

ORPHANHOOD IN THE UNITED STATES

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ABSTRACT

Several improvements and modifications to the methodology for the indirect measurement of child orphanhood are incorporated in estimates of the recent prevalence and incidence of orphanhood. Comparisons are drawn between the situation today and the situations 25 and 50 years ago, and selected characteristics of orphans are discussed.

I. INTRODUCTION

The measurement by indirect methods of the phenomenon of orphanhood among children under age 18 was a significant component of actuarial endeavor before soaring divorce and illegitimacy rates, in combination with falling mortality rates, ended the predominance of orphanhood among the social problems besetting children. Methodology developed in the seminal work by Lotka [3] was applied in papers by Spiegelman [8], Woolfer [10], Shudde [6, 7], and Epstein and Skolnik [1] to measure orphanhood in the mid-1900s.

The last four papers cited were authored by actuaries and statisticians in the Social Security Administration who were evaluating the agency's survivors insurance program. The agency, in fact, sponsored in October 1949 an unsuccessful attempt to *count* the orphan population in the Current Population Survey, the only attempt ever at direct measurement of orphanhood in the U.S.

This paper presents estimates of the size and characteristics at the beginning of 1990 of both the orphan population and the subpopulation of orphan Social Security beneficiaries, and a comparison with a quarter-century ago and a half-century ago. Estimates of the annual incidence of orphanhood, as well as of the average age at orphanhood and of the average age of parent at death, are also given.

Several modifications to Lotka's method were made in deriving these estimates, as described below.

II. METHODOLOGY

In this section, I discuss (1) the basis for measuring the prevalence of orphanhood, (2) the extension to the measurement of full orphanhood, (3) the progression from relative numbers to absolute numbers, (4) the adaptation of the method to the measurement of incidence, and (5) the specificity of the life table.

In Lotka's method, the proportion of children age X (last birthday) who are maternal orphans is equated to the probability of mother's death in the $\{X+1/2\}$ years after birth. Similarly, the proportion who are paternal orphans is equated to the probability of father's death in the $\{X+5/4\}$ years after conception. These probabilities are calculated, separately by race when possible, from the mean age of mother/father at birth of child and a life table for females/males.

Instead of the mean age alone, a distribution of mothers' ages in five-year intervals was used by Goodman, Keyfitz, and Pullum [2] in their computations on maternal orphanhood. I take this one step further and use a single-age distribution.

Age detail is important because analyses based on averages can easily be misinterpreted. For example, after calculating that paternal orphans were age 10 on average at the death of their fathers, Woofter concluded that their fathers died at age 42 on average, the sum of 10 and the mean age of father at birth of child of 32. He bemoaned the circumstance that the decedent typically has not had the opportunity to accumulate wealth adequate for the support of his survivors. This preoccupation with averages misled Woofter from recognizing that surely fathers survived by minor children were older, as a group, at the birth of those children than were other fathers at the birth of their children.

The proportion of children age X who are *full* orphans (both parents deceased) is derived easily from the proportions orphaned from each parent if mortality of father is independent of mortality of mother. Lotka [3] found evidence to the contrary, however, in data for England and Wales for 1921. He attributed this observed dependence to the contagion of disease in the home and to the stress from the spousal illness and death. Shudde [7] accordingly argued that, in view of the diminished importance of contagious disease among causes of death during the mid-1900s, the independence assumption becomes justifiable.

However, this debate, focused as it is on causal factors of contagion and stress, misses the point that some correlation in mortality must be expected from *the correlation in spouses' ages*. A parent deceased during the offspring's childhood is likely to be an older parent; the spouse is probably also an older parent and hence more likely to become deceased than the average parent.

As an illustration, consider a hypothetical population in which (a) half of all births occur when both parents are age 25 and half when both parents are age 40, and (b) the probabilities of surviving 18 years are 0.9 for any person age 25, male or female, and 0.7 for any person age 40. Then the probability of either paternal orphanhood or maternal orphanhood is 0.2, but the probability of full orphanhood is 0.05, not the square of 0.2.

Accordingly, the estimate given in this paper of the number of full orphans in 1990 is derived from a *joint* distribution of mothers' and fathers' ages.

The *numbers* of paternal, maternal, and full orphans, by age of orphan and race, are then obtained by applying the appropriate proportions to the distribution of children by age and race, from a census or intercensal/post-censal estimate.

The method can be adapted to measure an annual incidence of orphanhood (although Lotka himself offered a different approach to the measurement of incidence). The proportion of children age X who are orphans now but not one year ago is equated to the probability of the parent's death between $\{X-1/2\}$ and $\{X+1/2\}$ years following the child's birth. An upwards adjustment is needed to include children orphaned during the year who later in the year reach adulthood or become deceased.

In their separate preparations of estimates of the number of paternal orphans in 1940, Spiegelman [8] and Woofter [10] disagreed about the appropriateness of total-population life tables for describing the mortality of *parents*. Spiegelman required life tables for married persons, because it was uncommon then for parents to be unmarried, while Woofter argued insightfully that the marital status differential in mortality could well be largely offset by a socioeconomic differential in the other direction, because a more-than-proportionate share of children are born to parents in lower socioeconomic strata, where mortality is higher.

For recent years, as the proportion of births occurring outside marriage surpasses 25%, there might be consensus on the adequacy of total-population life tables for computations of orphanhood.

III. SOCIAL SECURITY CHILD SURVIVOR BENEFITS

The natural child under age 18 of a deceased parent who had sufficient employment to be insured for survivorship is eligible to receive monthly Social Security benefits in an amount related to the average lifetime earnings of the decedent—if the child is not working, is not married, and (more significantly) meets the statutory definition of “child.” In general, illegitimacy is not a factor when the decedent is the child’s mother, but *is* when the decedent is the child’s father. Then benefits are payable only if paternity was acknowledged in writing by the father or established in a court of law, or if there was a combination of oral evidence and the circumstance of the father living with the child or contributing to the child’s support.

Social Security benefits are capped by a “family maximum,” which might dissuade the children’s surviving parent or representative from filing applications for all the children when the family size makes the cap operative. Because of the cap, a family of four receives no more in total survivor benefits than a family of three, and sometimes, depending on the level of benefits, a family of three receives no more in total survivor benefits than a family of two. However, agency officials encourage the filing of an application for each family member eligible for benefits.

Under certain circumstances benefits are also payable to children surviving a stepparent or an adoptive parent, and these few children will unavoidably be included in the beneficiary data presented later.

IV. ORPHANHOOD IN 1940 AND 1965

For 1940, Spiegelman estimated there were 2,472,000 paternal orphans and 1,374,000 maternal orphans in the U.S. and among them 293,000 full orphans (see Table 1). According to this estimate, nearly 10% of the nation’s 40 million children were orphaned from at least one parent. For the same year, Woofter estimated there were more than 3.3 million paternal orphans alone. Most, but not all, of the discrepancy between the two estimates derives from whether or not the mortality schedule used was specific to marital status, as discussed earlier.

The first study of orphan reciprocity of Social Security benefits is for 1953 [6]. At that time, almost half of paternal orphans were program beneficiaries. The oldest orphans, ages 15 to 17, were only half as likely to be beneficiaries as the youngest, ages 0 to 4, a phenomenon the study’s author attributed to the program’s immaturity. That is, the greater average duration of orphanhood among older children translates to a greater likelihood that much of

TABLE I
ESTIMATES OF THE NUMBER OF ORPHANS IN THE U.S. (IN THOUSANDS)

	Paternal	Maternal	Full
1940			
Spiegelman [8]	2,472	1,374	293
Woolfer [10]	3,331	N/A	N/A
1965 (Epstein and Skolnik) [1]	2,400	1,000	70
1990 (this study)	1,675	554	28

the employment of the deceased parent did not count towards achievement of insured status, having preceded the inception of the Social Security program in 1937 or its expansion in 1951. Also, black children were only half as likely to be beneficiaries as white children, which the author attributed to the weaker work records of black adults.

In 1965 there were, according to estimates by Epstein and Skolnik [1] and using methods seemingly similar to Spiegelman's, about 2.4 million paternal orphans and about 1.0 million maternal orphans, including about 70,000 full orphans. The drop over the 25-year period in the relative number of orphans, unlike the drop in absolute number, is rather dramatic, because in 1965 there were 70 million children in the U.S., a reflection of the postwar baby boom.

Approximately 1.7 million among the 2.4 million paternal orphans in 1965, or about 70%, were Social Security beneficiaries. No age or race information was provided for this group.

V. DATA FOR 1990 ESTIMATES

My objective is to estimate the prevalence of orphanhood at the beginning of 1990 and the incidence of orphanhood during the preceding year (1989). Because of the much higher adult mortality of blacks, calculations are done separately for blacks and for all other races combined.

All children under age 18 at the beginning of 1990 were born between 1972 and 1989. The incidence estimate requires the number of children born in 1971 who were orphaned in 1989 before their 18th birthday. Accordingly I begin with the age-of-parent distributions for each year from 1971 to 1989 published in the annual compendia of vital registration data [5].

While the published age-of-mother distributions are complete and in single-age detail, the published age-of-father and joint-age distributions contain a large "father's age unknown" component and are presented in five-year age intervals. First, following the practice of the National Center for Health

Statistics, I allocated the fathers with unknown age according to the distribution of fathers with known age within each joint age category of mother. Then, the National Center kindly provided an unpublished joint-age distribution of parents with single-age detail for one year in the observation period, which I used to disaggregate the published data to single-age detail for each year.

The 1979–81 decennial life tables [4], whose reference years are in the middle of the observation period, are used to describe adult mortality by sex and race. Because there is no decennial life table for the category “other than black,” I substituted the table for whites. In view of Woofter’s argument about counterbalancing socioeconomic differentials and considering that many births now occur outside marriage, the life tables were not adjusted for mortality differentials by marital status.

The combination of age-of-parent distributions and life-table probabilities yields estimates of the relative prevalence and incidence of orphanhood. These are then applied to the Census Bureau’s adjusted counts of children in the 1990 census [9] to obtain estimates in absolute terms. The three-month difference between the beginning of 1990 and census day is ignored.

Data on receipt of Social Security survivor benefits come from a 1-in-100 sample of Social Security Administration administrative records. A small but unknown fraction of child beneficiaries are survivors of an adoptive parent or stepparent, rather than a natural parent.

VI. ORPHANHOOD IN 1990

At the beginning of 1990 there were an estimated 1,675,000 paternal orphans and 554,000 maternal orphans, hence a major improvement since 1965. Included in both counts are an estimated 28,000 full orphans. The latter number, derived from the joint distribution of father’s age and mother’s age, is significantly larger than the estimate of 23,000 produced by the (unsatisfactory) independence assumption.

The number of children counted in the 1990 census is 63,924,000. Thus, 2.62% of children are paternal orphans; 0.87% are maternal orphans; 0.04% are full orphans; and 3.44% are orphaned from at least one parent.

Among 9,833,000 black children, 475,000 (4.83%) are paternal orphans, 142,000 (1.44%) are maternal orphans, and 12,000 (0.12%) are full orphans.

During 1989 an estimated 223,000 children became paternal orphans and an estimated 81,000 became maternal orphans. An estimated 7,000 children became full orphans upon the death of a parent in 1989.

Among children orphaned in 1989, the average age of the child upon the father's death was 10.0, upon the mother's death was 10.6, and upon becoming a full orphan was 13.5.

The father's age at death on average in 1989 was 41.9, and the mother's age at death on average was 38.5. These compare with mean ages over the 1972–1989 period at birth of child of 28.6 and 25.8, respectively, among all fathers and mothers.

Social Security benefits were paid at the beginning of 1990 to 1,082,000 paternal orphans—about 65% of the total—and to 253,000 maternal orphans—about 46% of the total (see Table 2). These percentages are not directly comparable to those for 1965 because the size of the denominator—the total orphaned population—was calculated differently for 1965 and 1990, once with mortality schedules for married persons and once with mortality schedules for all persons.

TABLE 2
RECEIPT OF SOCIAL SECURITY SURVIVOR BENEFITS BY ORPHANS, BEGINNING OF 1990

Characteristics	Paternal Orphans			Maternal Orphans		
	Total (000s)	Beneficiaries (000s)	Percentage	Total (000s)	Beneficiaries (000s)	Percentage
Total, all races and ages	1,675	1,082	65	554	253	46
Race						
White and other	1,200	819	68	412	196	48
Black	475	263	55	142	57	40
Age						
0–4	139	62	45	36	13	36
5–9	365	220	60	115	54	47
10–14	620	411	66	210	98	47
15–17	551	389	71	194	88	45

Among blacks, benefits were paid to 55% of paternal orphans and 40% of maternal orphans. Even considering differences in methodology, it is apparent that the proportion of black orphans receiving Social Security benefits is now much closer to that for the total population than it was several decades earlier.

In contrast to the findings for the earlier period, younger orphans are now less likely to be beneficiaries than older orphans. A partial explanation is that the parents of younger orphans are younger at death, as a group, and hence less likely to have satisfied the requirement for insured status.

Data I have examined on denied claims suggest that while the lack of insured status of the decedent is the most likely reason for nonpayment of benefits, the illegitimacy of the child is a frequent reason for nonpayment to paternal orphans.

VII. CONCLUSION

The extent and parameters of orphanhood are measured by indirect methods, using data on parental age at birth of child, adult mortality schedules, and census-based counts of children by age and race. Here I used single-age distributions of age of father, age of mother, and ages of both parents jointly, 1979–81 decennial life tables, and adjusted 1990 census counts of children.

The numbers of both paternal and maternal orphans have fallen substantially from 1965 to 1990 in both relative and absolute terms. The decreases from 1940 to 1965 were large in relative, but not absolute, terms.

About 35% of paternal orphans in 1990 were not receiving Social Security benefits, largely because either the deceased parent was not insured or the orphan did not meet the statutory definition of child.

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