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# INCOME EFFECTS OF DIVORCE IN FAMILIES WITH CHILDREN

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# Income Effects of Divorce
# in Families with Dependent Children[*]

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### Abstract

Marital splits may affect the economic well-being of families with children significantly. We study the economic effects of divorce in such families in Norway, using administrative information on more than 60,000 individuals. In the typical case, where the mother has custody, the mother (and child) lacks behind before maintenance payments, but after adding these, the outcomes at the median are very similar. However, the median pre-post divorce income reduction is larger for custodial women than for non-custodial men, they have larger risks of an income drop, and larger probabilities of an aggravated position in the income distribution. We also supplement the measures of realized net incomes with an estimate of earnings capabilities. Though not affecting the ranking of the different groups, these calculations indicate that measures based on realized incomes may underrate the well-being of individuals who do not work full-time. The analysis also includes a sensitivity analysis of important parameters in the equivalence scales. An important feature of the Norwegian "post-divorce package" is that the Government guarantees a minimum level for, and enforces, maintenance payments from the non-custodian to the custodian parent. The system emerges from our analysis as having an equalizing effect on the economic costs of divorce.

*Keywords:* marital dissolution, income distribution, income changes, child custody, equivalence scales

*JEL classifications:* J12, D31, I38

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# 1  Introduction

Divorce rates have been on the rise across the developed world for several years: in 1970 the OECD average number of divorces per 100 marriages was 14.3, in 1998 it had increased to 41.2. Marital break-ups may seriously affect the living conditions of those involved, in particular in families with children. Over the last couple of decades this fact has spurred research in the social sciences on the economic consequences of divorce, in particular on gender differences, and also on comparing the net effects of different types of social insurance and welfare programs across countries. This paper adds to the received literature with a study of the income effects of divorce in Norway, a country characterized by a high degree of female labour force participation, a quite extensive post-divorce income package for divorcees with child custody, and high divorce rates. Focussing on the interplay of gender and child custody, we use an equivalence scale that takes into account the time spent by non-custodians with their children. We also suggest an alternative measure of economic well-being based on earnings capacity rather than realized earnings.

Grossly speaking, the main finding of previous research is that wives experience serious post-divorce income drops, whereas the effects of a split are less dramatic for their ex-husbands. Burkhauser et al. (1990, 1991) compare the United States to Germany, using data from respectively the Panel Study of Income Dynamics and the German Socio-Economic Panel. They find that women and children are worse off than men in both countries, and that the inequalities in Germany following a divorce are at least as great as in the US, despite the more extensive social welfare system in Germany. Jarvis and Jenkins (1999), using the British Household Panel Survey find that "although the tax-transfer system mitigates the differentials in outcomes between husbands, on the one hand, and wives and children on the other, significant differentials remain." In another US study, Bianchi et al. (1999), using data from the late 1980s and early 1990s (the Survey of Income and Program Participation), find that wives who retain custody of children after separation have needs adjusted income levels at about 56% of their former husbands. Other studies suggesting different post-divorce outcomes for men and women include Duncan and Hoffman (1985) for the US, and Finnie (1993) for Canada.

Norway, the subject of this study, had an estimated number of divorces per 100 marriages of 46.8 in 2000, above the OECD 1998 average of 41.2 and Denmark's 37, but below Finland (57) and Sweden (65).[1]Like the other

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[1]Sources: OECD, Society at a glance 2001, Underlying data, Annex G: General context indicators, http://www.oecd.org, and Statistics Norway, http://www.ssb.no. In 1998 the Norwegian number was at the OECD average, but 1980-95 it was above. The number of divorces per 100 marriages for a given year is the percentage of divorces that would result during 60 years of marriage at the current divorce rates.

Scandinavian countries, Norway is characterized by a low degree of economic inequality (Atkinson et al. 1995; Aaberge et al., 2000). Social insurance and benefits are generally generous. Like in many other European countries, there are general child allowances that are not means tested. After divorces, custodians are supported by cash allowances as well as tax deductions. Moreover, child support is enforced by the public authorities: the minimum level of allowances is law-regulated, and in absence of payment, the government pays the minimum allowance to the custodian parent and takes reponsibility for collecting the debt from the other party. This feature makes the Norwegian system stand out, though it in other respects bears close resemblances to the post-divorce policies of other European countries. The present analysis utilizes data on more than 60,000 individuals, drawn from a large longitudinal database constructed by combining information from several public registers.

The common measures of economic well-being are based on realized incomes and transfers, and we follow the same approach. However, it may be seen as a weakness with such measures that the value of household production in effect is set to zero. We therefore supplement the analysis by drawing on Haveman and Bershadker (1998, 2001) who suggest using earnings capacity, defined as the earnings a household could obtain if all its adult members were working full time in the labour market, when measuring poverty. Their idea is that the most needy are those who are uncapable of generating a minimum income. Even though the focus in this paper is not on poverty, we find the earnings capacity concept relevant in our context, too, as an objective of the public policy towards divorced families is to avoid unfavourable outcomes for the party with the largest needs. Furthermore, using earnings capacity may be interpreted as placing an implicit value of unpaid child care and other unpaid work in the household, thus reflecting a family's maximum consumption possibilities.

A substantial part of the analysis to come is to assess the effect of welfare state interventions by comparing pre- and post-transfers incomes. These comparisons are only suggestive: in absence of governmental interventions families and individuals might have chosen other alternatives with respect to labour force participation as well as marital status. Furthermore, the probability of obtaining child custody may be endogenous to the probability of divorce. A full analysis of the distributional effects of the transfers system, with endogenous divorce and custody probabilities, is outside our scope in this paper – as in the received literature quoted above.[2]

The paper now proceeds with an assessment of the applied methods. The third section describes the data and gives more institutional details,

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[2] For analyses of the effects of expected income and transfers on divorce, see, e.g., Johnson and Skinner (1986), Moffitt (1990), Hoffman and Duncan (1995), Nixon (1997), Tjøtta and Vaage (2002).

followed by a section containing results and a discussion, and finally by a section with some concluding remarks.

## 2  Method

The aim of the analysis is to assess the distributional effects of divorce on couples with children. We focus on the effects of the total tax and transfer system by computing and comparing several income measures:

A  Post-tax earnings before any child-related transfers;

B  Post-tax earnings + ordinary child allowances;

C  Post-tax earnings + ordinary child allowances + extra advantages for custodial parents;

D  Post-tax earnings + ordinary child allowances + extra advantages for custodial parents + child support from the non-custodial to the custodial parent.

Thus we get an impression of the "general effect" of the welfare state (B) and the effects of measures directed especially towards divorced families (C, D). Our income measures C and D are comparable to those used by Jarvis and Jenkins (1999), whereas Burkhauser et al. (1990, 1991) use post-transfer pre-tax incomes.

We first perform these computations for divorced and intact families, using gross taxable earnings as inputs. The outcomes are then compared by gender, and marital and custody status. We also compare pre- and post divorce status, summarized by transitions to and from a low income group, and by percentage income change. Finally, the analysis is extended by computing and comparing A-D based on estimated earnings capacities.

### 2.1  Estimating earnings capacity

The full, or potential, income of an individual is the income that could be earned by working full time in the labour market (Becker, 1965). We model the expected potential income (in logs) of individual $i$ as

$$E(Y_i^*|X_i) = \beta'X_i, \tag{1}$$

where $X_i$ denotes human capital and $\beta$ is a vector of coefficients. The asterisk indicates the fact that full income is only observed for individuals who work full time. With an estimate of $\beta$ in hand, however, we may obtain an estimate of $E(Y_i^*|X_i)$.

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Letting $Y_i$ denote the log income of an individual who actually works full-time, and $D_i^*$ the propensity of working full-time, we can model this as a standard sample selection process:

$$Y_i^* = \beta' X_i + \epsilon_i \tag{2}$$
$$D_i^* = \gamma' Z_i + u_i \tag{3}$$
$$D_i = 1(D_i^* > 0) \tag{4}$$
$$Y_i = Y_i^* \text{ iff } D_i = 1, \text{ unobserved otherwise.} \tag{5}$$

The vector $Z_i$ contains $X_i$ (education, experience, and experience squared) in addition to variables that are assumed to affect the decision to work full time, but not income once the decision is made. $\epsilon_i$ and $u_i$ are random error terms.

The equation system (2) - (5) is estimated by Heckman's (1979) two-step estimator. We then follow Haveman and Bershadker (1998, 2001) in adding a random component to the predicted income to account for earnings variation that is not explained by the model. Thus the evaluation of the effects of public transfers for those who work less than full time is based on

$$\widetilde{Y}_i = \widehat{Y}_i + \eta_i, \tag{6}$$

where $\widehat{Y}_i$ is estimated potential outcome and $\eta_i$ is a pseudo-random draw from the normal distribution with mean zero and variance equal to the estimated variance in the income equation. For those who actually work full time, we use the observed $Y_i$.

The potential earnings of a *family* is simply the sum of the potential earnings of its individual (adult) members. We do not take into account income that might come from children above 18 still living with their parents.

## 2.2 Family income and equivalence scales

To make incomes comparable for households with different numbers of members, we use a parametric equivalence scale where household income is divided by

$$E = (A + \tau w C)^\theta, \tag{7}$$

where $A$ denotes the number of adults in the household (2 if married, 1 if divorced), and $C$ denotes the number of children. $w$ is a weight that allows child expenditures to be lower than expenditures for adults. We also take into account that the children of divorced couples spend some time with the parent without custody, by using the additional weight $\tau$, where $\tau = 1$ for those still married, $\tau = \tau^{cust}$ for divorced individuals with custody, and $\tau = \tau^{noncust} = 1 - \tau^{cust}$ for divorced individuals without custody. $\theta \in [0, 1]$ is meant to catch economies of scale. The closer to 0 $\theta$ is, the larger the economies of scale; oppositely, $\theta = 1$ indicates absence of scale economies.

There is no universally agreed-upon equivalence scale, cf. the discussions in Burkhauser et al. (1990) and Jarvis and Jenkins (1999), and the more general discussion in Jenkins and Cowell (1994). The scale defined by (7) is a variety of the one suggested by Buhmann et al. (1988), modified by the parameters $w$ and $\tau$. Our default choices of $w$ (0.75) and $\theta$ (0.5) are the same as in a Norwegian governmental report on transfers to families with children (NOU 1996:3). $\theta = 0.5$ (the "square root scale") is also commonly used in international studies. The parameter $\tau$, to our knowledge, is a novelty of this study. Attributing some weight to children also for divorced individuals without custody contrasts to an approach where all weight is given to the parent with custody, which makes the custodian seem worse off and the non-custodian better off. This change would be larger for the non-custodian because of the economies of scale parameter. In the analysis we base our choice of $\tau$ on a survey by Statistics Norway (1996) where it was found that on average, children in divorced families spent 26% of the time with the non-custodian parent on a yearly basis.[3] As the choice of $\tau$ may be important for the results, we perform a sensitivity analysis for this parameter. We also carry out sensitivity checks for $\theta$.

# 3    Data and institutional details

Our data are drawn from a longitudinal database ("KIRUT") which links individual level information from several Norwegian public registers. A 10% random sample of the population aged 16-67 is followed. The database covers the period 1989-1996. Records are at the individual (not household) level, but spouses' income and year of birth may be identified. KIRUT does not include survey information. For the present study, the inclusion criteria are that the individual was married in 1989 and did not re-marry during the observation period, and that women in the sample were below the age of 40 in 1989. For men, the corresponding age criterion is that the spouse should be below 40 in 1989. The age restriction is due to our focus on couples with children.

After exclusions due to missing variables, our sample consists of 31,205 women and 31,107 men. For each year until 1994, the sample is checked for marital status. "Parents" are defined as individuals (married or divorced) with children under the age of 18 in 1994, 26,722 women and 26,658 men. Among those, 2,576 women and 2,481 men were divorced in 1994, when the income comparisons are made. We may identify custody status because in the data, divorced individuals without custody are recorded as not having children. By comparing post- and pre-divorce child status we thus indirectly may infer status with respect to custody. The available income information

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[3]Parents with custody report somewhat less (23.2%), parents without custody somewhat more (28.0%) - on average 25.6%.

is gross taxable own earnings and spouse earnings. As noted in the previous section, we apply the tax rules on these earnings, and add general child benefits and extra benefits for custodian divorcees where applicable. Finally, child support from the custodian is added/subtracted. Means-tested social assistance is not taken into account, as only a binary indicator was available in the data. Compared to survey-based studies, we rely somewhat more on imputed transfers. On the other hand, our income data are obtained from the tax registers and, in principle, should be void of measurement problems (unless the tax reports themselves have been subject to evasions). Moreover, for a country with only about 4.5 mill. inhabitants, the sample is large compared to other studies.

The full sample is used when estimating the income equations for the potential income analysis, but only parents are used in the income comparisons that make up the main bulk of this study. A "full-time worker" is defined as having yearly earnings above NOK 150,000 (women) and 165,000 (men).[4] It follows from the construction of the database that about 10% of the individuals in the sample are married to each other, but we cannot identify who is married to (or divorced from) whom. The available spouse information is age and gross earnings; the earnings information is also available for ex-spouses.

(Table 1 about here)

Table 1 shows some background characteristics by marital status and gender. It follows from the sampling selection criteria that the average age of the female sample is about the same as the average spouses's age in the male sample. We further note that the average education of men is slightly higher than for women, and that the average education of those who divorce is lower than for those who stay married. As one would expect, the earnings of women in 1989 was lower than for men. It is also notable that a larger fraction were social assistance receivers in 1989 among those who later divorced than those who did not, and that this fraction had increased significantly by 1994.

The Norwegian law on child custody settles one of the parents as custodian and the other as non-custodian. Until recently (including the period covered in our data), joint custody is ruled out as an outcome from a judicial conflict, and only observed if parents agree upon it. Choice of custodian should be guided by what is in the best interest of the children. Obviously, in most cases that judgement is hard to make for a third party. The law therefore also takes into account observables such as earnings capacity, and which parent spends most time at home.

The main features of the child support and maintenance payments sys-

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[4]We had to base the "full-time" definition on earnings due to lack of reliable hours information. The chosen limits approximately correspond to the average earnings of hospital orderlies (men) and unskilled nursery workers (women).

tem are as follows. Ordinary child benefits for children under the age of 18 are paid to all parents. In addition, divorced families get benefits for one extra child. In married families, the benefits are paid to the mother, in divorced families to the custodial parent. The custodian also gets an extra tax deduction and cash benefits to cover child care.[5] Child support from the non-custodian to the custodian is negotiated privately based on the non-custodial parent's income, but enforced and guaranteed by the public authorities. In 90% of the cases the standard (minimum) rate is applied: 11% of gross income for one child, 18% for two, 24% for three, and a maximum of 28% for four children or more.[6] The paid/received amount is deductable/taxable. According to the Ministry of Children and Family Affairs, about 85% of the non-custodians pay the agreed-upon child support regularly. The public enforcement (with prepayment and subsequent debt collection in case of initial non-payment) of the private agreement between the parents is a quite special feature of the Norwegian system. Recently (2001), a reform of the system has been planned to promote "fairness": in the future, the earnings of both parents, along with actual child related costs, will be taken into account when calculating the support level. Interestingly, in the UK, The Child Support Pensions and Social Security Act 2000 takes steps in the opposite direction, from a cost based to an income based system.

## 4    Results and discussion

### 4.1    Results based on realized incomes

(Table 2 about here)

Table 2 shows different eqivalence scaled income measures in 1994 by gender and family status. The last line shows "raw" individual pre-tax earnings. Recall that all individuals are married and with children at the outset, but the men and women are not (necessarily) married to one another, due to the construction of the database. When computing equivalence scaled incomes, the "burden" of divorced couples' children is split between the parents according to custody status and the parameter $\tau$, as discussed in section 2.2.

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[5]Lone parents who undertake education are eligible for extra benefits, but we do not have information on the receipt of those.

[6]The authorities guarantee a minimum amount of support per year (NOK 11,760 in 1994). If the non-custodian's income is insufficient to provide the minimum amount by applying the standard rate, the difference is paid by the government. In these cases the support payments are decided discretionally, typically below the standard rate, with zero payments for those with very low incomes. In our calculations, we have approximated this practice by adjusting the standard rate ($q$) as follows. Let $a$ denote the minimum amount and $m = a/q$. For non-custodian income ($y$) less than $0.5m$, we set payments to 0. For $0.5m \leq y < m$, we adjust the rate to $q(y - 0.5m)/0.5m$. The received support is calculated as $\max(a, qy)$.

We note that the household incomes for married men and women are quite similar, indicating that using individual data to assess household entities gives a fairly good approximation. As expected, Table 2 shows that divorced households are worse off than those that stay married. Pre-tax earnings (the last line) are lower than for married individuals of the same gender (except divorced women without custody, whose earnings are slightly higher than for married women). The post-tax, pre-transfers measure (Income A) shows that the burden is typically worsened by the loss of the spouse's income, in particular for women. The gradual adding of child related transfers (Income B and C) shows that without these transfers, women with custody would be worst off in terms of equivalence income. Standard child benefits are not enough to equalize women with custody to those without. After adding extra advantages for custodians, women with custody are better off than women without, but still their median income is below the median of *men* without custody. The net result after including maintenance payments (Income D), however, is that women without custody are clearly worst off, even though their pre-tax earnings are higher than those of married women. Now, the median equivalence incomes of women *with* custody and men *without* are almost identical, indicating a fairly successful re-distribution. The 10th and 90th centiles reveals a larger income dispersion for men, however. The situation for women *without* custody is not so good, with median net income at 74% of the median for women with custody. The fact that the 10th percentile for this group is estimated to 0 must be seen in connection with social welfare payments not being included – as seen in Table 1, 16.7% of non-custodial women receive means tested social assistance.

(Table 3 and 4 about here)

Tables 3 and 4 describe income dynamics associated with marital splits. Table 3 shows transitions during 1989-1994 into and out of a low income group defined as earning less in terms of equivalized net income than the minimum social security benefit (NOK 51,174 for a single person in 1989, NOK 60,700 in 1994).[7] The 1989 incomes have been computed applying the same equivalence scales as for 1994. Clearly, the inflow to low income is lowest for those who stay married. For women who experience a marital split, but retain custody, the inflow is quite large (20.8%), but the rate is even higher for women without custody (27.5%). For men, inflow is lower. It deserves to be mentioned that the inflow to low-income is lower for non-custodial men than for custodial women, even though the 1994 net income 10th centile of the men is lower. The explanation must be that a larger fraction of low-income women have lost the income of an ex-spouse; whereas

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[7]For countries without an official poverty threshold, half of the median income is often used as a "poverty line". We have chosen the politically decided minimum pension partly because it gives an idea of what is officially accepted as a minimum, but also because the median income in our selected sample would not be representative for the population.

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low-income men to a larger extent have had low-income spouses.

The upper panel of Table 4 shows percentage net income changes. Again we find that the outcomes of women with custody are quite similar to men without, but still slightly worse: the median woman who experiences a marital split and retains custody has a 4.1% income drop, whereas non-custodial men drops 0.7% at the median. Women without custody drops as much as 31.9% at the median, and even at the 75th percentile the drop is 16.3%. Men with custody have the most favourable development of all (including those who stay married), with 8.8% income increase at the 25th centile, and 36.4% at the median. In the lower panel we have summed up changes in relative position when the income distribution is split into deciles. Clearly, there is a higher tendency to move down for divorcees, in particular for women without custody. This group also has the lowest probability of moving up the income ladder. Furthermore, the risk of a downward movement is larger for women *with* custody (66.1%) than for men *without* (58.4%). Men *with* custody have a more than 50% probability of improving their position in the income distribution, not too surprising considering the results in the top of the table.

### 4.1.1 Sensitivity analysis

In the sensitivity analysis we have focussed on the parameters $\tau$ (weighting of children according to custody) and $\theta$ (economies of scale), concentrating on the income measures in Table 2 labelled A (post-tax earnings before child related transfers), and D (post-tax earnings plus public and private transfers). Our primary focus is on the latter, but the pre-transfers measure (A) is also of interest, as the difference shows the impact of positive and negative child related transfers.

(Figures 1 and 2 about here)

Figure 1 shows the effect on median incomes of women with, and men without custody of letting $\tau^{noncust}$ vary, keeping $\theta$ constant at the default value 0.5. Recall from Table 2 that the median net income (Income D) of these groups are almost identical. We see that this result is quite dependent on $\tau^{noncust}$. If non-custodian men spend less time with their children than assumed in our calculations, the picture of the economic outcome is changed in their ex-spouses' disfavour. Furthermore, there are no values for $\tau^{noncust}$ that equalize men and women before transfers (Income A). Figure 2 shows the effects on the "opposite" constellation, men with and women without custody. Here, $\tau^{noncust}$ has no effect on the ranking of men and women in terms of the net result (D). The result that men are better off in terms of pre-transfers income holds for $\tau^{noncust} > 0.125$.

(Figures 3 and 4 about here.)

Figures 3 and 4 show a similar exercise for the economies of scale parameter $\theta$, keeping $\tau^{noncust}$ at 0.26. We find that this parameter, too, is

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critical for the ranking of women with and men without custody. For values of $\theta$ indicating less economies of scale (closer to 1) than assumed in the present analysis, the economic well-being of men without custody (Figure 3) apparently is better. Figure 4 shows that, again, the ranking of net incomes is not affected by the parameter value when the man has custody - the median woman is always worse off. For this constellation, the ranking of pre-transfer incomes is reversed for $\theta > 0.775$.

## 4.2   Results based on potential incomes

We now turn to comparisons based on potential incomes.[8]   As discussed in section 2.1, these are the household incomes that would be obtained if the parents worked full time, adjusted by the same equivalence scale as in the previous section. The results may be interpreted either as earnings capacities, or, alternatively, as placing a value, namely the market wage, on household production. Thus we may supplement our picture of different family types' consumption possibilities.

(Table 5 about here)

Table 5 shows the same equivalence scaled income measures as Table 2, but based on potential earnings. The unscaled pre-tax measure in the last line shows lower mean earnings capacity for women than for men. Subtracting taxes and running the result through the equivalence scale shows that before child-related transfers, women with custody are worse off than men without. When the roles are reversed, the "Income A" measure is almost equal for custodians and non-custodians, however. Adding child allowances and extra advantages improve the relative standing of parents with custody, and the final result (Income D) is that the ranking of female custodians and male non-custodians is reversed. This is due to transfers between the ex-spouses, however: when only child allowances and special advantages are included, the median income of divorced female custodians is still NOK 13,000 (9%) below their male counterpart's without custody. It should be noted that according to the potential income measure, female custodians are better off relatively to male non-custodians than when comparisons are based on realized incomes.

(Figures 5-8 about here)

We have performed the same sensitivity analysis on the equivalence scale parameters as for realized incomes, illustrated in Figure 5-8. In the previous paragraph we found that the end-result was that women with custody earn more than men without. Figure 5 shows that this is fairly robust to smaller values of $\tau^{noncust}$ – the ranking of median potential incomes changes only

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[8] The estimated earnings equations are reported in the appendix. All 31,205 women and 31,107 men (including those not defined as parents in 1994) were used in the estimations. For spouses, the potential income is based on average predictions grouped by age in 5-year intervals, as we have information on spouses' age but not their education and experience.

for values smaller than 0.1. Men with custody, on the other hand, are better off than women without for all values of $\tau$, as seen from Figure 6. What regards economies of scale, Figure 7 indicates that only when quite small economies of scale are assumed ($\theta > 0.875$), the median net income of female custodians becomes smaller than for male non-custodians. Figure 8 shows that, again, the net income ranking of female non-custodians below male custodians is not affected by the value of $\theta$.

## 4.3 Discussion

The primary aim of the Norwegian system of post-divorce transfers is to secure the economic well-being of children in divorced families, using public as well as private transfers. An important feature of the system is the public enforcement of private transfers within the divorced families. To the extent that the welfare of the child is synonymous with the welfare of the parent with custody, the policy is largely successful. In the typical situation, where the mother obtains custody, the median equivalence scaled net income is a 14% improvement from the post-tax income before extra advantages for custodians. For the minority who lives with the father, this is even more the case: after scaling, the net incomes in these households are at the same level as in complete families. This comes at the expense of the parent without custody, however, and in particular if this parent is a woman. The median net income of a woman without custody is only 56% of the equivalent income in a complete family. Consequently, the children in these families spend some of their time with a parent with seemingly severe economic difficulties.

It cannot be claimed that the economic consequences of divorce are totally equalized between men and women (assuming that the woman has custody). The median income change is more negative for custodial women than for non-custodial men, they have larger risks (54.4 vs. 51.3%) of an income drop, and also larger probabilities of an aggravated position in the income distribution (66.1 vs. 58.4%). None the less, these differences seem less dramatic, in particular when compared to intact families, where the risk of an income drop is less than 25%.

The potential income measures give an upward adjustment of the consumption possibilities for all groups, without changing their relative rankings in terms of net incomes. Women with custody at the median have about 80% of the equivalent income of intact families, slightly more than when looking at realized incomes. On the other hand, the ratio of the potential income of the "untypical" men with custody to the income of married families is reduced. We interpret this reduction as reflecting the larger value of household production in intact families. In the typical divorced family, the ex-husband is the loser, with about 69% of the median income of married families, and 86% of the income of divorced women with custody. These percentages are reductions compared to those based on realized incomes,

reflecting that women have larger unused earnings capacities, whether they are married or divorced. One way to interpret the analysis involving potential income is that measures based on realized incomes somewhat underrate the economic well-being of individuals who do not work full-time. Because women are over-represented among those, the relative standing of custodial women and married couples are improved in comparisons based on potential income.

One should bear in mind that the results are dependent on the parameter measuring the time children spend with the parent without custody. If the true value is lower than assumed (26%), the economic situation of custodian mothers is worse than for non-custodial fathers, measured by realized incomes. Thus our results may be too optimistic regarding these women. On the other hand, this sensitivity gives an important insight, as the usual approach when using equivalence scales to compare divorcees is to give no weight to the child for the non-custodian, thereby by necessity making the custodian seem worse off. But it is also clear that the outcome is harsh for women without custody, regardless of the equivalence scale parameters.

Compared to the studies quoted in the introduction, the gender differences found here (again, assuming that the wife obtains custody) are less dramatic. This may be due to different data and methods: we base our results on calculated transfers, whereas the survey-based studies use reports of actual transfers. We also have a longer observation period than the other studies. The sensitivity analysis has shown that the assumption that there is a cost associated with children also for divorcees without custody, is critical. Still we think the results reflect system differences. In particular, we have seen that the child support, guaranteed by the government, has the effect of almost bringing custodial women a par with non-custodial men. Some caution must be exerted: as noted in section 3, 85% of the non-custodians pay support regularly, implying that 15% do not. In these cases, our measure of net income (Income D) under-estimates the economic well-being of non-custodians. This may be reflected by the larger number of custodial women than non-custodial men being social assistance receivers, as seen from Table 1. Jarvis and Jenkins (1999) in their main calculations do not deduct fathers' maintenance payments, but in a sensitivity analysis they find that this is of less importance for the results. The explanation is that few liable non-custodial parents actually pay support, and the amounts paid are not large. In the present analysis we found that maintenance payments play a crucial part in equalizing the burdens of divorce – recall from Section 3 that in the Norwegian system the payments are sizeable, at least 11% of the non-custodian's gross income. Combined with the fact that a majority do pay, we believe that the results in Tables 2-4 reflect the main situation.

There are some additional caveats. We have not been able to include social assistance benefits, thus the full impact of the welfare state is not reflected in our net income measure, and the actual end-result in the lower

end of the distribution may be better than our results suggest. Neither do we have access to financial wealth and income, housing wealth and expenditures. In the earnings capacities calculations, it may be argued that because childcare expenses are not included, the potential incomes of persons with and without child custody are difficult to compare. Another problem is that we have no information about cohabitation and cannot rule out that some divorcees have co-habitants, thereby possibly improving their economic position. For the same reason, the effects of breaking up cohabiting unions are not addressed. However, we do not find it probable that these shortcomings have altered the main conclusions.

An interesting question is whether the Norwegian post-divorce transfer system actually induces divorces. Our results show that the combination of private and public transfers and tax deductions dramatically improve the economic performance of divorced parents with child custody. It is tempting to conclude that the system has two side effects: First, it stimulates marital break-up by reducing the associated economic risk for the custodial part, and second, it stimulates conflicts over child custody due to the detrimental effects on the non-custodial party, if she is a woman. To draw such conclusions, however, a simultaneous analysis of divorce decisions, custody probability, and labour market participation would be necessary.

## 5    Concluding remarks

A marital split may reduce the level of economic well-being of the family significantly, especially for couples with children. In this paper we have studied the economic effects of divorce in such families in Norway, taking into account the full "post-divorce package", which includes special transfers to the custodial part, as well as a governmental guarantee for the level and payment of child support from the non-custodian. We find that in the typical case, where the mother has custody, the mother (and child) lacks behind before maintenance payments, but after adding these, the outcomes at the median are very similar, and to a greater extent than in previous findings from the UK, US, and Germany. This is not true, however, for non-custodian mothers, who have only 56% of the equivalized income in an intact family at the median. The optimistic result for custodial mothers is modified by the finding that the median income reduction is larger than for non-custodial men, they have larger risks of an income drop, and larger probabilities of an aggravated position in the income distribution.

We also supplement the measures of realized net incomes with an estimate of earnings capabilities. This does not affect the ranking of the different groups, but the standing of custodial women and married couples are improved. The reason is that women have larger unused earnings capacities, whether they are married or divorced. Thus measures based on

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realized incomes may underrate the well-being of individuals who do not work full-time.

As is common, we use equivalence scales to compare incomes of households of different sizes. We depart from similar studies by assuming (based on survey information) that the non-custodial parent spend some time with the child(ren), and adjust the equivalence scale accordingly. A sensitivity analysis shows that this assumption is critical for the result that the median net incomes of custodial mothers and non-custodial fathers are almost equal. Therefore, this optimistic conclusion should be interpreted with some care. On the other hand, the finding also indicates that similar studies, which do not make this adjustment in the equivalence scale, may under-rate the well-being of custodians relatively to non-custodians.

The Norwegian system emerges from the analysis looking fairly successful in equalizing the economic costs of divorce. At the same time the expected number of divorces per 100 marriages in Norway is almost at the upper quartile among the OECD countries. One may ask if there is a causal connection between these two statements, however any conclusion is unwarranted here, as the analysis has taken the divorce probabilities as exogenous.

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Table 1 Descriptive statistics

| | Women | | | | | | | | Men | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Full sample | | Parents by marital status 1994 | | | | | | Full sample | | Parents by marital status 1994 | | | | | |
| | | | Married | | Divorced, custody | | Divorced, not custody | | | | Married | | Divorced, custody | | Divorced, not custody | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Education 1989 | 11.2 | 2.2 | 11.4 | 2.2 | 10.9 | 2.0 | 10.7 | 2.1 | 11.6 | 2.6 | 11.8 | 2.6 | 11.4 | 2.5 | 11.1 | 2.3 |
| Education 1994 | 11.4 | 2.3 | 11.6 | 2.3 | 11.3 | 2.2 | 10.8 | 2.3 | 11.8 | 2.7 | 12.0 | 2.7 | 11.6 | 2.6 | 11.3 | 2.3 |
| Experience 1989 | 8.5 | 4.9 | 8.4 | 4.7 | 7.5 | 4.6 | 8.4 | 4.9 | 14.5 | 5.3 | 14.1 | 5.1 | 14.7 | 4.8 | 13.8 | 5.5 |
| Experience 1994 | 12.4 | 5.7 | 12.2 | 5.6 | 11.1 | 5.6 | 12.5 | 5.8 | 19.3 | 5.4 | 18.9 | 5.2 | 19.4 | 4.8 | 18.4 | 5.7 |
| Age 1989 | 32.4 | 5.1 | 32.0 | 4.9 | 30.4 | 5.0 | 34.1 | 4.7 | 35.3 | 5.9 | 34.8 | 5.6 | 35.4 | 5.5 | 34.4 | 6.3 |
| Spouse's age 1989 | 35.4 | 5.9 | 34.8 | 5.6 | 33.6 | 5.8 | 37.3 | 5.7 | 32.4 | 5.0 | 32.0 | 4.8 | 31.6 | 4.7 | 31.2 | 5.3 |
| Children <18, 1989 | 1.8 | 1.0 | 1.9 | 1.0 | 1.8 | 0.9 | 1.8 | 0.8 | 1.8 | 1.0 | 1.9 | 1.0 | 2.1 | 0.9 | 1.8 | 0.9 |
| Children <18, 1994 | 1.8 | 1.1 | 2.1 | 0.9 | 1.9 | 0.8 | 1.7 | 0.7 | 1.8 | 1.1 | 2.1 | 0.9 | 2.1 | 0.8 | 1.9 | 0.8 |
| Gross earnings 1989 | 95 | 72 | 91 | 72 | 87 | 70 | 99 | 80 | 226 | 106 | 229 | 105 | 229 | 105 | 207 | 103 |
| Spouse's gross earnings 1989 | 222 | 131 | 225 | 110 | 204 | 109 | 223 | 133 | 92 | 75 | 88 | 75 | 87 | 70 | 88 | 72 |
| Spouse's gross earnings 1994 | 237 | 254 | 268 | 267 | - | - | - | - | 113 | 122 | 123 | 127 | - | - | - | - |
| Social assistance receiver 1989 | 1.3% | | 0.9% | | 4.8% | | 2.4% | | 2.1% | | 1.8% | | 4.3% | | 5.4% | |
| Social assistance receiver 1994 | 2.3% | | 0.5% | | 18.6% | | 16.7% | | 2.5% | | 1.6% | | 6.8% | | 10.8% | |
| N | 31205 | | 24146 | | 2038 | | 538 | | 31107 | | 24177 | | 600 | | 1881 | |

Notes:  Education measured in years

Experience: years with income above basic counting unit in social insurance system

Earnings and spouse's earnings in 1000s 1994 NOK

Table 2 Effects of transfers on equivalence scaled 1994 household incomes. 1000 NOK

| | | | Women | | | Men | |
|---|---|---|---|---|---|---|---|
| | | Married | Divorced, custody | Divorced, not custody | Married | Divorced, custody | Divorced, not custody |
| Income A | Mean | 142 | 61 | 85 | 142 | 110 | 128 |
| | 10$^{th}$ centile | 79 | 0 | 0 | 78 | 37 | 22 |
| | 50$^{th}$ centile | 139 | 66 | 97 | 139 | 110 | 132 |
| | 90$^{th}$ centile | 204 | 115 | 146 | 205 | 175 | 198 |
| Income B | Mean | 154 | 75 | 85 | 153 | 125 | 128 |
| | 10$^{th}$ centile | 93 | 14 | 0 | 91 | 53 | 22 |
| | 50$^{th}$ centile | 150 | 80 | 97 | 150 | 125 | 132 |
| | 90$^{th}$ centile | 214 | 127 | 146 | 214 | 187 | 198 |
| Income C | Mean | 154 | 94 | 85 | 153 | 147 | 129 |
| | 10$^{th}$ centile | 93 | 30 | 0 | 91 | 73 | 24 |
| | 50$^{th}$ centile | 150 | 100 | 97 | 150 | 146 | 132 |
| | 90$^{th}$ centile | 214 | 149 | 146 | 214 | 211 | 198 |
| Income D | Mean | 154 | 109 | 77 | 153 | 159 | 114 |
| | 10$^{th}$ centile | 93 | 44 | 0 | 91 | 88 | 22 |
| | 50$^{th}$ centile | 150 | 115 | 85 | 150 | 160 | 116 |
| | 90$^{th}$ centile | 214 | 164 | 129 | 214 | 222 | 177 |
| | | | | | | | |
| Pre-tax | Mean | 124 | 120 | 137 | 267 | 240 | 225 |
| N | | 24146 | 2038 | 538 | 24177 | 600 | 1881 |

Income A: Post-tax earnings, no child related transfers
Income B: Post-tax earnings + child benefits
Income C: Post-tax earnings + child benefits + extra advantages for custodians
Income D: Post-tax earnings + child benefits + extra advantages for custodians +/- maintenance payments from/to ex-spouse
Pre-tax: Unscaled earnings (without spouse)

Table 3 Low-income transitions 1989-94 by marital and custody status 1994

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | All | Married | Divorced, custody | Divorced, not custody | All | Married | Divorced, custody | Divorced, not custody |
| *Transitions from non-low income 1989* | | | | | | | | |
| NL-NL | 96.0% | 97.8% | 79.2% | 72.5% | 96.9% | 97.7% | 94.1% | 87.3% |
| NL-L | 4.0% | 2.2% | 20.8% | 27.5% | 3.1% | 2.3% | 5.9% | 12.7% |
| Observations | 25303 | 22974 | 1834 | 495 | 25403 | 23107 | 571 | 1725 |
| *Transitions from low income 1989* | | | | | | | | |
| L-NL | 74.0% | 78.1% | 60.8% | 25.6% | 70.7% | 73.3% | 69.0% | 53.2% |
| L-L | 26.0% | 21.9% | 39.2% | 74.4% | 29.3% | 26.7% | 31.0% | 46.8% |
| Observations | 1419 | 1172 | 204 | 43 | 1255 | 1070 | 29 | 156 |

NL: Equivalence scaled household income ≥ minimum social security benefit for a single person
L: Equivalence scaled household income < minimum social security benefit for a single person

Table 4 Percentage income change and change in relative position in the income distribution 1989-94, by marital and custody status 1994

| | Women | | | | Men | | | |
| | All | Married | Divorced, custody | Divorced, not custody | All | Married | Divorced, custody | Divorced, not custody |
|---|---|---|---|---|---|---|---|---|
| *Percentage income change* | | | | | | | | |
| Lower quartile | 2.6% | 6.5% | -28.0% | -65.1% | 4.3% | 6.3% | 8.8% | -27.6% |
| Median | 22.8% | 25.0% | -4.1% | -31.9% | 23.9% | 24.8% | 36.4% | -0.7% |
| Upper quartile | 45.7% | 47.2% | 22.1% | -16.3% | 46.5% | 46.8% | 65.4% | 29.2% |
| | | | | | | | | |
| 50+ % drop | 3.1 | 1.8 | 11.7 | 32.0 | 2.9 | 2.0 | 4.2 | 14.3 |
| 10-50% drop | 12.5 | 10.1 | 30.8 | 49.4 | 11.3 | 10.2 | 8.3 | 26.7 |
| 0-10% drop | 7.2 | 6.9 | 11.9 | 4.8 | 6.9 | 6.6 | 4.3 | 9.9 |
| 0-10% increase | 10.3 | 10.4 | 11.7 | 3.4 | 10.4 | 10.5 | 9.2 | 9.8 |
| 10-50% increase | 45.0 | 48.0 | 19.8 | 6.3 | 46.0 | 48.0 | 35.6 | 24.0 |
| 50+% increase | 21.8 | 22.9 | 14.1 | 4.1 | 22.5 | 22.7 | 38.4 | 15.3 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| | | | | | | | | |
| *Change in relative position (decile) in the income distribution* | | | | | | | | |
| Down | 38.0 | 34.7 | 66.1 | 80.9 | 36.2 | 34.6 | 31.5 | 58.4 |
| Same | 23.2 | 23.9 | 16.9 | 13.7 | 23.8 | 24.4 | 15.8 | 19.2 |
| Up | 38.8 | 41.4 | 17.0 | 5.4 | 40.0 | 41.0 | 52.7 | 22.4 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table 5 Effects of transfers on equivalence scaled 1994 estimated household earnings capacities. 1000 NOK

| | | Women | | | Men | | |
|---|---|---|---|---|---|---|---|
| | | Married | Divorced, custody | Divorced, not custody | Married | Divorced, custody | Divorced, not custody |
| Income A | Mean | 176 | 101 | 126 | 181 | 128 | 156 |
| | 10$^{th}$ centile | 136 | 75 | 97 | 139 | 86 | 110 |
| | 50$^{th}$ centile | 173 | 98 | 122 | 174 | 119 | 145 |
| | 90$^{th}$ centile | 221 | 127 | 157 | 227 | 180 | 213 |
| Income B | Mean | 188 | 115 | 126 | 192 | 142 | 156 |
| | 10$^{th}$ centile | 150 | 92 | 97 | 153 | 104 | 110 |
| | 50$^{th}$ centile | 184 | 112 | 122 | 185 | 134 | 145 |
| | 90$^{th}$ centile | 230 | 139 | 157 | 237 | 190 | 213 |
| Income C | Mean | 188 | 136 | 126 | 192 | 165 | 156 |
| | 10$^{th}$ centile | 151 | 113 | 97 | 153 | 124 | 110 |
| | 50$^{th}$ centile | 184 | 132 | 122 | 185 | 157 | 145 |
| | 90$^{th}$ centile | 230 | 162 | 157 | 237 | 214 | 213 |
| Income D | Mean | 188 | 152 | 112 | 192 | 178 | 137 |
| | 10$^{th}$ centile | 150 | 128 | 85 | 153 | 139 | 95 |
| | 50$^{th}$ centile | 184 | 148 | 109 | 185 | 170 | 128 |
| | 90$^{th}$ centile | 230 | 178 | 141 | 237 | 228 | 188 |
| | | | | | | | |
| Pre-tax | Mean | 206 | 204 | 208 | 293 | 281 | 276 |
| N | | 24146 | 2038 | 538 | 24177 | 600 | 1881 |

Income A: Post-tax earnings, no child related transfers
Income B: Post-tax earnings + child benefits
Income C: Post-tax earnings + child benefits + extra advantages for custodians
Income D: Post-tax earnings + child benefits + extra advantages for custodians +/- maintenance payments from/to ex-spouse
Pre-tax: Unscaled potential earnings capacity (without spouse)

Appendix: Earnings equations (2-step estimates)

| | Women | | | Men | | |
|---|---|---|---|---|---|---|
| | Coef. | Std. Err. | z | Coef. | Std. Err. | z |
| *Earnings equation* | | | | | | |
| Education | 0.025 | 0.001 | 18.38 | 0.051 | 0.001 | 51.71 |
| Experience | 0.002 | 0.002 | 0.73 | 0.037 | 0.003 | 14.39 |
| Experience$^2$/10 | 0.001 | 0.001 | 1.82 | -0.008 | 0.001 | -11.81 |
| Selection term | -0.067 | 0.011 | -5.92 | 0.039 | 0.015 | 2.67 |
| Constant | 11.901 | 0.040 | 300.56 | 11.500 | 0.030 | 379.66 |
| *Selection equation* | | | | | | |
| Education | 0.190 | 0.004 | 52.13 | 0.186 | 0.004 | 41.79 |
| Experience | 0.184 | 0.007 | 26.91 | 0.121 | 0.010 | 12.18 |
| Experience$^2$/10 | -0.031 | 0.002 | -12.71 | 0.005 | 0.003 | 1.65 |
| Age | -0.019 | 0.002 | -9.64 | -0.106 | 0.003 | -37.22 |
| # children < 18 | -0.232 | 0.009 | -27.12 | 0.009 | 0.009 | 1.03 |
| Married | -0.059 | 0.054 | -1.08 | 0.097 | 0.069 | 1.41 |
| Custody | -0.340 | 0.047 | -7.30 | 0.188 | 0.035 | 5.43 |
| Social assistance receiver | -0.886 | 0.077 | -11.53 | -1.018 | 0.053 | -19.25 |
| Spouse income/10$^4$ | -0.002 | 0.001 | -3.44 | 0.006 | 0.001 | 4.75 |
| Constant | -2.739 | 0.100 | -27.41 | 0.425 | 0.121 | 3.52 |
| | | | | | | |
| N | 31205 | | | 31107 | | |
| Selection=1 | 12662 | | | 25943 | | |
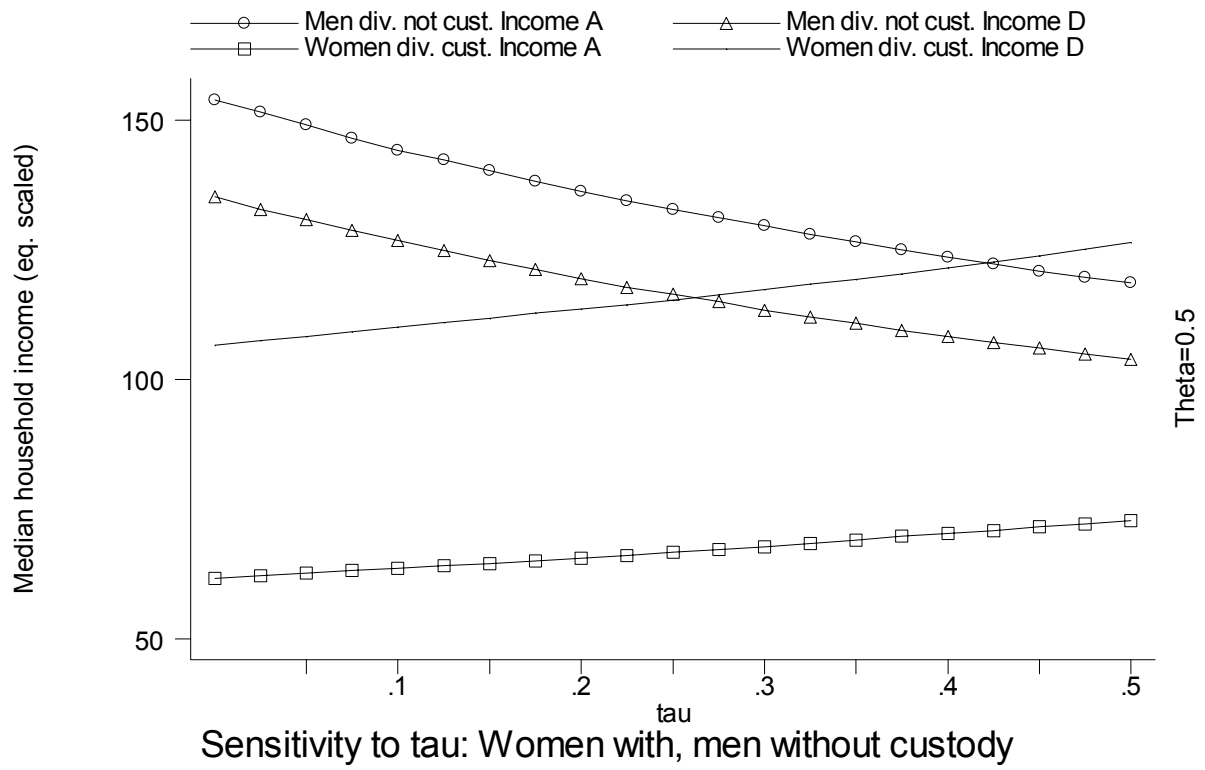
**Figure 1**
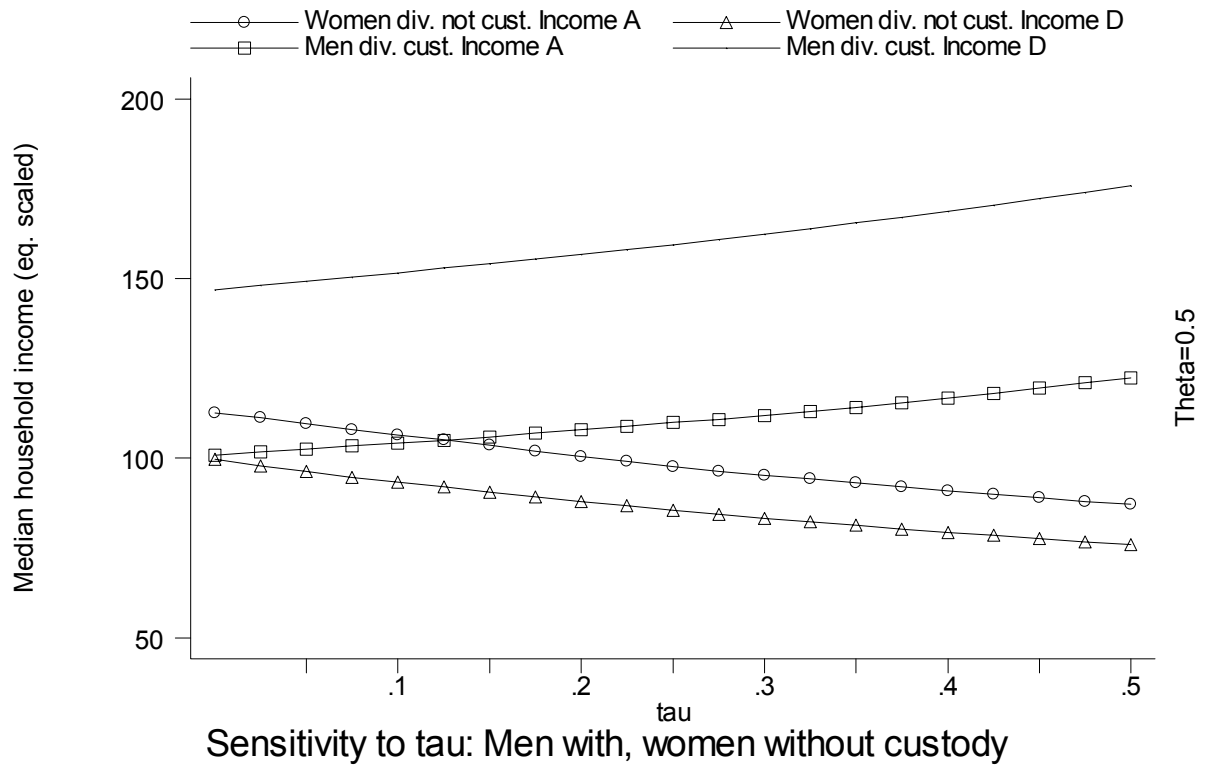


**Figure 2**
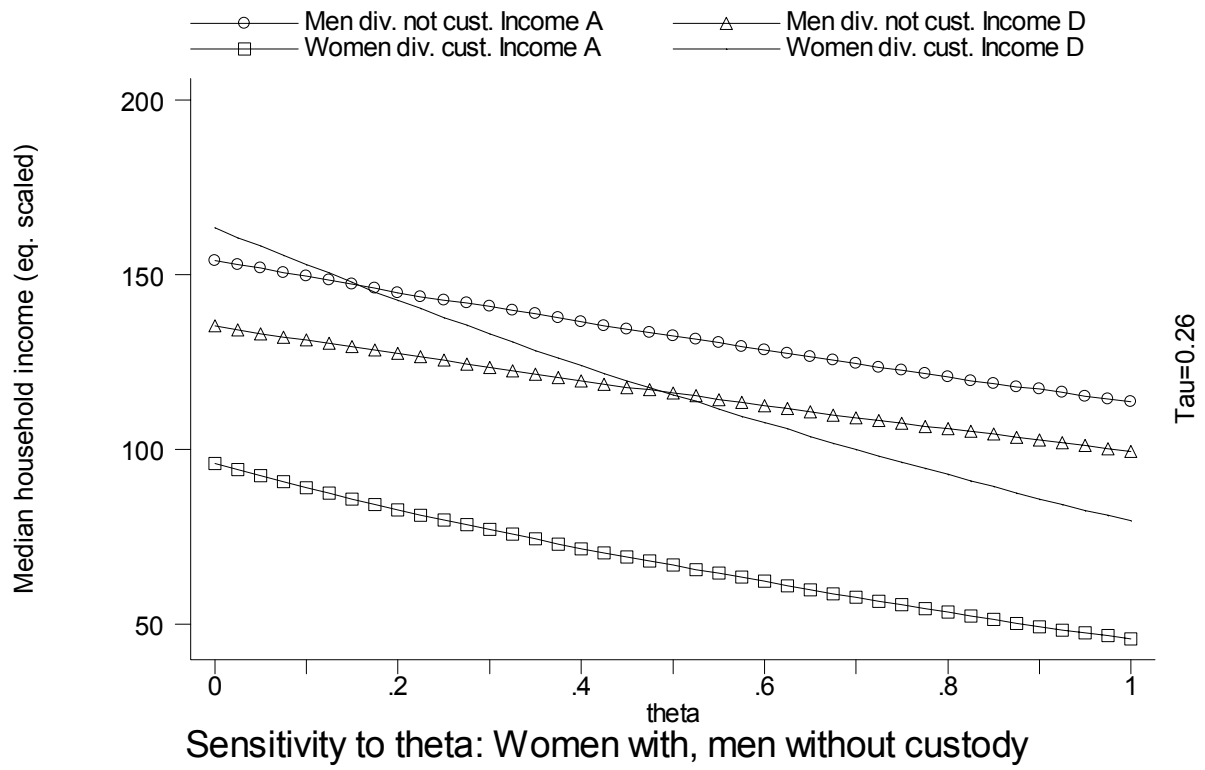
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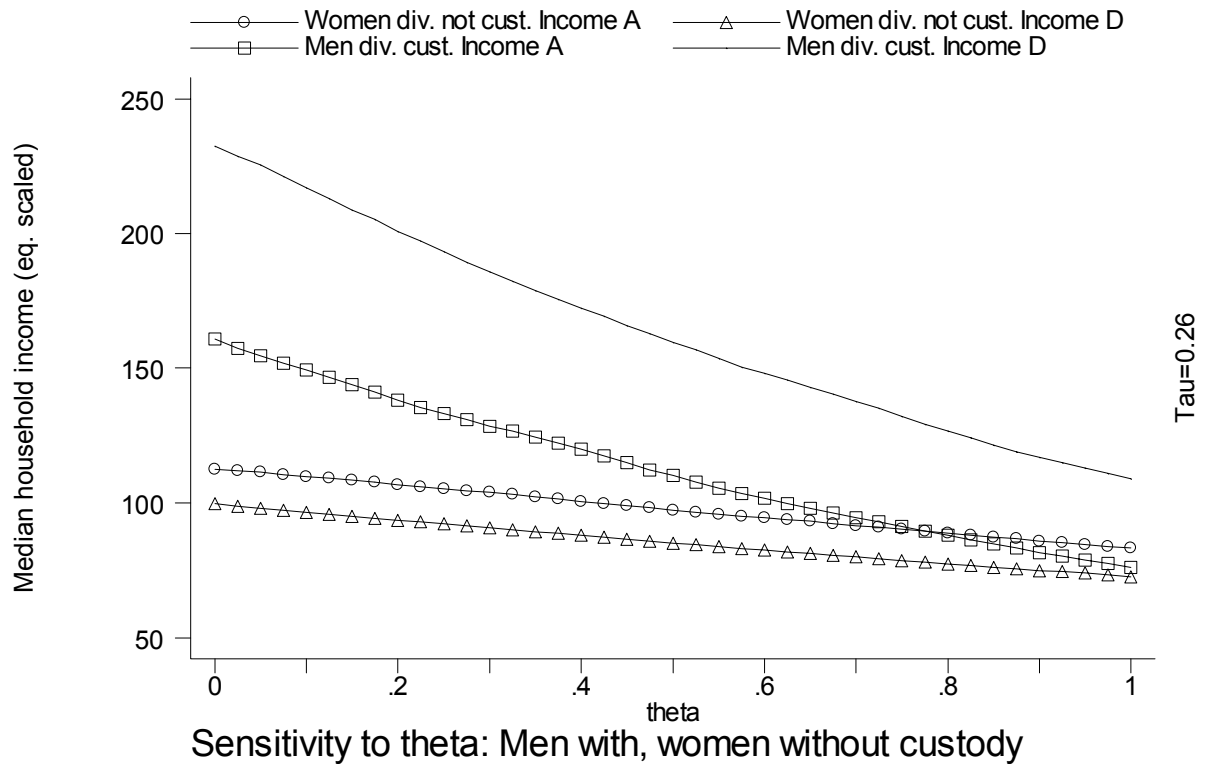


**Figure 4**
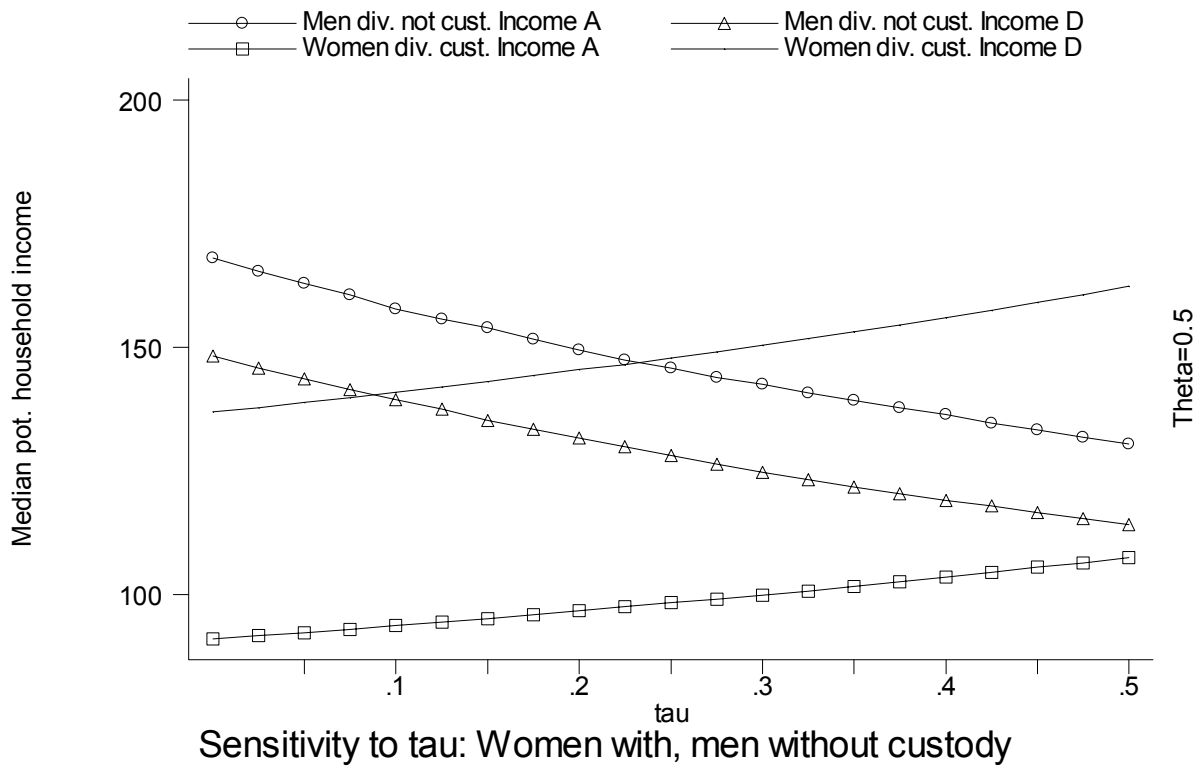
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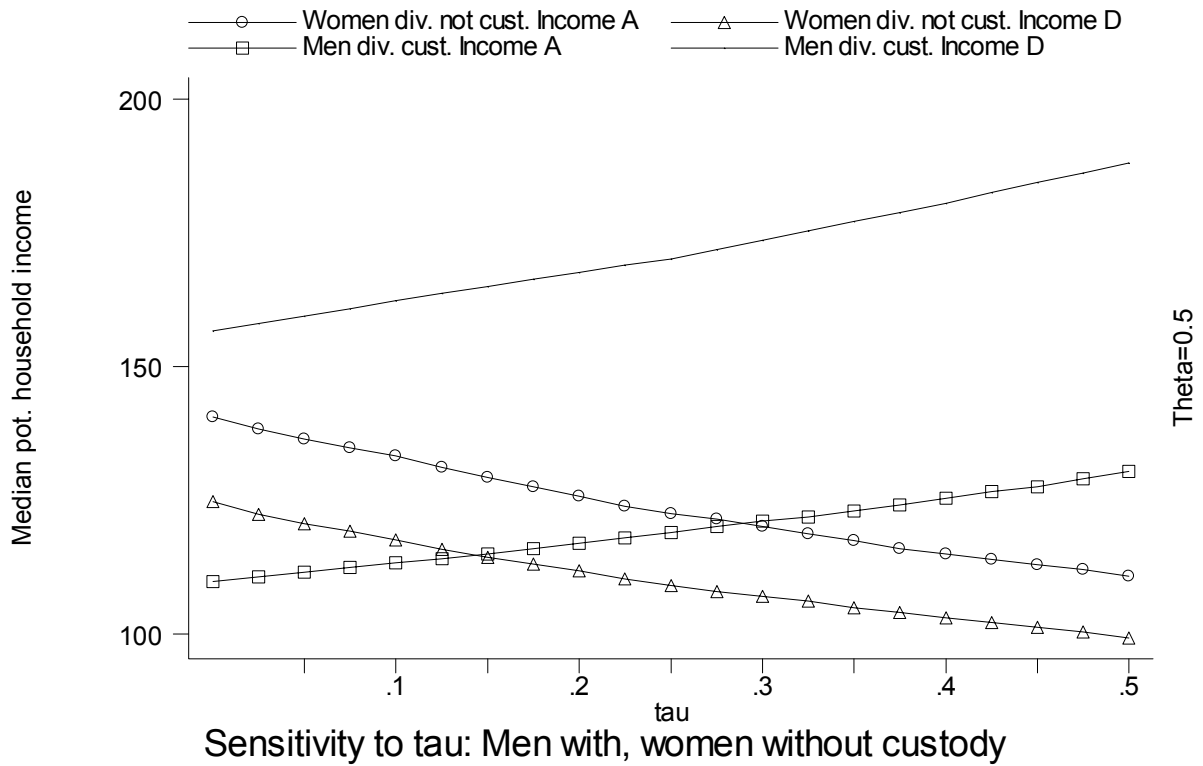


**Figure 6**

**Figure 7**



**Figure 8**