

Running Head: CHILD SUPPORT GUIDELINES AND EQUAL LIVING STANDARDS

Child Support Guidelines and the Equalization of Living Standards

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In 1984, the Child Support Enforcement Amendments enacted by Congress mandated that states make numeric child support guidelines available to decision-makers in every jurisdiction. In the Family Support Act of 1988, amendments to the original act required that rebuttably presumptive child support guidelines be enacted by state statute (Venohr & Williams, 1999). Thus, unless a judge decides otherwise, ordered child support amounts since the 1990's are calculated by precise formulas. Interestingly, however, the Act did not specify any given type of formula the states needed to specify nor even at what goals state's guidelines should aim (Venohr & Williams). Most states appear to have adopted the "continuity of expenditure" goal, wherein the guideline amounts attempt to assure that **the children receive the same overall percentage of parental income as they would if the parents were still together** (Garrison, 1999). Both the "income shares" approach and the "percent-of-obligor-income" standard supposedly attempt, by different means, to achieve this goal (Garrison).

Despite the reasonableness of such a goal, many advocates (e.g. Garrison, 1999; Cassetty & Sprinkle, 1987; Eden, 1987), have urged that **equalization of the living standards** of the two households be the preferred goal instead. So far, no states have explicitly endorsed such a goal, much to their advocate's chagrin. In fact, clearly such a goal is incompatible with the fundamental notion of child support, which is to support the child. Willis (this volume) has shown that child support inevitably benefits the custodial parent even though intended solely for the child, thus only a share of joint costs is appropriately attributable to the child. If greater equalization of living standards is desired by decision- or policy-makers, there is another mechanism of income transfer for divorced or separated

families designed precisely for this purpose: alimony. However, alimony/spousal maintenance appears less politically acceptable at present (with both spouses so often being employed full time) than it was historically. Indeed, it appears to be ordered relatively rarely, in less than 15% of divorce cases (Braver & O'Connell, 1998; Maccoby & Mnookin, 1992.) Ellman has written several essays intended to set better guidelines for ordering alimony or "compensatory spousal payments" (Ellman, 1989; 1991; Ellman, Kurtz & Scott, 1998; A.L.I. 2002.)

While alimony is apparently politically less acceptable, child support is widely regarded as necessary and appropriate. As a result, some advocates are attempting to accomplish their goal of equalization of living standards by the more circuitous, and less direct means of disguising it within complicated and opaque child support calculations. Thus, for example, Grace Blumberg (1999), in drafting the American Law Institute's recommended formula (A.L.I., 2002), calculates a base award to achieve continuity of expenditures using familiar principles, but then adds a "supplement percentage" intended to bring the two households' standards of living (SOL) into closer agreement. The supplemental percentage can increase the award by 70%. Moreover, to the degree that any guideline amount exceeds the (proportionate) cost of the actual costs of raising the child, the guideline automatically contains **hidden alimony**. Roger Gay (1994) has produced demonstrations that many guidelines do so.

While equalization of living standards can thus hardly be regarded as a legitimate goal of child support guidelines, suppose it were. It is widely assumed by its advocates that applying this goal will lead to much higher child support awards. What has not been widely recognized, however, is that child support guidelines could conceivably be generous enough already that equality of outcomes has commonly been achieved. In fact, it is at least

theoretically possible that guidelines have already become *too* generous; that the living standards advantage generally believed to be enjoyed by the noncustodial parent (NCP) may already be overcorrected. Thus, by inept income transferring through child support, we might inadvertently be making custodial households more well off than noncustodial ones. An important goal of this chapter is to provide the concepts and calculations to properly compare post-divorce living standards, which requires the analyst to take into account a large number of factors.

Most frequently overlooked are two factors: (1) differential taxation of the two households; and (2) that an appreciable portion of expenses due to children may be borne directly by the noncustodial household. With respect to taxation, Braver (1999; Braver & O'Connell, 1998, Ch. 3) showed that a large number of tax advantages are available to the custodial parent (CP), but not similarly available to the NCP. These include the claiming of the children as "exemptions"; the Child Tax Credit; a lower tax rate for "head of household" filing status; the availability of the Earned Income Credit; and the fact that child support income is tax-free¹. When the CP receives the child support, she² doesn't have to pay any taxes on it, unlike most other income. In contrast, when a NCP pays child support to his ex-spouse, he must pay federal income tax, social security or FICA tax, state, and local taxes on this amount. (Alimony has the opposite tax status.) Consequently, NCPs pay all the taxes on the child support amounts while CPs get to keep the full amount. For example, assume both parents gross \$2,000/month and live in Oklahoma, and there are 3 children who live with the CP who claims them on her taxes. According to calculations we will detail below, assuming they both take the standard deduction, he will pay \$43 more per month in state taxes; he will also pay \$179 per month in Federal taxes, while she will not only pay no

Federal tax, she will actually receive \$250 per month in total from the Earned Income Credit and the Child Tax Credit that he will not qualify for. Then he will pay her \$400 per month in after-tax dollars for child support and she will receive these as tax-free dollars. After this transfer, she will have more than twice his spendable (i.e., after tax, after child support) income.

With regard to the second point concerning who pays the expenses for the children, virtually all comparisons (other than mine) of post-divorce SOL make what we call the “sacrosanct household” assumption. That is, they assume that *all* the family units’ income and *only* the family units’ income goes to support only *that* household’s members. Put another way, it assumes that a single person spends all after-tax income to support only him- or herself, and that a family pays for all its members’ needs out of only its own after-tax income. This is an entirely reasonable assumption for unrelated households, for which the analyses were originally designed. However, when applied to a divorced family, the assumption is commonly inappropriate. It would be valid only if child support and alimony were the only monetary transfer of income and expense between the households. In actuality, however, child support and alimony paid may well represent only a portion of the expenses for the children assumed by NCPs. If they pay for the child’s food or transportation while the child is with them during visitation or access, if they buy clothes for the child, if they pay out-of-pocket for medical and dental expenses, etc., the model is ill-applied, and the sacrosanct household assumption is violated. Instead, means need to be sought to take into account these direct payments for child’s needs when comparing SOL.

We will describe in detail below an analytic method of incorporating these transfers and defrayals of children’s expenses in financial comparisons. A variant was used in Braver

(1999) and Braver & O'Connell (1998), when analyzing a matched sample of households getting divorced in 1986. It was found there that when appropriate corrections for the two factors above are applied, the living standards of the two households were approximately equal. However, the comparisons are probably now outdated since the divorces analyzed all occurred before guidelines were enacted in 1988. Guidelines increased child support substantially (Thoennes et al., 1991; Bay et al, 1988; Garrison, 1994). Moreover some of the tax advantages to the custodial household have been expanded. In particular, the Child Tax Credit wasn't part of the tax code in the prior analyses. As a result of these factors, **there is a basis to hypothesize that cases in which the CP has a substantially higher SOL than the NCP may now have become the majority.**

In the current analysis, we assess more current situations, using the 2001 child support guidelines of 7 representative states that have various formulas and approaches and are from different parts of the country. Rather than analyze actual family income data, we examine multiple hypothetical but plausible scenarios. In each state, for each of the scenarios, we compute what gross income the CP would need to have in order that, after taxes and child support, the two households have the identical SOL.

The goal in this paper is thus to determine **what gross income a CP or obligee would need in order that her SOL would be exactly equal to the NCP's or obligor's.** Once this gross income figure is identified, its implication is that any CP who earns more than this amount has a higher SOL than her matched NCP, while any CP who earns less has a lower SOL.

Any such calculations necessarily contain a large number of assumptions, which may or may not be accurate or may or may not apply to a particular case. An advantage of the

present approach, however, is that developing financial estimates requires making these assumptions explicit and transparent. To the degree that they are in contention, at least a critic knows exactly what assumptions are being made. A second advantage is that one can evaluate to what degree the final calculations depend upon making these assumptions. Sensitivity analyses may be conducted which evaluate the dependence of the estimates on the exact assumptions by inserting alternative plausible values into the calculations. If the resultant estimates vary dramatically, especially if they vary in one direction, then we say the estimates are “sensitive” to the assumptions. A happier outcome is when varying the assumptions does not result in substantially different conclusions, in which case one concludes that the calculations are insensitive or “robust”. Sensitivity analyses are included here for most or all of the assumptions made.

Defining SOL, Net Income and the Matter of Taxes

In order to perform this calculation, we need to operationally define SOL. In our definition, consistent with the basic approach of Duncan and Hoffman (1985), Weitzman (1985), Peterson (1996) and Braver (1999), **SOL is spendable income (by our definition, net income, after both taxes and child support and other transfers) divided by an index of the family’s need.**

The numerator of this fraction, spendable income, is defined as gross income minus taxes plus (for the recipient) or minus (for the payer) child support, alimony and any other transfers between the households. The taxes we incorporate here are of the three nearly universal types: Federal income tax, State income tax and payroll taxes (FICA and Medicare). In the scenario calculations to follow, we estimate the exact amount of taxes CPs and NCPs would pay under the scenario’s specifications.³ After taxes are subtracted from gross income,

child support is subtracted from the obligor's and added to the obligee's net income⁴. As in other similar investigations, we assume that the amount ordered is actually paid. The child support calculations need to be specific to the state in which the order originates, since different states have entirely different schemes, as discussed below.

There may also be other monetary transfers to consider (i.e., to subtract from NCP's after-tax income and add to CP's) besides child support and alimony. Any amounts that NCP pays to CP (or vice versa, for that matter) should also be included. The most obvious recurring example is payment for medical expenses that insurance doesn't cover. This sort of transfer is included in the estimates we develop below if the state requires that each parent pay a portion of such expenses over and above child support.

The states we selected for analysis are Arizona, Kentucky, Massachusetts, Missouri, Oklahoma, Washington state and Wisconsin. These states were selected because they cover most of the major U.S. geographic regions, as well as having a variety of representative child support schemes. For example, Wisconsin and Massachusetts are percent of obligor income states, while the others use the income shares approach (Venohr & Williams, 1999)⁵. They also vary in terms of how large the child support burden is that they impose (Dodson & Entmacher, 1994; Morgan & Lino, 1999; Pirog, Klotz & Byers, 1998.) For example, Massachusetts often is found to have one of the highest child support guideline regimens, while Missouri has one of the lowest. Some have adjustments for NCP's visitation expenses, while others do not. They also have different state income tax schemes. For example, Washington has no state income tax, while Kentucky doesn't have a head of household distinction and taxes low incomes at a relatively high level.

Because the various states used such a variety of challenging calculation schemes

for child support and state tax that we tried to replicate here, the chance for inadvertent error was high. Accordingly, we have verified our calculations of taxes and child support with independent calculators available on the Web.⁶

An Index of Family Need Based on Household Size and Composition

Next we consider the denominator of the SOL definition, an index of the family's need, which reflects the different size and composition of the two households. We need to divide by a number reflecting family size because it is inappropriate -- and unfair to CPs -- to simply compare after-tax/after-child-support incomes. After all, in the CP's household, the income must go to support more family members, the children and the parent. Because the marginal financial burdens attributed to additional family members are clearly diminishing (there are "economies of scale"; for example, the third child doesn't generally add as much cost to the household as the first did) the method most economists recommend is a "needs adjusted income" technique. This divides income by a value that is related to -- but not equal to -- family size and composition, but is adjusted to take into account marginal living costs. At least two different such "equivalence factors" have been used by different analysts comparing SOL for divorced families, including the Bureau of Labor Statistics "1977 Lower Standard Budget" (Duncan & Hoffman, 1985; Weitzman, 1985; Peterson, 1996; Blumberg, 1999), which was phased out as obsolete after the report of an Expert Panel (Watts, 1980) in 1980, and Federal Poverty Thresholds (Rogers & Bieniewicz, this volume; Braver, 1999), which replaced it (for a history and explanation of the issues surrounding choice of equivalence scale, see Johnson, Rogers & Tan, 2001).

In the present analysis, we use a third index of need or household composition, one developed by the Panel on Poverty and Federal Assistance in response to a directive from the

Joint Economic Committee of Congress in 1992. We prefer this index endorsed by the National Research Council for three reasons: (1) It is the most recent -- and official -- consensus technique for accounting for family size; (2) it lends itself most readily to incorporating the variations we propose here to account for divorced family households; (3) it is expressed in units that are commensurable with family size, albeit fractional (they may be called “first adult equivalents”). It should also be noted that results using it may not be materially different from those using the older outdated methods (Braver, 1999), and that, in any event, the other two methods will be compared in the sensitivity analyses.

According to the Panel’s report (Citro & Michael, 1995) family size should be expressed according to the following expression:

$$FSF=(A + CCM*K)^F, \quad (1)$$

where FSF stands for Family Size Factor, A represents the number of adults in the family, CCM represents the child cost multiplier, K represents the number of children, and F represents an economy of scale factor. If $K=0$, and $F=1$, FSF would reduce simply to the number of adults, A. Thus dividing net income by it would essentially be to find per capita income. If CCM were set at 1.0, this would indicate that we could simply add together the number of adults plus children. However, the Panel indicated that CCM should be set at .7, rather than 1.0, in reflection of the fact that children typically cost somewhat less than adults to maintain. In addition, the Panel recommended that F be set at values somewhat lower than 1.0, to reflect the economy of scale. The consensus of the Panel is that F should be set between .65 and .75. We shall commonly use the midpoint of those two values, .7; thus, in what follows, both F and CCM in (1) will both be set to .7 as in (2) except for the sensitivity analyses.

$$FSF=(A + .7*K)^7, \quad (2)$$

Suppose there were two adults and no children; then $A=2$ and $K=0$, and according to (2), $FSF=1.62$. This indicates that the two adults' needs constitute 1.62 times that of one adult (note that its less than 2 times, as a per capita index would yield.) A household composed of two adults and two children would have $FSF=2.36$, implying it would require 2.36 times the net income of one adult to support the family at the same SOL. If we added one additional child, we'd get an FSF of 2.69, 14% greater than the 2.36.

In what follows, we divide spendable income by FSF , yielding (3), our fundamental definition of SOL.

$$SOL_{NEEDS\ ADJUSTED} = \frac{AFTER\ TAX\ INCOME \pm CHILD\ SUPPORT \pm OTHER\ TRANSFERS}{FSF} \quad (3)$$

To assess the SOL of a divorced parent, we assume each parent is the sole adult in their respective household, meaning we preclude consideration of situations such as remarriage, cohabitation, roommates, or moving in with parents, which complicate matters beyond the capability of the present analysis to deal with them. Thus for A in (2), we always use 1.

We also add to formula (2) an adjustment to capture the possibility that some proportion of the child's expenses may be directly borne by each parent. This results in (4):

$$FSF=(1 + .7*PCE*K)^7 \quad (4)$$

In (4), PCE represents the Proportion of the Child's Expenses the parent expends directly on behalf of the child. In the divorce scenario, we would have a FSF for the CP and another for the NCP, (designated with subscripts C and N, respectively). Thus, we'd have:

$$FSF_C=(1 + .7*PCE_C*K)^7 \quad (5)$$

$$FSF_N=(1 + .7*PCE_N*K)^7 \quad (6)$$

The sacrosanct household assumption, within this formulation, implies that we assume that, other than child support, the CP bears all (or 100%) of the child's expenses ($PCE_C=1.0$) and the NCP bears none (or 0%) of them ($PCE_N=0$). In this case, the formulas would reduce:

$$FSF_C=(1 + .7*K)^7 \quad (7)$$

$$FSF_N=1^{.7} = 1 \quad (8)$$

However, we wish here to be able to relax this simplifying assumption implicitly made by previous analysts (Blumberg, 1999; Duncan & Hoffman, 1985; Peterson, 1996; Weitzman, 1985) to account for what is probably the far more common instance where the CP directly spends less than 100% and/or the NCP directly expends more than 0% on children's expenses, yielding more general solutions for PCE_C and PCE_N .

Obtaining Expressions for PCE.

The PCE for N and C represent respectively the proportion of the Total Child Expenses (TCE; the denominator of the PCE expression), paid for directly by the NCP and CP, respectively. Thus, the numerator of each PCE expression is the total amount paid by that parent. Thus,

$$PCE_P = CEP_P/TCE \quad (9)$$

where CEP_P represents the Child Expenses Paid for directly by Parent P. However, determining CEP_P generally is difficult; it becomes a far more tractable problem if we abandon (9) and instead attempt to break overall expenditures required on behalf of children down into various types of expenses, such as that estimated by the US Department of Agriculture (Lino, 1998) or the Consumer Expenditure Survey (Morgan & Lino, 1999). The list should include amounts for the following expenses: housing, utilities, food, transportation, clothing, health care (both insurance and non-covered or unreimbursed expenses), child care,

baby-sitting (distinguishable from child care because the child care is work-related or occurs during working hours, whereas the latter does not; the IRS makes a similar distinction for the Child Care Credit), education expenses, recreation, toys and games, personal care items, uniforms and equipment, and lessons and memberships. For older children, we might include allowance, and expenses concerning cars, such as auto insurance, car purchase, gas and oil, and car maintenance expenses.

For purposes of determining and comparing the SOL of the two parents, we propose to divide these myriad expenses into four categories described in more detail below, because each of the categories likely has a different pattern for the potential sharing of expenses across the two households: Variable expenses (denoted V), fixed Unduplicated expenses (denoted U), fixed Duplicable expenses (D) and Ordered allocation expenses (which we denote O). (The first three categories were specified by Judge Vaughn of New Jersey; see discussion in Venohr & Williams, 1999). Thus, the Total Child Expenses (TCE) is the sum of these four categories of expense, so that

$$TCE = V + U + D + O \quad (10)$$

An expression alternate to (9) may be found for PCE that doesn't require direct determination of the CEP_P values. This alternative and more tractable formula for PCE is

$$PCE_P = p_{PV} * P(V) + p_{PU} * P(U) + p_{PD} * P(D) + p_{PO} * P(O) = \sum p_i P(i) \quad (11)$$

where the p_{Pi} represent the proportion of expense category i paid directly by parent P , and the $P(i)$ (i.e., the $P(V)$, $P(U)$, $P(D)$, and $P(O)$, respectively) represent that category's relative proportion of total expense TCE. ($\sum P(i) = P(V) + P(U) + P(D) + P(O) = 1$). Since we want a PCE expression for each parent, we really have two equations:

$$PCE_C = p_{CV} * P(V) + p_{CU} * P(U) + p_{CD} * P(D) + p_{CO} * P(O) \quad (12)$$

$$PCE_N = p_{NV} * P(V) + p_{NU} * P(U) + p_{ND} * P(D) + p_{NO} * P(O)^7 \quad (13)$$

V, U, D and O Expenses. The distinguishing feature of Variable (V) expenses is that they are regarded as borne entirely by the parent with whom the child is residing at the moment the expense is incurred. Thus, they are zero-sum (what one parent pays subtracts from what the other needs to) and are directly related to the amount of time the child spends with the parent. The V expenses we include from the earlier list include food, recreational expenses (e.g., movies, bowling), any extra utilities needed when the child is in the home, transportation expenses, and baby-sitting. We denote with t the proportion of time the child is in the NCP's care; thus the child is in the CP's care $1-t$. As discussed above, we assume the parents divide the V expenses in exact accordance with the amount of time spent in each household. Thus, we assume $p_{NV}=t$, and $p_{CV}=1-t$.

The two "fixed" expenses are either of the duplicable or unduplicated variety. Fixed unduplicated (U) expenses are of the sort that only one parent pays them, regardless of where the child is at any given moment; from the original list, U expenses include uniforms, memberships and lessons (e.g., piano or karate), car expenses for teenagers, and allowance. We assume, as did Judge Vaughn (Venohr & Williams, 1999) that the CP pays all of these expenses, directly out-of-pocket.⁸ Thus, $p_{CU}=1.0$, and $p_{NU}= 0$.

Fixed duplicable (D) expenses are items that may or may not be duplicated in each parent's home. The best example is housing; the child may or may not have a bedroom in each parent's house; clothing, toys, games, equipment and personal care items are also in this category. We assume $p_{CD}=1$, meaning that we assume the CP pays 100% of such expenses. However, we assume that the NCP may also pay some of these (after all, they are duplicable expenses). In particular, we assume p_{ND} phases in with t ; there is a lower value of t below

which the NCP spends nothing on this category (we will denote this lower threshold t_L)⁹, and a high value of t , above which the NCP pays just as much as the CP; i.e., $p_{ND}=1$. This higher, fully phased-in value is denoted t_F . In between these two values, we assume a linear increase of p_{ND} with t . In other words,

$$\begin{aligned}
 p_{ND} &= 0, & \text{if } t \leq t_L \\
 &= \frac{t - t_L}{t_F - t_L}, & \text{if } t_L < t < t_F \\
 &= 1, & \text{if } t \geq t_F.
 \end{aligned} \tag{14}$$

For example, if t_L is set to .15 and t_F is set to .45, we imply that NCPs who have the child less than 15% of the time expend \$0 on expenses such as housing, clothes, and toys; NCPs who have the child 45% of the time or more are as well equipped and spend as much in terms of these items as CPs, but those who see the child 25% of the time have $\frac{.25 - .15}{.45 - .15} = .33$ of the expenses for housing, clothes, toys, personal items, etc. as would be the case in an intact household.

Finally, the Ordered allocation expenses (O) are expenses whose allocation between the parents is directly addressed in the child support order, either as an integral part of the calculation or as “side payments” (for example, when the NCP writes an additional check to the CP to reimburse for a portion of doctor’s bills.) According to Elrod (1994), “the basic child support guideline chart amount does not include the costs of child care or health insurance”. Nonetheless, she notes, by recommendation of the U.S. Commission on Interstate Child Support, these expenses need to be taken into account in the child support order. Generally, then, O expenses include the following from the above list: health care items (both insurance itself and non-reimbursed expenses), child care expenses (during working hours)

and some educational expenses, such as for special educational needs. Most child support orders and divorce decrees specify, for example, which parent is to pay for medical and dental insurance, how non-covered medical expenses are to be shared between the parents, and whether the NCP should directly pay, over and above any child support, a proportion of special educational needs or child care. Most states' guidelines incorporate this expense directly into the child support order by adding (or subtracting in some cases) to the "basic award" (which is supposed to provide for every other non-O expense on the list), an amount based on the O expenses¹⁰. The most common rule for allocating O expenses between the two parents is proportional to gross income, although there are other rules as well.

For example, if the CP is the one paying for health insurance for the child of \$150 per month and child care of \$175, and the CP earns 40% of the couples' combined gross income (this would be the case, for example, if NCP's monthly gross income was \$3,000, while CP's was \$2,000), the NCP's child support ("basic award") will probably be augmented by \$195 (60% of \$150 + \$175). However, imagine instead that better health insurance is available to the NCP. Then he might pay the \$150 health insurance directly, as a payroll deduction. CP would then "owe" him 40% of that \$150, but NCP would owe her 60% of the \$175 for child care, for a net debt to her of \$45. His child support order would be increased by \$45, but this would be in addition to the \$150 he pays directly for the insurance. Thus in either event, his payment for the child is increased by \$195. It simplifies the analysis considerably that the net effect is the same regardless of who directly pays the O expense. Thus, for simplification purposes, we may assume that CP is the one who actually pays the insurance and child care costs and that NCP pays his share through a child support add-on, recognizing that it comes out the same way under different arrangements. Since the amount for Ordered expenses is

then considered added directly to the child support order, we don't need to further account for it in the PCE calculations. Instead, we may assume that, like U expenses, the CP pays all (or 100%) of the actual expenses and the NCP pays none (after the child support is augmented as described above), so that $p_{CO}=1.0$, and $p_{NO}=0$.¹¹

Obtaining Values For The P(i)

Morgan and Lino (1999) published a table of annual expenses in each of several categories by age of children and income level, estimated from Consumer Expenditure Survey data. Table 1 breaks their table down into percentages by assuming food and transportation are V, miscellaneous (which a footnote describes as including personal care items, entertainment and reading materials) are U, housing and clothing are considered D, and health care and child care/education are considered O. Based upon Table 1, we initially set the P(i) to the values for the "average" "middle income" family; in other words, we set $P(V)=.3243$, $P(U)=.1130$, $P(D)=.4012$, and $P(O)=.16146$. When we use the latter P(O) value to calculate the add-in portion of child support, we need to calculate what additional percentage of the remaining (i.e., V, U and D) expenses it is, so we actually divide it by the sum of the remaining expenses (see AZ example below). Later, when we conduct sensitivity analyses, we insert other plausible values from Table 1 instead.

Obtaining Values For PCE_C and PCE_N

Putting the expressions discussed above together with (12) for CP, we have:

$$\begin{aligned}
 PCE_C &= p_{CV} * P(V) + p_{CU} * P(U) + p_{CD} * P(D) + p_{CO} * P(O) \\
 &= (1-t) * P(V) + 1 * P(U) + 1 * P(D) + 1 * P(O) \\
 &= 1 - P(V)t \\
 &= 1 - .3243t
 \end{aligned}
 \tag{15}$$

while, for NCP, putting the expressions together with (13), we have

$$\begin{aligned} PCE_N &= p_{NV} * P(V) + p_{NU} * P(U) + p_{ND} * P(D) + p_{NO} * P(O) \\ &= tP(V) + 0 * P(U) + 0 * P(D) + 0 * P(O), & \text{if } t \leq t_L \\ &= .3243t & \text{if } t \leq t_L \end{aligned} \quad (16)$$

$$\begin{aligned} &= t * P(V) + 0 * P(U) + \frac{t - t_L}{t_F - t_L} * P(D) + 0 * P(O), & \text{if } t_L < t < t_F \\ &= tP(V) + P(D) \left(\frac{t - t_L}{t_F - t_L} \right), & \text{if } t_L < t < t_F \\ &= .3243t + .4012 \left(\frac{t - t_L}{t_F - t_L} \right), & \text{if } t_L < t < t_F \end{aligned} \quad (17)$$

and

$$\begin{aligned} &= t * P(V) + 0 * P(U) + 1 * P(D) + 0 * P(O), & \text{if } t \geq t_F. \\ &= tP(V) + P(D) \\ &= .3243t + .4012, & \text{if } t \geq t_F. \end{aligned} \quad (18)$$

It should be noted that PCE_C and PCE_N often sum to more than 1.0 (whenever $t > t_L$.)

This is because of the duplicated expenses, D. In cases where $t \geq t_F$, the sum is 1.4012, implying that in such shared custody families, the child is costing the parents 140% of what the same child would cost in an intact household, or any family in which the child remains exclusively in one household. Williams (1987) has made a slightly higher assumption of 150%, the figure that has now been adopted by most states with a “duplicable expense multiplier” (Venohr & Williams, 1999.)

To gauge relative SOL, we replace the value of PCE_C in (5) with (15), and replace the values of PCE_N in (6) with either (16), (17) or (18), as appropriate depending on the value of t relative to t_L and t_F . Then, the obtained values for FSF are inserted in (3) to get the values for

CP and NCP of $SOL_{needs\ adjusted}$. These two SOL values are then compared.

Comprehensive Example

Table 2 provides one particular detailed example for the scenario involving the State of Arizona, with NCP's gross income set at \$3,000 monthly, with 2 young children spending 30% of their time with the NCP. The calculations were generated by an Excel spreadsheet¹². The results were obtained iteratively with a specially written macro. That is, once the scenario involving a particular state, a particular NCP income, a particular number of children and a particular percentage of time with NCP was selected, an arbitrary starting value for CP's gross was selected. Taxes were calculated¹³ and subtracted from each parent's gross, then child support was calculated, subtracted from NCP's net and added to CP's. Then the PCEs were calculated based on the percentage time in each household, using (15) for CP, and either (16), (17) or (18) for NCP; then the FSFs were calculated. We in turn divided the spendable net income by FSF to produce $SOL_{needs\ adjusted}$. It was observed whether the ratio of NCP's to CP's $SOL_{needs\ adjusted}$ was greater than or less than 1.0. If less than 1.0, the macro inserted a lower value for CP's gross income, while if greater than 1.0 a higher value was inserted and the process continued, "homing in" on the CP gross income value that gave a ratio of exactly 1.0. The final value that gave a ratio of exactly 1.0, i.e., that equated the two parents' SOLs, was inserted in Table 2 as CP's gross income.

It can be seen that the gross income the CP would need under these assumptions to have the same SOL as the NCP as found by the macro is \$1,578 (which is 53% of the NCP's \$3,000 gross, nearly \$1,500 per month less than NCP's gross.) With these gross incomes, NCP would have \$332 deducted monthly in Federal income tax (\$3,987 annual tax), while CP would pay \$0; the AZ state income tax would be \$79 monthly for NCP (\$948 total annual

state tax), while CP would pay \$5 monthly (\$58 annual); and the respective payroll (FICA) tax would be \$230 monthly for NCP, \$121 monthly for NCP. CP would also qualify both for \$2,780 of Earned Income Credit (\$232 monthly) and \$893 of “additional child tax credit” (\$74 monthly), which in essence is extra income. These taxes bring the net incomes to \$2,359 for NCP and \$1,758 for CP, more than halving the difference in their gross income. Under the AZ child support guidelines, which use the income shares method, the “basic obligation” would be \$1,024, the amount the guidelines presume would be spent monthly on non-O expenses for the two children in a married household when the parents’ combined gross income was \$4,578. Since the NCP’s percent of combined annual gross income is 66%, the income shares approach requires him to pay 66% of the basic obligation, or \$671 monthly. AZ is one of only a few states that have a visitation credit that spans a wide range of visitation scenarios. In the example, visitation is at 30%, or 110 days, which the AZ guidelines turn into a .161 credit or \$165, which subtracts from the “basic award”, reducing it to \$506. Then we assume there will be another \$197 of O expenses spent on the children (19.26% of the basic obligation)¹⁴, of which the NCP’s portion is .66 for another \$129 monthly. This brings the combined child support award to \$635. This amount is then subtracted from NCP’s net income and added to CP’s, giving them spendable incomes \$1,724 and of \$2,393, respectively. We wish to divide these amounts by their respective Family Size Factors (FSFs), which means we first need to compute PCE_N and PCE_C , the respective proportions of child expenses NCP and CP pay directly, respectively. With t being above t_L , PCE_N , according to

$$(17), \text{ is } .3243(.3) + .4012\left(\frac{.3 - .15}{.45 - .15}\right) = .2979, \text{ (meaning NCP pays 29.79\% of the total}$$

children’s expenses directly out-of-pocket), while according to (15), PCE_C is $1 - .3243t$, or $1 - .3243(.30) = .9027$. Note that since t is greater than the threshold t_L , the sum of PCE_N and

PCE_C exceeds 1.0, meaning duplication of some of the D expenses is occurring. When these PCE amounts are inserted into (6) and (5), we get FSF_N of 1.276 and FSF_C of 1.772. These may be interpreted as suggesting that, given the visitation situation, NCP's Family Size Factor is 1.276 (i.e., his expenses run about 28% more to maintain the same SOL as if he were truly single) while CP's expenses run about 77% greater to maintain the same SOL as if she were truly in a one-person household. When these two FSF's divide the respective parent's spendable monthly incomes, they each have \$1,351 per month per first adult equivalent, exactly equal, so their $SOL_{NEEDS\ ADJUSTED}$ are identical, as sought by the macro. Thus if the CP brings in more than \$1,578, the CP gross income the calculation identified as the **equalization of living standards gross income**, the CP will have a **higher** living standard than the NCP in this scenario. Only if the CP earned less than \$1,578 would her SOL be less than NCP's.

Main Results

Table 3 provides the results of all of the above the calculations repeated for each of 198 scenarios in AZ, where each scenario represents a unique combination of number of children (1-3), percentage of time the children typically spend with the NCP (0% to 50%, in 5% increments), and NCP gross monthly income (\$2,000-\$7,000, in \$1,000 increments.) Table 4 then converts each of those results into percentage of NCP's gross income (by dividing the solved-for CP's gross income by the NCP's income); for example, in place of reporting \$1,578 as CP's gross income for the example scenario, we report that it is 53% of NCP's \$3,000 gross. We term this E%N, implying the Equalization of living standards % of NCP's gross income. **Thus a E%N of .65 would mean that the gross income of the CP would need to be 65% of that of the NCP's in order to equate their SOLs.** An E%N of greater than 1.00 means that the CP must have a higher gross income than the NCP in order

to share the same SOL, while one less than 1.00 indicates the CP needs less gross income than the NCP to maintain the same SOL. It can be seen that for the NCPs with only \$2,000 gross, the E%N is 30%-50%. For higher income NCPs, the E%N is generally in the 80's and 90's and exceeds 1.0 for the higher income NCP's.

We use three main ways to reduce this information for AZ and the remaining states. First, we report the E%N **for three representative scenarios**, in terms of number of children, time spent with NCP, and NCP's gross monthly income, as well as the mean E%N, averaged over all 198 scenarios, in Table 5. The Table discloses that **average E%N over all 198 scenarios for Arizona was .76. For the remaining states it is: Kentucky, 61%. Massachusetts, 40%; Missouri, 92%; Oklahoma, 74%; Washington¹⁵, 73%; Wisconsin, 49%.**

Second, we report the relationship between E%N, NCP gross monthly income, and number of children, averaged over all of the values of time spent with NCP. For the values in Table 4, these results can be seen in Fig. 1a. As can be seen, for Arizona, the E%N is smallest for NCP gross incomes of \$2000 per month, increasing at \$3000, and leveling off at \$4000 per month.

The remaining states are presented in this fashion in Figs. 1b-1g. Oklahoma has a similar pattern, as does Missouri, but the latter's level is higher. The remaining states have a variety of different patterns. Since there is no justifiable basis to "discriminate" against either CPs or NCPs based on either NCP gross income or on number of children, what should be desired is a pattern that is flat (E%N should be a relatively constant percentage whatever NCP's gross income) and tight (E%N shouldn't vary by number of children). The only state that has the desired relatively flat and tight pattern is Massachusetts, however, as noted, its

overall level is very low.

Finally, we present the relationship between E%N, and time spent with the NCP, for each of the various numbers of children, averaged over all of the values of NCP gross income. For the values for Arizona in Table 4, these results are presented in Fig. 2a. As can be seen, the E%N shows a dip beginning at about 15% time, reaching its minimum at 35% time, then leveling back off. The results for one child are sometimes highest and sometimes lowest.

The remaining states are presented in this fashion in Figs. 2b-2g. Oklahoma has a pattern very similar to Arizona's, despite a visitation adjustment scheme in its guidelines that is somewhat different (see note 5). Kentucky and Washington, neither of which adjust for visitation, demonstrate patterns very similar to one another, but very different from Oklahoma and Arizona. Massachusetts, which does not adjust for visitation and which has a hybrid child support model, has a pattern which is the most widespread, with E%N ranging from a low of 15% to a high of 115%.

Again, the most desirable system would be one resulting in a flat, tight pattern; otherwise the regime unjustifiably "discriminates" against either CPs or NCPs based either on how much time the child spends with NCP or on number of children. The state that comes closest to this ideal is probably Missouri, but, as noted, its overall level of E%N is very high.

Main Results Summary

The results showed enormous variability from state to state. The overall average E%N ranged from 40% (Massachusetts) to 92% (Washington). In Massachusetts, for example, **most CPs who make more than only 40% of their NCP's gross income have higher standards of living (SOLs) than their ex-spouses.**

In all of the income shares states (i.e., all but Massachusetts and Wisconsin), the E%N

undesirably decreased as NCP income decreased. This means, for our very poorest NCPs, their counterpart CP had the greatest chance of enjoying a higher SOL than they did. Likely this is due to the large tax advantages given to low income CPs and not available to NCPs. Alternatively, it may be due to the income shares states assumption that the larger the income, the smaller the percentage necessary for child support. Our basic model assumes that this proportion is constant.

States that include NCP parenting time as part of the formula in computing presumptive child support generally showed a relatively constant E%N for differing amounts of NCP parenting time, which is desirable. Based on our analysis, it would seem difficult to justify a criterion or cutoff amount for time spent with NCP. Using the E%N as a criterion, it also appeared that many states overcompensated for the number of children, by having too much spread in their graphs. This was especially apparent in Kentucky and Wisconsin.

A desirable pattern would be tight and flat, so that unjustifiable discrepancies due to number of children, percent time with NCP, or income level might be avoided. None of the states analyzed achieved such a pattern, but overall, Arizona and Oklahoma were closest.

Sensitivity Analysis

As indicated above, there were many assumptions made to yield the above set of results. It is certainly possible that any particular assumption is invalid, debatable, or does not apply in a specific family. Accordingly, we wished to test the sensitivity of the results to the various assumptions made, as is considered good practice in economic analyses with assumption-laden estimates (but too often overlooked in the child support arena). To conduct the sensitivity analysis, we repeated our calculations numerous times, each time inserting other realistic values for many of the variables required for the estimates and re-solving for

E%N. The variables we evaluated for sensitivity, and the other realistic values inserted were:

A. CCM, the child cost multiplier: As noted earlier, based on Citro and Michael's NRC

(1995) recommendations, we used a value of .7 for CCM in (1) and later formulae and the base analysis of Tables 2-5, and Figures 1 and 2, implying that children cost exactly .7 of an adult. Other plausible values were inserted instead in the sensitivity analyses; we used values of .6, .65, .7, .75 and .8. When .8 was inserted in the example of Table 2, for example, it moved E%N from 53% to 59%; inserting .6 lowered E%N to 49%.

B. Age of children: A few states have different ordered payment amounts depending upon whether the children are "older" (more than 12 years old) or younger. In the "base" estimates of Tables 2-5, and Figures 1 and 2, we assumed no children were older. In the sensitivity analyses, we let the number of older children range from none to all. In the case of the analysis in Table 2, if both children were older (and simultaneously raising CCM from .7 to .77, since older children are reported to cost about 10% more than younger children, according to Lino and Morgan's 1999 USDA figures), the E%N would drop from 53% to 43%.

C. P(V), P(U), P(D) and P(O). In the base analysis, as noted earlier, we used $P(V)=.32$, $P(U)=.11$, $P(D)=.40$, and $P(O)=.16$. In the sensitivity analyses, we substituted instead the most extreme sets of values from Table 1: if the oldest child was young, $P(V)=.26$, $P(U)=.09$, $P(D)=.43$, $P(O)=.21$; if the oldest child was "old" (older than 12; see Age of Children, above), $P(V)=.45$, $P(U)=.09$, $P(D)=.36$, $P(O)=.10$. This variable is called VUDO in Table 6, below. The "young" values lowered E%N in Table 2 to 44%; the "older" values left it unchanged at 53%.

D. F, the economy of scale factor in (1). As noted earlier, we used a value of .7 for F in (1)

and later formulae. Other plausible values were inserted instead in the sensitivity analyses. We used both .65 and .75, recommended as alternatives by Citro and Michael (1995). These values changed E%N in Table 2 from 53% to 49% and 59%, respectively. In addition, we used values for F derived in two different alternate ways. According to the Betson (1990) data, widely used in the development of the income shares approach, two-parent families' expenditures on children as a percent of total net income decreases as the income level increases. A chart depicting these percents is available in Venohr and Williams (1999, p. 14). In the first method we used this chart to solve for F in the formula below, where B represents the Betson percent:

$$\frac{(A)^F}{(A + .7K)^F} = (1 - B) \quad (19)$$

In (19), the denominator represents the needs of the entire family and is identical to (2), while the numerator represents the needs of only the adults, expressed in the same fashion. The resulting ratio is the percentage of the family's needs attributable to the adults in the family; which should be the complement of the percentage of the families' needs attributable to the children. Since the Betson chart is based on two-parent families, we substituted 2 for A, then solved for F (using logs)¹⁶, using B as found from the families' combined net income and number of children in Betson's chart. The maximum F found for any family was .9675, while the minimum was .4791. In the second method, a least square solutions was used to estimate the Morgan and Lino (1999 p. 202) data. The value of F was estimated as a linear function of the inverse of annual family income with $F' = .24 + 27103/\text{Income}$.¹⁷ Within the ranges of income used in this paper, the values of F ranged from .32 to .99. Inserting the latter values into Table 2 changed E%N from 53% to

32% and 90%, respectively. These alternative values are termed “Type of Exponent” in Table 6.

E. t_L and t_F . In the base calculations we used .15 for t_L and .45 for t_F . In the sensitivity analyses, we let t_L vary from 0 to .3 (by .10 increments) and let t_F vary from .30 to .50 (by .10 increments). However, we never allowed both t_L and t_F to be the same value, .30. Using $t_L = 0$ and $t_F = .3$ changed E%N in the example of Table 2 from 53% to 38%, while inserting instead .3 and .5, respectively, raised it all the way to 94%.

F. Alternate equivalence factors: While we used the Citro and Michael (1995) FSF formulation in the base analysis, we inserted instead the two main alternative indices in the sensitivity analysis, the outdated Bureau of Labor Standards’ Lower Standard Budget (BLS-LSB) approach and the Poverty Threshold approach. For the BLS-LSB approach, we used its “equivalence scale” that expresses the cost of each type of household in a ratio to that of the “base family” household: a two-adult-two-child household with an over-35-year-old householder. For example, according to this approach, a one-adult-two-child family with an over-35-year-old householder requires 76% of the income of the base family and a one-adult-no children household with an over-35-year-old householder requires 36% to be at the same SOL¹⁸. To calculate a BLS-LSB equivalence factor that took into account sharing of child expenses, each household was deemed to be one with the children their respective PCE proportion of the time, and a single adult-no children household the remaining time. In the example of Table 2, as noted in the Comprehensive Example section, the value of PCE was .2979 for NCP and .9027 for CP, meaning that NCP paid nearly 30% of the direct expenses of the children, while CP paid about 90% of the direct expenses of the children. To calculate the BLS-LSB equivalence value for NCP

for that scenario, for example, we assumed NCP's household had the expenses of a one-adult-two-children household (which has 76% of the expenses of the base family) .2979 of the time, and a one-adult-no-children household (having 36% of the expenses of the base family) the remainder or .7021 of the time ($76 \cdot .2979 + 36 \cdot .7021 = 47.92$). This adjusted equivalence scale then was used as the divisor for that parent's spendable income. Using the over-35-year-old householder BLS values in the example of Table 2 raised the E%N from 53% to 73%, while using the under-35 values raised it to 61%.

For the Poverty Thresholds approach, we used the 2001 poverty levels¹⁹ in an analogous fashion. For example, for a one adult household the poverty level is \$9,214, while for one adult with 2 children, it is \$14,269. The adjusted poverty level for the example of Table 2 is found by assuming the NCP's household had the poverty threshold of a one-adult-two-children household .2979 of the time, and that of a one-adult-no-children household the remainder or .7021 of the time ($14,269 \cdot .2979 + 9,214 \cdot .7021 = 10,720$). This was used as the divisor for NCP's spendable income with an analogously calculated divisor for CP's spendable income. This method is a slight adaptation of what was used in Braver (1999) and Braver and O'Connell (1998). Using poverty thresholds instead of FSF in the example of Table 2 lowered the E%N from 53% to 44%. Thus the FSF approach is intermediate between the two alternatives.

G. Taxes: In the base analysis, we assumed the standard deduction was taken by both parents. In fact, however, those who own their own home, as well as some others, typically take the higher itemized deduction, which lowers their taxes. In addition, any individual's actual taxes depend on a variety of other factors. In the sensitivity analyses, we allowed each parent's taxes to be one of 6 possibilities. (1) Standard deduction; (2) standard

deduction plus 10% additional tax for any factors not considered; (3) standard deduction, but a credit (subtraction) of 10% of their final tax for factors we couldn't consider (the 10% "fudge factor" was ample enough to account for Child Care Expense tax credit); (4)-(6) each of the above combined with an itemized deduction. We chose a total itemized deduction of 30% of gross income to account for mortgage interest expense and real estate tax deduction. 30% was chosen since it is the maximum percent of gross income that mortgage lenders will commonly consider. The highest E%N for any combination of tax specifications for the Table 2 example was 70%.

Results of the Full Factorial Sensitivity Analyses

We reported above the effects of varying each of the assumptions on the example of Table 2, but still to be determined was the sensitivity to these assumptions in other scenarios, as well as the effects of altering the various assumptions in combinations. To assess this sensitivity, the E%N values for all unique combinations of the variants for the above variables were computed (the "full factorial" analysis) for the same three representative scenarios as used in Table 5 (1 child, 20% time, \$5000/month NCP income; 2 children, 0% time, \$3000/month NCP income; and 3 children, 40% time, \$7000/month NCP income) for each state. In states without corrections for older children, 26,136 combinations were found. In states with corrections for older children, the numbers of values computed were 52,272, 78,408, and 98,799 for the three scenarios, respectively.

The mean and standard deviation of all E%N values were computed over all these combinations for each of the three scenarios for each state and compared with the value that was found in the base analysis. The results are presented in the third and fourth columns, respectively, of Table 6. With one exception (MA-2) the means were quite close to the value

computed in the base analysis for that scenario (in Table 5 and repeated in column 2 of Table 6). More importantly, the standard deviations were generally not too large (again with the exception of MA-2), suggesting that for the most part **the analyses were substantially insensitive to or robust against the assumptions**. While it is certainly true that a number of assumptions needed to be made to generate exact values in Tables 2-5 and Figures 1 and 2, as a general statement, **altering these assumptions in other plausible and reasonable ways did not change the overall conclusions greatly**.

We also wished to detect whether certain assumptions were more critical than others. In order to establish which of the various assumptions made the biggest overall difference in the results, multiple correlation/regression analysis was conducted. In subsequent columns of Table 6, the E%N values were regressed on each of the realistic values variables and the value of eta-squared computed. Eta-squared is a common index which represents the proportion of the variance in E%N that is due to or accounted by a given assumption (i.e., predictor) variable.

Examining the values in these remaining columns in Table 6 shows most of these eta-squared values are small, under .1. This shows that few of the assumptions had much of an effect, but exceptions were notable. The two variables or assumptions with the biggest effect were which index of needs was used and NCP's tax situation. This suggests that caution should be used when interpreting the results if a different needs index is used besides Citro and Michael's FSF (1995). However, as noted above for the Table 2 example, the FSF index's result was intermediate between the other two indexes. Using poverty thresholds yields somewhat smaller E%Ns and using BLS-LBS values (especially for over-35-year-old householders, see footnote 18) yields substantially larger ones. Caution is also necessary if

NCP's tax situation is other than the base analysis assumes. When NCP itemized deductions, E%N were noticeably higher than in the base analysis. One additional assumption, how many older children there are in the family, also had a big impact but only for one state:

Washington.

Conclusions and Implications for Child Support Policy

Since we studied hypothetical scenarios, the question arises as to whether, in general, given the child support regimes currently in place, CPs actually do have higher SOLs than their matched NCPs. The answer to this question depends on how many CPs actually have gross incomes in excess of the E%Ns we obtained. Published empirical literature provides some answers to that question. In California, Maccoby and Mnookin (1992) estimated that CPs earned on average only 46% of what NCPs did shortly after divorce, while I found the ratio in AZ was 63% one year after divorce (Braver, 1999). This latter estimate is very close to the 66% value found in an analysis of 400 randomly selected new filings in the state of AZ in 2002 (Venohr & Griffith, 2003²⁰.) However, there is clear evidence that CP's earning capacity grows substantially and disproportionately as time accrues after divorce (Duncan & Hoffman, 1985), undoubtedly due to a combination of working more hours, upgrading job skills and education, and remarriage. Thus the best comparison is not one that is confined to the early post-divorce years, as in each of the previous citations, but is more comprehensive in terms of how long it is after the divorce when comparative income is assessed, so that it covers the entire span of time over which the children are still minors and subject to the child support order. Fabricius, Braver and Deneau (2003) found that among college freshman whose parents had divorced (who typically would have been covered by a child support order in the preceding year), the average reported mother's household income was fully 86% of the

father's. The most definitive estimates are probably those of the Census Bureau. According to 1999 U.S. Census data, the median income of the closest category to male NCP's, "nonfamily households with a male householder" is \$30,753, while for the category closest to divorced female CP's, "Family households with a female householder, no husband present" the median is \$26,164, **85%** of the NCP's (Current Population Studies, 1999). Thus, in comparing the values in the last row of Table 5 with this 85% standard, we believe **our results suggest that under current child support guidelines, the majority of CPs currently have higher SOLs than their matched NCPs**, dramatically so in Massachusetts and Wisconsin, to a lesser extent in Kentucky. On the other hand, in Missouri, it can be assumed that NCPs often had higher SOLs than CPs, but this was the only state studied where that conclusion is probably warranted.

Assuming the foregoing is correct (although we would like to see it replicated), what are the implications of the analysis for child support policy? We believe the results show that many of the guidelines in place (especially Massachusetts, Wisconsin and Kentucky, but probably not in Missouri) result in the majority of NCPs who are worse off after divorce than their CP counterparts. Thus, those who advocate using child support guidelines to equalize SOLs (Garrison, 1999; Blumberg, 1999) should recognize that doing so with an accurate analysis will **probably result in lower overall child support awards.**²¹ The states with the flattest and tightest patterns in Figs.1 and 2 (and therefore least discriminatory) were those using the income shares (rather than percent of obligor income) approach and those with the most continuous and generous adjustments for time with NCP. If equalization of living standards is one of the goals, states that do not incorporate such features should give them serious consideration.

Because taxes figured prominently in the analyses, two other possibilities for tax reform should be considered: (1) routinely give the tax advantages due to the children to the NCP rather than the CP (as AZ does; see footnote 13), since there will probably be greater “bang for the buck” this way; and (2) make child support (like alimony and almost every other form of income) taxable to the obligor and tax-free to the obligee.

Alternatively, policy-makers could systematically disregard the comparative living standards of the two households. We argued earlier that equalization of living standards of the two households was **not** the rationale for child support; instead, it’s the basis for alimony. Child support, as the name suggests, is simply to support to the child. If policy makers aim only at that simple goal, and don’t attempt to equate the two households, many of the complexities apparent in the present analysis disappear.

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Table 1. Percentages of Child Expenses in Variable (V), Unduplicated fixed (U), Duplicable fixed (D) categories, and Ordered (O) categories, by income level and age of child

Age of Child	Low Income				Medium Income				High Income			
	V	U	D	O	V	U	D	O	V	U	D	O
0-2	26.8%	10.0%	44.5%	18.7%	25.8%	11.0%	42.7%	20.5%	23.6%	12.5%	44.6%	19.3%
3-5	27.4%	10.0%	43.1%	19.6%	26.6%	11.0%	41.1%	21.3%	24.3%	12.3%	43.4%	20.0%
6-8	33.1%	10.4%	41.7%	14.8%	31.6%	11.4%	40.5%	16.5%	27.9%	12.7%	43.4%	15.9%
9-11	37.9%	10.8%	38.8%	12.5%	35.6%	11.8%	38.8%	13.8%	31.1%	13.1%	42.6%	13.2%
12-14	36.2%	11.9%	42.0%	9.9%	34.1%	12.6%	42.1%	11.2%	30.7%	13.5%	44.9%	10.8%
15-17	43.6%	8.8%	35.2%	12.4%	39.7%	10.0%	35.9%	14.4%	33.8%	11.5%	39.9%	14.8%
Average	34.5%	10.3%	40.8%	14.5%	32.4%	11.3%	40.1%	16.1%	28.7%	12.6%	43.1%	15.6%

Table 2. Example calculation for AZ, with NCP earning a gross monthly income of \$4,000, 2 children spending 30% time with NCP

	NCP	CP	CP's Percent of NCP Gross
2 Children in Arizona, 30% time with NCP			
Monthly Gross Income	\$3,000	\$1,578	52.59%
Federal Tax	\$332	\$0	
State Tax	\$79	\$5	
FICA (Payroll tax)	\$230	\$121	
Federal Tax Credits (Income)	\$0	\$306	
Net After Tax	\$2,359	\$1,758	
Child Support Transfer	-\$635	\$635	
Net After Tax and Child Support (Spendable)	\$1,724	\$2,393	
Family Size Multiple ("Needs Factor")*	1.276	1.772	
Monthly Income Per Unit Adult	\$1,351	\$1,351	

***Poverty Panel Formula: Each child costs .7 of an adult;
 .70 is the Economy of Scale Factor. Because of V, U, D and O
 Child Expenses, NCP Bears 42% of Child's Costs, CP Bears 78%.**

Table 3. CP's Gross Income Amounts to Match NCP'd SOL

AZ NCP Gross	Percent Time With NCP										
	.00	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
\$2,000	\$1,044	\$1,034	\$1,040	\$1,048	\$1,045	\$1,050	\$976	\$946	\$1,044	\$1,126	\$1,095
\$3,000	\$2,526	\$2,504	\$2,511	\$2,515	\$2,476	\$2,462	\$2,206	\$2,112	\$2,373	\$2,647	\$2,576
\$4,000	\$3,434	\$3,418	\$3,418	\$3,418	\$3,377	\$3,357	\$3,167	\$3,090	\$3,270	\$3,461	\$3,407
\$5,000	\$4,290	\$4,257	\$4,255	\$4,254	\$4,192	\$4,162	\$3,930	\$3,846	\$4,039	\$4,276	\$4,194
\$6,000	\$5,348	\$5,304	\$5,299	\$5,295	\$5,222	\$5,169	\$4,830	\$4,696	\$4,970	\$5,272	\$5,176
\$7,000	\$6,376	\$6,326	\$6,315	\$6,308	\$6,208	\$6,136	\$5,775	\$5,617	\$5,906	\$6,226	\$6,126
\$2,000	\$941	\$926	\$926	\$926	\$884	\$876	\$769	\$726	\$826	\$995	\$959
\$3,000	\$2,586	\$2,491	\$2,476	\$2,451	\$2,226	\$2,076	\$1,578	\$1,471	\$1,776	\$2,218	\$2,078
\$4,000	\$3,589	\$3,526	\$3,508	\$3,479	\$3,326	\$3,225	\$2,842	\$2,681	\$2,941	\$3,229	\$3,134
\$5,000	\$4,527	\$4,445	\$4,420	\$4,383	\$4,193	\$4,059	\$3,626	\$3,433	\$3,711	\$4,026	\$3,924
\$6,000	\$5,774	\$5,650	\$5,605	\$5,561	\$5,260	\$5,032	\$4,402	\$4,176	\$4,476	\$4,928	\$4,773
\$7,000	\$6,945	\$6,781	\$6,726	\$6,676	\$6,326	\$6,076	\$5,371	\$5,044	\$5,431	\$5,907	\$5,726
\$2,000	\$957	\$926	\$925	\$903	\$826	\$785	\$671	\$626	\$726	\$876	\$826
\$3,000	\$2,833	\$2,754	\$2,694	\$2,626	\$2,111	\$1,863	\$1,531	\$1,323	\$1,575	\$1,852	\$1,748
\$4,000	\$3,922	\$3,798	\$3,738	\$3,691	\$3,376	\$3,152	\$2,568	\$2,226	\$2,645	\$3,006	\$2,883
\$5,000	\$5,026	\$4,863	\$4,776	\$4,689	\$4,308	\$4,026	\$3,420	\$3,129	\$3,434	\$3,808	\$3,672
\$6,000	\$6,472	\$6,226	\$6,126	\$6,026	\$5,426	\$5,001	\$4,201	\$3,868	\$4,203	\$4,607	\$4,443
\$7,000	\$8,282	\$7,870	\$7,651	\$7,462	\$6,545	\$6,076	\$5,076	\$4,600	\$5,041	\$5,576	\$5,351

Table 4. CP's Percent of NCP's Income Amounts to Match NCP's SOL

AZ	Percent Time With NCP											
	NCP Gross	.00	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
	\$2,000	52%	52%	52%	52%	52%	52%	49%	47%	52%	56%	55%
	\$3,000	84%	83%	84%	84%	83%	82%	74%	70%	79%	88%	86%
	\$4,000	86%	85%	85%	85%	84%	84%	79%	77%	82%	87%	85%
	\$5,000	86%	85%	85%	85%	84%	83%	79%	77%	81%	86%	84%
	\$6,000	89%	88%	88%	88%	87%	86%	81%	78%	83%	88%	86%
	\$7,000	91%	90%	90%	90%	89%	88%	83%	80%	84%	89%	88%
	\$2,000	47%	46%	46%	46%	44%	44%	38%	36%	41%	50%	48%
	\$3,000	86%	83%	83%	82%	74%	69%	53%	49%	59%	74%	69%
	\$4,000	90%	88%	88%	87%	83%	81%	71%	67%	74%	81%	78%
	\$5,000	91%	89%	88%	88%	84%	81%	73%	69%	74%	81%	78%
	\$6,000	96%	94%	93%	93%	88%	84%	73%	70%	75%	82%	80%
	\$7,000	99%	97%	96%	95%	90%	87%	77%	72%	78%	84%	82%
	\$2,000	48%	46%	46%	45%	41%	39%	34%	31%	36%	44%	41%
	\$3,000	94%	92%	90%	88%	70%	62%	51%	44%	52%	62%	58%
	\$4,000	98%	95%	93%	92%	84%	79%	64%	56%	66%	75%	72%
	\$5,000	101%	97%	96%	94%	86%	81%	68%	63%	69%	76%	73%
	\$6,000	108%	104%	102%	100%	90%	83%	70%	64%	70%	77%	74%
	\$7,000	118%	112%	109%	107%	93%	87%	73%	66%	72%	80%	76%

Table 5. Percent of NCP's income necessary for CP to maintain identical standard of living, for three representative scenarios in terms of number of children, % time child spends with NCP, and NCP's gross monthly income, and averaged over all scenarios

Scenario	Arizona	Kentucky	Massachusetts	Missouri	Oklahoma	Washington	Wisconsin
1 child, 20% time, \$5000/month	84%	81%	32%	95%	78%	87%	53%
2 children, 0% time, \$3000/month	88%	87%	95%	93%	94%	99%	59%
3 children, 40% time, \$7000/month	72%	34%	3%	91%	76%	53%	59%
Average over all scenarios	76%	61%	40%	92%	74%	73%	49%

Table 6. Sensitivity analysis for three scenarios

State and Scenario	Our Value in Base analysis	Mean	s.d.	VUDO	F	Type of Exponent	Older Kids	tl	tf	Kids Mult	Index	CP Tax Correction	NCP Tax Correction	CP Tax Deduction	NCP Tax Deduction
AZ-1	.841	.832	.106	.026	.038	.026	.039	.198	.028	.06	.193	.033	.156	.016	.187
AZ-2	.875	.791	.201	.199	.12	.006	.076	0	0	.163	.256	.002	.127	0	.022
AZ-3	.718	.708	.14	.029	.011	.052	.05	.055	.228	.007	.05	.018	.163	.023	.26
KY-1	.809	.824	.112	.019	.036	.025	0	.192	.027	.057	.187	.047	.195	.016	.197
KY-2	.867	.87	.159	.183	.122	.01	0	0	0	.164	.309	.01	.167	0	.024
KY-3	.341	.395	.134	.072	.01	.029	0	.036	.174	.006	.031	.002	.294	0	.36
MA-1	.323	.399	.208	.049	.019	.008	.154	.131	.017	.031	.107	.003	.176	0	.191
MA-2	.948	.711	.343	.096	.107	.008	.116	0	0	.145	.228	.005	.141	0	.02
MA-3	.033	.027	.039	.092	.004	.005	.25	.021	.068	.003	.017	0	.12	0	.174
MO-1	.947	.947	.128	.018	.039	.03	0	.199	.028	.062	.185	.055	.195	.042	.172
MO-2	.933	.929	.153	.158	.124	.014	0	0	0	.166	.361	.01	.138	0	.02
MO-3	.906	.922	.186	.012	.013	.052	0	.055	.218	.007	.045	.048	.144	.071	.211
OK-1	.78	.788	.098	.024	.035	.024	0	.187	.027	.056	.193	.04	.21	.01	.202
OK-2	.94	.923	.161	.152	.124	.014	0	0	0	.167	.327	.011	.171	0	.023
OK-3	.761	.799	.201	.018	.013	.051	0	.052	.23	.007	.042	.037	.191	.045	.258
WA-1	.873	.825	.11	.017	.039	.026	.216	.201	.028	.061	.185	.018	.075	.01	.119
WA-2	.987	.872	.157	.136	.094	.01	.358	0	0	.126	.236	.003	.023	0	.005
WA-3	.533	.439	.159	.04	.01	.034	.378	.04	.182	.006	.036	.001	.075	0	.165
WI-1	.592	.607	.098	.029	.031	.016	0	.167	.026	.049	.203	.022	.238	0	.228
WI-2	.588	.628	.141	.141	.13	0	0	0	0	.173	.283	0	.223	.002	.029
WI-3	.387	.42	.099	.02	.011	.033	0	.038	.186	.006	.033	.004	.275	0	.368
Mean	.7134	.698	.149	.073	.054	.023	.078	.075	.070	.072	.167	.018	.167	.011	.154

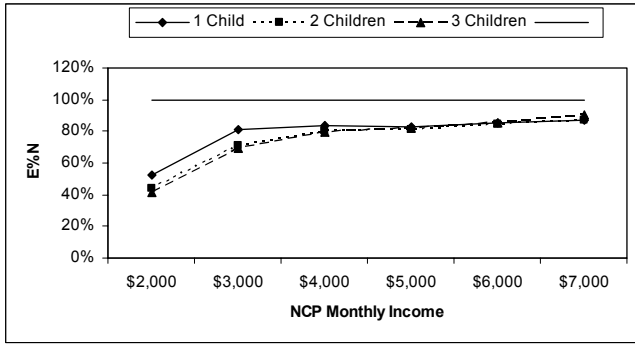


Fig. 1a. Arizona

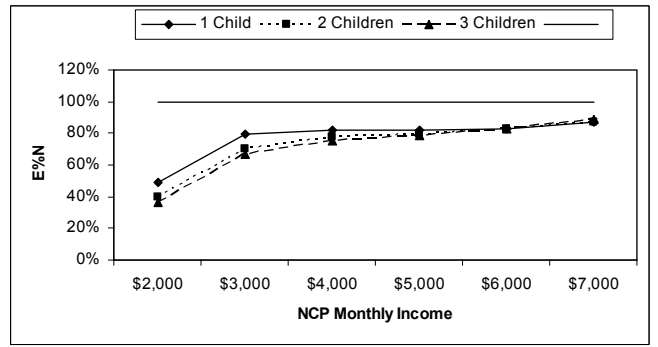


Fig. 1e. Oklahoma

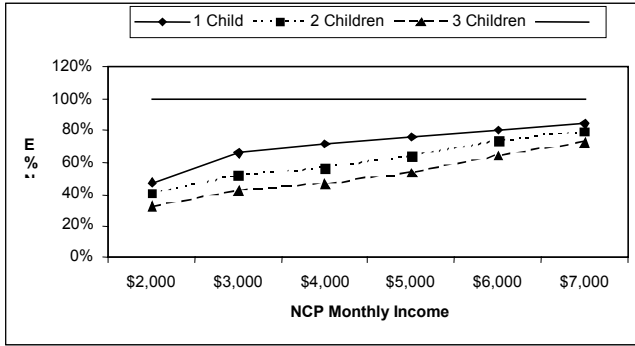


Fig 1b. Kentucky

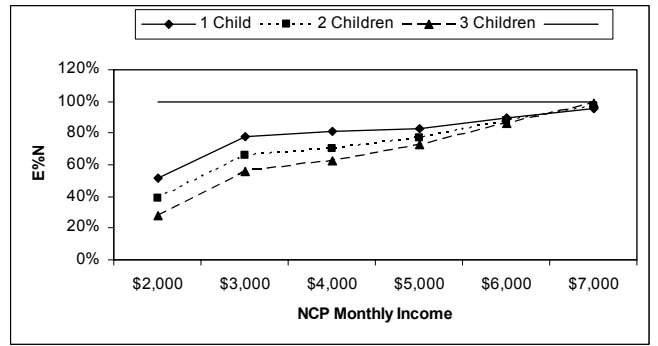


Fig. 1f. Washington

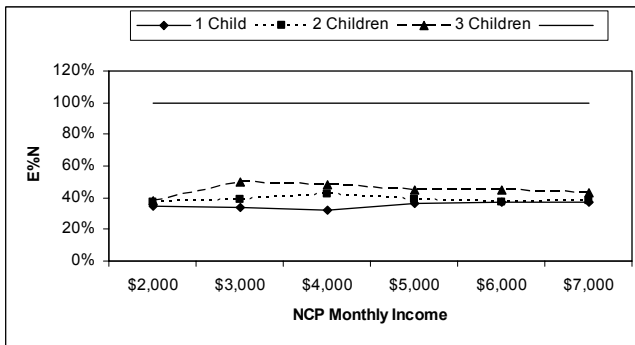


Fig. 1c. Massachusetts

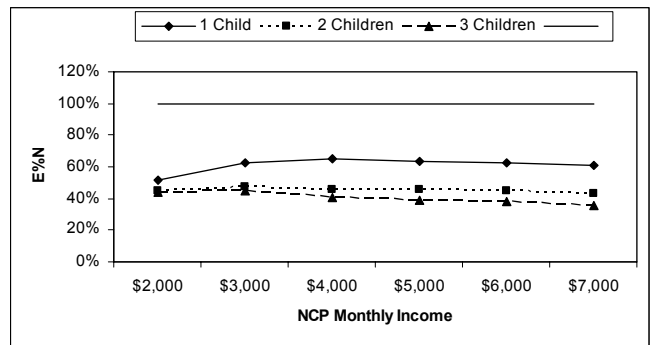


Fig. 1g. Wisconsin

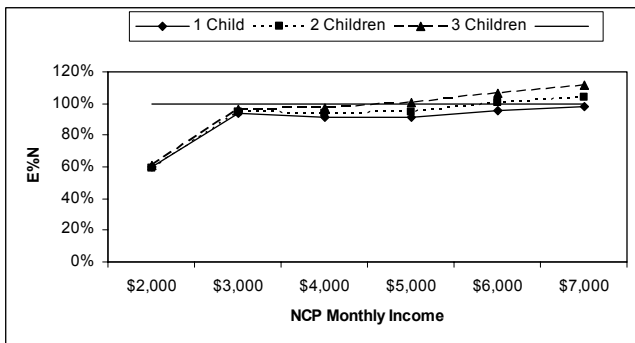


Fig. 1d. Missouri

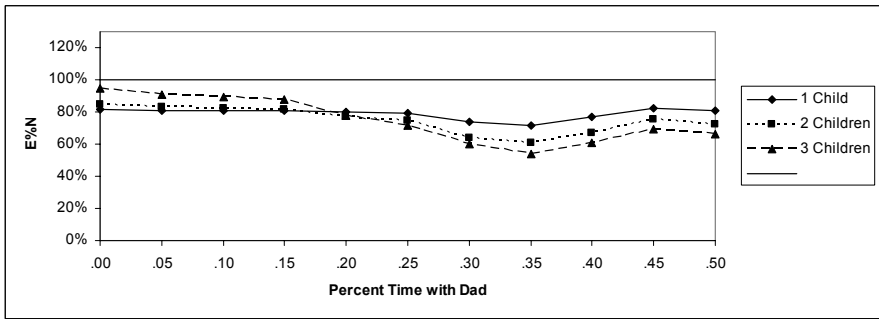


Fig. 2a. Arizona

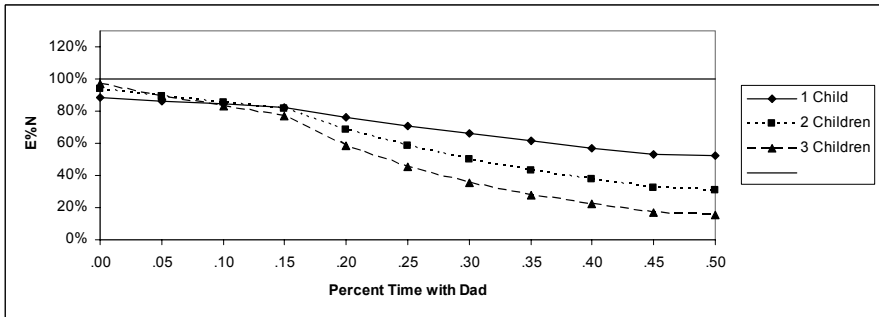


Fig. 2b. Kentucky

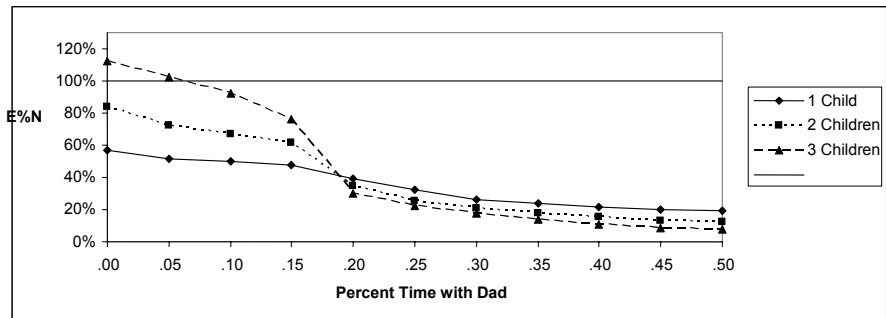


Fig. 2c. Massachusetts

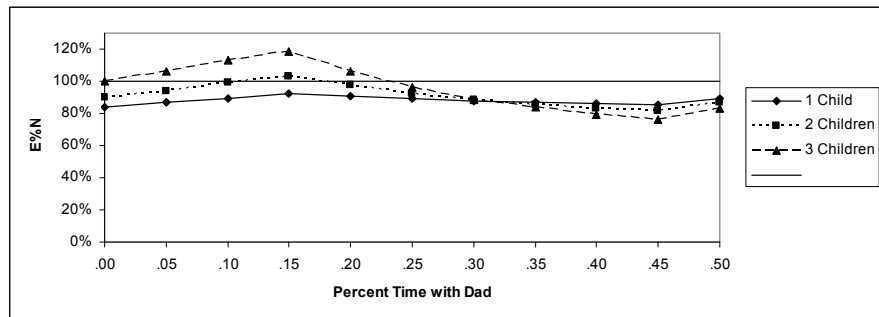


Fig. 2d. Missouri

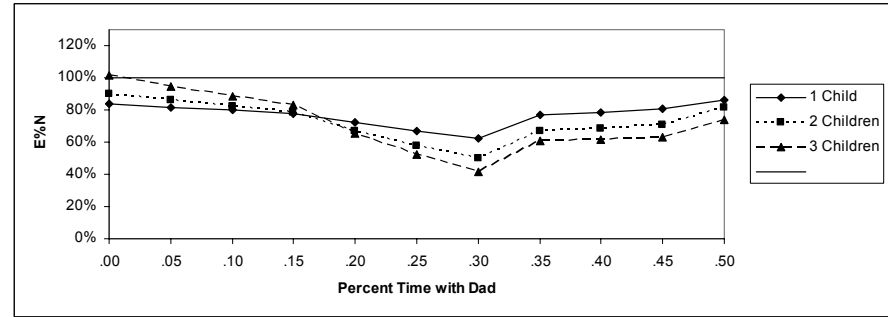


Fig. 2e. Oklahoma

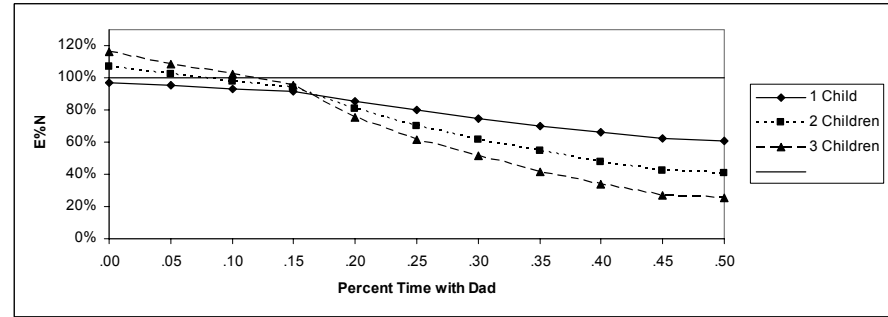


Fig. 2f. Washington

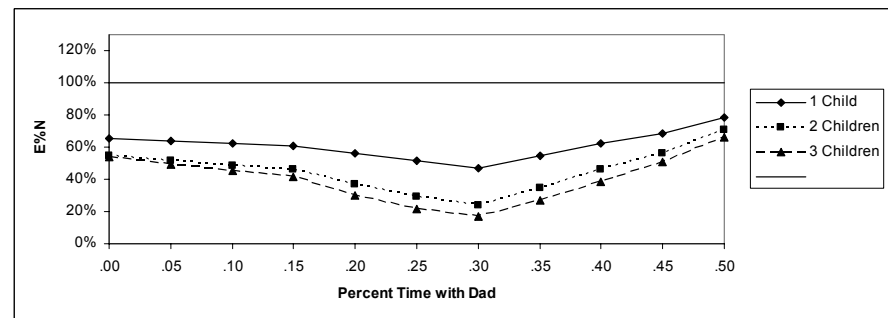


Fig. 2g. Wisconsin

Notes

¹The parties can negotiate who receives the first two of the preceding tax benefits, but the Federal tax code by default gives them to the CP unless the CP signs a special form (Form 8332). The remaining tax benefits referred to are not negotiable.

²For expository convenience, but with some loss of accuracy, we use the feminine gender for CP, the masculine gender for NCP.

³To estimate the Federal income tax, we use the following assumptions: only the CP gets to take the children as exemptions, for the Earned Income Credit and for the Child Tax Credit. As a result, the filing status of the former is Head of Household, while the NCP's is Single. We also assume initially that both parties take the standard (not itemized) deductions. Initially we assume \$0 in deductible Child Care Expenses. When the Earned Income Credit is available because of CP's low gross income, we assume the entire income is "earned income" rather than investment income. We assume any interest, dividends, capital gains, IRA distributions, pensions and annuity income, unemployment compensation, social security income is included in gross income, and any student loan interest deductions are already subtracted from gross income

⁴It is appropriate to compute this transfer after taxes because, as mentioned above, under the U.S. (as well as every state's) tax code, child support is a transfer of NCP's after-tax dollars to the CP, who has no tax obligations on this income. Alimony, however, should be incorporated before any taxes are calculated. In this investigation, **\$0 in alimony is assumed**. This was the assumption in order to compare the SOLs of the two households under a scenario in which SOL-equating was not taken as a goal, as it is with alimony, and because it is relatively rare in any event. However, if it is desirable to incorporate it into the calculations, it can be done in principle by assuming NCP's and CP's gross incomes are at the values they assume after alimony.

⁵**Arizona** is an income shares state with an adjustment for time the child spends with the NCP that is continuous, though non-linear. It also has a "proportion of total gross income" method of dividing Ordered child care and health insurance. **Kentucky** is an incomes shares state with no adjustment for time spent with NCP. It also uses "proportion of total gross income" to allocate Ordered expenses. **Massachusetts** uses a hybrid income shares and income percentage with a custodial reserve to assess child support. Massachusetts has no presumptive allowance for visitation frequency or shared custody. The guidelines correct for health insurance but not other extraordinary or child care expenses. **Missouri** uses the income shares method with "proportion of total gross income" to allocate Ordered expenses. Time spent with NCP is deducted proportionally. **Oklahoma** uses an income shares approach in assessing child support with a NCP time "cliff" that kicks in at about 32% time or greater. **Washington** assesses child support on an income shares basis imposed on net income with no consideration for NCP visiting time in the presumptive amount. The child support table stops at a combined net income of \$7,000. When combined monthly net income exceeds that amount, the court uses its discretion. **Wisconsin** assesses child support as a straight percentage of NCP's gross income. Parenting time kicks in at 35% and more. No adjustment is made for health insurance or extraordinary expenses.

⁶ For Federal tax, we used www.quicken.com/freedom.

⁷To aid the reader in recognizing that (9) and (13) yield identical results, consider an example, which uses the expense amounts that Morgan & Lino (1999) estimate are paid on average by a high income family for its only child, a 10 year-old, when broken down into our categories as described subsequently. These costs are \$3,760, \$1,580, \$5,150, and \$1,600 for V, U, D and O, respectively, totaling \$12,090 (TCE=12,090). Suppose the NCP pays directly \$1,128 of the \$3,760 V expenses ($p_{NV} = 30\%$ or .3), \$158 of the \$1,580 U expenses ($p_{NU} = .10$), \$2,060 of the \$5,150 D expenses ($p_{ND} = .40$) and \$80 of the \$1,600 O expenses ($p_{NO} = .05$). Then he pays \$3,426 altogether (so $CEP_N = 3,426 = 1,128 + 158 + 2,060 + 80$). Thus, according to (9), he pays 28.3% of the TCE total expenses, since $PCE_N = CEP_N / TCE = 3,426 / 12,090 = .283$. This identical value for PCE_N can also be obtained by application of (13) if one notices that $P(V) = 3,760 / 12,090 = .311$, $P(U) = 1,580 / 12,090 = .131$, $P(D) = 5,150 / 12,090 = .426$, and $P(O) = 1,600 / 12,090 = .132$, respectively (the preceding percentages are shown in Table 1): $PCE_N = p_{NV} * P(V) + p_{NU} * P(U) + p_{ND} * P(D) + p_{NO} * P(O) = .3 * .311 + .1 * .131 + .4 * .426 + .05 * .132 = .283$.

⁸However, it should be noted that, in contrast to the assumption, we have found many decrees that specify other breakdowns for which parent will pay for lessons, etc.

⁹We (Fabricius & Braver, in press) have recently completed an analysis of such expenses as reported by children of divorce who are now college students, finding that such expenses indeed vary with the amount of time the child spends in the NCP household, but are more appreciable than believed (according to the now-young-adult child's report) even for low levels of contact. For example, 49% of children who spent only 20% or less of their time with the NCP nonetheless had their own room in the NCP household (perhaps shared with siblings); 30% of children spending 30% or less time with NCP nonetheless had their own bicycle at the NCP's home.

¹⁰While this is true in most states, some (e.g., Washington and Wisconsin) do not add a share of such costs to child support. The computations to follow do so only when that particular state's rules to do so.

¹¹We also need to consider non-covered items, such as health care costs for the children that insurance doesn't pay for, and "copayments". Any such costs incurred are hardly ever included as add-ons to the monthly child support amounts, since they are irregular and unpredictable. Instead, such expenses are usually paid for by one parent out-of-pocket. However, most states and decrees order ultimate division between the parents of such costs by the same proportional to gross income rule. Thus, even if we assume it is the CP that directly pays all of them, we should also assume the NCP will reimburse CP for his proportionate share. Accordingly, these non-covered items should adjust the PCE expenses. However, such costs are highly variable from family to family, and it is virtually impossible to get any sort of reliable estimates of typical amounts. Therefore, they have been left out of subsequent calculations with the ultimate result being that the NCP's PCE is slightly to somewhat underestimated.

¹²The spreadsheet is available upon request from the first author.

¹³AZ is perhaps the only state in the U.S. (and certainly the only state in the current study) in which the guidelines specify that the NCP can sometimes claim the child as an exemption on tax returns and reap the tax benefits thereof. If the NCP has 2/3 of the combined gross income, for example, the AZ guideline specifies that he should claim the child two out of every three years. This rule, however, would not entitle him to the head of household designations, nor to the EIC, etc. For present purposes, we did not treat AZ uniquely in this

respect. The reader may assume, instead, that this was one of the years that the CP was entitled to the benefit.

¹⁴The basic award of \$1,024 in the example is assumed by the guideline to represent V, U and D expenses only, which together comprise 83.85% of children's expenses according to Table 1. We need to solve for what additional proportion O is. The algebra reduces to: if 1,024 is 83.85% of the total, what (O) amount is 16.15%? The solution is \$197. In general, we solve for the O amount to add in to child support by the expression $.1615/.8385=.1926$.

¹⁵As observed in note 5, Washington's guidelines do not cover all of our scenarios, since the tables stop at a combined total net income of \$7,000. Our study used the \$7000 child support amounts when these income limits were exceeded. Health insurance and extraordinary expenses in Washington are treated slightly differently, with corrections for health insurance only if it exceeds a certain dollar amount. Our study split extraordinary expenses equally between health insurance and other.

¹⁶ Since (19) can also be stated (inserting 2 for F) as $\left(\frac{2}{2+.7K}\right)^F = (1-B)$, taking logs of

both sides yielded $F = \frac{\log(1-B)}{\log(2/(2+.7K))}$.

¹⁷The percentage of family income i spent on child(ren) was estimate by a least-squares estimate where % on Child = $((2+.7K)^{a+b(1/i)} - (2)^{a+b(1/i)}) / (2+.7K)^{a+b(1/i)}$, where K is the number of children and a and b are estimated parameters. The Morgan and Lino (1999) data were for two adult families.

¹⁸Lower values arise in the BLS-LSB approach and tables if the householder is younger than 35. For example, the values for such younger families that correspond to the 36 and 76 of the main text are 35 and 67 for younger families. Even though the median age of divorcing parents is near the critical 35 year-old age mark (Venohr & Griffiths, 2003), we used the over 35 values in the sensitivity analyses.

¹⁹From the Census Bureau's web-page:

<http://www.census.gov/hhes/poverty/threshld/thresh01.html>. For a one adult household with 1 and 3 children, respectively, the poverty levels are \$12,207, and \$18,566.

²⁰The figure reported is the ratio of the obligee's mean income to the obligor's mean income. Using medians instead, the ratio is 64% (Venohr, personal communication, April 8, 2003.)

²¹One justification proffered for the idea that child support guidelines should be set at an amount that helps to equalize living standards is that to do otherwise means the child may disproportionately bear the adverse economic consequences of the parental divorce (Blumberg, 1999; Garrison, 1999.) We have shown here that this probably happens far less frequently than believed. Even in cases where the obligor's SOL is substantially higher than the obligee's, however, the adverse economic impact to the child is mitigated to the degree that the NCP makes substantial non-child support voluntary outlays on behalf of the child (as found in Fabricius, Braver & Deneau, 2003, and Fabricius & Braver, in press) and/or the child spends substantial time with each parent (according to Venohr & Griffiths 2002 data, 65% spend 25% or more time with NCP) and therefore shares in the SOL of each.