The Determination of the Deduction for Remarriage from the Pecuniary Loss of a Widow

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hod is presented of superimposing on the ate experience of remarriage of a specified ation of widows the select effect ienced by another population. The method plied to the aggregate experience of riage of South African populations of ws with the select effect of a United lom population and deductions for riage from widows' pecuniary losses are nined.

nciple of deduction for age

a South African court determines the tum of damages sustained by a widow as a t of loss of support on the death of her and, it normally makes a deduction to for the possibility that she will remarry.

practice of making such deductions has consistently endorsed by the courts, ding the Appeal Court. The matter has dingly become settled law and the only dy left to those who wish to see the practice shed is that of legislation. That course was ct pursued in the United Kingdom in the of a section of the Law Reform ellaneous Provisions) Act, 1971, in terms ich a court is required to ignore the fact or ect of remarriage.

arguments in favour of making deductions low for a widow's prospects of remarriage

that "the object of awarding damages to the dependants of a deceased who has been killed owing to the negligence of another is to compensate them for the material loss, not to improve their material prospects";

and

that "in Western society no woman can be legally dependent upon two husbands at the same time: were the rule as to remarriage otherwise, such a state of affairs would in effect be created".

arguments against making such deductions uding those relating to certain legal rines whose validity has been refuted by the ts) are:

that a widow should not be penalized by the party responsible for her late husband's death for not wishing to remarry another man in the future;

and

that, because remarriage is a matter with regard to which a widow may exercise her own discretion, it is not a contingency.

deduction for remarriage purports to allow the possibility that the widow's right to ort from her late husband will be replaced ffset) by support from another source. This the questions whether that source must ssarily be another husband and whether another husband would necessarily constitute such a source.

7. Just as a widow's claim for loss of support derives from the rights bestowed on her by marriage, so the scope of the deduction is confined to legal remarriage. However, the question whether (and to what extent) another husband would replace her right to support is dependent on the amount of his earnings.

8. From an actuarial point of view it is important to define what constitutes legal marriage because for the purposes of an investigation of remarriage rates the numbers of widows exposed to risk and the numbers remarrying should be determined as far as possible with reference to that definition. A marriage must be registered in order to be legal. Except as far as the law allows for customary unions between black persons, polygamous marriages are not legal. For practical purposes it is reasonable to presume that the statistics used in this paper conform to these criteria.

The determinants of the deduction

9. In discussions and judgments on the subject there is abundant evidence of confusion within the legal professions between such expressions as "chance of remarriage", "remarriage prospect", and the percentage "of .... widows of the age of ..... years (who) remarry" on the one hand and the percentage deduction from the widow's future loss on the other. There is apparently no confusion in the law itself, however; for wherever consideration is given to the period of widowhood before remarriage, its relevance to the determination of the deduction is acknowledged.

10. In fact, the relationship between the probability of remarriage and the percentage deduction is not completely quantified by the period of the widow's and her late husband's joint expectation of life after the expected date of her remarriage. It is also affected by the level of her expected support during that period, relative to the level of support she would have enjoyed but for the delict.

11. The level of her expected support during that period is in turn affected by the mortality of her future husband and by the possibility of divorce.

12. In court, the amount of the deduction is subjectively determined, consideration being given to such matters as the widow's appearance, her personality, her financial circumstances, the number of children and whatever else the judge may consider relevant. However, it is customary for the actuary to be required to give expert evidence on the amount not only of the value of the widow's loss of support but also on the amount of the deduction to be made for the possibility of her remarriage.

13. The actuary's expertise is clearly confined to the objective determinants of the prospects of a widow's remarriage – objective in the sense that they can be and have been measured and

recorded for the appropriate population of widows and for remarriages of widows in that population . In general, his task is to determine, for given values of the objective determinants, the difference between the value of the widow's loss of support regardless of remarriage and the value of her loss of support assuming that it ceases on her remarriage.

14. The actuary may be instructed to assume that a widow will in fact remarry (or has remarried) on a certain date, or that her chances of remarriage are enhanced by a certain percentage. In the absence of such instruction, it is reasonable to assume that the widow's prospects of remarriage conform to those of a random sample of widows with similar objective determinants of remarriage to her own.

15. The actuary may be instructed to assume that the future husband will be older (or younger) relative to the widow than the late husband. In fact, if the difference between the ages of the widow and her late husband was unusually great, the actuary should either obtain an instruction in this regard or make a suitable assumption.

16. The actuary may also be instructed to assume that the income or the retirement date of the future husband will be different from that of the late husband. If the actuary has reason to think that the income or retirement date of a future husband is likely to be different from that of the late husband, he should obtain an instruction.

17. The possibility of a divorce between the late husband and the widow is not normally dealt with in an actuarial assessment of the widow's pecuniary loss. That would normally be regarded as one of the subjective determinants of the widow's loss. If the court considers it appropriate, it may make a contingency deduction from the assessed value of the widow's gross future pecuniary loss to allow for the possibility of divorce. The possibility of a divorce between the widow and a future husband should be similarly treated.

18. The deduction for remarriage as determined by the actuary is regarded by the courts merely as "one of the facts, to be considered along with all the other facts", and not even as "a starting point" – let alone as an appropriate deduction. Nevertheless, the fact that it is recognized as one of the facts to be considered makes it reasonable for either party to look to its actuary to quote a deduction based on the objective determinants of the widow concerned. The actuary should try to ensure that the assumptions he has made in arriving at the quoted deduction are understood.

The objective determinants of remarriage prospects

19. It is the unhappy lot of the actuary that all of the criteria used to categorize people for demographic purposes are matters about which some people are sensitive.

20. Race is the prime example. Should one apply different remarriage deductions for different races?

21. On the one hand it may be argued that:

   (i) particularly in a society that has been adversely affected by racial discrimination, no discrimination on the grounds of race can be tolerated by a member of the profession;

   (ii) although that argument is weakened in its application to premium and annuity rates because of the freedom of the individual and competition in the life assurance market, it is strengthened in its application to claims for damages because of the claimant's absolute reliance on the discretion of the court;

   (iii) interracial marriages no longer being illegal and social differences becoming dissociated from racial distinctions, historical data for specific races may be an unreliable guide to the long-term future; and

   (iv) differences in the remarriage rates of different races generally arise from socio-economic or religious factors that are affected by race but are not strictly dependent on race.

22. On the other hand it may be argued that:

   (i) the more objective determinants one has, the less subjective adjustments have to be made and the better one's ultimate estimate of the appropriate deduction is likely to be;

   (ii) if one refuses to discriminate according to race then one cannot justify discrimination according to age or sex and the actuary cannot help the court to quantify the loss, let alone the deduction;

   (iii) if discrimination according to race is to the advantage of those who are otherwise generally at a disadvantage as a result of racial discrimination then it is not unjust; and

   (iv) because the available data are for whites, "coloureds" and Asians only, thus excluding the bulk of the South African population, the actuary has no means of obtaining non-racial data.

23. In the annual report issued by Central Statistical Services on marriages and divorces, the numbers of marriages in South Africa of whites, "coloureds" and Asians during each calendar year are analysed according to the race, age group and marital status of the bride. (They are also analysed according to whether there was an antenuptial contract, according to magisterial district and denomination of officiating minister, and according to age and marital status of bridegroom; but these criteria are not determinable before marriage and therefore cannot be regarded as determinants of remarriage prospects.)

24. In the 1970 and 1980 censuses, the total number of persons in the population were analysed *inter alia* according to race, sex, age group and marital status.

25. The available data are grouped according to age in various ways. The age group intervals may vary between otherwise similar successive reports.

26. In general, it takes some time for a widow's claim to be settled; the delay can be up to 5 years or even more. The data referred to in paragraphs 23 and 24 can be used to determine a remarriage deduction according to the race and age of the widow, but the experience of other populations indicates that the period that has elapsed since the death of the husband (the "select period") is a material determinant. No statistics have been published in South Africa relating to the

riage of widows according to the select
1.

statistics have however been published in countries. In the United Kingdom select ltimate rates of remarriage of widows are shed as part of the Government Actuary's juennial Review. The rates published are robabilities of remarriage during years ving attainment of certain ages and select ds. These are not independent of the ility of that population, but independent riage rates may be extracted from the ibilities by making appropriate mptions about the mortality of the lation.

e absence of information about the select in South Africa (and in the absence of any n to presume that such an assumption d be biased) it is reasonable to assume that, idows of a certain attained age, the forces of rriage according to select period are ortionate to those for the same attained age other population, whilst the aggregate force narriage at that attained age is unaffected. he purposes of this paper the rates referred paragraph 27 are used for this purpose.

iages of black persons under customary n are registered locally and no data have published. Even if they had, their ance would be dubious. When a black an is widowed it is the tradition that her er-in-law must take responsibility for her. resulting relationship is generally not a tered marriage and she is accordingly not ly entitled to any support from him. ough the tradition is still fairly extensively wed, it is not generally as inviolable as it was. It tends to operate to the disadvantage widow because – quite apart from any tion of legal entitlement to support or inal apportionment of family income – the er-in-law tends to derive more support the widow than she does from him. rtheless because of general awareness of radition, a black widow is unlikely to be to remarry (let alone to register such a iage), particularly if there is a brother-in- In submitting a report on the determination e value of a black widow's loss of support, tuary should therefore not suggest or imply a deduction should be considered for the ibility of remarriage.

a widower claiming for loss of support on death of his late wife (and therefore umably earning less than she was earning), lation data would seriously overstate the ability of remarriage.

scope of application of the method ented in this paper is limited to white, oured" and Asian widows.

odel

Lsf(x,Y)dx and Lsw(x,Y)dx denote the ber of females and widows respectively in specified polulation at time Y in the age val (x,x+dx). Let Ya and Yb denote the s of two successive censuses. For the oses of this paper,

= 1970,345 denotes the census on 6th May),

= 1980,331 denotes the census on 30th April).

For Y = Ya and Yb, values of Lsf(x,Y) and Lsw(x,Y) may be found by differentiation (by age) of the interpolation polynomials of the cumulative totals (by age) of the relevant data. (Particulars of methods of interpolation, numerical differentiation and numerical integration adopted in this paper are given in Appendix 1.) Values of Lsf(x,Y) and Lsw(x,Y) for certain ages are shown in Schedule A.

33. Let Lmf(x)dx denote the number of females in the model population in the age interval (x,x+dx) subject to the mortality of the specified population according to the life table for that population. Values of this function for certain ages are shown in Schedule B.

Let

$$Rg(x,Y) = \frac{Lsf(x,Y)}{Lmf(x)}.$$

Values of Rg(x,Y) for Y = Ya and Yb for certain ages are shown in Schedule A.

34. The purpose of determining Rg(x,Y) is to allow for the departure of the distribution of the specified population by age from that of the model population. For a cohort of lives in the age interval (x,x+dx) at time Ya, the only causes of variation in Rg(x+Y–Ya,Y) as Y increases are migration, errors in enumeration and departure from the assumed mortality. It is assumed that in the time interval (Y,Y+dY) where Ya < Y < Yb, the variation in a cohort of the female population because of these effects was proportionate to Lsf(x+Y–Ya,Y); say

$$Lmf(x+Y\text{-}Ya)dRg(x+Y\text{-}Ya,Y)$$
$$= Fsg(x) * Lsf(x+Y-Ya,Y)dY.$$

Thus

$$Fsg(x) = \frac{\log(Rg(x+Yb\text{-}Ya,Yb))\text{-}\log(Rg(x,Ya))}{Yb\text{-}Ya}.$$

Values of Fsg(x) for certain ages are shown in Schedule B.

35. Let

$$Rh(x,Y) = \frac{Lsw(x,Y)}{Lsf(x,y)}.$$

Values of Rh(x,Y) for Y = Ya and Yb for certain ages are shown in Schedule A.

36. As might be expected, the values of Rh(x,Yb) show slight variations from those of Rh(x,Ya). It is assumed that in the time interval (Y,Y+dY), the variation in the population of widows due to changes in the proportion of females that were widows was proportionate to Lw(x,Y); say

$$Lsf(x,Y)dRh(x,Y) = Fsh(x) * Lsw(x,Y)dy.$$

Thus

$$Fsh(x) = \frac{\log(Rh(x,Yb))\text{-}\log(Rh(x,Ya))}{Yb\text{-}Ya}.$$

Values of Fsh(x) for certain ages are shown in Schedule B.

37. The value of Lsw(x,Y) may now be found for any values of x and Y as follows.

(i) From paragraph 33,
$$Lsf(x,Y) = Lmf(x) * Rg(x,Y).$$

(ii) From paragraph 34,
$$Rg(x,Y) = Rg(x-(Y-Ya),Ya) * \exp(Fsg(x-(Y-Ya)) * (Y-Ya)).$$

(iii) From paragraph 35,
$$Lsw(x,Y) = Lsf(x,Y) * Rh(x,Y).$$

(iv) From paragraph 36,
$$Rh(x,Y) = Rh(x,Ya) * \exp(Fsh(x) * (Y\text{-}Ya)).$$

Thus

$$Lsw(x,Y) = Lmf(x) * Rg(x-Y+Ya,Ya) * Rh(x,Ya) * \exp((Fsg(x-Y+Ya) + Fsh(x)) * (Y-Ya)).$$

38. Let Y0 and Y1 denote respectively the beginning and end of the period for which marriages of widows are to be taken into account. For the purposes of this paper,

Y0 = 1970; and
Y1 = 1981.

39. Let zLsw(x) denote the number of females in the specified population that (on the abovementioned assumptions) attained age x as widows during the period (Y0,Y1); i.e.

$$zLsw(x) = \int_{Y0}^{Y1} Lsw(x,Y)dY.$$

Values of zLsw(x) for certain ages are shown in Schedule C.

40. Let

$$zRg(x) = \int_{Y0}^{Y1} Rg(x,Y)dY.$$

Values of zRg(x) for certain ages are shown in Schedule B.

41. Let Lmw(x)dx denote the number of widows in the model population in the age interval (x,x+dx). It is assumed that

$$\int_{Y0}^{Y1} Lmw(x) * Rg(x,Y)dY$$
$$= \int_{Y0}^{Y1} Lsw(x,Y)dY,$$

i.e.

$$Lmw(x) = \frac{zLsw(x)}{zRg(x)}.$$

Values of Lmw(x) for certain ages are shown in Schedule C.

42. Let Nswr(x,Y)dxdY denote the number of widows in the specified population marrying during the time interval (Y,Y+dY) in the age interval (x,x+dx). Let zNswr(x)dx denote the number of widows in the specified population marrying during the period (Y0,Y1) in the age interval (x,x+dx).

Then

$$zNswr(x) = \int_{Y0}^{Y1} Nswr(x,Y)dY.$$

Values of zNswr(x) may be found by differentiation (by age) of the interpolation polynomials of the cumulative totals (by age) of the numbers of widows that remarried during that period. Values for certain ages are shown in Schedule C.

43. Let Nmwr(x)dx be the annual number of widows in the model population remarrying in the age interval (x,x+dx). It is assumed that

$$\int_{Y0}^{Y1} Nmwr(x) * Rg(x,Y)dY$$
$$= \int_{Y0}^{Y1} Nswr(x,Y)dY.$$

Thus

$$Nmwr(x) = \frac{zNswr(x)}{zRg(x)}.$$

Values of Nmwr(x) for certain ages are shown in Schedule C.

44. A model has now been developed of a stationary population from which the force of remarriage at age x may be derived as

$$\frac{Nmwr(x)}{Lmw(x)}.$$

However, such forces would have no regard to the select effect, to which it is now necessary to give consideration.

45. Let Nmfw(x)dx be the annual number of females in the model population becoming widows in the age interval (x,x+dx).

Then

$$dLmw(x) = Nmfw(x)dx - Nmwr(x)dx + \frac{Lmw(x)}{Lmf(x)} dLmf(x).$$

Thus

$$Nmfw(x) = \frac{d}{dx} Lmw(x) + Nmwr(x) - \frac{Lmw(x)}{Lmf(x)} * \frac{d}{dx} Lmf(x).$$

Values of

$$\frac{d}{dx} Lmw(x) \text{ and } \frac{d}{dx} Lmf(x)$$

may be found by differentiation of the interpolation polynomials of Lmw(x) and Lmf(x). Values of Nmfw(x) for certain ages are shown in Schedule C.

46. Let the life table of females subject to the mortality experienced by the other population be represented by Lof(x). Values of this function for certain ages are shown in Schedule D. Let Low([x]+s)dxds denote the number of widows remaining at a select duration in the interval (s,s+ds) out of Low([x])dx widowed in the interval (x,x+dx), subject to the force of remarriage Fowr([x]+s) and the force of mortality Fofm(x+s) experienced by the other population.

Thus

$$dLow([x]+s) = -(Fowr([x]+s)+Fofm(x+s)) * Low([x]+s)ds,$$

where Fofm(x) is such that

$$dLof(x) = -Fofm(x) * Lof(x)dx;$$

i.e.

$$Fofm(x) = -\frac{\frac{d}{dx} Lof(x)}{Lof(x)}.$$

47. Let Powr([x]+s) denote the probability of remarriage during the year following attainment of age x+s and select period s according to the experience of the other population.

$$x]+s) = \int_0^1 \mathrm{Fowr}([x]+s+t) * \frac{\mathrm{Low}([x]+s+t)}{\mathrm{Low}([x]+s)}\,dt.$$

; of Low([x]+s) and Fowr([x]+s) may be from Powr([x]+s) and Fofm(x) by means following algorithm.

.et Fowre([x]+s,n) denote the nth estimate f Fowr([x]+s).

.et
'owre([x]+s,1) = Powr([x]+s) for all values of x and s.

.et

$$\mathrm{owre}([x]+s,n) = \exp\left(-\int_0^s (\mathrm{Fowre}([x]+t,n) + \mathrm{Fofm}(x+t))dt\right).$$

.et

$$\mathrm{Powre}([x]+s,n) = \int_0^1 \mathrm{Fowre}([x]+s+t,n) * \frac{\mathrm{Lowre}([x]+s+t,n)}{\mathrm{Lowre}([x]+s,n)}\,dt.$$

.et

$$\mathrm{Fowre}([x]+s,n+1) = \mathrm{Fowre}([x]+s,n) * \frac{\mathrm{Powr}([x]+s)}{\mathrm{Powre}([x]+s,n)}.$$

Repeat (iii), (iv) and (v) for n = 1, 2, 3, ..., m until

$-E < \mathrm{Fowre}([x]+s,m) - \mathrm{Fowre}([x]+s,m-1) < E$

for all values of x, where E is a predetermined error limit.

$[x]+s) = \mathrm{Fowre}([x]+s,m)$.

s of Fowr([x]+s) for certain values of x and hown in Schedule D.

mwr([x]+s) denote the force of remarriage dows exactly s years after widowhood at age x in the model population. In dance with paragraph 28 it is assumed that

$$= \frac{\mathrm{Fmwr}([x-s]+s)}{\mathrm{Fowr}([x-s]+s)}.$$

.mws([x]+s)dxds denote the number of ws in the model population who were wed in the age interval (x,x+dx) and have ined widows for a select period (s,s+ds) e s < Su, and let Lmwu(x)dx denote the er of widows in the age interval (x,x+dx) have been widows for more than Su years.

$$\mathrm{nws}([x]+s) = \mathrm{Nmfw}(x) * \frac{\mathrm{Lmf}(x+s)}{\mathrm{Lmf}(x)} * \exp\left(-\int_0^s \mathrm{Fmwr}([x]+t)dt\right)$$

$$= \mathrm{Nmfw}(x) * \frac{\mathrm{Lmf}(x+s)}{\mathrm{Lmf}(x)}$$

$$\mathrm{p}\left(-\int_0^s \mathrm{Rf}(x+t) * \mathrm{Fowr}([x]+t)dt\right) \quad \text{for } s < Su;$$

(ii) Lmwu(x)

$$= \mathrm{Lmw}(x) - \int_0^{Su} \mathrm{Lmws}([x-s]+s)ds; \quad \text{and}$$

(iii) Nmwr(x)

$$= \mathrm{Lmwu}(x) * \mathrm{Fmwr}([x-Su]+Su) + \int_0^{Su} \mathrm{Lmws}([x-s]+s) * \mathrm{Fmwr}([x-s]+s)ds$$

$$= \mathrm{Rf}(x) * (\mathrm{Lmwu}(x) * \mathrm{Fowr}([x-Su]+Su) + \int_0^{Su} \mathrm{Lmws}([x-s]+s) * \mathrm{Fowr}([x-s]+s)ds);$$

i.e.

Rf(x)

$$= \mathrm{Nmwr}(x) / (\mathrm{Lmwu}(x) * \mathrm{Fowr}([x-Su]+Su) + \int_0^{Su} \mathrm{Lmws}([x-s]+s) * \mathrm{Fowr}([x-s])ds).$$

51. The simultaneous equations in paragraph 50 may be solved by means of the following algorithm.

(i) Let Rfe(x,n) denote the nth estimate of Rf(x).

(ii) Let

$$\mathrm{Rfe}(x,1) = \frac{\mathrm{Nmwr}(x)}{\mathrm{Lmw}(x)} * \frac{1}{\mathrm{Fowr}([x-Su]+Su)} \quad \text{for all values of } x.$$

(iii) Let Lmwse([x]+s,n) denote the nth estimate of Lmws([x]+s) and Lmwue(x,n) the nth estimate of Lmwu(x), as follows:

$$\mathrm{Lmwse}([x]+s,n) = \mathrm{Nmfw}(x) * \frac{\mathrm{Lmf}(x+s)}{\mathrm{Lmf}(x)} * \exp\left(-\int_0^s \mathrm{Rfe}(x+t,n) * \mathrm{Fowrs}([x]+t)dt\right)$$

for s < Su; and

$$\mathrm{Lmwue}(x,n) = \mathrm{Lmw}(x) - \int_0^{Su} \mathrm{Lmwse}([x-s]+s,n)ds.$$

(iv) Let

$$\mathrm{Rfe}(x,n+1) = \mathrm{Nmwr}(x) / (\mathrm{Lmwue}(x,n) * \mathrm{Fowr}([x-Su]+Su) + \int_0^{Su} \mathrm{Lmwse}([x-s]+s,n) * \mathrm{Fowrs}([x-s]+s)ds).$$

(v) Repeat (iii) and (iv) for n = 1,2,3,......m until $-E < \mathrm{Rfe}(x,m) - \mathrm{Rfe}(x,m-1) < E$ for all values of x, where E is a predetermined error limit. Then

Rf(x) = Rfe(x,m).

Values of Rf(x) for certain values of x are shown in Schedule C.

52. From pararaph 49,

Fmwr([x]+s) = Rf(x+s) * Fowr([x]+s).

Values of Fmwr([x]+s) for certain values of x+s and s are shown in Schedule E.

53. Values of Lmws([x]+s) (and, for s > Su, Lmwu(x+s)), determined according to the equation in paragraph 50(i) and (ii) for certain values of x+s and s are shown in Schedule E.

54. The model has now been adapted to allow for the select effect. Values of

$$\mathrm{Lmwr}([x]+s) = \mathrm{Lmwr}([x]+Su) * \frac{\mathrm{Lmf}(x+s)}{\mathrm{Lmf}(x+Su)} * \exp\left(\int_0^{Su} \mathrm{Fmwr}([x]+t)dt\right)$$

where

Lmwr([x]+Su) =

$$\mathrm{Lmwr}([x-1]+Su) * \frac{\mathrm{Lmf}(x+Su)}{\mathrm{Lmf}(x-1+Su)} * \exp\left(-\int_0^1 \mathrm{Fmwr}([x-1]+Su+t)dt\right)$$

for certain values of x+s and s are shown in Schedule E.

Calculation of remarriage deduction

55. Let Lmm(x)dx denote the number of males in the model population in the age interval (x,x+dx) subject to the mortality of the specified population according to the life table for that population. Values of Lmm(x) for certain ages are shown in Schedule B.

56. For a specific claim, the following further definitions are required:

s = the period that has elapsed between the date of delict and the date of settlement (the "select period");

y = the age of the widow at the date of delict;

x1 = the age of the late husband at the date of delict;

x2 = the presumed age of a future husband at the date of delict;

I1 = the widow's share of the net annual income of the late husband;

I2 = the widow's share of the presumed net annual income of a future husband;

x1+n1 = the age at which the late husband would have ceased to earn an income but for his death;

x2+n2 = the presumed age at which a future husband would cease to earn an income if he survives;

and

Fi = the excess of the force of interest (net of tax) over the force of growth in the widow's share of net annual incomes.

57. Without consideration of the possibility of remarriage, the value of the widow's future pecuniary loss may be defined as

$$\mathrm{Vfw}([y]+s) = \mathrm{I1} * \int_s^{n1} \mathrm{Lmm}(x1+t) * \mathrm{Lmf}(y+t) * \exp(-\mathrm{Fi} * (t-s))dt / (\mathrm{Lmm}(x1) * \mathrm{Lmf}(y+s)).$$

It should be noted here that, in accordance with accepted practice:

(i) cognizance is taken of the fact that the widow has in fact survived the select period;

(ii) allowance is made for the possibility that the late husband might, had he not died at the date of delict, nevertheless have died during the select period;

(iii) discounting is to the date of settlement and not to the date of delict; and

(iv) no consideration is given here to the widow's pecuniary loss during the select period because (unless she has in fact remarried) cognizance is taken of the fact that she has not remarried and the question of a deduction for the possibility of remarriage from that loss does not arise.

58. With due consideration of the possibility of remarriage, the value of the widow's future pecuniary gain before the date on which her late husband would have died may be defined as:

$$\mathrm{Vmr}([y]+s) = \int_s^{n2} \frac{\mathrm{Lmm}(x1+t)}{\mathrm{Lmm}(x1+t)} * \exp(-\mathrm{Fi} * (t-s) * \int_s^t \frac{\mathrm{Lmwr}([y]+u)}{\mathrm{Lmwr}([y]+s)} * \mathrm{Fmwr}([y]+u) * \frac{\mathrm{Lmf}(y+t)}{\mathrm{Lmf}(y+u)} * \frac{\mathrm{Lmm}(x2+t)}{\mathrm{Lmm}(x2+u)}\,du\,dt$$

59. The deduction for the possibility of remarriage may be expressed as a proportion of the value of the widow's future pecuniary loss by means of the ratio

$$\mathrm{Rv}([y]+s) = \frac{\mathrm{Vwr}([y]+s)}{\mathrm{Vfw}([y]+s)}.$$

Values of Rv([y]+s) for certain values of x1, y, x2, n1, n2 and i (where Fi = log(1+i)), and for I2 = I1, are shown in Schedule F. Values for any other value of I2 may be found by proportion. Those for any other set of values of the other variables may be found by interpolation.

Conclusion

60. For certain South African populations the deductions shown in schedule F may be used to determine the deduction that it would be appropriate to make from the calculated value of a widow's loss of support, based on certain assumptions. In order to enable the court to consider the applicability of a deduction so calculated to the circumstances of a particular widow's claim, the assumptions on which the deduction for remarriage has been determined should be clearly specified. An appropriate specification is set out in Appendix 2.

61. It is of interest to note that the deductions for ı widows are very low in comparison with ; for white widows. The reason for this rence is largely ascribed to the different ious tenets of the respective populations. deductions for coloured widows are mediate.

also of interest that the deductions are not cularly sensitive to the select period. For tical purposes it would be satisfactory to ıltimate rates regardless of the select period.

ıraphy

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Appendix 1

Numerical methods

In this paper, the interpolation polynomials were defined according to Newton's divided difference formula, taken to the third order. Thus

$$u(x) = u(a) + (x-a)\,\Delta_{ab}\,u(a) + (x-a)(x-b)\,\Delta^2_{abc}\,u(a)$$
$$+ (x-a)(x-b)(x-c)\,\Delta^3_{abcd}\,u(a)$$

for $a < b \leqslant x < c < d$

or, where necessary

for $a \leqslant x < b < c < d$

or $a < b < c \leqslant x \leqslant d$.

If an interpolation polynomial was required to be integrated or differentiated it was expanded as

$$\begin{aligned} u(x) = & \left(u(a) - a\,\Delta_{ab}\,u(a) + ab\,\Delta^2_{abc}\,u(a)\right.\\ & \left.-abc\,\Delta^3_{abcd}\,u(a)\right)\\ & + x\left(\Delta_{ab}\,u(a) - (a+b)\,\Delta^2_{abc}\,u(a)\right.\\ & \left.+ (ab+ac+bc)\,\Delta^3_{abcd}\,u(a)\right)\\ & + x^2\left(\Delta^2_{abc}\,u(a) - (a+b+c)\,\Delta^3_{abcd}\,u(a)\right)\\ & + x^3\left(\Delta^3_{abcd}\,u(a)\right) \end{aligned}$$

and accordingly integrated over the interval concerned or differentiated at the closed limit of that interval.

Values of each function were also determined with the divided difference formula taken to the second order. The resulting values of Rv([y]+s) did not differ sufficiently from those shown in Schedule F to warrant consideration of an order higher than the third.

Appendix 2

Statement of assumptions

The following statement may be used for the purpose of specifying the assumptions on which the deduction for remarriage has been determined for a specific widow's claim.

1. For an Asian, coloured or white widow:
   "Based on South African statistics relating to Asian/coloured/white widows, a deduction of ..% of the widow's gross future loss has been made."
2. For a black widow:
   "No statistics relating to the remarriage of black widows are available and no deduction has therefore been made from the widow's gross future loss."

Schedule A **Population: A**

Census(Y): 70.345

x	Lsf(x,Y)	Lsw(x,Y)	Rg(x+0.345,Y)	Rh(x,Y)
20	7 266	15	0.0745	0.0020
25	6 151	38	0.0625	0.0061
30	4 719	111	0.0481	0.0234
35	3 697	187	0.0389	0.0506
40	3 144	225	0.0326	0.0717
45	2 450	380	0.0265	0.1551
50	1 996	453	0.0216	0.2268
55	1 437	462	0.0170	0.3212
60	1 095	515	0.0138	0.4697

Census(Y): 80.331

x	Lsf(x,Y)	Lsw(x,Y)	Rg(x+10.331,Y)	Rh(x,Y)
20	8 048	23	0.0734	0.0029
25	7 748	50	0.0623	0.0064
30	7 088	132	0.0503	0.0187
35	6 048	248	0.0413	0.0410
40	4 801	365	0.0339	0.0759
45	3 874	520	0.0280	0.1342
50	3 073	641	0.0227	0.2084
55	2 410	767	0.0182	0.3181
60	1 783	764	0.0140	0.4287

Lsf(x,Y)dx = number of females in specified population
Lsw(x,Y)dx = number of widows in specified population
Rg(x,Y) = ratio of females in specified population to females in model population
Rh(x,Y) = ratio of widows in specified population to females in specified population

Schedule A **Population: C**

Census(Y): 70.345

x	Lsf(x,Y)	Lsw(x,Y)	Rg(x+0.345,Y)	Rh(x,Y)
20	20 007	69	0.2193	0.0035
25	16 213	65	0.1758	0.0040
30	12 700	173	0.1437	0.0136
35	11 535	349	0.1322	0.0302
40	9 873	524	0.1143	0.0530
45	7 648	759	0.0920	0.0993
50	5 960	877	0.0761	0.1472
55	4 875	1 019	0.0663	0.2089
60	4 100	1 349	0.0620	0.3291

Census(Y): 80.331

x	Lsf(x,Y)	Lsw(x,Y)	Rg(x+10.331,Y)	Rh(x,Y)
20	30 380	10	0.2163	0.0003
25	24 040	113	0.1750	0.0047
30	19 308	253	0.1489	0.0131
35	15 619	424	0.1387	0.0271
40	12 501	661	0.1152	0.0529
45	11 442	1 016	0.0923	0.0888
50	9 155	1 287	0.0806	0.1405
55	6 790	1 501	0.0771	0.2211
60	5 329	1 666	0.0667	0.3127

Lsf(x,Y)dx = number of females in specified population
Lsw(x,Y)dx = number of widows in specified population
Rg(x,Y) = ratio of females in specified population to females in model population
Rh(x,Y) = ratio of widows in specified population to females in specified population

dule A

Population: W

(Y): 70.345

	Lsf(x,Y)	Lsw(x.Y)	Rg(x+0.345,Y)	Rh(x,Y)
	32 039	66	0.3297	0.0021
	29 312	127	0.3049	0.0043
	26 924	218	0.2804	0.0081
	23 017	362	0.2399	0.0157
	23 197	626	0.2431	0.0270
	19 905	1 091	0.2134	0.0548
	20 236	1 779	0.2182	0.0879
	17 365	2 467	0.1956	0.1420
	16 628	3 908	0.1967	0.2350

(Y): 80.331

	Lsf(x,Y)	Lsw(x.Y)	Rg(x+10.331,Y)	Rh(x,Y)
	36 027	49	0.3750	0.0013
	37 650	156	0.3376	0.0041
	35 013	224	0.3192	0.0064
	31 583	405	0.2560	0.0128
	30 727	769	0.2566	0.0250
	24 263	1 079	0.2225	0.0445
	23 580	2 018	0.2280	0.0856
	20 203	2 866	0.2068	0.1419
	19 663	4 147	0.1903	0.2109

)dx = number of females in specified population
Y)dx = number of widows in specified population
) = ratio of females in specified population to females in model population
) = ratio of widows in specified population to females in specified population

dule B

Population: A

	Lmm(x)	Lmf(x)	Fsg(x)	Fsh(x)	zRg(x)
	95 585	96 814	–0.0014	0.0353	0.8821
	94 588	96 341	–0.0003	0.0042	0.8121
	93 493	95 842	0.0046	–0.0228	0.6925
	92 130	95 170	0.0060	–0.0210	0.5576
	89 966	94 232	0.0040	0.0058	0.4584
	86 220	92 546	0.0057	–0.0145	0.3741
	80 355	89 766	0.0050	–0.0085	0.3096
	72 185	84 857	0.0071	–0.0010	0.2489
	62 677	77 564	0.0012	–0.0092	0.2019

x)dx = number of males in model population
)dx = number of females in model population
) = rate of increase over period in ratio of females in specified population to females in model population (per cohort)
) = rate of increase over period in ratio of widows in specified population to females in specified population (at constant age)
) = integral over period of ratio of females in specified population to females in model population (at constant age)

Schedule B

Population: C

x	Lmm(x)	Lmf(x)	Fsg(x)	Fsh(x)	zRg(x)
20	88 375	90 513	–0.0014	–0.2321	3.0249
25	86 253	89 682	–0.0004	0.0157	2.4621
30	83 675	88 551	0.0035	0.0040	1.9831
35	80 805	87 030	0.0048	–0.0108	1.6665
40	77 361	84 754	0.0008	–0.0003	1.4931
45	72 886	81 691	0.0003	–0.0112	1.2890
50	66 999	77 778	0.0058	–0.0047	1.0490
55	59 032	72 656	0.0150	0.0057	0.8793
60	49 732	66 159	0.0073	–0.0051	0.7899

Lmm(x)dx = number of males in model population
Lmf(x)dx = number of females in model population
Fsg(x) = rate of increase over period in ratio of females in specified population to females in model population (per cohort)
Fsh(x) = rate of increase over period in ratio of widows in specified population to females in specified population (at constant age)
zRg(x) = integral over period of ratio of females in specified population to females in model population (at constant age)

Schedule B

Population: W

x	Lmm(x)	Lmf(x)	Fsg(x)	Fsh(x)	zRg(x)
20	96 656	97 808	0.0129	–0.0426	4.0456
25	95 407	97 425	0.0102	–0.0044	3.8862
30	94 237	97 002	0.0130	–0.0237	3.6180
35	93 120	96 497	0.0065	–0.0206	3.1714
40	91 723	95 760	0.0054	–0.0076	2.8562
45	89 572	94 540	0.0042	–0.0210	2.5521
50	86 137	92 595	0.0044	–0.0027	2.4656
55	80 827	89 697	0.0056	–0.0001	2.3099
60	73 231	85 445	–0.0033	–0.0108	2.2388

Lmm(x)dx = number of males in model population
Lmf(x)dx = number of females in model population
Fsg(x) = rate of increase over period in ratio of females in specified population to females in model population (per cohort)
Fsh(x) = rate of increase over period in ratio of widows in specified population to females in specified population (at constant age)
zRg(x) = integral over period of ratio of females in specified population to females in model population (at constant age)

Schedule C

Population: A

x	zLsw(x)	Lmw(x)	zNswr(x)	Nmwr(x)	Nmfw(x)	Rf(x)
20	209	237	23	26	24	0.2236
25	490	604	18	22	184	0.2236
30	1 374	1 984	16	22	531	0.0955
35	2 389	4 285	16	28	223	0.0784
40	3 198	6 977	16	35	1 292	0.0957
45	4 955	13 245	10	27	1 140	0.0557
50	6 016	19 429	7	23	1 819	0.0520
55	6 748	27 108	4	17	1 735	0.0493
60	6 990	34 617	2	12	2 632	0.0449

zLsw(x)dx = integral over period of number of widows in specified population (at constant age)
Lmw(x)dx = number of widows in model population
zNswr(x)dx = Number of widows in specified population marrying during period (per age at marriage)
Nmwr(x)dx = number of widows in model population marrying, per annum
Nmfw(x)dx = number of females in model population becoming widows, per annum
Rf(x) = ratio of force or remarriage of widows in model population to force of remarriage of widows in other population (per attained age)

eC

Population: C

zLsw(x)	Lmw(x)	zNswr(x)	Nmwr(x)	Nmfw(x)	Rf(x)
339	112	4	1	48	0.3031
972	395	49	20	117	0.3031
2 344	1 182	85	43	277	0.3027
4 137	2 482	115	69	335	0.3358
6 700	4 487	141	95	745	0.3926
9 832	7 627	155	120	805	0.4300
11 703	11 157	149	142	1 082	0.5539
13 772	15 663	117	133	1 559	0.6532
16 729	21 178	90	113	1 425	0.6285

= integral over period of number of widows in specified population (at constant age)
= number of widows in model population
x = Number of widows in specified population marrying during period (per age at marriage)
x = number of widows in model population marrying, per annum
x = number of females in model population becoming widows, per annum
.o of force or remarriage of widows in model population to force of remarriage of widows in other
ɔulation (per attained age)

ieC

Population: W

zLsw(x)	Lmw(x)	zNswr(x)	Nmwr(x)	Nmfw(x)	Rf(x)
656	162	42	10	41	1.2469
1 603	412	321	82	166	1.2469
2 503	692	419	124	163	1.5177
4 312	1 359	467	147	312	1.3468
7 083	2 480	537	188	578	1.3875
11 858	4 646	637	250	840	1.4077
19 785	8 024	765	310	929	1.6225
29 410	12 732	661	286	1 973	1.6574
42 485	18 977	645	288	2 234	1.6965

= integral over period of number of widows in specified population (at constant age)
= number of widows in model population
x = number of widows in specified population marrying during period (per age at marriage)
x = number of widows in model population marrying, per annum
x = number of females in model population becoming widows, per annum
.o of force or remarriage of widows in model population to force of remarriage of widows in other
ɔulation (per attained age)

le D

Lof(x)	Fowr([x]+s) s=0	s=1	s=2	s=3	s=4	x+5	Fowr(x+5)
97 779	0.264	0.180	0.194	0.206	0.197	25	0.185
97 562	0.060	0.159	0.157	0.153	0.141	30	0.132
97 318	0.024	0.106	0.114	0.109	0.098	35	0.084
96 972	0.042	0.063	0.084	0.073	0.067	40	0.050
96 410	0.025	0.055	0.064	0.051	0.043	45	0.031
95 430	0.006	0.044	0.046	0.037	0.028	50	0.021
93 797	0.006	0.024	0.027	0.023	0.018	55	0.011
91 321	0.000	0.018	0.011	0.012	0.008	60	0.005

umber of females surviving according to mortality of other population out of corresponding num-
ɔrs at lower ages
s) = force of marriage of widows in other population

Schedule E

Population: A

x	Fmwr([x]+s) s=0	s=1	s=2	s=3	s=4	x+5	Fmwr(x+5)
20	0.059	0.040	0.043	0.046	0.044	25	0.041
25	0.013	0.028	0.023	0.019	0.015	30	0.013
30	0.002	0.008	0.008	0.008	0.007	35	0.007
35	0.003	0.007	0.009	0.008	0.007	40	0.005
40	0.002	0.004	0.004	0.003	0.002	45	0.002
45	0.000	0.002	0.003	0.002	0.001	50	0.001
50	0.000	0.001	0.001	0.001	0.001	55	0.001
55	0.000	0.001	0.000	0.001	0.000	60	0.000

x	Lmws([x]+s) s=0	s=1	s=2	s=3	s=4	x+5	Lmwu(x+5)
20	24.35	23.33	22.47	21.57	20.70	25	144.19
25	183.52	179.54	175.17	171.74	168.97	30	500.10
30	531.12	527.70	522.90	518.12	513.51	35	1 928.83
35	223.26	221.77	219.58	217.26	215.17	40	4 059.47
40	1 292.07	1 284.03	1 273.99	1 263.97	1 254.74	45	6 760.44
45	1 140.14	1 132.48	1 123.09	1 113.62	1 104.13	50	12 717.37
50	1 819.22	1 801.61	1 780.99	1 758.49	1 734.57	55	18 255.25
55	1 734.67	1 707.77	1 678.86	1 648.39	1 615.87		

x	Lmwr([x]+s) s=0	s=1	s=2	s=3	s=4	x+5	Lmwr(x+5)
20	120 711	115 071	110 351	105 405	100 638	25	96 341
25	94 973	92 674	90 156	88 198	86 630	30	85 367
30	85 027	84 428	83 603	82 809	82 058	35	81 354
35	81 460	80 924	80 141	79 297	78 534	40	77 880
40	78 098	77 627	77 063	76 508	75 990	45	75 491
45	75 672	75 182	74 584	73 972	73 353	50	72 703
50	72 803	72 105	71 291	70 403	69 455	55	68 456
55	68 492	67 434	66 297	65 097	63 816	60	62 450

Fmwr([x]+s) = force of remarriage of widows in model population
Lmws([x]+s)dxds = number of widows in model population (per age at and duration since widowhood)
Lmwu(x)dx = number of widows in model population who have been widowed for more than 5 years
Lmwr([x])+s) = number of widows surviving and not remarried (per age at and duration since widowhood) out of corresponding numbers at shorter durations

le E

Population: C

s=0	s=1	Fmwr([x]+s) s=2	s=3	s=4	x+5	Fmwr(x+5)
0.080	0.055	0.059	0.062	0.060	25	0.056
0.018	0.048	0.048	0.046	0.043	30	0.040
0.007	0.031	0.034	0.034	0.032	35	0.028
0.014	0.023	0.032	0.029	0.026	40	0.020
0.010	0.021	0.024	0.020	0.018	45	0.013
0.002	0.020	0.022	0.018	0.015	50	0.011
0.003	0.014	0.016	0.014	0.011	55	0.008
0.000	0.011	0.007	0.007	0.005	60	0.003

s=0	s=1	Lmws([x]+s) s=2	s=3	s=4	x+5	Lmwu(x+5)
48.18	45.13	42.62	40.03	37.58	25	92.99
116.61	112.11	106.44	101.27	96.61	30	303.84
276.91	270.22	260.49	250.90	241.92	35	994.34
334.93	327.36	316.71	305.51	295.53	40	2 114.47
745.20	728.72	707.05	686.25	668.19	45	3 967.91
804.95	787.63	763.24	740.36	720.68	50	6 772.31
1 082.12	1 059.33	1 029.99	1 000.78	973.85	55	9 843.54
1 559.30	1 522.02	1 481.62	1 444.34	1 407.01		

s=0	s=1	Lmwr([x]+s) s=2	s=3	s=4	x+5	Lmwr(x+5)
122 069	114 362	108 004	101 444	95 218	25	89 682
87 755	84 370	80 109	76 218	72 707	30	69 594
68 749	67 088	64 671	62 292	60 062	35	58 042
58 254	56 937	55 085	53 136	51 401	40	49 906
50 879	49 754	48 275	46 855	45 623	45	44 536
45 506	44 527	43 149	41 857	40 744	50	39 773
40 422	39 571	38 475	37 385	36 379	55	35 481
35 750	34 895	33 969	33 114	32 258	60	31 444

+s) = force of remarriage of widows in model population
+s)dxds = number of widows in model population (per age at and duration since widowhood)
x = number of widows in model population who have been widowed for more than 5 years
+s) = number of widows surviving and not remarried (per age at and duration since widowhood) out of corresponding numbers at shorter durations

Schedule E

Population: W

x	s=0	s=1	Fmwr([x]+s) s=2	s=3	s=4	x+5	Fmwr(x+5)
20	0.329	0.225	0.242	0.256	0.246	25	0.231
25	0.075	0.195	0.196	0.221	0.219	30	0.200
30	0.037	0.147	0.157	0.156	0.140	35	0.114
35	0.057	0.089	0.119	0.089	0.090	40	0.069
40	0.035	0.083	0.089	0.073	0.064	45	0.044
45	0.008	0.060	0.065	0.052	0.042	50	0.033
50	0.010	0.046	0.042	0.037	0.036	55	0.019
55	0.000	0.028	0.018	0.020	0.014	60	0.009

x	s=0	s=1	Lmws([x]+s) s=2	s=3	s=4	x+5	Lmwu(x+5)
20	40.52	31.14	24.76	19.26	14.94	25	78.34
25	165.65	142.32	116.44	94.42	75.58	30	116.67
30	162.55	146.38	124.99	106.66	91.79	35	330.03
35	312.11	290.58	260.88	234.42	214.01	40	958.01
40	577.81	541.10	493.80	453.87	422.43	45	1 677.68
45	840.26	805.06	751.18	705.18	669.61	50	3 759.86
50	929.37	894.54	849.69	811.50	776.60	55	6 448.68
55	1 972.71	1 920.16	1 857.97	1 805.95	1 756.99		

x	s=0	s=1	Lmwr([x]+s) s=2	s=3	s=4	x+5	Lmwr(x+5)
20	334 723	257 409	204 720	159 288	123 662	25	97 425
25	89 179	76 638	62 721	50 868	40 726	30	32 974
30	30 994	27 910	23 833	20 336	17 499	35	15 380
35	15 522	14 451	12 973	11 656	10 642	40	9 767
40	10 523	9 855	8 996	8 271	7 701	45	7 259
45	7 716	7 394	6 903	6 480	6 154	50	5 897
50	6 196	5 965	5 666	5 412	5 180	55	4 993
55	5 090	4 955	4 794	4 660	4 534	60	4 432

Fmwr([x]+s) = force of remarriage of widows in model population
Lmws([x]+s)dxds = number of widows in model population (per age at and duration since widowhood)
Lmwu(x)dx = number of widows in model population who have been widowed for more than 5 years
Lmwr([x])+s) = number of widows surviving and not remarried (per age at and duration since widowhood) out of corresponding numbers at shorter durations

F

Population: A

x1−y	= 5
x2−y	= 5
x1+n1	= 65
x2+n2	= 65
i	= .04

Rv([y]+s) s=0	s=1	s=2	s=3	s=4	y+5	Rv(y+5)
0.243	0.220	0.201	0.177	0.152	25	0.126
0.219	0.198	0.177	0.153	0.127	26	0.104
0.193	0.173	0.151	0.126	0.103	27	0.087
0.167	0.149	0.126	0.104	0.087	28	0.074
0.143	0.125	0.103	0.087	0.073	29	0.063
0.116	0.103	0.086	0.073	0.063	30	0.055
0.096	0.087	0.074	0.063	0.055	31	0.049
0.080	0.074	0.064	0.055	0.049	32	0.044
0.069	0.064	0.056	0.049	0.044	33	0.040
0.060	0.056	0.050	0.045	0.040	34	0.037
0.052	0.050	0.045	0.041	0.037	35	0.033
0.047	0.045	0.041	0.037	0.033	36	0.029
0.043	0.042	0.038	0.035	0.030	37	0.025
0.040	0.039	0.035	0.030	0.025	38	0.020
0.037	0.036	0.032	0.026	0.021	39	0.016
0.034	0.032	0.027	0.022	0.017	40	0.013
0.030	0.028	0.023	0.018	0.014	41	0.011
0.026	0.023	0.019	0.014	0.011	42	0.009
0.022	0.019	0.015	0.012	0.010	43	0.008
0.019	0.016	0.013	0.010	0.008	44	0.007
0.015	0.013	0.011	0.009	0.007	45	0.006
0.013	0.012	0.010	0.008	0.006	46	0.005
0.012	0.011	0.008	0.007	0.005	47	0.005
0.010	0.009	0.007	0.006	0.005	48	0.004
0.009	0.008	0.006	0.005	0.004	49	0.003
0.008	0.007	0.006	0.004	0.003	50	0.003
0.007	0.006	0.005	0.004	0.003	51	0.002
0.006	0.005	0.004	0.003	0.002	52	0.002
0.005	0.005	0.004	0.003	0.002	53	0.001
0.004	0.004	0.003	0.002	0.002	54	0.001
0.004	0.003	0.002	0.002	0.001	55	0.001
0.003	0.003	0.002	0.001	0.001	56	0.001
0.002	0.002	0.002	0.001	0.001	57	0.000
0.002	0.002	0.001	0.001	0.000	58	0.000
0.002	0.001	0.001	0.001	0.000	59	0.000

				Rv([y]+s) y=30		y=40		y=50	
x2−y	x1+n1	x2+n2	i	s=0	s=5	s=0	s=5	s=0	s=5
5	65	65	0.020	0.052	0.033	0.015	0.006	0.004	0.001
5	65	65	0.040	0.049	0.032	0.015	0.006	0.003	0.001
5	65	60	0.020	0.047	0.029	0.012	0.004	0.000	0.000
5	60	65	0.020	0.057	0.037	0.018	0.008	0.000	0.000
0	65	65	0.020	0.058	0.038	0.018	0.008	0.005	0.002
5	65	65	0.020	0.050	0.031	0.014	0.005	0.003	0.001

= deduction for remarriage

Population: C

x1−y	= 5
x2−y	= 5
x1+n1	= 65
x2+n2	= 65
i	= .04

y	Rv([y]+s) s=0	s=1	s=2	s=3	s=4	y+5	Rv(y+5)
20	0.363	0.345	0.330	0.312	0.293	25	0.275
21	0.344	0.328	0.312	0.294	0.275	26	0.257
22	0.325	0.310	0.293	0.275	0.257	27	0.239
23	0.306	0.293	0.275	0.257	0.239	28	0.222
24	0.287	0.276	0.258	0.240	0.222	29	0.206
25	0.268	0.259	0.240	0.223	0.206	30	0.191
26	0.251	0.242	0.224	0.207	0.192	31	0.178
27	0.233	0.226	0.209	0.193	0.178	32	0.165
28	0.217	0.210	0.194	0.179	0.166	33	0.154
29	0.202	0.196	0.181	0.168	0.154	34	0.142
30	0.188	0.183	0.170	0.156	0.143	35	0.131
31	0.175	0.171	0.159	0.145	0.132	36	0.120
32	0.164	0.160	0.149	0.135	0.122	37	0.109
33	0.154	0.150	0.138	0.124	0.110	38	0.099
34	0.144	0.140	0.128	0.114	0.100	39	0.089
35	0.136	0.130	0.118	0.104	0.091	40	0.081
36	0.126	0.120	0.108	0.094	0.083	41	0.074
37	0.117	0.111	0.099	0.086	0.076	42	0.068
38	0.109	0.103	0.091	0.079	0.070	43	0.063
39	0.101	0.095	0.084	0.073	0.065	44	0.058
40	0.095	0.089	0.078	0.068	0.060	45	0.053
41	0.089	0.084	0.073	0.062	0.055	46	0.049
42	0.084	0.080	0.068	0.057	0.049	47	0.044
43	0.079	0.075	0.063	0.052	0.044	48	0.039
44	0.074	0.069	0.058	0.047	0.039	49	0.034
45	0.068	0.064	0.052	0.042	0.034	50	0.029
46	0.062	0.058	0.047	0.037	0.030	51	0.025
47	0.056	0.052	0.043	0.033	0.026	52	0.021
48	0.050	0.047	0.038	0.029	0.022	53	0.017
49	0.045	0.041	0.033	0.025	0.018	54	0.014
50	0.039	0.036	0.028	0.021	0.015	55	0.011
51	0.034	0.031	0.024	0.017	0.012	56	0.008
52	0.029	0.026	0.019	0.013	0.008	57	0.006
53	0.024	0.021	0.014	0.010	0.006	58	0.003
54	0.020	0.016	0.010	0.007	0.003	59	0.002

					Rv([y]+s) y=30		y=40		y=50	
x1−y	x2−y	x1+n1	x2+n2	i	s=0	s=5	s=0	s=5	s=0	s=5
5	5	65	65	0.020	0.188	0.131	0.095	0.053	0.039	0.011
5	5	65	65	0.040	0.177	0.125	0.090	0.051	0.038	0.011
5	5	65	60	0.020	0.170	0.113	0.075	0.034	0.000	0.000
5	5	60	65	0.020	0.202	0.146	0.110	0.069	0.000	0.000
5	0	65	65	0.020	0.207	0.148	0.112	0.067	0.057	0.025
0	5	65	65	0.020	0.180	0.125	0.087	0.048	0.031	0.007

Rv([y]+s) = deduction for remarriage

F

Population: W

x1−y	= 5
x2−y	= 5
x1+n1	= 65
x2+n2	= 65
i	= .04

Rv([y]+s) s=0	s=1	s=2	s=3	s=4	y+5	Rv(y+5)
0.777	0.758	0.752	0.739	0.722	25	0.707
0.762	0.749	0.738	0.724	0.706	26	0.690
0.746	0.737	0.723	0.707	0.689	27	0.673
0.730	0.724	0.707	0.690	0.671	28	0.651
0.713	0.709	0.691	0.673	0.651	29	0.620
0.694	0.692	0.672	0.650	0.618	30	0.584
0.677	0.676	0.651	0.620	0.582	31	0.549
0.659	0.655	0.622	0.584	0.548	32	0.517
0.633	0.626	0.588	0.551	0.517	33	0.483
0.600	0.591	0.555	0.520	0.484	34	0.447
0.565	0.557	0.525	0.488	0.448	35	0.413
0.534	0.526	0.493	0.452	0.414	36	0.381
0.505	0.494	0.460	0.421	0.384	37	0.348
0.474	0.461	0.430	0.392	0.353	38	0.320
0.441	0.429	0.398	0.357	0.322	39	0.296
0.416	0.403	0.371	0.334	0.303	40	0.272
0.388	0.372	0.344	0.310	0.277	41	0.246
0.364	0.351	0.325	0.288	0.255	42	0.223
0.344	0.331	0.301	0.261	0.228	43	0.203
0.327	0.313	0.279	0.239	0.210	44	0.184
0.309	0.291	0.255	0.219	0.190	45	0.166
0.285	0.270	0.234	0.198	0.169	46	0.150
0.267	0.252	0.213	0.178	0.153	47	0.135
0.246	0.231	0.192	0.161	0.137	48	0.121
0.222	0.209	0.175	0.145	0.122	49	0.107
0.201	0.190	0.160	0.131	0.109	50	0.092
0.183	0.173	0.145	0.117	0.094	51	0.077
0.167	0.159	0.134	0.105	0.081	52	0.063
0.150	0.143	0.118	0.088	0.065	53	0.053
0.135	0.128	0.101	0.074	0.057	54	0.042
0.120	0.108	0.085	0.065	0.046	55	0.031
0.097	0.090	0.072	0.051	0.032	56	0.024
0.083	0.077	0.056	0.038	0.025	57	0.017
0.072	0.061	0.041	0.029	0.018	58	0.010
0.053	0.045	0.030	0.020	0.010	59	0.005

				Rv([y]+s)					
				y=30		y=40		y=50	
x2−y	x1+n1	x2+n2	i	s=0	s=5	s=0	s=5	s=0	s=5
5	65	65	0.020	0.565	0.413	0.309	0.166	0.120	0.031
5	65	65	0.040	0.543	0.396	0.297	0.160	0.117	0.031
5	65	60	0.020	0.505	0.348	0.238	0.102	0.000	0.000
5	60	65	0.020	0.626	0.472	0.373	0.223	0.000	0.000
0	65	65	0.020	0.627	0.473	0.372	0.219	0.184	0.077
5	65	65	0.020	0.527	0.379	0.274	0.142	0.091	0.019

= deduction for remarriage

OBITUARY: WALTER DU MAURIER MARSHALL FACER

Wally would have liked me to commence this note on his life by referring to his incisive humour - difficult to capture for posterity but delightful for the moment. My memory of him, stretching over 40 years, was that he found in every situation the right word or phrase mostly containing a humorous aspect.

Walter du Maurier Marshall Facer was a perfectionist. Dressed immaculately at every occasion - formal or informal - and in his more mature years always with a distinctive buttonhole that became his hallmark. The perfection that Wally brought to his work came through clearly in the reports, documents, accounts and pamphlets produced by him and under his direction. Nothing was too insignificant to escape his notice which was a reflection of his axiom "If a job was worth doing, it was worth doing well."

Walter Facer was born on 10 August 1920 at Stutterheim, Cape. He was the top scholar in Marist Brothers College in Uitenhage and in his matric year achieved the first position in the Eastern Province. Besides being a top scholar he was also an accomplished sportsman representing his school in no less than 6 different sports.

In 1938 his father was the Senior District Manager of Old Mutual in Uitenhage and he and the General Manager of Old Mutual at that time persuaded Wally to also join Old Mutual. He wasted no time in commencing his actuarial studies and passed the first two parts within two years.

When war broke out in 1939 Wally joined the South African Air Force on the day after writing the second actuarial examination and reached the rank of Captain. Most of his war service was spent in North Africa and Italy - some of it with the R.A.F. mainly as a Meteorological Officer of great distinction.

It was not easy for him to adjust to civilian life on his return in 1945 and successes in examinations were not as regular as before. Promotion within Old Mutual, however, took place with monotonous regularity showing clearly the ability and dedication that Wally brought to his work in the Actuarial sphere within Old Mutual. In 1955 he attained the Fellowship of the Faculty of Actuaries and soon thereafter, in 1955, was promoted to Assistant Actuary followed by promotion to Group Actuary in 1958 and Actuary in 1961.

In 1966 he was thrust into a new field of endeavour. A Mutual Fund known as the South African Mutual Unit Trust was established and he was appointed as its first Manager. The title and position was later elevated to General Manager.

almost 11 years Wally held this position and became the 'en of the Unit Trust movement in South Africa. Except one year, he held the position of Chairman of the ;ociation of Unit Trusts from 1969 to 1979.

the latter years of his working life his health left much be desired and he sought early retirement at the age of He nevertheless became involved, and played a major .e, in placing a prominent social club back onto a sound ıancial footing. He was a committee member, chairman and :er made an Honorary Life Member of the same club.

was a lodge member for many years and took an active :erest in every club of which he was a member. He loved wild life and spent some time each year during his :irement in visiting game parks, especially the Kruger :k.

.ly leaves a wife, Elizabeth, two sons and two daughters whom he was a devoted husband and father. We express our ırtfelt sympathies to them in the loss that they suffered ›n Wally died on 17 June 1987.

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NOTES