University of Colombo
Faculty of Arts
Bachelor of Arts Degree Examination (Special) - Fourth Year
Semester End Examination- Semester I - 2021/2022
DMG 4168: Labour Force Projection Methods

Answer three (03) questions only. **Time: Two (02) hours**
Calculaters can be used.
This paper contains five (05) questions and five (05) pages

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1. a) Discuss the importance of doing labour force projections in a country by citing examples

(10 Marks)

b) State two labour market indicators and explain the trends and patterns of those by taking Sri Lanka as an example.

(10 Marks)

2. a) Explain why the age-sex structure should be considered when conducting labour force projections in a country.

(05 Marks)

b) Below table shows the male activity rates in 2015 and 2020 for Country 'Z'. Project male activity rates for the year 2025 by using the direct extrapolation method. Use equation 'b' for the calculation.

(12 Marks)

Age groups	Male activity rates 2015	Male activity rates 2020
15-19	57.2	44.5
20-24	82.3	82.4
25-29	97.2	93.5
30-34	96.3	96.1
35-39	97.4	94.8
40-44	98.9	97.3
45-49	96.3	94.4
50-54	91.7	95.8
55-59	84.4	92.2
60-64	80.4	85.2
65+	84.2	68.2

C) Interpret your results. (03 Marks)

3. a) Explain the importance of projecting future labour force by using cohort extrapolation method.

(04 Marks)

b) Below table shows the population data for country 'X'. By using those data calculate the relative and absolute contribution of population growth and changes in activity rates to determine the size of the economically active population in that country.

(12 Marks)

Economicall active population in thousands (15 years and above)	**Symbal**	**Year 2000**	**Year 2005**
Total	A_{Σ}	78,357	101,408
Male	A_m	51,705	65,981
Female	A_f	26,653	36,427
Population in thousand (15 years and above)			
Total	P_{Σ}	138,261	173,908
Male	P_m	67,205	84,123
Female	P_f	71,056	89,785

C) Interpret your results.

(04 Marks)

4. a) Below table shows the projected data sheet which obtained from a working life tables. Elaborate it.

Age groups	Net years of active life 1980	Net years of active life 1985	Total difference	net working life based on 1980 activity rates and 1985 nLx	Difference due to activity rates	Difference due to mortality
15-19	30.1	30	-0.1	30.6	-.0.6	0.5
20-24	27.3	27.2	-0.1	27.6	-0.4	0.3
25-29	23.6	23.5	-0.1	23.9	-0.4	0.3
30-34	19.4	19.3	-0.1	19.6	-0.3	0.2
35-39	15	14.8	-0.2	15.2	-0.4	0.2
40-49	10.5	10.3	-0.2	10.6	-0.3	0.1
50-59	6.4	6.2	-0.2	6.4	-0.2	0.0

(05 Marks)

b) Using the data given below project labour force entries and separations of male active population in country 'Y' and calculate,

(i) Labour force replacement ratio and

(ii) Labour force replacement rate.

(10 Marks)

Age Groups	Male Active Population	
	2010	2015
15-19	1,092.7	1,329.2
20-24	1,159.5	1,357.3
25-29	1,125.7	1,262.4
30-34	1,030.5	1,125.1
35-39	854.7	1,001.8
40-44	689.7	809.2
45-49	553.5	642.9
50-54	447.4	492.3
55-59	345.9	386.5
60+	502.2	592.1

c) Interpret your results and provide the suggestions you can make from the results.

(05 Marks)

5. a) Discuss the use of labour force projections when studying labour supply in a country by citing examples.

(06 Marks)

b) Explain the recent trends and patterns of labour demand and labour supply in Sri Lanka.

(14 Marks)

Required Formulars for Calculation

Direct Extrapolation

$$a_{t1}^{x} = a_{t}^{x} \frac{100 \pm \Delta_{t,t1}^{x}}{100}$$

Equation A

$$\Delta_{t,t1}^{x} = \left(\frac{a_{t}^{x}}{a_{t0}^{x}}\right)\left(\frac{a_{t}^{x} \times u_{t}^{x}}{a_{t0}^{x} \times u_{t0}^{x}}\right)$$

Equation B

$$\Delta_{t,t1}^{x} = 1 + \left(\frac{a_{t}^{x}}{a_{t0}^{x}} - 1\right)\left(\frac{a_{t}^{x} \times u_{t}^{x}}{a_{t0}^{x} \times u_{t0}^{x}}\right)$$

Indirect Extrapolation

$$a_{t1}^{x} = 100 - (u_{t}^{x} \cdot \infty)$$

$$\infty = \frac{u_{t}^{x}}{u_{t0}^{x}}$$

$$\Delta_{t,t1}^{x} = (u_{t}^{x} \cdot \infty)\left(\frac{a_{t}^{x} \times u_{t}^{x}}{a_{t0}^{x} \times u_{t0}^{x}}\right) - 100$$

Equation A

$$\Delta_{t,t1}^{x} = \left[\infty\left(\frac{a_{t}^{x} \times u_{t}^{x}}{a_{t0}^{x} \times u_{t0}^{x}}\right)\right] \times u_{t}^{x}$$

Equation B

$$\Delta_{t,t1}^{x} = \left[1 + (\infty - 1)\left(\frac{a_{t}^{x} \times u_{t}^{x}}{a_{t0}^{x} \times u_{t0}^{x}}\right)\right] \times u_{t}^{x}$$

Calculate the change in male activity rate

$$P_{amt1}\left(a_{mt1} - a_{mt}\right)$$

Calculate the change in female activity rate

$$P_{aft1}\left(a_{ft1} - a_{ft}\right)$$

Calculate share of the male population

$$\frac{(a_{mt} \times P_{mt1} + a_{ft} \times P_{ft}) - (a_{mt} \times P_{mt} + a_{ft} \times P_{ft})}{100}$$

Calculate share of the female population

$$\frac{(a_{mt} \times P_{mt} + a_{ft} \times P_{ft1}) - (a_{mt} \times P_{mt} + a_{ft} \times P_{ft})}{100}$$