Eastern Economic Journal, **2010**, **36**, (370–390)

www.palgrave-journals.com/eej/

Symposium article

The Effect of the Loss of a Parent on the Future Earnings of a Minor Child

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We quantify the effect of a parent's absence on a child's future earnings. A parent's absence because of separation or divorce reduces a child's lifetime earnings between 3 and 12 percent. Lifetime educational attainment is adversely affected by between 2 and 4 percent if a parent of the same gender as the child dies (a smaller impact than if absence is because of separation or divorce). No such adverse effect is found if a girl's father or a boy's mother dies. We conclude that it is sensible that lifetime earnings loss to children not be estimated in a parent's wrongful death case.
Eastern Economic Journal (2010) **36,** 370–390. doi:10.1057/eej.2010.25

Keywords: forensic economics; earnings; death; minors

JEL: K13

INTRODUCTION

Forensic economists are often called upon to estimate the loss of services, guidance, and income to minor children resulting from the personal injury or death of a parent. A methodology and data sources exist for valuing these losses.[1] Receiving much less attention in the forensic literature is the effect of the loss of a parent on the future earnings of a minor child. No doubt a child's future loss of earnings due to the absence of a parent traditionally has not been an element of damages in cases involving the wrongful death of a parent and therefore there has not been research published in the forensic literature on this topic.[2] Should it be one of the elements of damage? If a parent's death has a large negative effect on a child's future earnings, it could be argued that good public policy would require such a loss to be added to the list of damages that can be claimed in such cases.

A forensic economist may also be interested in the effect of the absence of a parent on educational attainment when projecting lost earnings capacity in the case of wrongful injury to a child. Spizman-Kane [1992] used an ordered probit model to estimate the probability of a child attaining different educational levels based on family background characteristics and subsequently to estimate lifetime earnings of the child. Kane-Spizman [2001] extended their earlier study and showed that educational attainment and lifetime earnings were predicted to be higher when both biological parents were present in the household when the child was 14 years old. However, Kane-Spizman did not distinguish between the reason

for the absence of a parent (i.e., death or other causes such as divorce or separation).

This paper examines how the absence of a biological parent affects the future earnings of a minor child. In 'Studies of the effect of the loss of a parent on a child's future earnings' section, we review literature in economics and psychology that directly or indirectly bears on the impact a parent's loss has on a child's future educational attainment and earnings. In 'Assessing the effect of losing a parent via the impact on educational attainment' section, we examine one approach to quantifying the effect of the loss of a parent on a child's future earnings by expanding the model that has been proposed by Kane and Spizman [2001] for estimating the educational attainment of a minor child, based on the child's personal and family characteristics and the socio-economic circumstances of the child's parents. The data used to estimate this model are discussed in 'Data' section. Empirical results are presented in 'Educational attainment probabilities' section. Following this quantitative exercise, in 'Problems of interpretation' section we discuss some problems and issues that arise with the approach described in 'Assessing the effect of losing a parent via the impact on educational attainment' section. 'The effect of absence of a parent on a child's lifetime earnings' section provides estimates of lifetime earnings for different family demographics. 'Conclusion' section presents our main conclusions. Our results suggest that the absence of a biological parent for reasons other than death reduces a child's lifetime earnings between 3 and 12 percent. The loss of a parent to death, however, has an effect that appears to vary by the gender of the child. Lifetime educational attainment is adversely affected if a parent of the same gender as the child dies, and the effect on lifetime earnings is between 2 and 4 percent, which is always smaller than if the absence is for reasons other than death. Lifetime educational attainment and earnings appear not to be adversely affected by the death of the father of a female child or the death of the mother of a male child.

STUDIES OF THE EFFECT OF THE LOSS OF A PARENT ON A CHILD'S FUTURE EARNINGS

A forensic economist might be predisposed to think that the absence of a biological parent through death, abandonment, or divorce would have a negative impact on educational attainment of the surviving child and, as a consequence, the child's future earnings. This section reviews some studies addressing this and other linkages.

Ginther and Pollak [2003] examined the connection between family structure and the educational attainment of children. They found that children who grew up in traditional families (children that were biological children of both parents) tended to have a better educational outcome than children that grew up in single-parent and blended families. (A blended family included stepchildren and the biological children of both parents in the new family who all lived together.) They found that the children in a blended family had educational outcomes that were similar to each other. These results were consistent with McLanahan and Sandefur [1994] who found that children who grew up with both biological parents did better than children who grew up in a single-parent family or with stepparents. Deleire and Kalil [2002] reached a similar conclusion. However, they also found that when a teenager was living with a single mother in a multigenerational family (with at least one grandparent), the developmental outcome for that teenager was as good as (or even better than) it was for teenagers from intact married families.

The research reported in these three papers did not distinguish among blended families arising from divorce, death, or some other means. Other studies have tried to make this distinction. Amato and Bruce [1991] estimated the impact of a child being separated from a biological parent on adult socio-economic attainment. The independent variables were divorce, parental death, never having a father, and other separations.[3] They found that parental divorce for white male children, white female children, and black female children lowered educational attainment, earnings, the standard of living, and asset ownership. They found there was no difference between black male children being raised in a single-parent household or in an intact family. However, they found that, regardless of race and gender, "No significant associations were observed for death of a parent" (p. 96). These results were consistent with earlier studies by Amato [1988] and Wadsworth and Maclean [1986] which also found that parental divorce/separation, but not the death of a parent, was associated with lower educational attainment.

Menning [2002] examined the effect on educational attainment of the absent parent who was involved with the child on an interpersonal level as well as the effect of the absent parent contributing financial support to the child. He found that neither of these factors, independent of each other, had an effect on educational attainment. However, both activities combined (an absent parent who was involved with the child and provided financial contributions to the child) increased the probability that the child would finish high school or attend college.

Biblarz and Gottainer [2000] examined whether the negative effects for children were greater when single motherhood resulted from divorce rather than death of the father. They found that children of divorced single mothers had significantly lower levels of occupational status, education, and happiness in adulthood when compared to children of widowed single mothers. They found there was no difference between children living with two biological parents and children living with widowed single mothers.[4] The authors concluded that the death of a parent might have little impact on a child's future earnings because the child typically still has the same (or perhaps even greater) financial means to acquire the human capital necessary to succeed. When a child's father dies, the widow is likely to receive life insurance and Social Security survivors' benefits for the minor children. These benefits help insure that the child's educational opportunities will be comparable to those of children from intact families. Children of divorced mothers do not have the same safety net as children of deceased parents.

Using Canadian data, Corak [2001] initially found that, on average, children (specifically teenagers) of divorced families had significantly lower incomes and earnings than children in families where a parent had died. After controlling for different background variables, the differences in income and earnings were almost eliminated or much diminished. Lang and Zagorsky [2001] used a variety of family background control variables to see if children growing up without a biological parent did worse, on average, than other children. They found little to support the notion that a parent's presence throughout childhood affects economic well-being in adulthood. This was especially true when they considered the impact of parental death.

Swallen and Hass [2002] utilized a data set of people born between 1931 and 1941 who were middle aged (at the time of the study) and whose parents had died when the respondents were less than 19 years of age. "For men, early parental death exerts no additional effect on lifetime social economic status; for women, however, we find that early parental death is an independent factor that predicts lower wealth

accumulation and educational attainment." The reduction of educational attainment for women was 0.316 fewer years as a result of a parent dying during childhood. Most of their study dealt with educational attainment and human capital formation due to the death of a parent. The main problem with the Swallen and Hass result for women was that the sample population was born during the Depression of the 1930s and World War II. Given the social norms of that generation, especially with respect to educational opportunities for females, one must be careful, if not totally skeptical, in generalizing their results to more current labor cohorts.

Bruce and Anderson [2004], using Canadian data and an approach very much like the one used here, found a statistically significant but relatively small effect of living with both parents until 15 years of age. "In particular, among both males and females, those who lived with both parents were approximately 6 percent less likely to drop out of school before completing high school and 9 percent more likely to complete university than were those who living with only one parent" (p. 14).

Björklund and Sundström [2006] used Swedish data of full biological siblings to examine if there is a negative relationship in childhood educational outcomes and parental separation. They also had a review of the literature that captures a more international flavor. Their conclusion stated that further research was required to determine if "a country's social institutions matter for the longer-term relationship between parental separation and children's educational attainment."

Chen et al. [2009] used three national data sets from Taiwan to determine how the death of a mother or father affects children's college attainment. As with Björklund and Sundström data, the relative homogenous population of Taiwan and its social institutions might affect the outcome, which showed little effect of the father's death on a child's educational level and a much larger effect from the mother's death.

ASSESSING THE EFFECT OF LOSING A PARENT VIA THE IMPACT ON EDUCATIONAL ATTAINMENT

There is literature that examines the factors that influence a child's eventual educational attainment based on familial and demographic characteristics. Statistical models have been developed to provide quantitative predictions about the probability that a child will reach various levels of educational attainment.[5]

One method of predicting the educational attainment of a minor child involves the use of the ordered probit educational attainment model of Kane and Spizman [2001]. The ordered probit specification is given by

$$Z_i = X_i\beta + \mu_i$$

The unobservable variable Z_i represents the benefits and/or costs of alternative levels of educational attainment. X_i is a vector of family background and demographic variables that influence Z_i. Because Z_i is unobservable, an indicator variable is used to show the actual educational level for each individual in the sample. In the version of this model used in the current study, it is assumed that individual i acquires[6]:

- less than a high school degree if $Z_i \leqslant \theta_{11}$;
- a high school diploma or General Education Degree (GED) if $\theta_1 < Zi \leqslant \theta_2$;

Table 1 Probabilities of alternative level of educational attainment

Outcome	*Probability*[a]
Less than high school diploma	$\Phi(\widehat{\theta}_1 - \widehat{Z}_i)$
High school or GED degree	$\Phi(\widehat{\theta}_2 - \widehat{Z}_i) - \Phi(\widehat{\theta}_1 - \widehat{Z}_i)$
1–3 years of college	$\Phi(\widehat{\theta}_3 - \widehat{Z}_i) - \Phi(\widehat{\theta}_2 - \widehat{Z}_i)$
Associate degree	$\Phi(\widehat{\theta}_4 - \widehat{Z}_i) - \Phi(\widehat{\theta}_3 - \widehat{Z}_i)$
4-year college degree	$\Phi(\widehat{\theta}_5 - \widehat{Z}_i) - \Phi(\widehat{\theta}_4 - \widehat{Z}_i)$
Master's degree	$\Phi(\widehat{\theta}_6 - \widehat{Z}_i) - \Phi(\widehat{\theta}_5 - \widehat{Z}_i)$
Ph.D. degree (or equivalent)	$1 - \Phi(\widehat{\theta}_6 - \widehat{Z}_i)$

[a]$\Phi(\ )$ is the cumulative density function for the standard normal density function.

- 1–3 years of college if $\theta_2 < Zi \leqslant \theta_3$;
- an Associate degree if $\theta_3 < Zi \leqslant \theta_4$;
- a 4-year college degree if $\theta_4 < Zi \leqslant \theta_5$;
- a Master's degree if $\theta_5 < Zi \leqslant \theta_6$;
- a Ph.D., M.D., J.D., or equivalent degree if $Zi > \theta_6$.

The estimated coefficients for the ordered probit model are used to estimate the probability of the minor child reaching each alternative educational level.[7] The probability of reaching each alternative level of educational attainment is listed in Table 1.

Once these probabilities are estimated, population average earnings for the particular educational category may be used to estimate lifetime earnings streams for the minor child.

DATA

The model described above was estimated using data from the National Longitudinal Survey of Youth, 1979 [NLSY79]. This was a national sample of 12,686 individuals aged 14–22 years when they were initially interviewed in 1979. The participants in this study were reinterviewed annually until 1994 and biannually since then. The most recent publicly available data are from the 2004 follow-up survey of this sample. Earlier releases of this data collection have been used by forensic economists to examine the determinants of educational attainment.[8] Since more recent surveys have filled in more data on educational attainment and other relevant variables for sample respondents, the current study is based on a substantially larger sample (10,199 individuals) than was available in prior studies using these (or similar) data.[9]

Table 2 contains a listing of the variables and the sample means of these variables for the male and female subsamples. Most of these variables have been discussed in Spizman and Kane [1992], Gill and Foley [1996], and Kane and Spizman [2001]. The main differences in the current study are

- The Both Parents variable used in Gill/Foley and Kane/Spizman has been replaced by a set of dummy variables that represent the presence of a biological father, a biological mother,[10] or no biological parent[11] in the household when the respondent was 14 years old. (The excluded category in this set of dummy

Table 2 Description of variables and estimated means

Variable	*Description*	*Estimated means*	
		Males	*Females*
Highest degree			
Less than high school diploma	= 1 has not completed either a high school degree or GED	0.126	0.098
High school (or GED)	= 1 if either a high school degree or a GED	0.554	0.510
1–3 years college	= 1 if 1–3 years of college but no college degree	0.081	0.108
Associate degree	= 1 if the respondent reports completing an Associate degree	0.057	0.080
4-year degree	= 1 if the respondent reports completing a B.A. or B.S. degree	0.134	0.150
Masters	= 1 if the respondent reports a Master's degree	0.035	0.048
Ph.D.	= 1 if the respondent reports a Ph.D., J.D., M.D., D.D.S., or equivalent	0.015	0.007
Demographic variables			
Hispanic	= 1 if the respondent reports primary racial/ethnic identification as Hispanic	0.145	0.152
Black	= 1 if the respondent reports primary racial/ethnic identification as Black	0.213	0.212
Urban14	= 1 if lived in a town or city when 14 years old	0.780	0.786
Mother's education			
High school	= 1 if mother completed 12 years of school	0.434	0.412
1–3 years of college	= 1 if mother completed 13–15 years of school	0.097	0.096
4-year college degree	= 1 if mother completed 16 or more years of school	0.081	0.076
Father's education			
High school	= 1 if father completed 12 years of school	0.341	0.339
1–3 years of college	= 1 if father completed 13–15 years of school	0.096	0.092
4-year college degree	= 1 if father completed 16 or more years of school	0.144	0.137
Adult's occupation			
Professional	= 1 if the adult male or female present in the household when the respondent was 14 worked in a professional or managerial occupation	0.239	0.231
Sales or clerical	= 1 if the adult male or female present in the household when the respondent was 14 worked in a sales or clerical occupation	0.199	0.199
Religion raised			
Baptist	= 1 if Baptist	0.259	0.264
Protestant	= 1 Protestant, Episcopalian, Lutheran, Methodist, or Presbyterian	0.239	0.232
Catholic	= 1 if Roman Catholic	0.341	0.353
Jewish	= 1 if Jewish	0.010	0.011
Other	= 1 if other religion	0.105	0.108

Table 2 *(Continued)*

Variable	*Description*	*Estimated means*	
		Males	*Females*
Biological parents in home (age of 14 years)			
Biological mother only	= 1 if the biological mother is present and the biological father is absent when the respondent is 14 years old	0.196	0.202
Biological father only	= 1 if the biological father is present and the biological mother is absent when the respondent is 14 years old	0.031	0.023
Neither bio parent	= 1 if neither biological parent was present at age 14	0.027	0.030
Mother deceased	= 1 if the respondent's mother is reported as being deceased in either the 1978 or 1980 survey	0.025	0.023
Father deceased	= 1 if the respondent's father is reported as being deceased in either the 1978 or 1980 survey	0.150	0.158
Other			
Newspapers	= 1 if a household member received newspapers regularly when the respondent was 14 years old	0.798	0.783
Magazines	= 1 if a household member received magazines regularly when the respondent was 14 years old	0.607	0.590
Library card	= 1 if any household member had a library card when the respondent was 14 years old	0.718	0.745
Observations		5,133	5,066

variables is the case in which both biological parents are present in the household.)

- The Deceased Mother and Deceased Father variables have been introduced. Unfortunately, insufficient information is available to determine the age of the respondent at the time of the parent's death. Information on the death of a parent is available (for a reasonably large sample of respondents) only at specific dates due to the design of the longitudinal study, beginning with the 1979 survey. Since a large proportion of the sample did not respond to this question in 1979, this variable was set to equal one (1) if the respondents reported that the parent was deceased in 1979, or did not respond to this question and reported that the parent was deceased by 1980.[12]
- An additional educational attainment category is included for the category of Associate degree. (In the earlier studies by Gill and Foley [1996] and Kane and Spizman [2001], this category was subsumed within the 1–3 years of college category.)

EDUCATIONAL ATTAINMENT PROBABILITIES

Table 3 contains the estimated parameters of the ordered probit model described above. For variables that are identically defined, the results of this model are, not surprisingly, similar to those appearing in Gill and Foley [1996] and Kane and Spizman [2001]. The most interesting results are those for the more detailed breakdown of household structure.

Table 3 Ordered probit equation

Variables	*Males*		*Females*	
	Coefficient	*t-value*	*Coefficient*	*t-value*
Hispanic	0.094*	1.78	0.192***	3.70
Black	0.232***	5.19	0.400***	9.16
Urban14	0.051	1.30	−0.093**	−2.38
Mother's education: high school	0.217***	5.31	0.348***	8.71
Mother's education: 1–3 years college	0.384***	6.07	0.505***	8.17
Mother's education: bachelor's degree	0.640***	8.95	0.784***	10.74
Father's education: high school	0.237***	5.90	0.229***	5.79
Father's education: 1–3 years college	0.442***	7.29	0.379***	6.27
Father's education: bachelor's degree	0.645***	10.56	0.569***	9.30
Professional	0.259***	5.87	0.274***	6.23
Sales or clerical	0.151***	3.69	0.099***	2.44
Baptist	0.250***	3.05	0.094	1.03
Protestant	0.291***	3.54	0.209***	2.29
Catholic	0.335***	4.11	0.187**	2.06
Jewish	0.562***	3.38	0.442***	2.62
Other religion	0.373***	4.20	0.175*	1.81
Biological mother only	−0.202***	−4.39	−0.206***	−4.62
Biological father only	−0.446***	−4.27	−0.246*	−1.95
Neither biological parent	−0.185*	−1.89	−0.349***	−03.76
Biological father only × mother deceased	0.673***	3.27	0.133	0.61
Biological mother only × father deceased	0.067	0.084	0.201**	2.52
Newspapers	0.097**	2.22	0.146***	3.42
Magazines	0.338***	9.35	0.225***	6.19
Library card	0.177***	4.71	0.186***	4.78
$\hat{\theta}_1$	−0.094		−0.439	
$\hat{\theta}_2$	1.778		1.376	
$\hat{\theta}_3$	2.058		1.717	
$\hat{\theta}_4$	2.291		2.020	
$\hat{\theta}_5$	3.180		2.922	
$\hat{\theta}_6$	3.788		3.872	
$\chi^2(24)$	1326.79***		1294.72***	

*significant at a 10 percent significance level; **significant at a 5 percent significance level; ***significant at a 1 percent significance level.

Since the excluded family structure category is the presence of both biological parents in the household, the coefficients on each of the family structure variables provide a measure of the predicted change in Z_i that occurs when the condition holds. A negative coefficient implies an increased probability of the respondent not completing high school and a reduced probability of attaining an advanced degree. An inspection of Table 3 indicates that the absence of one or both biological parents from the household has a significant adverse effect on educational attainment.

One reason for the absence of a parent in the household is the death of the parent. Since the Deceased Parent variable only appears in households in which one of the parents is missing, the effect of a missing parent caused by the death of that parent on the predicted value of Z_i is determined by summing the coefficients for the absence of that parent and the death of that parent. For example, if the father of a male child dies, the effect is to worsen the predicted educational outcome because such a death reduces the value of Z_i by 0.135, because the sum of −0.202 and 0.067 is −0.135. Likewise, if the mother of a female child dies, the effect is to reduce the

value of Z_i by 0.113, because the sum of −0.246 and 0.133 is −0.113. On the other hand, the effect of the death of a parents of the opposite sex is either negligible, in the case of the death of the father of a female child, where Z_i is reduced by only 0.005, or positive, in the case of the death of the mother of a male child, where Z_i is increased by 0.227. In all cases, loss of a parent by death has a smaller adverse impact relative to the absence of a parent from other causes, which always worsens the educational attainment outcome when compared to that of a child living with both biological parents.

To illustrate the implications of the estimated model, it will be helpful to consider an example. Consider a white male minor child, living in an urban area, whose mother and father are high school dropouts. Neither parent works in a professional, sales, or clerical job. The child has not been raised in a religion and the family does not regularly receive newspapers and magazines, nor does anyone in the household have a library card. Essentially all of the coefficients are zero except for urban.[13] If both parents are present in the household when the child is 14 years of age, the estimated value of $\widehat{Z}_i$ is equal to

$$\begin{aligned}\widehat{Z}_i = {} & 0.094(0) + 0.232(0) + 0.051(1) + 0.217(0) + 0.384(0) \\ & + 0.640(0) + 0.237(0) + 0.442(0) + 0.645(0) + 0.259(0) \\ & + 0.151(0) + 0.250(0) + 0.291(0) + 0.335(0) + 0.562(0) \\ & + 0.373(0) - 0.202(0) - 0.446(0) - 0.185(0) + 0.673(0) \\ & + 0.067(0) + 0.097(0) + 0.338(0) + 0.177(0) = 0.051\end{aligned}$$

Substituting this value of $\widehat{Z}_i$ (and the predicted values of $\widehat{\theta}_i$) into the formulas listed in Table 1 makes it possible to estimate the probability of each alternative level of educational attainment. These estimated probabilities appear in Table 4.

To examine the effect of family structure on the child's projected educational attainment, it will be helpful to repeat this procedure using alternative assumptions concerning educational attainment (holding other characteristics constant). The results of this exercise are presented in Table 5. As the discussion above suggests, these results show that a male child's expected educational attainment is adversely affected by the absence of a biological father (regardless of the reason). The effect of the absence of a biological mother, however, depends on the cause of the mother's absence. If the mother's absence is for reasons other than death (e.g., divorce or separation), the son's expected educational attainment will also be lower. However, if the mother's absence is due to her death, the model predicts an increase in the

Table 4 Estimated probabilities of level of educational attainment both biological parents present

Outcome	*Probability*[a]
Less than high school diploma	$\Phi(-0.094-0.051) = \Phi(-0.145) = 0.4424$
GED or high school diploma	$\Phi(1.778-0.051)-\Phi(-0.094-0.051) = 0.958-0.442 = 0.5156$
1–3 years of college no degree	$\Phi(2.058-0.051)-\Phi(1.778-0.051) = 0.978-0.442 = 0.0197$
Associate degree	$\Phi(2.291-0.051)-\Phi(2.058-0.051) = 0.987-0.978 = 0.0098$
4-year college degree	$\Phi(3.18-0.051)-\Phi(2.291-0.051) = 0.999-0.987 = 0.0117$
Master's degree	$\Phi(3.788-0.051)-\Phi(3.18-0.051) = 1.000-0.999 = 0.0008$
Ph.D. degree (or equivalent)	$1-\Phi(3.788-0.051) = 1-1 = 0.0001$

[a]$\Phi(\ )$ is the cumulative density function for the standard normal density function.

Table 5 Probabilities under alternative family structures

Level of educational attainment	*Probabilities*				
	Both bio parents present (%)	*Bio mother present bio father absent (%)*	*Bio mother present bio father deceased (%)*	*Bio father present bio mother absent (%)*	*Bio father present bio mother deceased (%)*
(a) Probabilities under alternative family structures for a white male child, living in an urban area, both parents high school dropouts, not professional, not sales or clerical, no religion, no newspapers, no magazines and no library card					
1. Less than high school diploma	44.24	52.27	49.60	61.83	35.49
2. High school diploma or GED	51.56	45.04	47.27	36.68	57.82
3. Some college, but no degree	1.97	1.33	1.52	0.78	2.93
4. Associate degree	0.98	0.63	0.73	0.35	1.55
5. Bachelor's degree	1.17	0.69	0.82	0.34	2.02
6. Master's degree	0.08	0.04	0.05	0.02	0.16
7. Ph.D. degree	0.01	0.00	0.01	0.00	0.02
	100.00	100.00	100.00	100.00	100.00
(b) Probabilities under alternative family structures for a white female child, living in an urban area, both parents high school dropouts, not professional, not sales or clerical, no religion, no newspapers, no magazines and no library card					
1. Less than high school diploma	36.47	44.43	36.66	46.02	40.79
2. High school diploma or GED	56.44	50.87	56.32	49.67	53.53
3. Some college, but no degree	3.58	2.51	3.55	2.33	2.96
4. Associate degree	1.78	1.17	1.77	1.07	1.42
5. Bachelor's degree	1.60	0.96	1.58	0.86	1.21
6. Master's degree	0.12	0.06	0.12	0.05	0.09
7. Ph.D. degree	0.00	0.00	0.00	0.00	0.00
	100.00	100.00	100.00	100.00	100.00

son's educational attainment. The reason for this effect is unknown. We would conjecture that perhaps the father spends more resources and time on his child's development and education to offset the loss of the son's natural mother.

Table 5 contains the results of a similar exercise conducted for a female child with the same characteristics. For a female child, the expected educational attainment is adversely affected by the absence of a biological father and mother regardless of the reason, though the extent of the adverse impact as a result of the death of the biological father is very slight.

PROBLEMS OF INTERPRETATION

The data on family structure in the NLSY are limited in various ways, and these limitations urge caution when interpreting our empirical results. One limitation is that there could have been wide differences in the age of the child when the Missing Parent or Deceased Parent condition began. The Missing Parent variable in the data used for estimation related to the parental situation when the child was 14 years of age. It could have made a difference, however, whether (a) the mother never even knew who the father was, with the child being born and not living with both parents, (b) one parent disappeared from the household when the child was about to begin school, or (c) the not Living with Both Parents condition did not begin until the child was the age of 14 years. In addition, for some children living with both parents at the age of 14 years, the child may not have been living with both parents at some earlier or later time, for example, at the age of 15 years or older, prior to graduating from high school. Such a child would be lumped together with children who always lived with both parents until completing high school.

Because of these ambiguities, there is some uncertainty as to what can really be learned from the exercise that produced Table 5. On the surface at least, it does still appear that the death of a parent may have a different effect on lifetime earnings than the absence of a parent due to relationship problems between the parents. These results are generally consistent with the results found in the studies by economists and psychologists reviewed above.

THE EFFECT OF ABSENCE OF A PARENT ON A CHILD'S LIFETIME EARNINGS

The probabilities of educational attainment in different family structures can be combined with earnings data classified by level of educational attainment to estimate the impact of the absence of a parent on a child's projected lifetime earnings. To directly examine any differences in earnings impact, we present analyses incorporating median earnings, without the obfuscating detail of age-earnings effects.[14] We further assume that female work life will be equal to male work life at educational levels.[15] We further perform the analyses in current dollars, without discounting to present value.[16] These presentation simplifications do not affect the essential comparison of earnings levels. Indeed, in analyzing a claim for damages, the forensic economist first determines where differences exist pre-injury versus post-injury.

Table 6 shows the work life expectancies used to set the duration of working life, simplified by using the male work life expectancy for both males and females. Based on the most recent published research on work life expectancy, a different expectancy is assigned to each educational attainment level.

Table 6 Relevant dates and expectancies male work life expectancies used for both males and females

	Date	*Year and fractional equivalent*	*Number of years*	*Age*
1. Date of birth	January 1, 1991	1991.00	0.00	0.00
2. Child's assumed age	January 1, 2004	2004.00	13.00	13.00
3. Male statistical life expectancy[a]	November 24, 2066	2066.90	62.90	75.90
4. Female statistical life expectancy[a]	December 31, 2071	2072.00	68.00	81.00

Male work life used for both females and males

Level of educational attainment	Labor market entry date	Entry Age	Statistical[c] work life expectancy
1. Less than high school diploma	2008.00	17.00	33.92
2. With a high school diploma	2009.00	18.00	37.97
3. With some college, no degree	2011.00	20.00	37.62
4. With an associate degree	2011.00	20.00	37.62
5. With a bachelor's degree	2013.00	22.00	38.98
6. With a master's degree	2015.00	24.00	39.16
7. With a Ph.D. degree	2017.00	26.00	37.53

[a]Computed for male or female at the age of 13 years, US Department of Health and Human Services, 2004, United States Life Tables, National Vital Statistics Reports, 56 (9), December 28, Tables 2 and 3 respectively.
[b]Computed from age as of the assumed date of entry into the labor force using Skoog and Ciecka [2001], Tables 2–6. This paper updates with recent data the older work life expectancy estimates found in the US Department of Labor, Bureau of Labor Statistics, "Worklife Estimates: Effects of Race and Education," Bulletin 2254, (February 1986).
[c]Some forensic economist make a further adjustment for the probability of living from child's assumed age to the labor force entry age, but the impact of this adjustment is normally very slight.

Table 7 shows the cumulative loss to work life expectancy for each educational level.

Column 3 shows the median earnings in 2006 dollars. Column 4 brings 2006 dollars to current [2007] dollars by using a growth rate of 3.5 percent. Column 5 shows the lifetime earnings to work life expectancy for each educational level. Fringe benefits of 18.95 percent are added to the lost lifetime earnings in column 6.

Tables 8 and 9 show various scenarios of educational attainment and lost lifetime earnings based on different family demographic characteristics. These tables also show the loss to the minor child given the reason the parents are absent from the family unit.

Table 10 compares the differences of lifetime earnings when a child lives with both parents (Column A) as compared to a father being absent (Column B), a father being deceased (Column D), a mother being absent (Column F), and a mother being deceased (Column H). A male child's lifetime earnings will be reduced between 3.19 and 5.40 percent if his father is absent (Column C) and between 2.15 and 3.67 percent if his father is dead (Column E). If his mother is absent, he will incur a loss of lifetime earnings between 6.73 and 11.56 percent (Column G). However, if a son's mother is deceased, his lifetime earnings will increase between 3.96 and 9.81 percent (Column I). A female child's lifetime earnings will be reduced between 4.13 and 6.35 percent if her mother is absent (Column G) and between 1.96 and 2.95 percent if her mother is dead (Column I). If her father is absent, she will incur a loss of lifetime earnings between 3.48 and

Table 7 Earnings by level of educational attainment white race and aged 18 years and over working full time, year round in 2004–2006 and computed lifetime money earnings and fringe benefits

(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Level of educational attainment	*2004–2006 number working full-time year-round*[a]	*2004–2006 US median earnings*[a] *(2006$s)*	*2007 estimated US median earnings (3) × 1.035*[b]	*Expected lifetime money earnings (4) × Work Life Expectancy (WLE)*	*Lifetime money earnings & fringe benefits*[c] *(5) × 1.1895*
Males					
Less than high school diploma	2,589,975	$29,473	$30,505	$1,034,715	$1,230,793
High school diploma	11,846,958	$36,841	$38,130	$1,447,813	$1,722,173
Some college, no degree	2,677,247	$42,104	$43,578	$1,639,391	$1,950,055
Associate degree	5,931,438	$44,209	$45,756	$1,721,353	$2,047,549
Bachelor's degree	8,824,924	$63,156	$65,366	$2,547,985	$3,030,828
Master's degree	3,136,962	$75,902	$78,559	$3,076,354	$3,659,323
Ph.D. degree	666,173	$87,830	$90,904	$3,411,629	$4,058,133
Females					
Less than high school diploma	1,150,698	$21,052	$21,789	$739,077	$879,132
High school diploma	7,676,970	$26,915	$27,857	$1,057,731	$1,258,171
Some college, no degree	2,203,953	$30,526	$31,594	$1,188,582	$1,413,818
Associate degree	4,382,651	$31,578	$32,683	$1,229,543	$1,462,542
Bachelor's degree	6,556,565	$43,373	$44,891	$1,749,853	$2,081,451
Master's degree	2,828,456	$53,132	$54,992	$2,153,472	$2,561,555
Ph.D. degree	313,256	$66,314	$68,635	$2,575,871	$3,063,999

[a] *Source*: Expectancy data, "Full-time Earnings in the United States: 2006 edition. Shawnee Mission, Kansas, 2007, pp. 27–30 (white males), and pp. 31–34 (white females).
[b] *Source*: Growth in Employment Cost Index for wages and salaries, December 2006 to December 2007. See http://www.bls.gov/ncs/ect/home.htm, USDL 08-0129.
[c] Computed from "Employer Costs for Employee Compensation," at http://www.bls.gov/ncs/ect/home.htm, USDL 07-1883, Table 1. The fringe benefit percentage of 18.95 percent of money earnings is derived as the ratio of $4.22(= $2.35 for insurance + 1.22 for retirement + $0.17 for federal and state unemployment insurance + $0.48 for workers compensation) to $22.27 (= $19.56 for money wages and salaries + $1.95 for paid leave + $0.076 for supplemental pay).

Table 8 Expected lifetime earnings calculation table for males

Both

Parents present likelihood (%)[a]	*Level of educational attainment*	*Estimated lifetime total compensation*	*Bio mother present bio father absent*	*Bio mother present bio father deceased*	*Bio father present bio mother absent*	*Bio father present bio mother deceased*
(a) For a white male child, living in an urban area, both parents high school dropouts, not professional, not sales or clerical, no religion, no newspapers, no magazines and no library card						
44.24	1. Less than high school diploma	$1,230,793	52.27%	49.60%	61.83%	35.49%
51.56	2. High school diploma or GED	$1,722,173	45.04%	47.27%	36.68%	57.82%
1.97	3. Some college, but no degree	$1,950,055	1.33%	1.52%	0.78%	2.93%
0.98	4. Associate degree	$2,047,549	0.63%	0.73%	0.35%	1.55%
1.17	5. Bachelor's degree	$3,030,828	0.69%	0.82%	0.34%	2.02%
0.08	6. Master's degree	$3,659,323	0.04%	0.05%	0.02%	0.16%
0.01	7. Ph.D. degree	$4,058,133	0.00%	0.01%	0.00%	0.02%
100.00	Expected value using likelihoods	$1,529,011	$1,480,231	$1,496,140	$1,426,111	$1,589,586
(b) For a white male child, living in an urban area, both parents high school graduates, not professional, not sales or clerical, Catholic religion, newspapers and magazines but no library card in the home						
8.55	1. Less than high school diploma	$1,230,793	12.16%	10.86%	17.80%	5.52%
60.70	2. High school diploma or GED	$1,722,173	63.80%	62.97%	65.07%	55.35%
9.07	3. Some college, but no degree	$1,950,055	7.81%	8.24%	6.18%	10.22%
6.20	4. Associate degree	$2,047,549	5.07%	5.44%	3.77%	7.40%
12.64	5. Bachelor's degree	$3,030,828	9.41%	10.42%	6.25%	16.84%
2.24	6. Master's degree	$3,659,323	1.42%	1.66%	0.78%	3.55%
0.60	7. Ph.D. degree	$4,058,133	0.33%	0.40%	0.15%	1.11%
100.00	Expected value Using likelihoods	$1,943,824	$1,855,130	$1,883,322	$1,761,591	$2,057,609

Table 8 *(Continued)*

Both

Parents present likelihood (%)[a]	*Level of educational attainment*	*Estimated lifetime total compensation*	*Bio mother present bio father absent*	*Bio mother present bio father deceased*	*Bio father present bio mother absent*	*Bio father present bio mother deceased*
(c) For a white male child, living in an urban area, both parents with some college, occupation sales or clerical, Catholic religion, newspapers and magazines but no library card in the home						
2.92	1. Less than high school diploma	$1,230,793	4.55%	3.95%	7.41%	1.70%
46.28	2. High school diploma or GED	$1,722,173	52.67%	50.63%	59.09%	38.54%
11.05	3. Some college, but no degree	$1,950,055	10.58%	10.78%	9.50%	11.07%
8.64	4. Associate degree	$2,047,549	7.85%	8.14%	6.62%	9.17%
22.75	5. Bachelor's degree	$3,030,828	18.69%	20.04%	14.01%	27.11%
6.02	6. Master's degree	$3,659,323	4.24%	4.78%	2.63%	8.51%
2.33	7. Ph.D. degree	$4,058,133	1.42%	1.68%	0.74%	3.90%
100.00	Expected value using likelihoods	$2,229,876	$2,109,377	$2,147,957	$1,980,675	$2,379,439
(d) For a white male child, living in an urban area, both parents with bachelor's degrees, occupation professional, Catholic religion, newspapers and magazines and library card in the home						
0.42	1. Less than high school diploma	$1,230,793	0.75%	0.62%	1.43%	0.21%
21.82	2. High school diploma or GED	$1,722,173	27.96%	25.85%	36.10%	15.87%
9.18	3. Some college, but no degree	$1,950,055	10.19%	9.89%	10.96%	7.77%
8.67	4. Associate degree	$2,047,549	9.15%	9.03%	9.25%	7.78%
33.74	5. Bachelor's degree	$3,030,828	31.91%	32.64%	28.35%	34.31%
15.54	6. Master's degree	$3,659,323	20.05%	21.98%	13.92%	34.05%
10.64	7. Ph.D. degree	$4,058,133	1.42%	1.68%	0.74%	3.90%
100.00	Expected value using likelihoods	$2,760,169	$2,634,964	$2,692,058	$2,440,997	$3,030,942

[a]Likelihood of completing various levels of education based on the ordered probit estimates for males from Table 1, and given the socio-economic assumptions set forth in the title of this table.

Table 9 Expected lifetime earnings calculation table for females

Both parents present likelihood (%)[a]	*Level of educational attainment*	*Estimated lifetime total compensation*	*Bio mother present bio father absent*	*Bio mother present bio father deceased*	*Bio father present bio mother absent*	*Bio father present bio mother deceased*
(a) For a white female child, living in an urban area, both parents high school dropouts, not professional, not sales or clerical, no religion, no newspapers, no magazines and no library card						
36.47	1. Less than high school diploma	$879,132	44.43%	36.66%	46.02%	40.79%
56.44	2. High school diploma or GED	$1,258,171	50.87%	56.32%	49.67%	53.53%
3.58	3. Some college, but no degree	$1,413,818	2.51%	3.55%	2.33%	2.96%
1.78	4. Associate degree	$1,462,542	1.17%	1.77%	1.07%	1.42%
1.60	5. Bachelor's degree	$2,081,451	0.96%	1.58%	0.86%	1.21%
0.12	6. Master's degree	$2,561,555	0.06%	0.12%	0.05%	0.09%
0.00	7. Ph.D. degree	$3,063,999	0.00%	0.00%	0.00%	0.00%
100.00%	Expected value using likelihoods	$1,144,625	$1,104,756	$1,143,061	$1,097,380	$1,122,224
(b) For a white female child, living in an urban area, both parents high school graduates, not professional, not sales or clerical, Catholic religion, newspapers and magazines but no library card in the home						
6.93	1. Less than high school diploma	$879,132	10.12%	7.00%	10.84%	8.57%
56.15	2. High school diploma or GED	$1,258,171	60.42%	56.27%	61.06%	58.69%
11.94	3. Some college, but no degree	$1,413,818	10.54%	11.91%	10.24%	11.21%
8.58	4. Associate degree	$1,462,542	7.10%	8.54%	6.80%	7.77%
13.40	5. Bachelor's degree	$2,081,451	9.97%	13.31%	9.37%	11.45%
2.77	6. Master's degree	$2,561,555	1.73%	2.74%	1.57%	2.15%
0.23	7. Ph.D. degree	$3,063,999	0.12%	0.23%	0.10%	0.16%
100.00	Expected value using likelihoods	$1,418,661	$1,357,538	$1,417,093	$1,346,450	$1,384,268

Table 9 *(Continued)*

Both parents present likelihood (%)[a]	*Level of educational attainment*	*Estimated lifetime total compensation*	*Bio mother present bio father absent*	*Bio mother present bio father deceased*	*Bio father present bio mother absent*	*Bio father present bio mother deceased*
(c) For a white female child, living in an urban area, both parents with some college, occupation sales or clerical, Catholic religion, newspapers and magazines but no library card in the home						
2.96	1. Less than high school diploma	$879,132	4.64%	2.99%	5.04%	3.80%
44.17	2. High school diploma or GED	$1,258,171	50.69%	44.34%	51.87%	47.83%
13.47	3. Some college, but no degree	$1,413,818	12.93%	13.47%	12.77%	13.24%
11.03	4. Associate degree	$1,462,542	9.91%	11.01%	9.66%	10.46%
21.34	5. Bachelor's degree	$2,081,451	17.18%	21.24%	16.40%	19.04%
6.26	6. Master's degree	$2,561,555	4.22%	6.20%	3.89%	5.07%
0.77	7. Ph.D. degree	$3,063,999	0.43%	0.76%	0.38%	0.56%
100.00	Expected value using likelihoods	$1,561,585	$1,485,141	$1,559,632	$1,471,247	$1,518,632
(d) For a white female child, living in an urban area, both parents with bachelor's degrees, occupation professional, Catholic religion, newspapers and magazines and library card in the home						
0.33	1. Less than high school diploma	$879,132	0.60%	0.33%	0.67%	0.46%
18.02	2. High school diploma or GED	$1,258,171	23.72%	18.15%	24.92%	21.04%
10.39	3. Some college, but no degree	$1,413,818	11.81%	10.42%	12.05%	11.20%
11.08	4. Associate degree	$1,462,542	11.80%	11.10%	11.88%	11.53%
34.20	5. Bachelor's degree	$2,081,451	32.31%	34.17%	31.81%	33.31%
20.43	6. Master's degree	$2,561,555	16.17%	20.33%	15.38%	18.06%
5.55	7. Ph.D. degree	$3,063,999	3.59%	5.49%	3.29%	4.39%
100.00	Expected value using likelihoods	$1,943,776	$1,840,040	$1,941,215	$1,820,409	$1,886,376

[a]Likelihood of completing various levels of education based on the ordered probit estimates for females from Table 1, and given the socio-economic assumptions set forth in the title of this table.
[b]*Source*: http://www.bls.gov/ncs/ect/home.htm, showing 18.95 percent.

Table 10 Comparison of lifetime earnings white male child age 14

Models	*(A)*	*(B)*	*(C)*	*(D)*	*(E)*	*(F)*	*(G)*	*(H)*	*(I)*
	Living with both biological parents	*Biological father absent*	*Percentage penalty when biological father absent (%)*	*Biological father deceased*	*Percentage penalty when biological father deceased (%)*	*Biological mother absent*	*Percentage penalty when biological mother absent (%)*	*Biological mother deceased*	*Percentage penalty when biological mother deceased (%)*
Socio-economic situation									
Model 1	$1,529,011	$1,480,231	3.19	$1,496,140	2.15	$1,426,111	6.73	$1,589,586	−3.96
Model 2	$1,943,824	$1,855,130	4.56	$1,883,322	3.11	$1,761,591	9.37	$2,057,609	−5.85
Model 3	$2,229,876	$2,109,377	5.40	$2,147,957	3.67	$1,980,675	11.18	$2,379,439	−6.71
Model 4	$2,760,169	$2,634,964	4.54	$2,692,058	2.47	$2,440,997	11.56	$3,030,942	−9.81
Comparison of lifetime earnings of white female child at the age of 14 years									
Model 1	$1,144,625	$1,104,756	3.48	$1,143,061	0.14	$1,097,380	4.13	$1,122,224	1.96
Model 2	$1,418,661	$1,357,538	4.31	$1,417,093	0.11	$1,346,450	5.09	$1,384,268	2.42
Model 3	$1,561,585	$1,485,141	4.90	$1,559,632	0.13	$1,471,247	5.78	$1,518,632	2.75
Model 4	$1,943,776	$1,840,040	5.34	$1,941,215	0.13	$1,820,409	6.35	$1,886,376	2.95

Model 1: Both parents high school dropouts, occupation not professional, sales or clerical, urban area, no religion, no newspapers, magazines or library card.
Model 2: Both parents high school graduates, occupation not professional, sales or clerical, urban area, catholic, newspapers, magazines, and no library card.
Model 3: Both parents with some college, occupation sales or clerical, urban area, catholic, newspapers, magazines, and no library card.
Model 4: Both parents with bachelor's degrees, occupation professional, urban area, catholic, newspapers, magazines, and library card.

5.34 percent (Column C). However, if a daughter's father is deceased, her lifetime earnings will decrease only by a negligible 0.11 to 0.14 percent (Column E).

CONCLUSION

Our initial inquiry into the effect of a parent's absence on the future earnings of a minor child as an adult was based on the presumption that there would be some reduction of the child's lifetime earnings when one of the child's parents dies. We also believed that a practicing forensic economist might want to explore the magnitude of this loss in wrongful death cases involving the death of a parent. If there was a substantial future loss to a child from the death of a parent, an argument could be made that this type of loss should be included among the elements of damage in wrongful death cases, and children of deceased parents should be compensated for that future earnings loss in addition to other more traditional losses computed in such cases.

We have shown that the Kane/Spizman ordered probit model provides a method of estimating the loss of a child's lifetime earnings resulting from the death of a parent. Other research on this issue has found that the loss from the death of a parent may be small compared to the loss from the absence of a parent due to other factors. We have found that the magnitude of this difference varies with gender, both of the child and of the deceased parent. When a father of a son dies, the loss of earnings of the son is between 2.15 and 3.67 percent. When the mother of a daughter dies, the loss of earnings of the daughter is between 1.96 and 2.95 percent. The effect of the death of a father on the lifetime earnings of a daughter is almost nil. The death of a mother causes a son's lifetime earnings to rise between 3.96 and 9.81 percent — a strange result we cannot readily explain.

In conclusion, our evidence is consistent with the hypothesis that the absence of a role model of the same gender reduces expected educational attainment and lifetime earnings whether it is the result of relationship discord or death. However, the death of a parent appears to have a relatively small effect on a child's lifetime earnings, with the largest negative effect we can find being 3.67 percent. Effects in the 2–4 percent range are relatively small when juxtaposed against the likely magnitude of the errors in any lifetime earnings estimate for a child. Therefore, we conclude that the common practice of not estimating the loss of lifetime earnings of any minor children in cases involving the death of a parent appears to be sensible and defensible.

Notes

1. See Tinari [1998] and Ireland and Depperschmidt [1999].
2. While the courts may look for guidance from an economist to determine the effect of the death of a parent on a child's future earnings, a recent federal case rejected such an attempt in a Daubert Challenge based on the plaintiff's economist's estimate of the minor child's lost potential income being too "attenuated and speculative to be reliable under Daubert." See *Kallas v Carnival Corporation*. Case No. 06-20115-Civ-Moreno/Torres, United States District Court for the Southern District of Florida 2009 US Dist. LEXIS 33797.
3. They did not consider the timing of the parental divorce.
4. The only exception was that children of mothers who were single due to death of the child's father had slightly lower odds of completing high school.

5. The most recent papers in the forensic economic literature are Jepsen and Jepsen [2001] and Kane and Spizman [2001]. The reference sections of these papers list earlier papers in the forensic economics literature and papers in the general economics journals.
6. This specification differs slightly from that used in Spizman and Kane [1992] and in Kane and Spizman [2001] in that the initial threshold value is specified as θ_1 instead of zero. This alternative specification is becoming more common in the literature, partly as a result of its adoption in the Stata statistical software package. The two alternative specifications are equivalent. The current specification, however, does not contain a separate constant term (the estimated value of θ_1 is the negative of the constant term in the earlier specification).
7. For a complete discussion of the development of the ordered probit model first used by forensic economists, see Spizman and Kane [1992].
8. Gill and Foley [1996] first utilized the 1979–1992 waves of this survey in their update and expansion of the Spizman-Kane [1992] model. Kane and Spizman [2001] used the 1979–1998 waves of this survey in their analysis.
9. The Spizman and Kane [1992] model was estimated using a sample of 7,862 participants in the *National Longitudinal Study of the High School Class of 1972*. Gill and Foley [1996] used a sample of 7,207 observations from the NLSY79. The Kane and Spizman [2001] model was estimated using a sample of 7,023 individuals.
10. The dummy variable Biological Mother only is defined to equal one (1) if the biological mother is present and the biological father is absent (an equivalent interpretation holds for the Biological Father Only variable). This variable equals one (1) regardless of the presence or absence of another adult partner in the household.
11. The Other variable used in this analysis reflects a wide variety of cases, including individuals who were adopted, living with foster parents, in group homes, in correctional facilities, with stepparents (and no biological parents), with friends, with other relatives, or on their own at the age of 14 years. While the effect of each of these living arrangements on the respondent's educational attainment is likely to be different, none of these categories contains a large enough sample to analyze, separately.
12. Thus, deaths of parents that occurred between the 1979 and 1980 surveys are not reflected in this variable unless the respondent did not complete this section of the 1979 survey. This variable indicates that the parent died at some time between the respondent's conception (or birth, in the case of female parents) and 1979 (and in a few cases in 1980). Given the age of NLSY79 respondents, this means that the parent died before the child reached an age of between 14 and 21 years (depending on the age of the respondent at the start of the NLSY79 survey).
13. Normally Table 2 would be used as part of a questionnaire to get data from the plaintiff. In the unlikely situation where the plaintiff does not know an answer to Table 2, then the missing variables can be filled with the sample mean for those variables (to capture the "average" outcome). For example, in the unlikely event that it was unknown whether the male plaintiff child lived in an urban area, the mean value of 0.780 from Table 2 could be used in combination with the coefficient of 0.051 from Table 3 to assign a value of 0.03978 ($=0.780 \times 0.051$).
14. This simplification is for expository reasons for the purpose of this paper. Normally, age earning profiles would be used in an actual case.
15. This assumption reduces the number of scenarios in this paper. Under normal circumstances, the proper gender work life table is used. However, there are some circumstances (for example, when dealing with professional females with an established work history) in which the male work life table may be appropriate.
16. As with the above assumptions, the no discounting assumption is made to simplify the presentation of this paper. Discounting is a legal question and some jurisdictions require it while others do not.

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