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Working Paper

Bargaining Models of Household Behavior: An Empirical Test Using the Luxembourg Income Study

LIS Working Paper Series, No. 98

Provided in Cooperation with:

Luxembourg Income Study (LIS)

Suggested Citation: Phipps, Shelley; Burton, Peter (1993) : Bargaining Models of Household Behavior: An Empirical Test Using the Luxembourg Income Study, LIS Working Paper Series, No. 98, Luxembourg Income Study (LIS), Luxembourg

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Luxembourg Income Study Working Paper Series

Working Paper No. 98

**Bargaining Models of Household Behavior:
An Empirical Test Using the Luxembourg Income Study**

Shelley Phipps and Peter Burton

July 1993

(scanned copy)



Luxembourg Income Study (LIS), asbl

Preliminary

Bargaining Models of Household Behaviour:
An Empirical Test using the Luxembourg Income Study

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July, 1993

The authors wish to acknowledge the financial support of the Social Sciences and Humanities Research Council of Canada.

'Divorce threat' bargaining models of household behaviour such as those proposed by Manser and Brown (1980) and McElroy and Horney (1981) predict that social/institutional parameters external to a marriage (termed 'extrahousehold environmental parameters' -- EEP's by McElroy, 1990) can affect the decisions made by individuals within the marriage by influencing the relative bargaining positions of spouses. As an example, if social transfers to single mothers ensure a decent standard of living, then the drop in standard of living following divorce will be less serious for a woman with children. This institutional feature will make it easier for a woman to 'walk out' of a bad marital situation, making the threat of divorce more credible and hence increasing her bargaining power while married.

Within any one country, there is limited variation in the social/institutional features which might affect the relative bargaining positions of men and women,¹ making it more difficult to test the validity of this hypothesis. Across countries, even fairly similar affluent countries, there can be quite wide variations in policies which affect the relative well-being of married versus single women (and similarly for men, though the focus here will be on women). Thus, one way to test the implications of the bargaining models of household behaviour is to see if cross-country variation in EEP's are associated with cross-country variations in behaviour. To do this, we combine micro-data for seven countries (Australia, Canada, Germany, the Netherlands, Sweden, the UK, and the USA) taken from the Luxembourg Income Study² to analyse the influence of social/institutional variables on the

¹ Even over time, it would take fairly major changes in policy to provide enough variation in institutional setting to allow us to assess the consequences of these changes for household behaviour.

² See Smeeding, et.al., for a detailed discussion of this data source.

labour-force participation of married women, one very important dimension of household behaviour.

Section 2 of the paper contrasts the traditional unitary model with the bargaining approach to household behaviour. Sections 3 and 4 discuss the methodology and data, respectively, while section 5 presents econometric results. Section 6 concludes.

1. Alternative Models of Household Behaviour

The traditional unitary model of household behaviour associated with the work of Becker (1974; 1981) assumes that household behaviour may be described as the outcome of the maximization of a single 'household' utility function subject to a single household budget constraint. This model is typically justified either through the assumption that husband and wife have identical preferences or that one of them behaves as a 'benevolent dictator.' As argued by many (e.g., Chiappori, et.al., 1992; Nelson, 1991; Woolley, 1991), either assumption is suspect.³

More formally, the unitary model assumes that couples choose x, l_m, l_f to maximize household utility

$$U(x, l_m, l_f ; A) \quad (1)$$

subject to the single household budget constraint

$$px \leq w_m(T - l_m) + w_f(T - l_f) + Y \quad (2)$$

or,

$$px + w_m l_m + w_f l_f \leq w_m T + w_f T + Y$$

³ It might be noted that authors employing a household model are at least making an attempt to expand beyond the analysis of individual behaviour to take some account of the influence of familial interactions.

where x represents household consumption (including husband's private consumption, wife's private consumption as well as the consumption of public goods within the household), l_m represents his leisure time, l_f represents her leisure time, Y is non-labour income and A is a vector of household characteristics (e.g., number and age of children, ages of husband and wife).⁴

The solution to this problem yields commodity and leisure demand functions as follows:

$$\begin{aligned} x^*(p, w_m, w_f, I, A) \\ l_m^*(p, w_m, w_f, I, A) \\ l_f^*(p, w_m, w_f, I, A) \end{aligned} \quad (3)$$

where $I = w_m T + w_f T + Y$.

In contrast, 'divorce-threat' bargaining models of household behaviour such as those proposed by Manser and Brown (1980) and McElroy and Horney (1981) start from the assumption that each spouse has unique preferences which can be represented through the individual-specific utility functions $U_m(x; A_m)$ and $U_f(x; A_f)$. Husband and wife are not assumed to have identical preferences, nor is one of the couple assumed to be a dictator. Rather, individual differences are assumed to be resolved and household decisions taken as the result of a co-operative game (typically Nash). Each spouse's bargaining power depends on his or her 'threat point' level of utility -- the utility he or she would have in the event of divorce/separation. Thus, macro/institutional variables can influence outcomes within households by affecting the options open to men and women outside marriage and hence their

⁴ The preferences of children and adult household members other than husband and wife are typically ignored.

bargaining power. As emphasized by McElroy (1990), this dependence of behavioural outcomes on 'extra-marital environmental parameters' is an empirically testable prediction of the divorce-threat bargaining models.

From the bargaining perspective, household behaviour can be described as the choice of x , l_m , l_f to maximize

$$[U_m(x, l_m; A_m) - T_m(\text{EEP})] [U_f(x, l_f; A_f) - T_f(\text{EEP})] \quad (4)$$

subject to the household budget constraint

$$px \leq w_m(T - l_m) + w_f(T - l_f) + Y \quad (5)$$

where EEP are extra-marital environmental parameters.

In this case, solution yields the following commodity and leisure demand system:

$$\begin{aligned} x^* & (p, w_m, w_f, I, A, \text{EEP}) \\ l_m^* & (p, w_m, w_f, I, A, \text{EEP}) \\ l_f^* & (p, w_m, w_f, I, A, \text{EEP}) \end{aligned} \quad (6)$$

where $I = w_m T + w_f T + Y$.

The difference between the demand system derived using the unitary model, (3), and the demand system derived using the divorce-threat bargaining model, (6), is the addition of the 'extra-marital environmental parameters' to (6). This is a testable prediction of the bargaining framework which will be examined empirically in this paper using cross-national data.

While the divorce-threat bargaining framework seems to constitute a large improvement over the traditional unitary framework by allowing for distinct preferences within the household, some (e.g., Lundberg and Pollak, 1992; Woolley, 1988) have argued that it is implausible to suggest that spouses threaten one another with divorce each time they have a disagreement. Thus, we suggest an alternative interpretation with almost the same empirical

implications and which seems particularly relevant in the context of international comparisons of behaviour. The framework is again that of a simple Nash co-operative bargaining game. In this case, however, we assume that household behaviour can be represented as the outcome of the maximization of the following:

$$U_m(x, l_m; A_m)^\alpha U_f(x, l_f; A_f)^{(1-\alpha)} \quad (7)$$

again subject to the household budget constraint

$$px \leq w_m(T - l_m) + w_f(T - l_f) + Y \quad (8)$$

where α is a weighting parameter which is assumed to depend on extra-marital environmental parameters, $\alpha(\text{EEP})$. Notice that in this formulation, the 'threat points' have been removed (though this is extreme -- it would be possible to combine the two approaches). Instead, the weight attached to the husband/wife in the bargaining process is affected by EEP's.

Intuitively, we interpret α as an attitudinal parameter (and hence refer to this version as the 'attitudinal' rather than the 'divorce-threat' bargaining model). The idea is that in societies where social institutions treat women more equally (relative to men), individuals may be persuaded that it is appropriate to treat women more equally within households. If so, women preferences will be accorded a larger weight in the bargaining process. (Alternatively, in societies in which individual attitudes accord women equal status, social institutions are likely to treat women more fairly. In either case, the observed empirical association between EEP's and behaviour should be the same.)

2. Methodology

In order to use cross-country variation in those institutional variables which might affect the relative bargaining power of men and women to test the bargaining model of household behaviour, this paper combines micro-data from seven LIS countries in a single estimating file in combination with macro 'bargaining power' variables with, in some cases, only one observation per country.⁵ This large dataset is then used to estimate probit equations for the probability of married women's labour-market participation -- one of the key household decisions which can be observed using the LIS data.⁶

From the discussion in section 2 above, we know that the traditional unitary model of household behaviour yields a leisure demand (labour supply) function for women which does not depend on extra-marital environmental parameters:

$$l_f^*(p, w_m, w_f, I, A) \quad (3)$$

where $I = w_m T + w_f T + Y$.

Given this leisure demand function, we can say that a woman will be observed to participate in the labour market,

$$LFP = 1, \quad \text{if}$$

⁵ These variables are, for the most part, constructed using the LIS data, as will be described below.

⁶ While it would have been desirable to estimate labour-supply functions, this is not possible for all seven countries studied. Yet, retaining the seven countries increases the variation in the institutional variables. There was thus a trade-off between having more labour-market information and having more variation in institutional variables. Estimating labour-force participation equations is, we believe, a reasonable compromise. Further, the focus of the analysis is on married women's labour-market participation rather than married men's participation as there is more variation in the women's behaviour.

$1_f^*(p, w_m, w_f, I, A) + e < 52$ (assuming leisure demand is measured in terms of annual weeks and where e is a stochastic error).

Otherwise, she will not be a participant,

$$\text{LFP} = 0.$$

While annual weeks of participation/non-participation are not available for all countries studied, we do observe participation/non-participation as well as a set of variables, A , Y , which, from theory, are predictors of labour-market behaviour.⁷

In other words,

$$\text{LFP} = 1 \text{ if}$$

$$\beta'A + \gamma'Y + e < 52.$$

Thus, an expression for the probability of labour-force participation consistent with the unitary model of household behaviour can be derived:

$$\begin{aligned} \text{Prob}(\text{Lfp} = 1) &= \text{Prob} (e > -\beta'A - \gamma'Y) \\ &= 1 - F(-\beta'A - \gamma'Y), \text{ where } F \text{ is the cumulative normal} \end{aligned}$$

distribution function.

From this, the parameter vectors β and γ can be estimated by maximizing the likelihood function:

$$L = \prod_{\text{LFP}=0} F(-\beta'x - \gamma'Y) \prod_{\text{LFP}=1} (1 - F(-\beta'X - \gamma'Y))$$

Derivation of the labour-force participation model from the bargaining models of household behaviour is nearly identical. The major (testable)

⁷ Notice that we drop wage rates which are, of course, not observable for non-participants.

difference between the two is that the bargaining models predict that the extra-marital environmental parameters will influence labour-force participation. If these variables are found to be statistically significant, then we can reject the unitary model; we will be unable to reject the bargaining framework. Moreover, since individual utility functions are increasing in leisure time (i.e., time not in paid employment⁸), the bargaining perspective as outlined above predicts that as women's power increases her labour-force participation should decrease.⁹

Since earlier research (Phipps, 1993) indicates that an important reason for cross-country differences in the labour-market participation of women is differences in response to variables in the vector of demographic variables, A, (especially number and age of children), careful attention is given to allowing for cross-country differences in response throughout the estimation (i.e., through the inclusion of country/demographic variable interaction effects).

⁸ An obvious problem with assuming that time not spent in paid employment is 'leisure time' is the fact that many women not working for pay are working within the home. Clearly, a more sophisticated model should also take account of home production. However, survey results (see Gunderson, et.al., 1990 for recent Canadian examples) indicate that even women who work full-time outside the home retain responsibility for a large share of work within the home -- they face a 'double burden.' Thus, it is very likely true that women who do not participate in the paid labour market do have more leisure time, though certainly not so much as would be indicated by the assumption outlined above.

⁹ The models as currently specified are rather limited insofar as they do not acknowledge the non-pecuniary benefits of many jobs (e.g., social interaction, status). Moreover, they do not take account of the fact that labour-force participation can have dynamic consequences. For example, labour-force participation today will often improve labour-market opportunities tomorrow as job experience is acquired. Thus, market participation today might increase bargaining power tomorrow. These more sophisticated aspects of the household bargaining game are left for future research.

3. Data

Data for this analysis are drawn from the Luxembourg Income Study, with a few supplements, primarily from the OECD Labour Force Statistics. Table 1 documents the original sources of the seven country data sets employed. For estimation of the probit equations for labour-force participation, married women aged 25 to 55 are selected from each country. These seven country files are concatenated, then a 50 percent random sample is selected leaving a total of 12,661 observations.¹⁰ Probit estimation also employs macro/institutional 'bargaining power' or 'extra-marital environmental' variables calculated using the individual country datasets (without the 50 percent sampling).

Table 2 reports these 'bargaining power' variables calculated using the individual country files.¹¹ First, one possible measure of the relative economic situations of married and single women (though not the preferred measure for this research) is simply the ratio of the average equivalent disposable income¹² received by single women to the average equivalent disposable income received by married women, by child status. These ratios are reported for each country of the seven countries in the first section of Table 2. Notice, first, that single women have a lower standard of living

¹⁰ Mainframe constraints require the selection of a random sample. However, results reported in Gordon et.al., (1993) suggest that 12,661 observations still constitutes an adequate sample size to avoid the problem of small-sample variability.

¹¹ These are the weighted means.

¹² Equivalent disposable income is calculated as disposable income for the household divided by the number of adult equivalents living in the household. In this case, the OECD equivalence scale is employed. Thus, the first adult counts as 1.0. Each additional adult adds 0.7 to the number of adult equivalents; each additional child adds 0.5.

than married women in all countries. Further, notice that in all countries except Sweden, childless single women are relatively much better off; the ratio of equivalent incomes falls as the number of children increases.

One major limitation of the ratio of equivalent income received by single women to the equivalent income received by married women as a measure of bargaining power within marriage is that income may not be equally shared within the household (see, for example, Jenkins, 1991). Thus, we may be overstating the economic well-being of married women. A second limitation, from a policy perspective, is that it is not clear, when we simply consider disposable incomes, which factors are driving the observed results -- why do single women have lower incomes? Thus, this research will focus on a set of measures which, together, help to establish the relative standards of living of single and married women.

A first included variable is the ratio of female to male earnings (for women and men 25-55 with positive earnings).¹³ We might hypothesize that as women's market opportunities improve relative to men their bargaining power within the marriage should improve. Thus, according to the bargaining framework, countries with less discrimination/better labour-market opportunities for women should have fewer within-household inequalities. As noted in Table 2, there is surprisingly little variation in the ratio of female to male earnings across the seven countries studied. Sweden has the

¹³ Note that both full-time and part-time employees are included. It is more usual to focus on full-time employees only when making such earnings comparisons. However, for the purposes of this paper, it seems more appropriate to include all employees. If women are primarily part-time employees in one country, it is important to take account of this fact when assessing their income possibilities from labour-market sources relative to male market opportunities.

highest ratio (0.63) while the UK has the lowest ratio (0.46). The other five countries are roughly similar with ratios of roughly 0.54.

A second potential extrahousehold environmental parameter is the availability of social transfers to single women. Given the bargaining framework, the higher are such transfers, the less disastrous will be the post-divorce economic position of women, and the better will be the bargaining position of women who are married. To facilitate comparisons, average equivalent social transfers received by single women (by child status) in each country are reported as a fraction of mean equivalent income before tax for the country. As indicated in Table 2, there is substantial variation across countries in this variable. In Australia, Canada, Germany and the US, single women without children receive relatively little in the way of social transfers. Single women with children do better in these countries, but there are noticeable differences in generosity of transfers received. Single women with children in Australia receive, on average, equivalent social transfers which are roughly 18 percent of equivalent income before tax for the country; Canadian and German single women with children receive only about 13 percent; US women receive only about 8 percent. Single women in the Netherlands, Sweden and the UK fare much better. Without children, equivalent social transfers as a percentage of country-wide equivalent gross income are 21 percent in the Netherlands, 16 percent in Sweden and 18 percent in the UK. With children, social transfers as a fraction of country-wide gross income increase to roughly 30 percent in the Netherlands, 20 percent in Sweden and 30 percent in the UK. If there is any validity in the 'divorce-threat' bargaining hypothesis, then we should expect that the behaviour of married

couples will be affected by such large differences in the relative situations of single women.

Another important issue determining the economic well-being of single women with children is the availability of child-support payments. Table 2 reports the average amount of child support received by single mothers (for mothers with any child support) again as a fraction of country-wide equivalent income before tax. Wide variation across the countries is apparent from a high of 53 percent of equivalent gross income in the Netherlands to a low of 13 percent of gross income in Sweden.¹⁴

Another variable which has appeared in the literature, though not the literature on bargaining models, is the age difference between spouses (see Browning, et.al., 1992). This variable differs from the first three discussed in that it is unlikely to affect relative utilities in the event of divorce.¹⁵ Age differences seem more likely to affect attitudes and hence relative male/female weights in the bargaining process. Another difference between this variable and the first three discussed is that it is not an extra-marital environmental parameter. Rather, age difference is a micro variable -- one which can be computed separately for each unit of analysis. However, country-wide averages are reported in Table 2 with the other bargaining variables for the sake of discussion. (Please keep in mind,

¹⁴ It should be noted that these figures may be somewhat misleading, given the large differences across countries in the percentage of women who receive child support. For example, only 10 percent of women in the Netherlands receive child support, although those who do receive relatively generous support. On the other hand, 100 percent of women in Sweden receive a relatively low average payment.

¹⁵ Unless there are different numbers of men/women of relevant age 'available' on the 'marriage market' (Lundberg and Pollak, 1990). We do not put much emphasis on this argument.

however, that while all other data reported in this table are those actually used for estimation, age differences are household-specific micro variables.) Note that there is very little variation across countries in the mean age difference between spouses, though there is significant micro-variation.

The bargaining variables discussed thus far are the only 'pure' variables in that there is no reason from the perspective of traditional (Beckerian) theory why they should have any influence on household behaviour. The remaining two variables to be discussed can be given a traditional interpretation. However, while their hypothesized influence has been discussed in the literature, it has been difficult to provide empirical tests using single-country cross-sections. The first of these is a categorical variable which indicates whether the country employs a joint or separate system of income taxation (=1 if joint). If lower-income wives are subject to their husband's higher-marginal tax rates, then traditional theory predicts that women's labour-force participation will be reduced. This point is particularly emphasized by Wolff (1989).

The second of these variables is the level of the female unemployment rate. Many others have argued that higher unemployment rates may discourage women's labour-market participation (see Humphries and Rubery, 1988 for a discussion of this idea). Given the wide variation in women's rates of unemployment, from a high of 13.6 percent in the Netherlands to a low of 1.9 percent in Sweden, this variable may play a significant role.

Notice that while these last two variables have straightforward traditional interpretations which would also be recognized by the bargaining

models,¹⁶ they may also play a role in household bargaining. Higher unemployment rates for women will certainly put divorced/separated women at greater risk of economic deprivation and may thereby reduce women's bargaining power within marriage. Countries which tax husbands and wives jointly create a situation in which women's net income within the household is lower and may thereby reduce women's bargaining power. On the other hand, women who leave their husbands will, in most cases, experience a drop in marginal tax rate, which from the strict 'divorce-threat' perspective, may increase their bargaining power. In summary, the effects of these variables may be multi-dimensional.

Table 3 reports the means of the traditional micro-data variables which are included in the estimation. Means are reported separately for individual countries as well as for the concatenated dataset. The dependent variable for the probit analysis is a categorical variable set equal to one if the woman is observed to have any labour-market earnings.¹⁷ Participation rates vary from a low of 34 percent in the Netherlands to a high of 87 percent in Sweden. (Recall that the sample is married women, 25-55 years of age.) Micro-variables which are included as explanatory variables in the analysis are the woman's age and its square (with an over-all mean of 38.7 years), number of children (1.31 on average over-all), a categorical variable equal to one if

¹⁶ The bargaining models also assume maximization subject to a single joint budget constraint. By reducing the woman's after-tax wage, joint income taxation would affect behaviour through the same channels as would be predicted with the unitary model.

¹⁷ This is not the most standard definition of labour-market participation and it has the disadvantage of excluding any woman who were unemployed throughout the entire survey year and hence had zero earnings. (Such women should certainly count as labour-market participants.) However, data limitations forced this choice.

the youngest child is less than six years of age (29 percent of observations have such a young child present) and family income less the woman's earnings (if any) divided by median gross income for the country (over-all mean is 1.31).¹⁸

A set of dummy variables to indicate country of residence was included in the probit equations (with the UK as base) to allow for country-specific differences in the constant term. Next, the country dummies were interacted with the child variables, to allow for country-specific responses to these variables ('number of children' and a 'preschooler' dummy). Results reported in Phipps, 1993 suggest that labour-force participation responses to the presence and ages of children differ significantly across countries. Finally, given that earlier results suggest that the labour-force participation of women in the US is very responsive to the availability of income other than their own earnings (see Phipps, 1993), an additional interaction term (= US X Other) was included in the estimation.

4. Estimation Results

Probit parameter estimates of the determinants of married women's labour-force participation are presented in Table 4.¹⁹ Consider, first, the

¹⁸ Earlier research (Phipps, 1993) has indicated that education is a very important determinant of labour-force participation, though a less important determinant of part-time versus full-time status. Unfortunately, data limitations forced me to exclude education for this analysis. In order to obtain an interesting range of variation in the macro/institutional variables, I wanted to include Sweden in the analysis and educational level is not reported for Swedish women.

¹⁹ These are unweighted estimates. In combining the country files, country-specific weights lose meaning. In any event, it is not possible to use weights when employing the SPSS 'Probit' procedure. Two sets of estimates are reported. The first excludes the female unemployment rate; the second includes this explanatory variable. Results of interest for this paper are

influence of the micro-demographic variables. These are, in general, quite reasonable. The probability of labour-force participation increases at a decreasing rate with the woman's age. The probability of participation falls with additional children, and falls if the youngest child is a pre-schooler. Other available income does not exert a statistically significant influence on the probability of labour-force participation except in the US, where additional resources significantly reduce the probability of participation.

Everything else equal, married women in Australia, Canada and the Netherlands are significantly less likely to be labour-market participants than married women in the UK (the base). (In other words, these categorical variables are negative and statistically significant.) There is no significant difference in the constant terms for Germany, Sweden and the US (relative to the UK).²⁰

Women in Australia, Canada and Sweden are less likely than British women to reduce their market participation in response to additional children; women in the Netherlands are more likely to reduce market participation. There is no significant difference between the response of British women to additional children and the responses of women in Germany and the US. Women with pre-schoolers are more likely to be labour-market participants in all other countries than the UK.

Consider, then, the influence of the macro-institutional variables. First, women living in countries which employ a system of joint income taxation have a significantly lower probability of labour-force participation.

not qualitatively affected by the inclusion/exclusion of this variable.

²⁰ The influence of the country-specific dummies for Germany, Sweden and the US was so small that SPSS would not enter them. Hence, no coefficient estimates are reported.

Apparently, wives who face their husbands' (usually) higher marginal tax rates are less likely to seek paid employment. This finding confirms the prediction of both unitary and bargaining models that reducing the after-tax wage will discourage market participation. It is also consistent with a divorce-threat rationale: In countries with joint taxation, a woman's take-home pay will increase following divorce, increasing her threat-point utility and hence her power. Since increased power is predicted to reduce labour-force participation, the finding that joint taxation is associated with lower rates of labour-force participation is not inconsistent with the divorce-threat model.

Next, women living in countries with higher female unemployment rates are significantly less likely to be market participants. This finding accords with notions of the 'discouraged worker' effect typically discussed in the context of unitary models. Of course, discouraged worker responses are equally consistent with a bargaining framework. (Higher unemployment reduces expected wages and hence should reduce rates of participation.) This result is not consistent with the idea that the level of female unemployment is a macroeconomic variable which influences women's threat-point utilities. Higher female unemployment should reduce women's bargaining power and thus increase their rates of labour-force participation.

The age difference between husband and wife (male age less female age) has been hypothesized to influence the allocation of resources in the household (though not in a bargaining context -- see Browning, et.al., 1992). We also find this variable to have a statistically significant relationship with behaviour. As the husband's age increases relative to the wife's age, the wife's probability of labour-force participation falls.

Finally, the variables of primary importance for this project are the pure bargaining variables -- social transfers available to single women, average child support received by single women and the ratio of average female to male earnings. Results indicate that as equivalent social transfers to single women increase, the labour-market participation of married women falls. If the bargaining power of married women increases as social transfers to single women increase, then this result accords with the predictions of the 'divorce-threat' models. If women's utility is increasing in her leisure time, then it is reasonable that her labour-force participation should fall as her power increases.

The female/male earnings ratio is also associated with significantly lower probabilities of labour-force participation for married women. Again, this accords with the predictions of the bargaining framework. If women's bargaining power increases as average female earnings increase relative to male earnings increase (reflecting more favourable market possibilities for women), then again, given that female utility is increasing in leisure time, the bargaining models would predict a reduction in labour-force participation.

Finally, the third bargaining power variable -- the average level of child support paid to single women with children -- is also associated with a significantly lower probability of labour-force participation. Higher average child support payments indicate better economic circumstances for divorced/separated women. By increasing 'threat-point' utility, higher child support payments should increase women's bargaining power and hence reduce their labour-force participation. Once again, the direction of the effect is that predicted by the bargaining model.

From the perspective of the unitary model of household behaviour, none of these last three variables should exert a statistically significant influence on labour-force participation. Thus, finding that they do affect behaviour constitutes a rejection of this framework.²¹

5. Conclusions

This paper combines micro-data from seven countries of the Luxembourg Income Study (LIS) with macro/institutional variables (also, in general, constructed using LIS) to test the implication of divorce-threat bargaining models of household behaviour that 'extra-marital environmental parameters' should influence behaviour. For example, more generous child-support payments or more generous social transfers to single women will increase a married woman's potential well-being in the event of divorce/separation. The bargaining framework predicts that by increasing her 'divorce-threat' utility, these more generous support or transfer payments should increase her bargaining power within the marriage and hence influence observable behavioural outcomes such as labour-force participation. There is no reason, from the perspective of unitary models of household behaviour (Becker, 1974, 1981) why these macro/institutional variables should influence behaviour.

We estimate a probit model of the labour-force participation of married women using the combined data set mentioned above. We are unable to reject the bargaining framework, though we do reject the Becker (1974, 1981) unitary

²¹ This is consistent with a growing number of papers which provide evidence against the unitary model of household, usually on the grounds that male and female non-labour incomes do not exert the same influence on behaviour (Apps and Rees, 1993; Bourguignon, et.al., 1992; Browning, et.al., 1992; Fortin and Lacroix, 1993; Phipps and Burton, 1992; Schultz, 1990; Thomas, 1990) .

model of household behaviour. While the bargaining models still present a crude depiction of behaviour within the household, they do constitute an improvement over the unitary framework; extra-marital environmental parameters seem to influence household behaviour. Our final conclusion, therefore, is that it is time to abandon the unitary framework and pursue theoretical refinement of bargaining (or other) models of behaviour within the household.

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TABLE 1: SOURCES OF DATA

Country, Year	Original Data Set	Sample Size
Australia, 1985-86	Income & Housing Survey	7,560
Canada, 1987	Survey of Consumer Finances	10,999
Germany, 1984	German Panel Survey	5,174
Netherlands, 1987	Survey of Income and Program Users	12,693
Sweden, 1987	Swedish Income Distribution Survey	9,421
United Kingdom, 1986	The Family Expenditure Survey	7,178
United States, 1986	March Current Population Survey	11,614

TABLE 2: BARGAINING POWER VARIABLES (WOMEN 25-55)

	1985-86	1987	1987	1984	1987	1986	1986
	Australia	Canada	Netherlands	Germany	Sweden	UK	USA
Single women's equivalent disposal income/couple's equivalent disposable income							
0 children	0.89	0.85	0.96	0.95	0.77	0.82	0.76
1 child	0.58	0.66	0.85	0.71	0.87	0.74	0.61
2 children	0.63	0.62	0.80	0.59	0.87	0.76	0.59
3 or more	0.54	0.55	0.68	0.55	0.99	0.78	0.46
Female/male earnings (for individual aged 25-55 with positive earnings)							
	0.55	0.54	0.55	0.54	0.63	0.46	0.52
Single women's equivalent social transfers/mean equivalent income before tax for country							
0 children	0.076	0.056	0.21	0.075	0.16	0.18	0.028
1 child	0.18	0.12	0.32	0.11	0.19	0.28	0.074
2 children	0.16	0.13	0.32	0.14	0.19	0.27	0.076
3 or more	0.19	0.15	0.28	0.13	0.21	0.29	0.097
Mean child support received by single mothers relative to mean equivalent income before tax for country (for mothers with any child support)							
	0.14	0.22 ¹	0.53	0.28	0.13	0.30	0.25
Dummy = 1 if joint tax system ²	0	0	0	1	0	1	1
Female Unemployment Rate ³	8.4	9.3	13.6	8.8	1.9	8.9	7.0
Average age difference between spouses (male age-female age)	3.08 (4.77) ⁴	2.91 (4.33)	2.62 (3.94)	3.13 (4.19)	2.99 (4.47)	2.82 (4.50)	2.85 (4.89)

¹Galerneau, 1992²Wolff, 1992.³OECD.⁴Standard deviations are reported in parentheses.

TABLE 3: MICRODATA MEANS BY COUNTRY AND OVER ALL

	Australia 1985-86	Canada 1987	Netherlands 1987	Germany 1984	Sweden 1987	UK 1986	USA 1986	ALL
Dummy = 1 if woman has any earnings	0.57 (0.50)	0.68 (0.47)	0.34 (0.47)	0.50 (0.50)	0.87 (0.34)	0.51 (0.50)	0.68 (0.47)	0.63 (0.48)
Woman's Age	37.88 (4.77)	38.29 (8.40)	37.02 (8.21)	39.51 (8.21)	40.34 (8.28)	38.72 (8.44)	38.21 (8.47)	38.66 (8.37)
Number of Children	1.49 (1.21)	1.36 (1.21)	1.32 (1.14)	1.19 (1.09)	1.19 (1.09)	1.32 (1.20)	1.31 (1.25)	1.31 (1.18)
Dummy = 1 if youngest child < 6 years	0.32 (0.47)	0.28 (0.45)	0.33 (0.47)	0.25 (0.43)	0.25 (0.44)	0.28 (0.45)	0.30 (0.46)	0.29 (0.45)
Family income less woman's earnings/Median income before tax for country	1.36 (0.87)	1.14 (0.69)	1.30 (0.65)	1.30 (0.75)	1.35 (0.68)	1.41 (0.87)	1.36 (1.03)	1.31 (0.82)
Age difference between spouses (Male age - female age)	3.08 (4.77)	2.91 (4.33)	2.62 (3.94)	3.13 (4.19)	2.99 (4.47)	2.82 (4.50)	2.85 (4.89)	2.92 (4.50)
Number of Observations	1653	2606	1014	1345	2217	1466	2360	12661

TABLE 4: PROBIT PARAMETER ESTIMATES OF THE PROBABILITY OF LABOUR FORCE PARTICIPATION FOR MARRIED WOMEN

	Without Female Unemployment		With Female Unemployment	
	Coefficient	T-Ratio	Coefficient	T-Ratio
Woman's Age	0.112	7.000	0.112	7.000
Woman's Age Squared	-0.0018	-9.086	-0.0018	-9.086
Number of Children (Nkids)	-0.240	-6.285	-0.240	-6.285
Dummy = 1 if youngest child > 6 years (Presch)	-0.655	-7.414	-0.655	-7.414
Family Income less woman's earnings/Median income before tax (Other y)	-0.0023	-0.132	-0.0023	-0.132
Single women's equivalent social transfers/median income before tax	-1.162	-1.886	-1.162	-1.886
Female/Male earnings	-2.168	-1.613	-2.455	-1.760
Mean child support	-1.627	-5.071	-1.115	-2.553
Dummy = 1 if joint taxation	-0.901	-4.304	-0.476	-3.260
Male Age-Female Age	-0.018	-6.737	-0.018	-6.737
Female Unemployment Rate	--	--	-7.641	-3.688
Dummy = 1 if Australia	-1.007	-6.349	-0.538	-4.566
Dummy = 1 if Canada	-0.722	-3.730	-0.229	-1.812
Dummy = 1 if Netherlands	-0.666	-3.688	--	--
Australia x Nkids	0.086	1.966	0.086	1.966
Canada x Nkids	0.113	2.759	0.113	2.759
Germany x Nkids	-0.017	-0.340	-0.017	-0.340
Netherlands x Nkids	-0.114	-2.042	-0.114	-2.042
Sweden x Nkids	0.170	3.359	0.170	3.359
USA x Nkids	0.041	0.973	0.041	0.973
Australia x Presch	0.286	2.516	0.286	2.516
Canada x Presch	0.422	3.927	0.422	3.927
Germany x Presch	0.204	1.616	0.204	1.616
Netherlands x Presch	0.377	2.831	0.377	2.831
Sweden x Presch	0.603	4.645	0.603	4.645
USA x Presch	0.403	3.669	0.403	3.669
USA x Other y	-0.138	-4.293	-0.138	-4.293
Constant	1.673	1.801	1.932	1.985
Number of Observations	12661		12661	