

Projecting the Lost Future Economic Contribution of a Female Child: Refining Income Data to Reflect True Losses

Introduction

In litigation concerning the total disability of a child, economists are called upon to estimate the individual's lost future economic contribution. With any worker, the ideal estimate should include both lost labor market earnings and the lost value of household services. However, household services are often ignored in calculations of the lost economic contribution because the value of a child's future household services depends on a highly uncertain future marital state. Furthermore, even if a value is placed on future household services, however measured, this component of economic loss is often only a small percentage of total damages claimed. In many instances total damages claimed also include long-

term medical care costs, which start immediately and continue throughout life, and can be significantly larger than discounted future earnings.

Computing a child's lost future economic contribution on the basis of lost paid earnings (thereby ignoring household production) underestimates any child's true economic loss. However, when average paid earnings for women are used to estimate a female child's economic loss, the magnitude of the underestimate is especially pronounced for two reasons. First, women, on average, spend twice as much time on household production than men, especially married women with children (Hersch and Stratton 1994). Second, to the extent that married women specialize in nonmarket activities, they have lower labor market earnings throughout their work

*Thomas R. Ireland, Department of Economics, University of Missouri-St. Louis, St. Louis, Missouri
Anne E. Winkler, Department of Economics, University of Missouri- St. Louis, St. Louis, Missouri

lives as compared with men who remain continuously in the labor market.¹ In this paper the inadequacy of using unadjusted average earnings for women as a measuring rod for the lost economic contribution of a female child is pointed out and then a superior proxy is proposed that is also based on labor market data.

Human Capital, Families and Household Production

The method proposed here to estimate a child's lost future economic contribution stems from Gary Becker's theory of marriage and the family. In the Beckerian (Becker 1981) model of the family, a married couple maximizes household welfare through specialization and exchange within the household. Within this model, even if men and women initially have similar market skills, wives tend to specialize in home production activities as part of childbearing while men specialize in market work. As specialization continues, husbands focus on investments in market oriented human capital, including educational attainment, job training and occupation-specific skill development. Wives, on the other hand, may have a divided focus and develop skills in child rearing and home production as well as skills valued in the labor market. To the extent that married women anticipate a shorter, more discontinuous work life, women invest in different fields of specialty and acquire different types of training from that of men. This process of specialization and differential investment causes

there is no *pure* measure of the difference in earnings between career oriented versus more home oriented women. Married women's earnings include the earnings of wives who are as career oriented as their husbands. Similarly, the earnings of single women are not necessarily synonymous with earnings of career oriented women because some single women are not career oriented. Indeed, some young women may choose job specializations and education levels that are compatible with being more home oriented in the hope that they may some day marry. Nevertheless, the category of "never-married women without children present" should have a much higher percentage of career oriented women and thus come closest to capturing the earnings of career women. One should expect and does find that the earnings of never-married women without children present are significantly higher than those of married women or of all women in general. This difference reflects the fact that a higher percentage of these women are career oriented as compared with married women, who tend to have a divided focus.

A Review of Gender Differences in Earnings Data

The theoretical basis of this paper was discussed in the previous section. In this section is provided more specific empirical information about the differences in earnings and household production by men and women. Over time, the amount of household production by women has been declining and that

by men has been slightly increasing (Robinson 1988). However, the difference is still very large. Even in families without children, wives do substantially more housework than their husbands (Robinson 1988; Hersch 1991; Hersch and Stratton 1994). Summarizing various research studies, Hersch and Stratton (1994) estimate that women spend an average of 20-30 hours per week in housework, compared to 6-14 hours by men. This absolute time difference critically ignores the fact that women, on average, invest more in home oriented skills than men and thus have more highly valued skills. This point may not be true for men who are exceptionally skilled at home repairs, but most men are not.

Table 1 shows life cycle earnings of all men and all women, irrespective of educational attainment. The most obvious finding is the flatness of the life cycle curves for all women versus all men. This flatter profile for females reflects the lower level of human capital acquisition because of women's different work life expectations as well as mommy track employments and actual interruptions due to child bearing and rearing responsibilities. Note that the difference between male and female wages is smallest in the starting 18 to 24 year old category where young men earn only 11.4% more than young women. Over the life cycle, the ratio between peak and starting men's earnings is 2.551 compared to 1.719 for women, reflecting a peak earnings difference between men and women of 66.2% in the 45 to 49 age category. Thus, specialization in the labor market produces

Table 1
Life Cycle Earnings^a of Men and Women: March, 1992

Ages	Female	%Change	Male	%Change
18-24	\$15,515		\$17,279	
25-29	\$21,722	40.01%	\$25,633	48.35%
30-34	\$24,525	112.90%	\$32,344	26.18%
35-39	\$25,967	5.88%	\$38,157	17.97%
40-44	\$25,924	-0.17%	\$41,524	8.82%
45-49	\$26,522	2.31%	\$44,072	6.14%
50-54	\$25,600	-3.48%	\$42,488	-3.59%
55-59	\$23,891	-6.68%	\$39,865	-6.17%

^a Full-time, year-round workers. Source: U.S. Bureau of the Census, *Current Population Reports*, P-60-184, *Money Income of Household, Families and Persons in the United States*, 1992, Table 30.

substantial earnings benefits for men, which is consistent with the Beckerian model of the family.

In reviewing the figures in table 1 (and other tables in this paper), it is important to keep in mind that these data are cross-sectional (moment-in-time). Consequently, giving these earnings figures a life cycle interpretation should be done with caution, especially in the case of women. Figures for older cohorts of women are likely to understate a young woman's future earnings because young women are currently making educational and training investments based on the expectation of a longer, more continuous work life as compared with women in earlier cohorts. In addition, there is a potential selection bias for both men and women over the age of 55, based on who remains in the sample collected for data purposes. The direction of this potential bias is unclear. More successful workers may leave the labor market earlier, or elect to take lower paying but more enjoyable jobs later in their work lives. However, it may also be true that less successful workers are forced out of the labor market by implicit age discrimination. Even with these difficulties, however, this data

Perhaps more to the point, a child's lost household production, however measured, is typically only a small part of total damages claimed if there are long-term care costs because of the disability. Thus, in most cases, an attorney is not likely to want an economist to project potential household production where assumptions about future home production are open to debate. For this reason, economists frequently rely exclusively on lost earnings in estimating a child's lost economic contribution. This approach not only omits the value of household services as a component of the estimate of lost economic contribution but also ignores the negative effect of time spent in household production on the paid earnings stream. The negative impact of household production on paid earnings is especially pronounced for women because many exit the labor force to undertake child rearing activities and then reenter at a later date. Upon reentry, these women typically receive lower earnings due to depreciation of market-based skills. This intermittent labor force behavior lowers the average earnings data from which the lost economic contribution for any woman, regardless of her own labor market attachment, is projected.

In this paper it is suggested that lost earnings of never-married childless women provide a better proxy for a female child's lost economic contribution than married women's (or all women's) earnings.³ In using this proxy, there is no presumption that a child will or will not marry. The virtue of the proxy is that the never-married

childless women series provides a more accurate picture of any woman's lost economic contribution, given that household production will not be separately calculated. These figures are superior because they include a lower-bound estimate of the value of lost household production. From a practical standpoint, the advantage of relying on earnings figures for never-married women versus computing a loss figure based on speculation about marriage and/or family responsibilities lies in the fact that the method is simple, relies on the same data base that is used for most other projections of lost earnings, and can easily be explained to a judge and jury.

Problems in Computing Lost Earnings for a Female Child

The major difficulty which arises in estimating lost earnings is that there is no established record on which to base future earnings. If the child was old enough before her injury, there may be school records that indicate in a general way whether the child was doing well in school, but in some instances even these indicators are missing. It is common for economists to utilize educational scenarios that meet the requirement of common sense, based on the educational achievements of the child's parents. If both of a child's parents have college degrees, it is reasonable to project that the child might have earned a bachelor's degree. To provide a range of estimates, an economist might also use a scenario in which the child was assumed to achieve an

a substantially downward-biased estimate for a female child. In the next section the focus is on an alternative earnings series that better reflects a female child's lost economic contribution.

Earnings Comparisons for Women Based on Family Status

Table 2 provides data extracted from the March 1990 *Current Population Survey (CPS) Annual Demographic File*, compiled by the Bureau of the Census, on the full-time, year-round earnings of three groups of women: all females, never-married women living alone with no children present, and married women. Figures are presented for three education categories: completed high school only, completed four years of college only, completed four or more years of college. Since the focus is on narrowly defined groups, the figures in table 2 were computed using individual-level CPS data available on machine-readable tape from the Bureau of the Census. Specifically, the March 1990 CPS provides information on individuals in nearly 60,000 households. Characteristics such as age, residence, marital status and years of education completed are for 1990, while income figures are based on the prior calendar year, 1989. Weights provided for each individual in the survey data set enable the researcher to characterize the demographic composition of the US population and make determinations about average earnings and income of the US population as a whole.

It is useful to consider briefly

an associate's degree rather than a bachelor's degree and another scenario in which the child earned more than a bachelor's degree.

Having developed such a set of assumed educational outcomes, an economist could then turn to a standard source, such as the *Money Income of Households, Families and Persons in the United States* series of the Bureau of the Census. Data provided is cross-sectional by sex, race, educational category and age and can be used to estimate in current dollars the expected earnings of an individual at various future ages. To project lost future earnings, these data would have to be coupled with some system for accounting for a normal preinjury work-life expectancy for the child, some projected future growth rate for earnings and some discount rate or set of discount rates for reducing the stream of estimated real future earnings to present value. Such a calculation would also have to consider net fringe benefits and possibly tax liabilities that would have existed against future income, depending on state law in the jurisdiction in which the calculation was performed.

How accurate this estimate is can never be known because the injury to the child prevents any test of the accuracy of the preinjury estimates. How persuasive it is to a judge or jury, however, depends on the reasonableness of the assumptions underlying the estimate. The central argument in this paper is that relying on published earnings data for all full-time year-round male workers provides a fairly accurate estimate of a male child's economic loss, but a similar method produces

Table 2
Full-Time Year-Round Money Earnings of Female Workers in 1989

Age	Four Years High School Only			Four Years College Only			Four Years College or More		
	All Females	Never-Married, Lives Alone	Married*	All Females	Never-Married, Lives Alone	Married*	All Females	Never-Married, Lives Alone	Married**
18-24	\$13,052	\$14,981	\$13,099	\$19,729	\$23,507	\$20,080	\$19,896	\$23,253	\$19,945
25-34	\$16,894	\$20,284	\$16,589	\$26,505	\$29,177	\$26,820	\$27,549	\$30,059	\$27,703
35-44	\$18,845	\$24,453	\$18,528	\$28,755	\$33,792	\$27,600	\$31,624	\$37,181	\$31,083
45-54	\$19,176	\$23,747	\$18,571	\$28,094	\$37,502	\$26,544	\$31,456	\$34,006	\$30,763
55-64	\$18,633	\$17,423 ^a	\$18,588	\$28,083	\$34,450 ^a	\$27,789	\$30,449	\$39,321 ^a	\$29,497
65+	\$16,643	\$19,422 ^a	\$18,053	\$21,047	\$23,500 ^a	\$18,342 ^a	\$23,360	\$24,300 ^a	\$22,454

^aSource: March 1990 Current Population Survey
*Never-married female lives alone (no adults or children present)
**Married female lives with her spouse, with or without children present
^bBased on sample size less than 35

the earnings figures for married women closely approximate those for all females, though a slight bit lower in age and educational categories (US Bureau of the Census 1992). In this data source, money earnings are defined as wages and salary income plus farm and nonfarm self-employment income. A full-time, year-round worker is defined as an individual who works 35 hours or more per week during 50 or more weeks during the year.

The first step in extracting the information from the *Current Population Survey* tape was to duplicate the summary information contained in table 29 of the *Money Income of Households, Families and Persons in the United States: 1988 and 1989* (1991) as a check on the accuracy of the data.

Table 29 presents nationally representative figures on year-round, full-time money earnings for the sample of all females in 1989, stratified by age and level of education completed. Mean earnings reported in table 2 of this paper for all females do not perfectly match dollar figures reported in the published *Current Population Report* (1991). The reason for this difference is that the individual-level CPS data that is available to the public (including the authors of this paper) is *top-coded*. Top-coded means that wages and salaries above \$100,000 are coded as \$100,000 to preserve confidentiality. However, when the Bureau of the Census itself computes average earnings, it computes these figures based on actual earnings, including earnings above \$100,000.⁴ Consequently, the figures in table 2, especially for those

with more education (and thus higher earners) are slightly lower than the published figures, but are, nevertheless, very close (within an average of 1.2%).

The advantage of computing mean earnings from individual-level CPS data rather than using published figures is that it allows one to determine the earnings of a specific demographic group of interest—full-time, year-round, never-married women workers. However, since this sample is narrowly defined by design, sample size becomes an issue among very young and older cohorts of women. Sample size also becomes an issue for married women over age 65. Thus, an “a” is noted next to those figures for which the CPS sample size is less than 35. The damage estimates that follow are based on earnings of those with “four years of college or more” rather than “four years of college only” in order to include as few years possible with sample sizes less than 35.

The key finding from table 2 is that the earnings of never-married childless women are higher in all but one age and educational category than earnings figures for all women and married women. This result is expected since these women have no family commitments. The one exception is the 55-64 age category for women with high school educations and involves a sample size too small to be meaningful.

The Compromise of Projecting Earnings from Never-Married Women

The argument in this paper depends on the premise that earnings of never-married women without children reasonably simulate an earnings stream for a career oriented woman.⁵ As discussed earlier, this series is preferred on the grounds that the differential between an earnings stream for never-married childless women and married women (with or without children) includes an implicit lower bound for the value of household production. When a female child's lost future economic contribution is computed using earnings of never-married women instead of earnings of all women, the estimate increases by 14.2 to 20.9%, depending on whether maximum educational attainment is assumed to be college or high school only.

Before proceeding to a discussion of damage calculations using the suggested series, however, it is also important to note that an estimate of lost economic contribution to damage, as described here, is not a *total* damage estimate. It is an estimate of the lost value of the injured child's ability to generate future economic value. Future medical costs and loss of the child's ability to enjoy life as much as before the injury are also compensable damages.

How Damage Estimates Were Prepared

Tables 3-6 provide two comparisons between damage calculations

tions based on earnings information for all females and calculations based on earnings information for never-married childless females. Tables 3 and 4 compare these categories at the "high school only" educational level, while tables 5 and 6 compare them for the "four years college or more" educational level. Each calculation was performed on the basis of a 40 year work-life expectancy certainty equivalence. There is some discounting distortion relative to the LPE and similar annual probability or work-life based systems (Baker and Seck 1987; Brookshire and Smith 1990)⁶. However, substituting a "probability of work life" system into the damage calculations provided below would not change any essential point in this paper.

The 40 year work-life expectancy assumption is based on average male work-life expectancy, rounded for simplicity from *Work-life Estimates: Effects of Race and Education* (1986). A rounded version of the male work-life expectancy was used for many of the same reasons behind the decision not to use data for all women, which includes a large number of married women. Work-life expectancy for females includes the impact of childbearing and rearing, periods of nonparticipation in the labor market that result when the family moves due to the husband's job change, and earlier retirement of younger wives to spend retirement time with older husbands. These factors, which shorten the average woman's work life, only apply to home oriented married women, but not to career oriented single or married women. Work-life expectancies of

career oriented women are much more like those of men. Indeed, such women might have work-life expectancies larger than those of men due to the greater life expectancy of women. However, since a shorter or longer work-life expectancy would not alter the basic point of this paper, a 40 year work-life expectancy figure is adequate for current purposes.

The 1989 earnings figures in table 2 were adjusted to 1993 by taking into account annual rates of increase in average hourly earnings of American workers for 1990 (3.3%), 1991 (2.6%), 1992 (2.8%) and 1993 (3.0%, estimated). After making this adjustment to all figures, a real net discount rate was employed to put the figures in present value terms. Thus, in tables 3-6, the lost earnings column, "89LostEarn," has numbers identical to those in table 2 for 1989. However, the annual present value column, captioned, "93 PresVal" includes adjustment for 1993 equivalency. Columns labeled "Cumulative" provide annual running totals of the amount of loss.

In order to make the calculations concrete, a sample case involving a 14 year old girl was selected. At any age over 16, it would be reasonable to worry about the specific career interests and actual courses taken by the girl prior to her injury. At ages younger than 14, the selection of a real net discount rate becomes increasingly important, so an age of 14 seemed to raise the fewest peripheral issues. A real net discount rate of three percent was used to reduce future income losses to present value and tax and fringe benefit issues were

Table 3
Lost Earnings of a Female High School Graduate
All Women Category (Disability at Age 14)

Year	Age ^a	89LostEarn ^b	93PresVal ^c	Cumulative ^d
1997	18	\$13,052	\$13,014	\$13,014
1998	19	\$13,052	\$12,635	\$25,648
1999	20	\$13,052	\$12,267	\$37,915
2000	21	\$13,052	\$11,909	\$49,824
2001	22	\$13,052	\$11,562	\$61,387
2002	23	\$13,052	\$11,226	\$72,612
2003	24	\$13,052	\$10,899	\$83,511
2004	25	\$16,894	\$13,696	\$97,207
2005	26	\$16,894	\$13,297	\$110,504
2006	27	\$16,894	\$12,910	\$123,414
2007	28	\$16,894	\$12,534	\$135,948
2008	29	\$16,894	\$12,169	\$148,116
2009	30	\$16,894	\$11,814	\$159,931
2010	31	\$16,894	\$11,470	\$171,401
2011	32	\$16,894	\$11,136	\$182,537
2012	33	\$16,894	\$10,812	\$193,349
2013	34	\$16,894	\$10,497	\$203,845
2014	35	\$18,845	\$11,368	\$215,213
2015	36	\$18,845	\$11,037	\$226,250
2016	37	\$18,845	\$10,715	\$236,966
2017	38	\$18,845	\$10,403	\$247,369
2018	39	\$18,845	\$10,100	\$257,469
2019	40	\$18,845	\$9,806	\$267,276
2020	41	\$18,845	\$9,521	\$276,796
2021	42	\$18,845	\$9,243	\$286,039
2022	43	\$18,845	\$8,974	\$295,013
2023	44	\$18,845	\$8,713	\$303,726
2024	45	\$19,176	\$8,607	\$312,333
2025	46	\$19,176	\$8,357	\$320,690
2026	47	\$19,176	\$8,113	\$328,804
2027	48	\$19,176	\$7,877	\$336,681
2028	49	\$19,176	\$7,648	\$344,328
2029	50	\$19,176	\$7,425	\$351,753
2030	51	\$19,176	\$7,209	\$358,962
2031	52	\$19,176	\$6,999	\$365,960
2032	53	\$19,176	\$6,795	\$372,755
2033	54	\$19,176	\$6,597	\$379,352
2034	55	\$18,633	\$6,223	\$385,575
2035	56	\$18,633	\$6,042	\$391,617
2036	57	\$18,633	\$5,866	\$397,484

^a A 14 year old child in 1993 would reach age 18 in 1997.

^b "89 LostEarn" refers to 1989 earnings for all year-round, full-time female

workers, high school degrees, reported in table 2.

^c "93PresVal" is the 1993 present value of the corresponding "LostEarn."

^d "Cumulative" is a running total of the "93PresVal" column.

Table 4
Lost Earnings of a Female High School Graduate
Never-Married Category (Disability at Age 14)

Year	Age ^a	89LostEarn ^b	93PresVal ^c	Cumulative ^d
1997	18	\$14,981	\$14,937	\$14,937
1998	19	\$14,981	\$14,502	\$29,439
1999	20	\$14,981	\$14,080	\$43,518
2000	21	\$14,981	\$13,669	\$57,188
2001	22	\$14,981	\$13,271	\$70,459
2002	23	\$14,981	\$12,885	\$83,344
2003	24	\$14,981	\$12,509	\$95,853
2004	25	\$20,284	\$16,444	\$112,298
2005	26	\$20,284	\$15,965	\$128,263
2006	27	\$20,284	\$15,500	\$143,763
2007	28	\$20,284	\$15,049	\$158,812
2008	29	\$20,284	\$14,611	\$173,423
2009	30	\$20,284	\$14,185	\$187,607
2010	31	\$20,284	\$13,772	\$201,379
2011	32	\$20,284	\$13,371	\$214,750
2012	33	\$20,284	\$12,981	\$227,731
2013	34	\$20,284	\$12,603	\$240,334
2014	35	\$24,453	\$14,751	\$255,085
2015	36	\$24,453	\$14,321	\$269,407
2016	37	\$24,453	\$13,904	\$283,311
2017	38	\$24,453	\$13,499	\$296,810
2018	39	\$24,453	\$13,106	\$309,916
2019	40	\$24,453	\$12,724	\$322,641
2020	41	\$24,453	\$12,354	\$334,994
2021	42	\$24,453	\$11,994	\$346,988
2022	43	\$24,453	\$11,645	\$358,633
2023	44	\$24,453	\$11,305	\$369,938
2024	45	\$23,747	\$10,659	\$380,597
2025	46	\$23,747	\$10,349	\$390,946
2026	47	\$23,747	\$10,047	\$400,993
2027	48	\$23,747	\$9,755	\$410,748
2028	49	\$23,747	\$9,471	\$420,219
2029	50	\$23,747	\$9,195	\$429,413
2030	51	\$23,747	\$8,927	\$438,340
2031	52	\$23,747	\$8,667	\$447,007
2032	53	\$23,747	\$8,414	\$455,422
2033	54	\$23,747	\$8,169	\$463,591
2034	55	\$17,423	\$5,819	\$469,410
2035	56	\$17,423	\$5,650	\$475,060
2036	57	\$17,423	\$5,485	\$480,545

^a A 14 year old child in 1993 would reach age 18 in 1997.
^b "89 LostEarn" refers to 1989 earnings for never married year-round, full time female workers, high school degrees, reported in table 2.
^c "93PresVal" is the 1993 present value of the corresponding "LostEarn."
^d "Cumulative" is a running total of the "93PresVal" column.

Table 5
Lost Earnings of a Female with 4 or More Years of College
All Women Category (Disability at Age 14)

Year	Age ^a	89LostEarn ^b	93PresVal ^c	Cumulative ^d
2002	23	\$19,896	\$17,112	\$17,112
2003	24	\$19,896	\$16,614	\$33,726
2004	25	\$27,549	\$22,334	\$56,060
2005	26	\$27,549	\$21,684	\$77,743
2006	27	\$27,549	\$21,052	\$98,795
2007	28	\$27,549	\$20,439	\$119,234
2008	29	\$27,549	\$19,843	\$139,077
2009	30	\$27,549	\$19,266	\$158,343
2010	31	\$27,549	\$18,704	\$177,047
2011	32	\$27,549	\$18,160	\$195,207
2012	33	\$27,549	\$17,631	\$212,837
2013	34	\$27,549	\$17,117	\$229,955
2014	35	\$31,624	\$19,077	\$249,031
2015	36	\$31,624	\$18,521	\$267,553
2016	37	\$31,624	\$17,982	\$285,534
2017	38	\$31,624	\$17,458	\$302,992
2018	39	\$31,624	\$16,949	\$319,942
2019	40	\$31,624	\$16,456	\$336,398
2020	41	\$31,624	\$15,977	\$352,374
2021	42	\$31,624	\$15,511	\$367,885
2022	43	\$31,624	\$15,059	\$382,945
2023	44	\$31,624	\$14,621	\$397,565
2024	45	\$31,456	\$14,120	\$411,685
2025	46	\$31,456	\$13,708	\$425,393
2026	47	\$31,456	\$13,309	\$438,702
2027	48	\$31,456	\$12,921	\$451,624
2028	49	\$31,456	\$12,545	\$464,169
2029	50	\$31,456	\$12,180	\$476,348
2030	51	\$31,456	\$11,825	\$488,173
2031	52	\$31,456	\$11,480	\$499,653
2032	53	\$31,456	\$11,146	\$510,800
2033	54	\$31,456	\$10,821	\$521,621
2034	55	\$30,449	\$10,170	\$531,791
2035	56	\$30,449	\$9,874	\$541,665
2036	57	\$30,449	\$9,586	\$551,251
2037	58	\$30,449	\$9,307	\$560,558
2038	59	\$30,449	\$9,036	\$569,593
2039	60	\$30,449	\$8,773	\$578,366
2040	61	\$30,449	\$8,517	\$586,883
2041	62	\$30,449	\$8,269	\$595,152

^a A 14 year old child in 1993 would reach age 18 in 1997.
^b "89 LostEarn" refers to 1989 earnings for all year-round, full-time female workers, Four or More Years of College, reported in table 2.
^c "93PresVal" is the 1993 present value of the corresponding "LostEarn."
^d "Cumulative" is a running total of the "93PresVal" column.

Table 6
Lost Earnings of a Female with 4 or More Years of College
Never-Married Category (Disability at Age 14)

Year	Age ^a	89 Lost Earn ^b	93 Pres Val ^c	Cumulative ^d
2002	23	\$23,253	\$19,999	\$19,999
2003	24	\$23,253	\$19,417	\$39,416
2004	25	\$30,059	\$24,369	\$63,785
2005	26	\$30,059	\$23,639	\$87,444
2006	27	\$30,059	\$22,970	\$110,414
2007	28	\$30,059	\$22,301	\$132,715
2008	29	\$30,059	\$21,651	\$154,366
2009	30	\$30,059	\$21,021	\$175,387
2010	31	\$30,059	\$20,409	\$195,796
2011	32	\$30,059	\$19,814	\$215,610
2012	33	\$30,059	\$19,237	\$234,847
2013	34	\$30,059	\$18,677	\$253,524
2014	35	\$37,181	\$22,429	\$275,953
2015	36	\$37,181	\$21,776	\$297,728
2016	37	\$37,181	\$21,141	\$318,870
2017	38	\$37,181	\$20,526	\$339,395
2018	39	\$37,181	\$19,928	\$359,323
2019	40	\$37,181	\$19,347	\$378,671
2020	41	\$37,181	\$18,784	\$397,455
2021	42	\$37,181	\$18,237	\$415,691
2022	43	\$37,181	\$17,706	\$433,397
2023	44	\$37,181	\$17,190	\$450,587
2024	45	\$34,006	\$15,264	\$465,851
2025	46	\$34,006	\$14,820	\$480,671
2026	47	\$34,006	\$14,388	\$495,059
2027	48	\$34,006	\$13,969	\$509,027
2028	49	\$34,006	\$13,562	\$522,589
2029	50	\$34,006	\$13,167	\$535,756
2030	51	\$34,006	\$12,783	\$548,540
2031	52	\$34,006	\$12,411	\$560,951
2032	53	\$34,006	\$12,050	\$573,001
2033	54	\$34,006	\$11,699	\$584,699
2034	55	\$39,321	\$13,133	\$597,832
2035	56	\$39,321	\$12,751	\$610,583
2036	57	\$39,321	\$12,379	\$622,962
2037	58	\$39,321	\$12,019	\$634,981
2038	59	\$39,321	\$11,669	\$646,650
2039	60	\$39,321	\$11,329	\$657,978
2040	61	\$39,321	\$10,999	\$668,977
2041	62	\$39,321	\$10,678	\$679,656

a. A 14 year old child in 1993 would reach age 18 in 1997.
b. "89 Lost Earn" refers to 1989 earnings for never married year-round, full-time female workers, 4 or more years of college, reported in table 2.
c. "93 Pres Val" is the 1993 present value of the corresponding "Lost Earn."
d. "Cumulative" is a running total of the "93 Pres Val" column.

ignored. Since a larger or smaller real net discount rate would affect both sides of the comparison in the same way, the choice of discount rate is not of central concern in this paper. The results, reported in tables 2-5 are consistent with expectations. When a female child's lost future economic contribution is computed using earnings of never-married women instead of earnings of all women, this adds 20.9% to the damage estimate if the child is assumed to complete high school and 14.2% to the estimate if she is assumed to have completed four or more years of college.

Indeed, a smaller differential for more educated women was expected in so far as a greater human capital investment in formal education should increase the opportunity cost of homemaker/parenting activity. If so, better educated women would be less likely to sacrifice future career development in favor of self investments in homemaking skills. They would be more likely to purchase more expensive, but time saving foods, clothing and household consumer durables. They would also be more likely to employ domestic help, take less time off from work due to child birth and be more likely to utilize day care centers.

Conclusion

The main objective in this paper was to demonstrate that using unadjusted earnings data for all women from the *Current Population Survey*, as presented in the *Money Income of Households, Families and Persons in the United States* series, significantly underes-

timates the lost economic contribution of a female child. Average earnings for all women reflect the earnings of a diverse group — women with and without family commitments. These figures omit imputed earnings from household production, which are especially important for women with family commitments. Ignoring household production activity also leads one to underestimate the lost economic contribution of a male child, but the underestimate is much more substantial in the case of a female child. The reason is that household production, especially when child rearing activities are involved, has a more sizeable and negative impact on the labor market earnings of females than on those of males. Household and child rearing responsibilities may result in absences from the labor market, but may also affect job selection, with women taking lower paying jobs that allow greater flexibility in dealing with child rearing issues. While one sees greater equalization in the roles of men and women, substantial differences in men's and women's responsibilities for household production and child rearing still remain.

In this paper, it is argued that the earnings stream of never-married childless women includes a usable proxy for both labor market earnings and the lost household production of a totally disabled female child. This proxy procedure is not perfect, however, and its limitations should be understood. The actual earnings of never-married childless women may not perfectly reflect the potential earnings opportunities from a full-time career for

a woman randomly selected from the population. The direction of bias is unclear. On the one hand, never-married women living alone may have characteristics like greater motivation and ability, which lead them to specialize in market work and lead to higher earnings. On the other hand, never-married women may have characteristics related to physical appearance or personality which lead them to do more poorly than average in the marriage and labor

markets.

These difficulties notwithstanding, the proxy measure presented here does provide an implied measure of at least some of the household production component of the lost opportunity set suffered by a personally injured female child. In addition, the proxy measure suggested here has the advantage of being consistent with the normal tort practice of relying exclusively on standard labor market sources.

Endnotes

1. For a discussion of women's human capital investments and the influence of children and family commitments, see Blau and Ferber (1992) or Fuchs (1988).

2. This argument implicitly assumes that a woman's probability of marriage is virtually 100%. For black women, in particular, this is an extreme assumption given evidence by Wilson and Neckerman (1986) on the scarcity of marriageable men. Specifically, they construct a male marriageable pool index, defined as employed black males per 100 black women. For black women aged 20-24, the male marriageable pool index fell from 70 in 1960 to 45 in 1980. This decline mirrored the fall in marriage rates among black women during the same period. While Becker (1981) discusses gender ratio imbalances, his focus on a choice mechanism implies that all women could marry if willing to accept sufficiently steep terms of trade. This may simply not be true.

3. Another very interesting approach to the same problem is taken by the Canadian legal system, as reported by Ross (1992). The Canadian legal system recognizes a damage category called "loss of marriageability" or "loss of permanent interdependent relationship." An injured party may sue for a lowered standard of living resulting from a lowered likelihood of marriage caused by physical or psychological unattractiveness caused by an injury.

This element of damages is only useful if a prospective marital partner can be assumed to be earning more than the injured party. This means in practice that this is an element of recovery available to females only. Ross's own methodology is to 1) compute total estimated household income of a future marital unit including the injured female child, 2) use Canadian Family Survey Expenditure data to project that 62% of family income would be used in way to benefit the injured female child if in a 2 person family unit, 3) use an estimate of the probability of marriage to discount this result, and 4) subtract the female child's expected post-injury earnings. The residual is then claimed as the dollar value of "loss of marriageability."

In effect, this captures some of the value of lost household production to the female child. A significant part of higher male earnings reflect female choices to emphasize household production, with compensation deriving from higher family income benefits that include the income of husbands. Unfortunately, it also makes it appear that this is income transferred from a prospective husband with higher productivity, rather than earned by the wife through household production.

4. In the process of matching these results, the authors discovered the issue of "topcoding" of the individual-level data available on tape, in a conversation with a programmer at the Bureau of the Census.

5. It is critical to consider the issue of selectivity bias when relying on the earnings stream of never-married, childless women. Importantly, the direction of bias could run either way. On the one hand, women who have chosen a ca-

reer oriented/never-married track may be more motivated or have higher ability, both factors leading to higher earnings. If so, the average earnings stream of never-married women may exceed the potential earnings stream of married woman if they did not marry. On the other hand, some never-married women may have personal characteristics (personality oriented, physical or mental) that cause them to be less likely to be married and lead them to have lower earnings in the marketplace. (For a discussion of evidence regarding physical appearance, see Biddle and Hamermesh (1993). In this case, the average earnings of never-married women may be lower than the potential earnings of married women if they did not marry.

6. With a work life certainty equivalence measure, all years of work life are treated as if they would occur consecutively, shortening the period over which discounting to present value would take place. There is no reason for not using the LPE system of accounting for work-life expectancy (Brookshire and Smith 1990; Baker and Seck 1987). With the LPE approach, one could have calculated the conditional probability of work life for each year based on the probability of survival through that year, the probability of labor market participation and the probability of employment. In such a calculation, one would have substituted male participation rates for female rates to capture a result more accurate result for never-married females, mirroring the use of male work-life expectancy figures in the simple work life approach taken here. However, changing approaches would not significantly affect the basic results in terms of the main point of this paper.

7. The larger the real net discount rate, the larger the impact of the number of years on discounted values between the date of the injury and the date at which earnings would begin to occur.

References

- Baker, William Gary, and Michael K. Seck. 1987. *Determining Economic Loss in Injury and Death Cases*. Colorado Springs, Colorado:Shepard's/McGraw Hill.
- Becker, Gary. 1981. *A Treatise on the Family*. Cambridge, Massachusetts: Harvard University Press.
- _____. 1985. "Human Capital, Effort, and the Sexual Division of Labor." *Journal of Labor Economics* 3(1) (Part 2): 533-58.
- Biddle, Jeffrey, and Daniel Hamermesh. 1993. "Beauty and the Labour Market" (Working Paper No. 4518). Cambridge, Massachusetts: National Bureau of Economic Research.
- Blau, Francine D., and Marianne Ferber. 1992. *The Economics of Women, Men and Work*. Englewood, New Jersey: Prentice Hall.
- Brookshire, Michael L., and Stan V. Smith. 1990. *Economic/Hedonic Damages*. Cincinnati, Ohio: Anderson Publishing Co.
- Fuchs, Victor R. 1998. *Women's Quest for Economic Equality*. Cambridge, Massachusetts: Harvard University Press.
- Hersch, Joni. 1991. "Male-Female Differences in Hourly Wages." *Industrial and Labor Relations Review* 44(4): 746-59.
- _____, and Leslie S. Stratton. 1993. "Housework, Effort and Wages of Married Workers." (Mimeo) University of Wyoming and University of Arizona.
- _____. 1994. "Housework, Wages and the Division of Household Time for Employed Spouses." *American Economic Review* 84(2): 120-25
- Robinson, John. 1988. "Who's Doing the Housework?" *American Demographics* 10:24-28.
- Ross, Peter. 1992. "Loss of Marriageability (Loss of Permanent Interdependent Relationship)." *Journal of Legal Economics* 2(2): 49-50.
- US Bureau of the Census. 1991. "Money Income of Households, Families and Persons in the United States: 1988 and 1989." *Current Population Report* 172:60 (table 29). Washington, D.C.: U.S. Government Printing Office.
- _____. 1992. "Marital Status and Living Arrangements: March 1991." *Current Population Report* 461:20 (table 1). Washington, D.C.: U.S. Government Printing Office.
- US Bureau of Labor Statistics. 1986. *Worklife Estimates: Effects of Race and Education*. (February) Bulletin 2254. Washington, D.C.: U.S. Government Printing Office.
- Wilson, William J., and Kathryn Neckerman. 1986. "Poverty and Family Structure: The Widening Gap between Evidence and Public Policy Issues." In *Fighting Poverty: What Works and What Doesn't*. S. Danziger and D. Weinberg, eds., 232-59. Cambridge: Harvard University Press.