

UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER 2006

TITLE OF PAPER : INDIRECT TECHNIQUES OF DEMOGRAPHIC ESTIMATION

COURSE CODE : DEM 303

TIME ALLOWED : THREE (3) HOURS

**INSTRUCTIONS : ANSWER ALL QUESTIONS FROM SECTION A
AND ANY THREE (3) QUESTIONS FROM
SECTION B.**

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SECTION A: ANSWER ALL QUESTIONS

QUESTION 1 (4+12+4 marks)

- a. Discuss the importance of indirect estimation in demography. Elaborate your answer with an example.
- b. Describe briefly the characteristics of each region (family) of the Coale and Demeny regional model life tables.
- c. Describe how you would select a model life table from the Coale and Demeny regional model life tables to use in specific demographic estimation.

QUESTION 2 (6+10+4 marks)

- a. What are the uses of Brass logit system?
- b. Fit the Brass logit model on the following life table:

Age (x)	l_x
15	96457
20	95800
25	94912
30	94042
35	93044
40	91645
45	89537
50	86259

- c. What are meanings of the Brass parameters obtained above?

SECTION B: ANSWER ANY THREE (3) QUESTIONS

QUESTION 3 (4+4+12 marks)

- a. What are the assumptions of the widowhood method for estimating adult mortality?
- b. What data are required to make use of the widowhood method?
- c. Outline the computational procedure for estimating the conditional female conditional survivorship probabilities using the widowhood method.

QUESTION 4 (4+16 marks)

- a. One method of estimating fertility is by using the increment of cohort parities between two surveys/censuses. Under what conditions is it appropriate to use this method?
- b. The data below show the average parities of women at two surveys 5 years apart ($P(i, 1)$ and $P(i, 2)$). Using the data calculate the inter-survey age specific fertility rates $f(1, s)$, $f(2, s)$, and $f(3, s)$.

Age Group	i	$P(i,1)$	$P(i,2)$
15-19	1	0.131	0.127
20-24	2	0.994	0.884
25-29	3	2.409	2.126
30-34	4	3.819	3.481
35-39	5	5.082	4.660
40-44	6	5.921	5.677

You may find the following formula useful:

$$\phi(i,s) = 0.9283 P(i, s) + 0.4547 P(i+1, s) - 0.0585 P(i+2, s) - 0.3245 \phi(i-1, s);$$

where $P(i,s) = P(i-1,s) + P(i, 2) - P(i-1, 1)$

QUESTION 5 (10+10 marks)

Describe any two of the following indirect demographic estimation methods. Make sure to include data requirements and computational procedures of each method.

- a. Sisterhood method;
- b. Orphanhood method; and
- c. Brass P/F Ratio Method.

QUESTION 6 (6+4+10+4 marks)

- a. Describe any three uses of model life tables.
- b. Explain the meaning of the parameters of the Brass Relational Gompertz model.
- c. What are the assumptions of the Coale and Trussel marital fertility model? What are the meanings of the parameters of the model?
- d. What is the difference between relational models and parametric models?

QUESTION 7 (5+10+5 marks)

- a. What are the assumptions of the Brass method for estimating childhood mortality using information from women on proportion of children dead?
- b. You are given the data below on average parity per woman and proportion of children dead classified by age group of women.

Age group	i	Average Parity	Proportion Dead
15-19	1	0.156	0.0959
20-24	2	1.326	0.1218
25-29	3	2.765	0.1485

Using Trussel's variant of the Brass method, calculate $q(2)$ and $q(3)$. You may find the following information useful:

i	a(i)	b(i)	c(i)
1	1.0819	-3.0005	0.8689
2	1.2846	-0.6181	-0.3024
3	1.2223	0.0851	-0.4704

- c. What are the limitations of the above method?

ANNEX II

General and African Standard Life Table l_x 's and Logits

General standard			African standard		
x	l_x	$Y_x(x)$	x	l_x	$Y_x(x)$
0	1.0000		0	1.0000	
1	0.8499	-0.8670	1	0.8802	-0.9972
2	0.8070	-0.7153	2	0.8335	-0.8053
3	0.7876	-0.6553	3	0.8101	-0.7253
4	0.7762	-0.6218	4	0.7964	-0.6820
5	0.7691	-0.6016	5	0.7863	-0.6514
10	0.7502	-0.5498	10	0.7502	-0.5498
15	0.7362	-0.5131	15	0.7362	-0.5131
20	0.7130	-0.4551	20	0.7130	-0.4551
25	0.6826	-0.3829	25	0.6326	-0.3829
30	0.6525	-0.3150	30	0.6525	-0.3150
35	0.6223	-0.2496	35	0.6223	-0.2496
40	0.5898	-0.1817	40	0.5898	-0.1817
45	0.5535	-0.1073	45	0.5535	-0.1073
50	0.5106	-0.0212	50	0.5106	-0.0212
55	0.4585	0.0832	55	0.4585	0.0832
60	0.3965	0.2100	60	0.3965	0.2100
65	0.3210	0.3746	65	0.3210	0.3746
70	0.2380	0.5818	70	0.2380	0.5818
75	0.1516	0.8611	75	0.1516	0.8611
80	0.0768	1.2433	80	0.0768	1.2433
85	0.0276	1.7810	85	0.0276	1.7810
90	0.0059	2.5634	90	0.0059	2.5634
95	0.0006	3.7090	95	0.0006	3.7090
100	0.0000		100	0.0000	

Source: Carrier and Hobcraft (1973) (These are the smoothed and extended versions of the original standard)