partners. The marriage will then end in divorce. In this sense, marriage is an experience good. In the marriages observed, marriages with little or no marital conflicts are over-represented, since those with many conflicts will eventually have dissolved. The implication of this argument is that in future research household labor

supply or household time allocation and marital conflict should be modelled jointly with marriage duration and divorce rates.

The results demonstrate the usefulness of simultaneous equation techniques, and equivalence scales, in assessing psychological factors in economic behavior. However, the general equivalence scale approach of Ray (1983) proved to be unsatisfactory. Not only did the model based on Barten (1964) give a significantly better fit, it revealed effects of marital conflict on labor supply and welfare that were concealed by the Ray model. Thus our results suggest that marital conflict has different impacts on the utility derived from different goods, and future research using equivalence scales should take this into account.

Acknowledgement

We would like to thank two anonymous referees for helpful comments on a previous draft of this paper.

Appendix

Since not all women were employed, their wage rates were predicted by the following wage equation. The dependent variable was the log of the wage rate. The exogeneous variables were: four education dummies, age and age squared. To control for possible selection bias we estimated the wage equation jointly with a participation equation by maximum likelihood. For a description of the likelihood function, see Amemiya (1985, p. 376).

Table A.1
Parameter estimates wage equation (*t*-values in parentheses)

	Participation equation	Wage equation
Intercept	1.591 ^a (6.897)	1.391 ^a (5.996)
Higher vocational education or university	1.005 ^a (7.642)	
Intermediate general education	0.600 ^a (4.452)	
Extended primary education	0.472 ^a (4.205)	
Intermediate vocational education	0.562 ^a (4.868)	
Age	-0.033 ^a (6.400)	0.041 ^a (3.286)
Age ² /100		-0.041 ^a (2.567)
Years of education		0.028 ^a (5.425)
Earnings husband/1,000	-0.137 (1.138)	
Non-labor income/100	-0.421 (1.665)	
Children (1 = yes; 0 = no)		-0.732 ^a (7.317)
σ		0.373 ^a (37.784)
ρ		-0.487 ^a (4.784)
Number of observations		1148
Log likelihood		-917.027

^a Significant at 1% level.

References

- Amemiya, T., 1985. *Advanced Econometrics*. Oxford: Basil Blackwell.
- Barten, A., 1964. 'Family composition, prices and expenditures'. In: P. Hart, G. Mills and G. Whitaker (Eds.), *Econometric Analysis for National Economic Planning*. London: Butterworth.
- Blundell, R., 1980. Estimating continuous consumer equivalence scales in an expenditure model with labour supply. *European Economic Review* 14, 145–157.
- Blundell, R. and I. Walker, 1982. Modelling the joint determination of household labour supplies and commodity demands. *Economic Journal* 92, 351–364.
- Burkhauser, R., G. Duncan, R. Hauser and R. Berntsen, 1990. Economic burdens of marital disruptions: A comparison of the United States and the Federal Republic of Germany. *The Review of Income and Wealth* 36, 319–333.
- Cromwell, R. and D. Olson, 1975. *Power in Families*. New York: Wiley.

- Deaton, A. and J. Muellbauer, 1980. An almost ideal demand system. *American Economic Review* 70, 312–326.
- Harrell, J., 1990. Husband's masculinity, wife's power, and marital conflict. *Social Behavior and Personality* 18, 207–216.
- Hoffman, L., 1989. Effects of marital employment in the two-parent family. *American Psychologist* 44, 283–292.
- Killingsworth, M. and J. Heckman, 1986. 'Female labor supply, a survey'. In: O. Ashenfelter and R. Layard (Eds.), *Handbook of Labor Economics*, Vol. I (pp. 103–204). Amsterdam: North-Holland.
- Kooreman, P., 1986. Essays on microeconomic analysis of household behavior. Ph.D. thesis, Tilburg University.
- Kooreman, P. and A. Kapteyn, 1985. The systems approach to household labor supply in the Netherlands. *De Economist* 133, 21–41.
- Maassen van den Brink, H., 1992. *Vrouwen over werk. Rapportage onderzoek telefonische enquête*, Universiteit van Amsterdam, 1992.
- Maassen van den Brink, H., 1994. *Female labor supply, child care and marital conflict*. Amsterdam: Amsterdam University Press.
- Maddala, G., 1983. *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge: Cambridge University Press.
- Markus, E., 1990. Does it pay for a woman to work outside her home? *Journal of Comparative Family Studies* 21, 397–411.
- McDonald, G., 1980. Family power: The assessment of a decade of theory and research, 1970–1979. *Journal of Marriage and the Family*, 841–854.
- Ott, N., 1989. *Haushaltsökonomie und interfamiliäre Arbeitsteilung: eine spieltheoretische Analyse familialer Entscheidungen*. Inaugural-Dissertation, Bielefeld, June, 1989.
- Parasuraman, S., J.H. Greenhaus, S. Rabinowitz, A.G. Bedelan and K.W. Mossholder, 1989. Work and family variables as mediators of the relationship between wives' employment and husbands' well-being. *Academy of Management Journal* 32, 185–202.
- Pollak, R. and T. Wales, 1981. Demographic variables in demand analysis. *Econometrica* 49, 1533–1551.
- Ray, R., 1983. Measuring the costs of children. *Journal of Public Economics* 22, 89–102.
- Staines, G.L., J.H. Pleck, L.J. Shephard and P. O'Connor, 1978. Wives' employment status and marital adjustment: Another look. *Psychology of Women Quarterly* 9, 95–120.
- Theeuwes, J. and I. Woittiez, 1992. Advising the minister on the elasticity of labour supply. Research Memorandum 9206, Department of Economics, Leiden University.