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638 MODEL MIGRATION SCHEDULES:  
A TECHNICAL APPENDIX

Andrei Rogers  
Luis Castro

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INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS  
A-2361 Laxenburg, Austria

## PREFACE

Interest in human settlement systems and policies has been a central part of urban-related work at IIASA since its inception. From 1975 through 1978 this interest was manifested in the work of the *Migration and Settlement Task*, which was formally concluded in November 1978. Since then, attention has turned to dissemination of the Task's results and to the conclusion of its comparative study, which is carrying out a comparative quantitative assessment of recent migration patterns and spatial population dynamics in all of IIASA's 17 NMO countries.

This paper is a technical appendix to *Model Schedules in Multistate Demographic Analysis: The Case of Migration* and sets out the more than 600 model migration schedules that were fitted for the comparative analysis presented in that paper.

Reports, summarizing previous work on migration and settlement at IIASA, are listed at the back of this paper. They should be consulted for further details regarding the data base that underlies this study.

Andrei Rogers  
Chairman  
Human Settlements  
and Services Area

## ACKNOWLEDGMENTS

The authors are grateful to the many national collaborating scholars who have participated in IIASA's Comparative Migration and Settlement Study. This paper could not have been written without the data bank produced by their collective efforts. Thanks also go to Richard Raquillet for his contributions to the early phases of this study and to Walter Kogler for his untiring efforts on our behalf in front of a console in IIASA's computer center.

## ABSTRACT

This paper is a technical appendix to *Model Schedules in Multistate Demographic Analysis: The Case of Migration* and sets out the more than 600 model migration schedules that were fitted for the comparative analysis presented in that paper.

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ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF  
OBSERVED MODEL MIGRATION SCHEDULES

Symbols

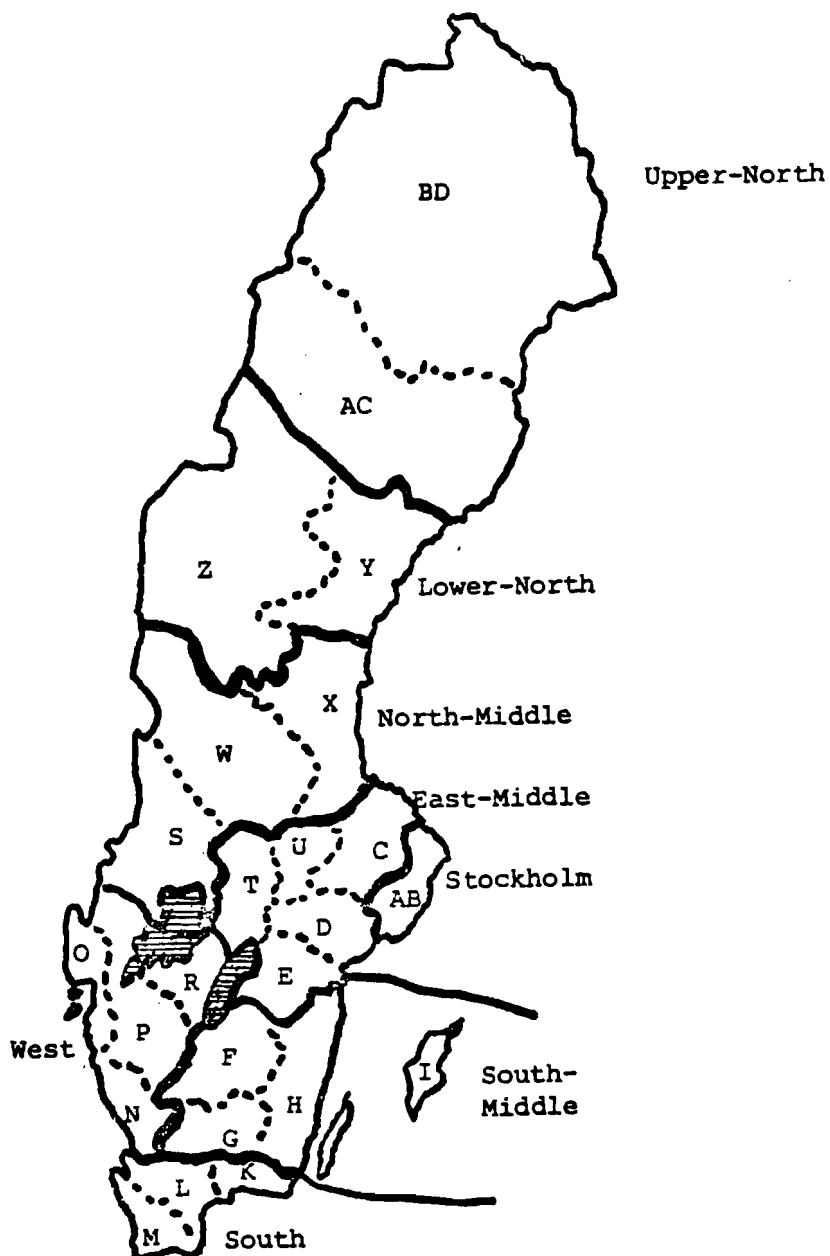
|           |   |
|-----------|---|
| GMR (OBS) | Observed gross migraproduction rate           |
| GMR (MMS) | Unit gross migraproduction rate               |
| MAE%M     | Goodness-of-fit index*                        |
| A1        | $a_1$   |
| Alpha1    | $\alpha_1$                                    |
| A2        | $a_2$   |
| Alpha2    | $\alpha_2$                                    |
| Lambda2   | $\lambda_2$                                   |
| A3        | $a_3$   |
| Mu3       | $\mu_3$                                       |
| Alpha3    | $\alpha_3$                                    |
| Lambda3   | $\lambda_3$                                   |
| c         | c   |
| Mean age  | Mean age of migration schedule                |
| % (0-14)  | Percentage of GMR in 0-14 age interval        |
| % (15-64) | Percentage of GMR in 15-64 age interval       |
| % (65+)   | Percentage of GMR in 65 and over age interval |
| Delta1c   | $\delta_{1c} = a_1/c$                         |
| Delta12   | $\delta_{12} = a_1/a_2$                       |
| Delta32   | $\delta_{32} = a_3/a_2$                       |
| Beta12    | $\beta_{12} = \alpha_1/\alpha_2$              |
| Sigma2    | $\sigma_2 = \lambda_2/\alpha_2$               |
| Sigma3    | $\sigma_3 = \lambda_3/\alpha_3$               |
| X low     | $x_l$ = the low point                         |
| X high    | $x_h$ = the high point                        |
| X ret.    | $x^r$ = the retirement peak                   |
| X shift   | $X^r$ = the labor force shift                 |
| A         | A = the parental shift                        |
| B         | B = the jump                                  |

---

\*Mean absolute error as a percentage of the observed mean.

SWEDEN

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF OBSERVED MODEL MIGRATION SCHEDULES \*



REGION NUMBER:

- |                        |                        |
|------------------------|------------------------|
| 1. Stockholm           | 5. West                |
| 2. East Middle-Sweden  | 6. North Middle-Sweden |
| 3. South Middle-Sweden | 7. Lower North-Sweden  |
| 4. South               | 8. Upper North-Sweden  |

\*Input data are for single-years of age. This is the only country in the comparative study for which this is the case.

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.49721  | 0.14028  | 0.18003  | 0.16041  | 0.23770  | 0.12798  | 0.11080  | 1.45443  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 14.38755 | 18.73808 | 18.38059 | 17.52322 | 16.05068 | 23.20831 | 19.79624 | 6.91029  |
| a1                | 0.02932  | 0.02749  | 0.01617  | 0.02775  | 0.03131  | 0.02884  | 0.04425  | 0.02921  |
| alpha1            | 0.10390  | 0.09740  | 0.06715  | 0.09068  | 0.12939  | 0.11569  | 0.15283  | 0.09737  |
| a2                | 0.03624  | 0.03431  | 0.04539  | 0.04400  | 0.04067  | 0.04472  | 0.07344  | 0.04076  |
| mu2               | 20.52766 | 21.48693 | 25.74848 | 20.15494 | 21.76578 | 22.73165 | 20.81563 | 20.80080 |
| alpha2            | 0.06941  | 0.09232  | 0.14450  | 0.07750  | 0.08806  | 0.09838  | 0.10252  | 0.07706  |
| lambda2           | 0.44182  | 0.31818  | 0.14625  | 0.61686  | 0.31284  | 0.25979  | 0.35142  | 0.37440  |
| a3                | 0.00000  | 0.00016  | 0.00022  | 0.00390  | 0.00010  | 0.00000  | 0.00000  | 0.00014  |
| mu3               | 0.00000  | 73.32459 | 74.92422 | 77.69675 | 76.69698 | 0.00000  | 0.00000  | 76.55451 |
| alpha3            | 0.00000  | 0.94211  | 0.86034  | 0.27276  | 0.85776  | 0.00000  | 0.00000  | 0.77600  |
| lambda3           | 0.00000  | 0.18034  | 0.16482  | 0.11187  | 0.14679  | 0.00000  | 0.00000  | 0.14487  |
| c                 | 0.00311  | 0.00453  | 0.00516  | 0.00181  | 0.00362  | 0.00472  | 0.00131  | 0.00215  |
| mean age          | 31.75264 | 33.56488 | 35.86642 | 30.73515 | 34.12481 | 33.36843 | 26.14594 | 31.02171 |
| % (0-14)          | 25.46029 | 26.52260 | 21.41147 | 24.18183 | 24.55616 | 25.12213 | 26.52485 | 25.60827 |
| % (15-64)         | 63.88061 | 59.15461 | 61.85583 | 65.58600 | 61.27226 | 61.50196 | 69.22668 | 64.49210 |
| % (65+ )          | 10.65910 | 14.32279 | 16.73270 | 10.23217 | 14.17159 | 13.37591 | 4.24847  | 9.89963  |
| delta1c           | 9.43177  | 6.06509  | 3.13523  | 15.29907 | 8.64841  | 6.10613  | 33.70855 | 13.55640 |
| delta12           | 0.80899  | 0.80125  | 0.35630  | 0.63065  | 0.76989  | 0.64480  | 0.60261  | 0.71646  |
| delta32           | 0.00000  | 0.00461  | 0.00490  | 0.08854  | 0.00240  | 0.00000  | 0.00000  | 0.00344  |
| beta12            | 1.49699  | 1.05500  | 0.46474  | 1.17007  | 1.46937  | 1.17591  | 1.49074  | 1.26349  |
| sigma2            | 6.36588  | 3.44651  | 1.01214  | 7.95960  | 3.55263  | 2.64070  | 3.42785  | 4.85854  |
| sigma3            | 0.00000  | 0.19142  | 0.19158  | 0.41012  | 0.17113  | 0.00000  | 0.00000  | 0.18669  |
| x low             | 16.76027 | 16.42026 | 13.35019 | 17.28028 | 16.41026 | 16.27026 | 15.72025 | 16.39026 |
| x high            | 24.41044 | 24.97046 | 25.30046 | 23.33042 | 25.59047 | 26.19049 | 24.21044 | 24.68045 |
| x ret.            | 0.00000  | 64.08767 | 64.86784 | 68.85869 | 64.60778 | 0.00000  | 0.00000  | 64.79782 |
| x shift           | 7.65018  | 8.55020  | 11.95027 | 6.05014  | 9.18021  | 9.92023  | 8.49019  | 8.29019  |
| a                 | 28.53181 | 25.07877 | 28.46198 | 28.51704 | 29.00578 | 28.77503 | 29.61704 | 27.86707 |
| b                 | 0.01904  | 0.01345  | 0.01148  | 0.02602  | 0.01735  | 0.01625  | 0.03337  | 0.01991  |

- 1 sweden males 1 to 2
- 2 sweden males 1 to 3
- 3 sweden males 1 to 4
- 4 sweden males 1 to 5
- 5 sweden males 1 to 6
- 6 sweden males 1 to 7
- 7 sweden males 1 to 8
- 8 sweden males 1 to the rest



|           | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs) | 0.44882  | 0.46135  | 0.15383  | 0.15250  | 0.23148  | 0.26972  | 0.08317  | 0.10183  | 1.44136  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| maeZm     | 11.79447 | 11.87554 | 19.55754 | 19.08109 | 15.31033 | 14.72713 | 28.61857 | 22.77179 | 7.75375  |
| al        | 0.01885  | 0.02513  | 0.02750  | 0.02134  | 0.02479  | 0.02898  | 0.03509  | 0.03364  | 0.02454  |
| alpha1    | 0.08413  | 0.10612  | 0.09468  | 0.04069  | 0.07769  | 0.11561  | 0.09006  | 0.10608  | 0.08796  |
| a2        | 0.06903  | 0.07136  | 0.05142  | 0.04009  | 0.05771  | 0.04863  | 0.04295  | 0.06998  | 0.05508  |
| mu2       | 19.81710 | 20.74837 | 20.99720 | 20.88873 | 20.65335 | 20.29992 | 20.67274 | 22.76923 | 20.27023 |
| alpha2    | 0.10337  | 0.12122  | 0.08546  | 0.09550  | 0.09493  | 0.08310  | 0.05701  | 0.11486  | 0.08966  |
| lambda2   | 0.43329  | 0.44707  | 0.35699  | 0.57927  | 0.42594  | 0.37255  | 0.40364  | 0.25322  | 0.40564  |
| a3        | 0.00000  | 0.00000  | 0.00000  | 0.00001  | 0.00004  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3       | 0.00000  | 0.00000  | 0.00000  | 75.07949 | 73.71991 | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3    | 0.00000  | 0.00000  | 0.00000  | 1.26871  | 1.13584  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3   | 0.00000  | 0.00000  | 0.00000  | 0.18770  | 0.19971  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c         | 0.00217  | 0.00292  | 0.00241  | 0.00124  | 0.00165  | 0.00289  | 0.00000  | 0.00225  | 0.00202  |
| mean age  | 29.45881 | 29.58655 | 29.99906 | 30.30155 | 28.90131 | 30.82533 | 28.31009 | 28.02732 | 29.16633 |
| Z(0-14)   | 18.64863 | 22.27053 | 24.12612 | 24.40201 | 23.35133 | 23.65187 | 26.63632 | 26.81819 | 22.81134 |
| Z(15-64)  | 74.56419 | 69.21748 | 67.97430 | 67.11652 | 69.99423 | 67.04594 | 68.71913 | 66.57432 | 70.38004 |
| Z(65+ )   | 6.78719  | 8.51199  | 7.89958  | 8.48147  | 6.65444  | 9.30219  | 4.64455  | 6.60749  | 6.80862  |
| deltac    | 8.67208  | 8.60623  | 11.42894 | 17.21542 | 15.06980 | 10.02908 | 0.00000  | 14.96033 | 12.14336 |
| delta12   | 0.27310  | 0.35221  | 0.53480  | 0.53239  | 0.42962  | 0.59591  | 0.81710  | 0.48074  | 0.44555  |
| delta32   | 0.00000  | 0.00000  | 0.00000  | 0.00036  | 0.00070  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12    | 0.81387  | 0.87545  | 1.10792  | 0.42608  | 0.81842  | 1.39118  | 1.57959  | 0.92351  | 0.98098  |
| sigma2    | 4.19165  | 3.68807  | 4.17721  | 6.06593  | 4.48710  | 4.48313  | 7.07970  | 2.20451  | 4.52395  |
| sigma3    | 0.00000  | 0.00000  | 0.00000  | 0.14795  | 0.17583  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low     | 15.50024 | 16.54026 | 16.20026 | 17.78029 | 16.47026 | 15.70024 | 16.69027 | 15.88025 | 15.92025 |
| x high    | 23.01041 | 23.57043 | 24.74045 | 23.79043 | 23.97043 | 24.11044 | 25.07046 | 25.65047 | 23.78043 |
| x ret.    | 0.00000  | 0.00000  | 0.00000  | 64.83783 | 64.87784 | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift   | 7.51017  | 7.03016  | 8.54020  | 6.01014  | 7.50017  | 8.41019  | 8.38019  | 9.77022  | 7.86018  |
| a         | 31.63033 | 28.79039 | 29.85372 | 27.18375 | 29.28372 | 29.99037 | 30.29180 | 28.51042 | 29.98704 |
| b         | 0.03500  | 0.03441  | 0.02375  | 0.02151  | 0.02832  | 0.02341  | 0.02187  | 0.02493  | 0.02768  |

- 1 sweden males 2 to 1
- 2 sweden males 2 to 2
- 3 sweden males 2 to 3
- 4 sweden males 2 to 4
- 5 sweden males 2 to 5
- 6 sweden males 2 to 6
- 7 sweden males 2 to 7
- 8 sweden males 2 to 8
- 9 sweden males 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.22279  | 0.27829  | 0.29545  | 0.34976  | 0.33738  | 0.07395  | 0.02427  | 0.04074  | 1.32718  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 19.81826 | 19.76009 | 16.83701 | 18.80753 | 18.06145 | 34.43987 | 65.50159 | 46.17618 | 12.02934 |
| a1                | 0.01550  | 0.02803  | 0.02338  | 0.02032  | 0.02717  | 0.03347  | 0.03120  | 0.03448  | 0.02409  |
| alpha1            | 0.03940  | 0.11992  | 0.05036  | 0.07682  | 0.11137  | 0.10996  | 0.17194  | 0.08780  | 0.09607  |
| a2                | 0.08437  | 0.07861  | 0.04076  | 0.05961  | 0.07030  | 0.05573  | 0.00341  | 0.04905  | 0.06884  |
| mu2               | 19.94683 | 20.15295 | 19.69622 | 19.55542 | 20.37078 | 21.07617 | 42.83605 | 20.27207 | 19.91879 |
| alpha2            | 0.13853  | 0.12198  | 0.07157  | 0.09329  | 0.10354  | 0.09343  | 0.43459  | 0.05837  | 0.10435  |
| lambda2           | 0.62864  | 0.37244  | 0.93646  | 0.41451  | 0.33839  | 0.43068  | 0.09271  | 0.49369  | 0.40439  |
| a3                | 0.00000  | 0.00000  | 0.00821  | 0.00000  | 0.00000  | 0.00012  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 64.63842 | 0.00000  | 0.00000  | 74.08085 | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.27775  | 0.00000  | 0.00000  | 1.13267  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 1.64049  | 0.00000  | 0.00000  | 0.20566  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00124  | 0.00269  | 0.00000  | 0.00219  | 0.00212  | 0.00251  | 0.00634  | 0.00000  | 0.00196  |
| mean age          | 28.17307 | 28.63306 | 28.14944 | 29.52734 | 28.63773 | 30.27205 | 33.43046 | 28.57291 | 28.28833 |
| % (0-14)          | 18.35129 | 22.13937 | 23.83321 | 20.30061 | 21.85455 | 25.29545 | 19.70188 | 24.45666 | 21.39600 |
| % (15-64)         | 76.02036 | 70.17955 | 70.51842 | 72.64585 | 71.64287 | 65.05975 | 66.19437 | 71.09943 | 72.47239 |
| % (65+ )          | 5.62836  | 7.68108  | 5.64838  | 7.05354  | 6.50259  | 9.64480  | 14.10374 | 4.44392  | 6.13161  |
| delta1c           | 12.45392 | 10.42499 | 0.00000  | 9.26599  | 12.80452 | 13.35583 | 4.92144  | 0.00000  | 12.26357 |
| delta12           | 0.18373  | 0.35661  | 0.57357  | 0.34082  | 0.38657  | 0.60052  | 9.16108  | 0.70303  | 0.34997  |
| delta32           | 0.00000  | 0.00000  | 0.20141  | 0.00000  | 0.00000  | 0.00214  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.28444  | 0.98308  | 0.70366  | 0.82347  | 1.07562  | 1.17700  | 0.39564  | 1.50416  | 0.92063  |
| sigma2            | 4.53795  | 3.05320  | 13.08435 | 4.44309  | 3.26830  | 4.60983  | 0.21334  | 8.45777  | 3.87523  |
| sigma3            | 0.00000  | 0.00000  | 5.90629  | 0.00000  | 0.00000  | 0.18157  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 16.74027 | 15.18023 | 17.73029 | 15.20023 | 15.07023 | 16.98027 | 14.12021 | 16.85027 | 15.41024 |
| x high            | 22.30040 | 23.04041 | 22.28040 | 22.97041 | 23.71043 | 24.45045 | 26.15048 | 24.27044 | 23.12041 |
| x ret.            | 0.00000  | 0.00000  | 65.66801 | 0.00000  | 0.00000  | 65.73802 | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 5.56013  | 7.86018  | 4.55010  | 7.77018  | 8.64020  | 7.47017  | 12.03028 | 7.42017  | 7.71018  |
| a                 | 29.26702 | 28.70037 | 28.87369 | 30.77034 | 30.43036 | 28.39706 | 28.91473 | 31.49702 | 29.93369 |
| b                 | 0.04425  | 0.03428  | 0.02804  | 0.02954  | 0.03111  | 0.02584  | 0.03064  | 0.02533  | 0.03347  |

- 1 sweden males 3 to 1
- 2 sweden males 3 to 2
- 3 sweden males 3 to 3
- 4 sweden males 3 to 4
- 5 sweden males 3 to 5
- 6 sweden males 3 to 6
- 7 sweden males 3 to 7
- 8 sweden males 3 to 8
- 9 sweden males 3 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.18669  | 0.14428  | 0.20545  | 0.58375  | 0.21547  | 0.05748  | 0.02478  | 0.03378  | 0.86793  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 17.90503 | 25.11287 | 19.02630 | 15.50543 | 20.75154 | 35.25547 | 48.29742 | 41.58521 | 10.93030 |
| al                | 0.02136  | 0.02695  | 0.02644  | 0.02267  | 0.03298  | 0.03120  | 0.02568  | 0.04891  | 0.02861  |
| alpha1            | 0.10034  | 0.12490  | 0.10059  | 0.10246  | 0.14833  | 0.10513  | 0.06762  | 0.14740  | 0.11726  |
| a2                | 0.07544  | 0.08532  | 0.07130  | 0.05697  | 0.08796  | 0.05564  | 0.04265  | 0.08066  | 0.07587  |
| mu2               | 20.05895 | 21.93276 | 21.33914 | 19.79724 | 22.50582 | 21.88145 | 18.88110 | 20.90952 | 21.17063 |
| alpha2            | 0.11654  | 0.13676  | 0.12309  | 0.10374  | 0.12629  | 0.11205  | 0.07271  | 0.09079  | 0.11503  |
| lambda2           | 0.36309  | 0.21836  | 0.31960  | 0.40962  | 0.21303  | 0.50253  | 0.49753  | 0.25343  | 0.26886  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00285  | 0.00326  | 0.00305  | 0.00360  | 0.00233  | 0.00433  | 0.00285  | 0.00000  | 0.00216  |
| mean age          | 29.80396 | 29.77975 | 29.55778 | 31.30268 | 28.57587 | 31.37809 | 30.38947 | 24.71596 | 28.26020 |
| % (0-14)          | 19.63763 | 21.56236 | 23.51498 | 21.49950 | 22.05305 | 25.92904 | 23.85927 | 26.43092 | 22.76177 |
| % (15-64)         | 72.12371 | 69.39305 | 67.76852 | 67.96104 | 71.25178 | 62.64716 | 67.24651 | 72.21613 | 70.73129 |
| % (65+ )          | 8.23866  | 9.04459  | 8.71650  | 10.53946 | 6.69518  | 11.42380 | 8.89422  | 1.35294  | 6.50694  |
| deltalc           | 7.49798  | 8.25829  | 8.66074  | 6.29003  | 14.18169 | 7.21011  | 8.99523  | 0.00000  | 13.27378 |
| delta12           | 0.28314  | 0.31585  | 0.37077  | 0.39786  | 0.37499  | 0.56075  | 0.60207  | 0.60644  | 0.37703  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.86098  | 0.91326  | 0.81726  | 0.98763  | 1.17455  | 0.93825  | 0.93003  | 1.62339  | 1.01937  |
| sigma2            | 3.11568  | 1.59669  | 2.59658  | 3.94838  | 1.68685  | 4.48492  | 6.84262  | 2.79128  | 2.33723  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 14.93023 | 13.53020 | 15.65024 | 15.39024 | 13.94020 | 18.24030 | 15.48024 | 14.29021 | 14.52022 |
| x high            | 23.07041 | 23.92043 | 24.16044 | 23.00041 | 24.84045 | 24.75045 | 22.41040 | 24.77045 | 24.16044 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.14019  | 10.39024 | 8.51019  | 7.61017  | 10.90025 | 6.51015  | 6.93016  | 10.48024 | 9.64022  |
| a                 | 30.27750 | 29.55116 | 28.33373 | 29.08703 | 31.14039 | 27.06376 | 27.63704 | 31.16268 | 29.89610 |
| b                 | 0.03325  | 0.02771  | 0.02841  | 0.02702  | 0.03004  | 0.02549  | 0.02031  | 0.02998  | 0.02966  |

- 1 sweden males 4 to 1
- 2 sweden males 4 to 2
- 3 sweden males 4 to 3
- 4 sweden males 4 to 4
- 5 sweden males 4 to 5
- 6 sweden males 4 to 6
- 7 sweden males 4 to 7
- 8 sweden males 4 to 8
- 9 sweden males 4 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.14456  | 0.15766  | 0.13176  | 0.16788  | 0.83908  | 0.11354  | 0.03729  | 0.04940  | 0.80208  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 18.46101 | 16.36193 | 16.58056 | 16.99601 | 6.32477  | 18.85471 | 31.45989 | 25.26701 | 9.32050  |
| al                | 0.01852  | 0.02679  | 0.02540  | 0.02010  | 0.03128  | 0.03804  | 0.04257  | 0.03357  | 0.02602  |
| alpha1            | 0.06495  | 0.09232  | 0.07356  | 0.05861  | 0.11522  | 0.14443  | 0.11601  | 0.09411  | 0.08951  |
| a2                | 0.06457  | 0.06832  | 0.05347  | 0.04441  | 0.05475  | 0.06685  | 0.04732  | 0.05950  | 0.05692  |
| mu2               | 20.21026 | 20.99600 | 21.02562 | 19.90371 | 20.77676 | 21.16585 | 19.60741 | 19.94070 | 20.36493 |
| alpha2            | 0.09692  | 0.10759  | 0.11000  | 0.07835  | 0.08593  | 0.11041  | 0.06156  | 0.07786  | 0.09146  |
| lambda2           | 0.41745  | 0.38743  | 0.45240  | 0.45754  | 0.37282  | 0.37456  | 0.59398  | 0.42721  | 0.41594  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00013  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 82.28864 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.52459  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.10170  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00169  | 0.00200  | 0.00291  | 0.00149  | 0.00185  | 0.00275  | 0.00000  | 0.00000  | 0.00180  |
| mean age          | 29.16209 | 28.16612 | 29.34510 | 30.88699 | 28.90808 | 28.81280 | 26.64668 | 25.65772 | 28.49074 |
| % (0-14)          | 19.32409 | 23.57239 | 25.88244 | 21.35281 | 24.50504 | 25.74249 | 27.75659 | 25.44501 | 23.53576 |
| % (15-64)         | 74.89941 | 70.31366 | 65.44968 | 70.00710 | 68.94920 | 66.25695 | 68.59250 | 72.53471 | 70.33982 |
| % (65+ )          | 5.77650  | 6.11395  | 8.66788  | 8.64010  | 6.54575  | 8.00056  | 3.65091  | 2.02029  | 6.12442  |
| delta1c           | 10.97071 | 13.39457 | 8.72132  | 13.51922 | 16.89068 | 13.85357 | 0.00000  | 0.00000  | 14.41825 |
| delta12           | 0.28688  | 0.39214  | 0.47503  | 0.45275  | 0.57131  | 0.56901  | 0.89970  | 0.56412  | 0.45722  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00294  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.67019  | 0.85804  | 0.66868  | 0.74805  | 1.34078  | 1.30808  | 1.88453  | 1.20869  | 0.97865  |
| sigma2            | 4.30718  | 3.60080  | 4.11270  | 5.83983  | 4.33861  | 3.39231  | 9.64897  | 5.48706  | 4.54787  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.19387  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 15.78025 | 16.32026 | 17.07028 | 16.06025 | 16.12025 | 16.31026 | 16.73027 | 15.92025 | 16.11025 |
| x high            | 23.55042 | 24.14044 | 23.95043 | 23.49042 | 24.52045 | 24.32044 | 23.18042 | 23.67043 | 23.80043 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 65.53798 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 7.77018  | 7.82018  | 6.88016  | 7.43017  | 8.40019  | 8.01018  | 6.45015  | 7.75018  | 7.69018  |
| a                 | 31.87034 | 29.22039 | 26.54375 | 30.40369 | 30.34037 | 28.76039 | 29.43748 | 29.76371 | 29.56704 |
| b                 | 0.03222  | 0.03151  | 0.02521  | 0.02375  | 0.02714  | 0.03017  | 0.02775  | 0.03031  | 0.02876  |

- 1 sweden males 5 to 1
- 2 sweden males 5 to 2
- 3 sweden males 5 to 3
- 4 sweden males 5 to 4
- 5 sweden males 5 to 5
- 6 sweden males 5 to 6
- 7 sweden males 5 to 7
- 8 sweden males 5 to 8
- 9 sweden males 5 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.28526  | 0.39119  | 0.05726  | 0.06849  | 0.22765  | 0.15697  | 0.10660  | 0.08057  | 1.21702  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 18.00820 | 15.38055 | 39.60669 | 40.26777 | 18.57688 | 26.72211 | 26.33018 | 29.42573 | 10.73805 |
| al                | 0.01859  | 0.02648  | 0.02810  | 0.02626  | 0.02444  | 0.02681  | 0.03192  | 0.03946  | 0.02544  |
| alpha1            | 0.10376  | 0.10924  | 0.07782  | 0.09976  | 0.11295  | 0.10497  | 0.10674  | 0.11958  | 0.10380  |
| a2                | 0.09088  | 0.07645  | 0.06116  | 0.04358  | 0.07994  | 0.04656  | 0.04120  | 0.07070  | 0.06899  |
| mu2               | 19.31207 | 20.21748 | 25.50892 | 17.32828 | 20.45310 | 19.96216 | 19.27206 | 22.73706 | 19.75376 |
| alpha2            | 0.12250  | 0.11721  | 0.10526  | 0.06017  | 0.12343  | 0.07881  | 0.06321  | 0.10426  | 0.10330  |
| lambda2           | 0.51752  | 0.40102  | 0.16894  | 0.34878  | 0.36644  | 0.41541  | 1.13704  | 0.30610  | 0.43684  |
| a3                | 0.00000  | 0.00000  | 0.00014  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 71.79685 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 1.07409  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.19816  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00213  | 0.00229  | 0.00237  | 0.00238  | 0.00285  | 0.00309  | 0.00176  | 0.00173  | 0.00191  |
| mean age          | 28.46342 | 28.23425 | 30.74753 | 31.13234 | 29.44569 | 31.39447 | 29.72525 | 27.47707 | 28.08992 |
| % (0-14)          | 16.41148 | 21.98790 | 25.05288 | 21.27886 | 20.61826 | 22.83481 | 24.29099 | 27.45868 | 21.51865 |
| % (15-64)         | 77.42499 | 71.26087 | 67.12347 | 69.65226 | 71.24463 | 67.36741 | 68.18456 | 67.25638 | 72.50780 |
| % (65+ )          | 6.16353  | 6.75123  | 7.82365  | 9.06889  | 8.13712  | 9.79778  | 7.52446  | 5.28494  | 5.97356  |
| deltalc           | 8.72491  | 11.54908 | 11.84362 | 11.04605 | 8.57114  | 8.66918  | 18.11756 | 22.86458 | 13.33818 |
| delta12           | 0.20451  | 0.34634  | 0.45956  | 0.60262  | 0.30565  | 0.57570  | 0.77492  | 0.55811  | 0.36867  |
| delta32           | 0.00000  | 0.00000  | 0.00228  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.84696  | 0.93201  | 0.73930  | 1.65792  | 0.91510  | 1.33196  | 1.68874  | 1.14700  | 1.00479  |
| sigma2            | 4.22451  | 3.42123  | 1.60498  | 5.79623  | 2.96886  | 5.27116  | 17.98880 | 2.93600  | 4.22868  |
| sigma3            | 0.00000  | 0.00000  | 0.18449  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 15.50024 | 15.59024 | 15.57024 | 12.81018 | 15.33024 | 15.82025 | 17.64029 | 16.97027 | 15.56024 |
| x high            | 22.05039 | 23.17042 | 27.76052 | 21.90039 | 23.32042 | 23.73043 | 21.69038 | 26.08048 | 22.93041 |
| x ret.            | 0.00000  | 0.00000  | 63.16779 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 6.55015  | 7.58017  | 12.19028 | 9.09021  | 7.99018  | 7.91018  | 4.05009  | 9.11021  | 7.37017  |
| a                 | 31.42365 | 29.10371 | 30.34711 | 30.79200 | 29.66703 | 30.16369 | 29.59698 | 29.50708 | 29.91702 |
| b                 | 0.04675  | 0.03549  | 0.01626  | 0.01937  | 0.03474  | 0.02301  | 0.02888  | 0.02841  | 0.03488  |

- 1 sweden males 6 to 1
- 2 sweden males 6 to 2
- 3 sweden males 6 to 3
- 4 sweden males 6 to 4
- 5 sweden males 6 to 5
- 6 sweden males 6 to 6
- 7 sweden males 6 to 7
- 8 sweden males 6 to 8
- 9 sweden males 6 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.37027  | 0.24937  | 0.05391  | 0.08544  | 0.13971  | 0.20182  | 0.17963  | 0.23127  | 1.33180  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 18.97245 | 24.40549 | 53.02048 | 62.98674 | 36.77934 | 29.75115 | 35.53116 | 23.28769 | 11.76225 |
| al                | 0.01969  | 0.02358  | 0.03298  | 0.02634  | 0.01874  | 0.03463  | 0.03205  | 0.03406  | 0.02522  |
| alpha1            | 0.13054  | 0.08059  | 0.25450  | 0.18612  | 0.03460  | 0.16016  | 0.14934  | 0.15172  | 0.12281  |
| a2                | 0.10143  | 0.08440  | 0.06929  | 0.10038  | 0.05547  | 0.06471  | 0.05118  | 0.10391  | 0.08149  |
| mu2               | 19.24769 | 19.79847 | 16.05688 | 21.80620 | 19.30947 | 19.69341 | 20.36539 | 23.80138 | 19.61678 |
| alpha2            | 0.14950  | 0.11222  | 0.07237  | 0.13694  | 0.09098  | 0.10618  | 0.09830  | 0.15343  | 0.11775  |
| lambda2           | 0.70375  | 0.43200  | 0.21416  | 0.19407  | 1.55482  | 0.37807  | 0.79105  | 0.23748  | 0.42724  |
| a3                | 0.00000  | 0.00040  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 85.71539 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.41659  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.09179  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00322  | 0.00039  | 0.00271  | 0.00496  | 0.00000  | 0.00363  | 0.00472  | 0.00263  | 0.00222  |
| mean age          | 29.62311 | 27.38409 | 30.95752 | 32.61270 | 28.04067 | 30.51160 | 32.80505 | 28.87290 | 28.24110 |
| % (0-14)          | 16.50127 | 19.83781 | 18.20335 | 16.78674 | 19.72814 | 22.66263 | 22.79895 | 22.25990 | 19.84127 |
| % (15-64)         | 74.59553 | 74.10361 | 73.36386 | 71.53071 | 76.14981 | 67.22253 | 64.49696 | 70.48548 | 73.61060 |
| % (65+ )          | 8.90320  | 6.05858  | 8.43279  | 11.68255 | 4.12206  | 10.11485 | 12.70409 | 7.25462  | 6.54813  |
| delta1c           | 6.10535  | 60.22449 | 12.14800 | 5.30830  | 0.00000  | 9.53883  | 6.79034  | 12.92696 | 11.38261 |
| delta12           | 0.19410  | 0.27933  | 0.47590  | 0.26244  | 0.33794  | 0.53512  | 0.62619  | 0.32778  | 0.30953  |
| delta32           | 0.00000  | 0.00468  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.87321  | 0.71811  | 3.51656  | 1.35910  | 0.38031  | 1.50841  | 1.51920  | 0.98888  | 1.04298  |
| sigma2            | 4.70748  | 3.84963  | 2.95916  | 1.41718  | 17.08967 | 3.56080  | 8.04736  | 1.54783  | 3.62842  |
| sigma3            | 0.00000  | 0.22035  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 16.31026 | 15.47024 | 8.72009  | 11.97016 | 18.01030 | 14.90023 | 17.92030 | 15.59024 | 15.19023 |
| x high            | 21.43038 | 22.80041 | 21.06037 | 23.55042 | 21.10037 | 22.96041 | 22.96041 | 25.58047 | 22.56040 |
| x ret.            | 0.00000  | 68.95871 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 5.12012  | 7.33017  | 12.34028 | 11.58027 | 3.09007  | 8.06018  | 5.04012  | 9.99023  | 7.37017  |
| a                 | 29.39033 | 29.79369 | 37.28526 | 33.41398 | 30.96697 | 29.41750 | 29.46701 | 30.76039 | 30.15368 |
| b                 | 0.05398  | 0.03986  | 0.02425  | 0.02812  | 0.03890  | 0.02871  | 0.02936  | 0.03551  | 0.03955  |

- 1 sweden males 7 to 1
- 2 sweden males 7 to 2
- 3 sweden males 7 to 3
- 4 sweden males 7 to 4
- 5 sweden males 7 to 5
- 6 sweden males 7 to 6
- 7 sweden males 7 to 7
- 8 sweden males 7 to 8
- 9 sweden males 7 to the rest

|                      | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)            | 0.26875  | 0.23209  | 0.05226  | 0.06520  | 0.13308  | 0.11073  | 0.17172  | 0.23786  | 1.03383  |
| gmr (mms)            | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub>    | 22.37707 | 26.54085 | 57.28117 | 48.79062 | 32.96115 | 40.98153 | 33.53604 | 22.98794 | 14.95188 |
| al                   | 0.02127  | 0.02078  | 0.04884  | 0.01829  | 0.02194  | 0.03999  | 0.02623  | 0.03299  | 0.02336  |
| alpha1               | 0.19777  | 0.08039  | 0.37792  | 0.07491  | 0.12937  | 0.40526  | 0.13381  | 0.16523  | 0.13534  |
| a2                   | 0.12465  | 0.06384  | 0.06175  | 0.05075  | 0.09340  | 0.08879  | 0.05882  | 0.07831  | 0.07670  |
| mu2                  | 19.38876 | 19.63455 | 30.73443 | 19.09658 | 19.54120 | 23.99384 | 21.10875 | 20.33439 | 19.46920 |
| alpha2               | 0.16617  | 0.10773  | 0.19347  | 0.07291  | 0.13312  | 0.18775  | 0.09859  | 0.11341  | 0.11362  |
| lambda2              | 0.46183  | 0.85778  | 0.12435  | 1.76712  | 0.36244  | 0.21789  | 0.68476  | 0.38107  | 0.44912  |
| a3                   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3                  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3              | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                    | 0.00325  | 0.00294  | 0.00764  | 0.00300  | 0.00357  | 0.00704  | 0.00395  | 0.00279  | 0.00282  |
| mean age             | 29.71777 | 29.87549 | 37.05132 | 32.24445 | 30.33252 | 36.54450 | 32.67766 | 29.52470 | 29.91274 |
| % (0-14)             | 13.88474 | 20.58014 | 18.83870 | 17.39176 | 17.58356 | 16.75358 | 20.29725 | 20.74366 | 18.28846 |
| % (15-64)            | 77.21950 | 70.99649 | 63.51167 | 73.32820 | 72.93925 | 65.92984 | 68.65950 | 71.29800 | 73.46371 |
| % (65+)              | 8.89576  | 8.42338  | 17.64963 | 9.28004  | 9.47719  | 17.31658 | 11.04325 | 7.95834  | 8.24783  |
| deltal <sub>0</sub>  | 6.53859  | 7.05980  | 6.39003  | 6.09238  | 6.13831  | 5.67665  | 6.63788  | 11.83138 | 8.28689  |
| deltal <sub>2</sub>  | 0.17064  | 0.32544  | 0.79092  | 0.36035  | 0.23485  | 0.45039  | 0.44583  | 0.42131  | 0.30465  |
| deltal <sub>32</sub> | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta <sub>12</sub>   | 1.19014  | 0.74620  | 1.95331  | 1.02751  | 0.97177  | 2.15851  | 1.35729  | 1.45693  | 1.19110  |
| sigma <sub>2</sub>   | 2.77922  | 7.96217  | 0.64271  | 24.23831 | 2.72256  | 1.16055  | 6.94582  | 3.36017  | 3.95272  |
| sigma <sub>3</sub>   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low                | 14.79022 | 17.36028 | 12.66018 | 17.96030 | 14.22021 | 13.52020 | 18.26030 | 15.37024 | 15.21023 |
| x high               | 21.60038 | 21.99039 | 27.19051 | 20.86036 | 22.24039 | 24.69045 | 23.89043 | 23.46042 | 22.47040 |
| x ret.               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift              | 6.81016  | 4.63011  | 14.53033 | 2.90007  | 8.02018  | 11.17026 | 5.63013  | 8.09019  | 7.26017  |
| a                    | 31.51460 | 29.03035 | 37.07216 | 34.44691 | 30.36892 | 36.02877 | 32.36367 | 31.66034 | 31.61032 |
| b                    | 0.05504  | 0.03831  | 0.01966  | 0.03478  | 0.03758  | 0.02711  | 0.03321  | 0.03568  | 0.03833  |

- 1 sweden males 8 to 1
- 2 sweden males 8 to 2
- 3 sweden males 8 to 3
- 4 sweden males 8 to 4
- 5 sweden males 8 to 5
- 6 sweden males 8 to 6
- 7 sweden males 8 to 7
- 8 sweden males 8 to 8
- 9 sweden males 8 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.49345  | 0.13278  | 0.16631  | 0.15949  | 0.23508  | 0.12988  | 0.10997  | 1.42697  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 11.28757 | 20.49792 | 18.82178 | 16.58710 | 15.50700 | 20.65920 | 19.98289 | 7.29242  |
| a1                | 0.03078  | 0.02149  | 0.01923  | 0.02456  | 0.03060  | 0.02809  | 0.03472  | 0.02854  |
| alpha1            | 0.11330  | 0.08182  | 0.07126  | 0.08309  | 0.10413  | 0.07457  | 0.12062  | 0.09131  |
| a2                | 0.04703  | 0.04146  | 0.04118  | 0.04745  | 0.04541  | 0.04018  | 0.08486  | 0.04722  |
| mu2               | 19.65185 | 19.09032 | 20.16404 | 19.25090 | 19.33387 | 19.14319 | 19.33588 | 19.31926 |
| alpha2            | 0.10289  | 0.09871  | 0.09475  | 0.08997  | 0.09427  | 0.09053  | 0.13434  | 0.09351  |
| lambda2           | 0.37336  | 0.27430  | 0.25324  | 0.35824  | 0.41696  | 0.50686  | 0.45609  | 0.36888  |
| a3                | 0.00000  | 0.00013  | 0.00037  | 0.00768  | 0.00014  | 0.00000  | 0.00000  | 0.00013  |
| mu3               | 0.00000  | 73.38062 | 75.71075 | 60.29656 | 74.70483 | 0.00000  | 0.00000  | 85.01035 |
| alpha3            | 0.00000  | 0.96737  | 0.47858  | 0.14923  | 0.90737  | 0.00000  | 0.00000  | 0.36935  |
| lambda3           | 0.00000  | 0.18530  | 0.09788  | 0.34985  | 0.16794  | 0.00000  | 0.00000  | 0.07245  |
| c                 | 0.00390  | 0.00444  | 0.00358  | 0.00251  | 0.00297  | 0.00298  | 0.00216  | 0.00219  |
| mean age          | 30.53835 | 33.03862 | 33.98676 | 30.79637 | 30.32676 | 28.92560 | 25.84219 | 29.54026 |
| % (0-14)          | 26.68320 | 23.61790 | 21.69331 | 23.57702 | 26.38641 | 27.98090 | 25.80983 | 25.95387 |
| %(15-64)          | 61.93792 | 62.63004 | 66.40550 | 66.31138 | 62.89375 | 62.94753 | 68.10368 | 65.10331 |
| %(65+ )           | 11.37887 | 13.75206 | 11.90118 | 10.11160 | 10.71983 | 9.07157  | 6.08649  | 8.94282  |
| deltalc           | 7.89139  | 4.83614  | 5.37349  | 9.80393  | 10.29016 | 9.43742  | 16.07569 | 13.05533 |
| delta12           | 0.65449  | 0.51823  | 0.46695  | 0.51767  | 0.67379  | 0.69929  | 0.40917  | 0.60433  |
| delta32           | 0.00000  | 0.00320  | 0.00903  | 0.16192  | 0.00302  | 0.00000  | 0.00000  | 0.00279  |
| beta12            | 1.10123  | 0.82889  | 0.75216  | 0.92352  | 1.10458  | 0.82374  | 0.89788  | 0.97650  |
| sigma2            | 3.62888  | 2.77878  | 2.67287  | 3.98162  | 4.42285  | 5.59885  | 3.39513  | 3.94488  |
| sigma3            | 0.00000  | 0.19155  | 0.20453  | 2.34431  | 0.18508  | 0.00000  | 0.00000  | 0.19616  |
| x low             | 15.13023 | 13.17019 | 13.67020 | 14.56022 | 15.30024 | 15.82025 | 15.27024 | 14.81022 |
| x high            | 22.85041 | 22.34040 | 23.54042 | 22.77041 | 22.63040 | 22.23039 | 21.92039 | 22.70041 |
| x ret.            | 0.00000  | 64.39774 | 59.12847 | 62.22795 | 64.59778 | 0.00000  | 0.00000  | 61.46807 |
| x shift           | 7.72018  | 9.17021  | 9.87023  | 8.21019  | 7.33017  | 6.41015  | 6.65015  | 7.89018  |
| a                 | 25.03611 | 25.49425 | 27.70195 | 27.15611 | 25.02372 | 23.73040 | 25.52705 | 25.48611 |
| b                 | 0.02046  | 0.01454  | 0.01449  | 0.02104  | 0.02126  | 0.01988  | 0.03873  | 0.02123  |

- 1 sweden females 1 to 2
- 2 sweden females 1 to 3
- 3 sweden females 1 to 4
- 4 sweden females 1 to 5
- 5 sweden females 1 to 6
- 6 sweden females 1 to 7
- 7 sweden females 1 to 8
- 8 sweden females 1 to the rest



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.47590  | 0.48097  | 0.15941  | 0.15252  | 0.23546  | 0.27602  | 0.08433  | 0.10090  | 1.48453  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 10.57396 | 13.30655 | 19.84638 | 23.25052 | 15.09312 | 15.39976 | 26.61785 | 19.56569 | 8.28380  |
| a1                | 0.01944  | 0.02963  | 0.02774  | 0.02367  | 0.02609  | 0.02987  | 0.03824  | 0.03979  | 0.02610  |
| alpha1            | 0.09256  | 0.13876  | 0.12062  | 0.08157  | 0.10883  | 0.11567  | 0.13634  | 0.12555  | 0.10837  |
| a2                | 0.07787  | 0.08077  | 0.06811  | 0.04391  | 0.06656  | 0.05547  | 0.05917  | 0.06953  | 0.06477  |
| mu2               | 18.17883 | 18.98295 | 18.87794 | 18.35994 | 18.83864 | 18.39334 | 19.42144 | 20.15133 | 18.51928 |
| alpha2            | 0.12621  | 0.13528  | 0.12185  | 0.07806  | 0.11020  | 0.09794  | 0.08909  | 0.11709  | 0.10914  |
| lambda2           | 0.58193  | 0.45073  | 0.37843  | 0.62124  | 0.52503  | 0.44428  | 0.43253  | 0.40476  | 0.49057  |
| a3                | 0.00001  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 76.25882 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.93784  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.15760  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00269  | 0.00316  | 0.00361  | 0.00276  | 0.00273  | 0.00295  | 0.00211  | 0.00224  | 0.00267  |
| mean age          | 28.79165 | 28.59048 | 29.65246 | 30.14259 | 28.63123 | 28.88618 | 27.93528 | 26.37369 | 28.38377 |
| % (0-14)          | 19.06055 | 22.36243 | 23.07471 | 22.82880 | 22.26280 | 24.42451 | 25.38210 | 28.49266 | 22.58877 |
| % (15-64)         | 72.57767 | 68.63758 | 66.76675 | 68.29680 | 69.73301 | 66.79877 | 67.98080 | 65.05048 | 69.47562 |
| % (65+ )          | 8.36178  | 8.99998  | 10.15854 | 8.87440  | 8.00419  | 8.77672  | 6.63710  | 6.45686  | 7.93561  |
| deltal            | 7.22991  | 9.37925  | 7.67984  | 8.58306  | 9.54351  | 10.13684 | 18.14487 | 17.74829 | 9.79088  |
| deltal2           | 0.24967  | 0.36682  | 0.40731  | 0.53902  | 0.39202  | 0.53837  | 0.64626  | 0.57223  | 0.40298  |
| delta32           | 0.00019  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.73337  | 1.02571  | 0.98988  | 1.04496  | 0.98750  | 1.18094  | 1.53044  | 1.07222  | 0.99296  |
| sigma2            | 4.61088  | 3.33189  | 3.10561  | 7.95876  | 4.76422  | 4.53604  | 4.85504  | 3.45680  | 4.49481  |
| sigma3            | 0.16804  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 14.86023 | 14.79022 | 14.12021 | 15.52024 | 15.32024 | 14.47022 | 15.38024 | 15.75025 | 14.80022 |
| x high            | 20.74036 | 21.58038 | 21.73038 | 21.49038 | 21.71038 | 21.61038 | 22.92041 | 23.07041 | 21.46038 |
| x ret.            | 64.81783 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 5.88013  | 6.79016  | 7.61017  | 5.97014  | 6.39015  | 7.14016  | 7.54017  | 7.32017  | 6.66015  |
| a                 | 27.84035 | 26.79466 | 26.47323 | 28.05702 | 27.74369 | 26.53894 | 28.73368 | 25.72373 | 27.32465 |
| b                 | 0.04145  | 0.03757  | 0.02901  | 0.02522  | 0.03465  | 0.02714  | 0.02910  | 0.03097  | 0.03325  |

- 1 sweden females 2 to 1
- 2 sweden females 2 to 2
- 3 sweden females 2 to 3
- 4 sweden females 2 to 4
- 5 sweden females 2 to 5
- 6 sweden females 2 to 6
- 7 sweden females 2 to 7
- 8 sweden females 2 to 8
- 9 sweden females 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.22989  | 0.30099  | 0.31010  | 0.37153  | 0.37253  | 0.07139  | 0.02259  | 0.03903  | 1.40795  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 19.54972 | 19.01686 | 20.22930 | 18.19707 | 15.74948 | 36.97505 | 81.01860 | 52.75172 | 10.59490 |
| a1                | 0.01826  | 0.02664  | 0.02522  | 0.01534  | 0.02788  | 0.03078  | 0.06652  | 0.03173  | 0.02335  |
| alpha1            | 0.08605  | 0.13501  | 0.10050  | 0.02377  | 0.12120  | 0.11965  | 0.37097  | 0.07072  | 0.10619  |
| a2                | 0.08985  | 0.08655  | 0.05501  | 0.07775  | 0.09039  | 0.05079  | 0.11906  | 0.05617  | 0.07970  |
| mu2               | 18.30289 | 18.53965 | 18.08877 | 18.59457 | 19.21123 | 18.67773 | 25.23693 | 19.47601 | 18.48962 |
| alpha2            | 0.14045  | 0.13392  | 0.09915  | 0.16697  | 0.14144  | 0.08143  | 0.42629  | 0.08147  | 0.12741  |
| lambda2           | 0.53745  | 0.54388  | 0.65852  | 0.76076  | 0.43956  | 0.99623  | 0.23196  | 0.74376  | 0.56001  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00290  | 0.00296  | 0.00316  | 0.00055  | 0.00268  | 0.00298  | 0.00815  | 0.00109  | 0.00262  |
| mean age          | 28.47035 | 28.35329 | 29.45487 | 29.25317 | 27.51992 | 30.02257 | 33.92778 | 26.59309 | 27.95831 |
| % (0-14)          | 18.53241 | 20.27774 | 22.76306 | 19.13971 | 22.08801 | 22.82447 | 20.91049 | 25.78880 | 20.66912 |
| % (15-64)         | 73.30567 | 71.40695 | 67.99854 | 72.76660 | 70.35699 | 68.28210 | 62.13239 | 70.04269 | 71.73227 |
| % (65+ )          | 8.16192  | 8.31531  | 9.23840  | 8.09369  | 7.55500  | 8.89344  | 16.95712 | 4.16851  | 7.59861  |
| deltalc           | 6.30117  | 9.00033  | 7.97898  | 27.63815 | 10.41156 | 10.32108 | 8.16281  | 29.21142 | 8.89679  |
| deltal2           | 0.20324  | 0.30784  | 0.45855  | 0.19728  | 0.30843  | 0.60601  | 0.55875  | 0.56491  | 0.29293  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.61267  | 1.00812  | 1.01354  | 0.14235  | 0.85692  | 1.46936  | 0.87023  | 0.86811  | 0.83345  |
| sigma2            | 3.82656  | 4.06125  | 6.64150  | 4.55624  | 3.10780  | 12.23371 | 0.54413  | 9.12939  | 4.39538  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 14.66022 | 14.98023 | 15.31024 | 15.88025 | 14.88023 | 16.78027 | 14.38021 | 17.05028 | 15.07023 |
| x high            | 20.74036 | 21.07037 | 20.84036 | 20.56036 | 21.72038 | 21.11037 | 22.62040 | 22.28040 | 21.06037 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 6.08014  | 6.09014  | 5.53013  | 4.68011  | 6.84016  | 4.33010  | 8.24019  | 5.23012  | 5.99014  |
| a                 | 27.49750 | 27.62750 | 26.81369 | 26.15370 | 26.77037 | 29.03699 | 24.98469 | 27.39371 | 27.27369 |
| b                 | 0.04389  | 0.04329  | 0.03119  | 0.04156  | 0.04069  | 0.03218  | 0.04032  | 0.03041  | 0.04162  |

- 1 sweden females 3 to 1
- 2 sweden females 3 to 2
- 3 sweden females 3 to 3
- 4 sweden females 3 to 4
- 5 sweden females 3 to 5
- 6 sweden females 3 to 6
- 7 sweden females 3 to 7
- 8 sweden females 3 to 8
- 9 sweden females 3 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.18042  | 0.13072  | 0.20453  | 0.61675  | 0.21544  | 0.05309  | 0.02256  | 0.03112  | 0.83788  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 14.40119 | 19.37475 | 18.33923 | 12.02150 | 15.80896 | 31.33330 | 60.83579 | 40.55485 | 8.80887  |
| a1                | 0.02210  | 0.02614  | 0.02579  | 0.02232  | 0.02538  | 0.03136  | 0.02439  | 0.03015  | 0.02490  |
| alpha1            | 0.12149  | 0.11010  | 0.09188  | 0.10229  | 0.12121  | 0.10270  | 0.03429  | 0.08033  | 0.10419  |
| a2                | 0.08829  | 0.07817  | 0.06822  | 0.06769  | 0.09239  | 0.06784  | 0.04536  | 0.06995  | 0.07989  |
| mu2               | 20.44922 | 20.17112 | 18.99365 | 17.78308 | 20.01824 | 20.75632 | 19.94550 | 20.03119 | 19.88172 |
| alpha2            | 0.13424  | 0.13263  | 0.12271  | 0.12741  | 0.14288  | 0.11969  | 0.07847  | 0.08720  | 0.12883  |
| lambda2           | 0.38635  | 0.46770  | 0.60251  | 0.57422  | 0.40449  | 0.44516  | 0.71499  | 0.78722  | 0.44238  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00305  | 0.00316  | 0.00284  | 0.00370  | 0.00285  | 0.00316  | 0.00000  | 0.00000  | 0.00251  |
| mean age          | 29.93616 | 29.21792 | 28.12748 | 29.73679 | 28.58059 | 28.84879 | 28.77427 | 25.45296 | 28.13918 |
| %(0-14)           | 18.75384 | 22.44046 | 23.86271 | 21.53953 | 20.67719 | 25.77753 | 23.25254 | 23.18344 | 21.92926 |
| %(15-64)          | 72.59032 | 68.66782 | 67.99608 | 67.92195 | 71.27039 | 65.59948 | 71.50774 | 75.35492 | 70.75705 |
| %(65+ )           | 8.65585  | 8.89172  | 8.14121  | 10.53851 | 8.05242  | 8.62299  | 5.23972  | 1.46164  | 7.31369  |
| deltalc           | 7.25600  | 8.27304  | 9.06635  | 6.03278  | 8.90250  | 9.93441  | 0.00000  | 0.00000  | 9.93187  |
| delta12           | 0.25031  | 0.33444  | 0.37808  | 0.32977  | 0.27465  | 0.46229  | 0.53770  | 0.43110  | 0.31166  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.90501  | 0.83012  | 0.74877  | 0.80289  | 0.84838  | 0.85807  | 0.43695  | 0.92119  | 0.80877  |
| sigma2            | 2.87805  | 3.52647  | 4.90997  | 4.50695  | 2.83107  | 3.71925  | 9.11166  | 9.02729  | 3.43392  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 15.43024 | 16.11025 | 15.89025 | 14.51022 | 15.25023 | 16.66027 | 17.39028 | 17.64029 | 15.61024 |
| x high            | 23.12041 | 22.79041 | 21.54038 | 20.32035 | 22.52040 | 23.57043 | 22.85041 | 22.73041 | 22.58040 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 7.69018  | 6.68015  | 5.65013  | 5.81013  | 7.27017  | 6.91016  | 5.46012  | 5.09012  | 6.97016  |
| a                 | 30.22035 | 27.48372 | 25.76705 | 25.64893 | 28.09371 | 26.63041 | 29.25703 | 30.16368 | 27.87371 |
| b                 | 0.03900  | 0.03646  | 0.03573  | 0.03474  | 0.04041  | 0.03000  | 0.02394  | 0.04099  | 0.03792  |

- 1 sweden females 4 to 1
- 2 sweden females 4 to 2
- 3 sweden females 4 to 3
- 4 sweden females 4 to 4
- 5 sweden females 4 to 5
- 6 sweden females 4 to 6
- 7 sweden females 4 to 7
- 8 sweden females 4 to 8
- 9 sweden females 4 to the rest

|                      | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)            | 0.15428  | 0.15921  | 0.13656  | 0.17448  | 0.87818  | 0.11303  | 0.03708  | 0.04546  | 0.82011  |
| gmr (mms)            | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub>    | 19.38082 | 17.02829 | 17.16428 | 16.18052 | 8.11708  | 20.26192 | 31.61677 | 27.14839 | 9.29364  |
| al                   | 0.02158  | 0.02934  | 0.02787  | 0.01969  | 0.02993  | 0.02958  | 0.03429  | 0.04002  | 0.02660  |
| alpha1               | 0.10025  | 0.11485  | 0.11278  | 0.08799  | 0.11624  | 0.11635  | 0.08841  | 0.11192  | 0.10561  |
| a2                   | 0.07752  | 0.07220  | 0.06198  | 0.05794  | 0.05842  | 0.06665  | 0.06017  | 0.07237  | 0.06738  |
| mu2                  | 20.02990 | 19.72771 | 18.53814 | 19.09944 | 18.41290 | 19.30369 | 20.22464 | 19.62243 | 19.36184 |
| alpha2               | 0.13088  | 0.12014  | 0.10655  | 0.11130  | 0.09545  | 0.11143  | 0.10131  | 0.10461  | 0.11411  |
| lambda2              | 0.35837  | 0.40633  | 0.58481  | 0.78259  | 0.46171  | 0.36956  | 0.58891  | 0.36735  | 0.44206  |
| a3                   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3                  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3              | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                    | 0.00348  | 0.00276  | 0.00289  | 0.00370  | 0.00226  | 0.00292  | 0.00176  | 0.00115  | 0.00263  |
| mean age             | 30.26018 | 28.30129 | 28.69374 | 31.09493 | 27.86862 | 28.68593 | 26.25804 | 24.51402 | 28.39042 |
| Z(0-14)              | 20.50653 | 23.80562 | 23.18428 | 20.68939 | 23.92207 | 23.82170 | 28.24833 | 28.37042 | 23.17745 |
| Z(15-64)             | 69.71413 | 68.25367 | 68.38404 | 68.63347 | 69.01508 | 67.78326 | 66.47886 | 68.07751 | 69.03040 |
| Z(65+)               | 9.77934  | 7.94071  | 8.43168  | 10.67714 | 7.06284  | 8.39504  | 5.27281  | 3.55207  | 7.79215  |
| deltal <sub>c</sub>  | 6.19670  | 10.62005 | 9.64629  | 5.31503  | 13.27175 | 10.13828 | 19.48135 | 34.70223 | 10.10850 |
| deltal <sub>2</sub>  | 0.27840  | 0.40635  | 0.44971  | 0.33986  | 0.51226  | 0.44382  | 0.56988  | 0.55295  | 0.39472  |
| deltal <sub>32</sub> | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta <sub>12</sub>   | 0.76594  | 0.95599  | 1.05841  | 0.79063  | 1.21783  | 1.04415  | 0.87267  | 1.06986  | 0.92552  |
| sigma <sub>2</sub>   | 2.73815  | 3.38209  | 5.48842  | 7.03158  | 4.83713  | 3.31659  | 5.81302  | 3.51158  | 3.87385  |
| sigma <sub>3</sub>   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low                | 14.80022 | 15.23023 | 15.39024 | 16.64027 | 14.60022 | 14.50022 | 17.18028 | 14.93023 | 15.23023 |
| x high               | 22.73041 | 22.60040 | 21.34037 | 21.53038 | 21.66038 | 22.38040 | 23.05041 | 22.82041 | 22.38040 |
| x ret.               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift              | 7.93018  | 7.37017  | 5.95014  | 4.89011  | 7.06016  | 7.88018  | 5.87013  | 7.89018  | 7.07016  |
| a                    | 28.48752 | 27.22705 | 27.00036 | 27.97702 | 27.51036 | 27.26609 | 25.85040 | 26.20611 | 27.42037 |
| b                    | 0.03219  | 0.03264  | 0.03357  | 0.03448  | 0.03019  | 0.02896  | 0.03111  | 0.03065  | 0.03271  |

- 1 sweden females 5 to 1
- 2 sweden females 5 to 2
- 3 sweden females 5 to 3
- 4 sweden females 5 to 4
- 5 sweden females 5 to 5
- 6 sweden females 5 to 6
- 7 sweden females 5 to 7
- 8 sweden females 5 to 8
- 9 sweden females 5 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.33618  | 0.43132  | 0.06161  | 0.06545  | 0.25773  | 0.16573  | 0.09926  | 0.07833  | 1.32987  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 15.59799 | 17.27359 | 33.78354 | 40.24480 | 20.79439 | 19.67123 | 31.78105 | 34.57414 | 11.52391 |
| a1                | 0.01065  | 0.01886  | 0.03088  | 0.01870  | 0.02169  | 0.03098  | 0.02873  | 0.04464  | 0.02066  |
| alpha1            | 0.03065  | 0.08253  | 0.10830  | 0.08482  | 0.09983  | 0.12934  | 0.14194  | 0.13478  | 0.10173  |
| a2                | 0.14574  | 0.09094  | 0.04282  | 0.05779  | 0.09787  | 0.06596  | 0.06425  | 0.07581  | 0.08715  |
| mu2               | 18.40889 | 18.54142 | 18.60426 | 18.27238 | 18.82641 | 19.22969 | 18.65681 | 20.80035 | 18.17688 |
| alpha2            | 0.22782  | 0.16136  | 0.07664  | 0.09480  | 0.15024  | 0.12451  | 0.09823  | 0.12054  | 0.13928  |
| lambda2           | 0.66775  | 0.51842  | 0.40643  | 0.43585  | 0.42934  | 0.33092  | 0.45023  | 0.34688  | 0.56099  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00158  | 0.00345  | 0.00359  | 0.00399  | 0.00282  | 0.00389  | 0.00331  | 0.00243  | 0.00284  |
| mean age          | 27.66525 | 29.07642 | 30.91828 | 31.86884 | 27.89493 | 29.86649 | 30.33460 | 26.52850 | 28.16997 |
| % (0-14)          | 14.44986 | 20.19953 | 24.89964 | 18.96615 | 19.84502 | 24.54928 | 20.49949 | 28.91071 | 19.39806 |
| % (15-64)         | 78.48260 | 70.05823 | 64.49407 | 70.13966 | 72.26749 | 64.60059 | 70.13815 | 64.47624 | 72.44738 |
| % (65+)           | 7.06754  | 9.74224  | 10.60629 | 10.89420 | 7.88749  | 10.85013 | 9.36236  | 6.61305  | 8.15456  |
| delta1c           | 6.75533  | 5.46391  | 8.60890  | 4.68960  | 7.67872  | 7.95778  | 8.68991  | 18.37580 | 7.27156  |
| delta12           | 0.07304  | 0.20742  | 0.72119  | 0.32367  | 0.22161  | 0.46970  | 0.44724  | 0.58878  | 0.23707  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.13453  | 0.51147  | 1.41318  | 0.89473  | 0.66447  | 1.03881  | 1.44504  | 1.11812  | 0.73035  |
| sigma2            | 2.93103  | 3.21275  | 5.30341  | 4.59766  | 2.85775  | 2.65782  | 4.58362  | 2.87766  | 4.02771  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 15.11023 | 14.75022 | 14.59022 | 14.12021 | 14.32021 | 13.90020 | 14.61022 | 15.68024 | 14.71022 |
| x high            | 20.01034 | 20.73036 | 22.38040 | 21.60038 | 21.20037 | 22.02039 | 21.94039 | 23.70043 | 20.60036 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 4.90011  | 5.98014  | 7.79018  | 7.48017  | 6.88016  | 8.12019  | 7.33017  | 8.02018  | 5.89013  |
| a                 | 25.71703 | 25.49467 | 26.57323 | 30.23605 | 26.84323 | 25.69731 | 30.35461 | 26.27897 | 27.01464 |
| b                 | 0.06796  | 0.04173  | 0.01932  | 0.02654  | 0.04247  | 0.02573  | 0.03118  | 0.02970  | 0.04440  |

- 1 sweden females 6 to 1
- 2 sweden females 6 to 2
- 3 sweden females 6 to 3
- 4 sweden females 6 to 4
- 5 sweden females 6 to 5
- 6 sweden females 6 to 6
- 7 sweden females 6 to 7
- 8 sweden females 6 to 8
- 9 sweden females 6 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.45491  | 0.27257  | 0.05167  | 0.08387  | 0.16087  | 0.20119  | 0.18893  | 0.23831  | 1.46339  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 20.04963 | 23.92752 | 65.23550 | 46.14219 | 34.15309 | 31.60828 | 27.76896 | 25.29143 | 11.38625 |
| a1                | 0.00968  | 0.02370  | 0.02760  | 0.02956  | 0.01746  | 0.02199  | 0.03187  | 0.03474  | 0.02108  |
| alpha1            | 0.02999  | 0.13414  | 0.24375  | 0.18285  | 0.02860  | 0.09747  | 0.17516  | 0.14701  | 0.11853  |
| a2                | 0.17169  | 0.11043  | 0.07556  | 0.11420  | 0.07664  | 0.05848  | 0.06441  | 0.08705  | 0.09628  |
| mu2               | 18.37997 | 18.82063 | 17.99653 | 19.71651 | 17.33270 | 18.34838 | 17.74540 | 18.77025 | 17.93298 |
| alpha2            | 0.24957  | 0.18157  | 0.10880  | 0.19297  | 0.15611  | 0.10036  | 0.11511  | 0.12079  | 0.14796  |
| lambda2           | 0.65818  | 0.53553  | 0.21829  | 0.41494  | 1.49869  | 0.57074  | 0.59249  | 0.48060  | 0.70132  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00157  | 0.00399  | 0.00622  | 0.00560  | 0.00086  | 0.00370  | 0.00443  | 0.00204  | 0.00285  |
| mean age          | 27.30629 | 29.62359 | 34.16194 | 32.10992 | 27.89495 | 30.86072 | 31.12526 | 26.45053 | 27.92848 |
| % (0-14)          | 13.17956 | 19.39787 | 17.72468 | 19.32931 | 20.20285 | 20.53079 | 21.08119 | 22.26965 | 18.26012 |
| % (15-64)         | 79.99929 | 69.81290 | 67.90916 | 66.96500 | 72.55789 | 69.15604 | 66.93164 | 71.98780 | 73.64727 |
| % (65+ )          | 6.82114  | 10.78923 | 14.36615 | 13.70568 | 7.23926  | 10.31318 | 11.98717 | 5.74255  | 8.09261  |
| deltalc           | 6.18192  | 5.93798  | 4.43589  | 5.27995  | 20.25869 | 5.94370  | 7.19662  | 17.00567 | 7.41025  |
| delta12           | 0.05639  | 0.21464  | 0.36535  | 0.25885  | 0.22784  | 0.37598  | 0.49482  | 0.39909  | 0.21897  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.12016  | 0.73882  | 2.24024  | 0.94755  | 0.18320  | 0.97130  | 1.52170  | 1.21715  | 0.80107  |
| sigma2            | 2.63730  | 2.94950  | 2.00628  | 2.15026  | 9.60044  | 5.68720  | 5.14719  | 3.97896  | 4.73979  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 14.97023 | 15.04023 | 9.90011  | 14.77022 | 15.94025 | 15.11023 | 14.54022 | 14.85023 | 15.07023 |
| x high            | 19.85034 | 20.81036 | 21.15037 | 21.55038 | 18.83032 | 21.28037 | 20.46035 | 21.58038 | 20.12035 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 4.88011  | 5.77013  | 11.25026 | 6.78016  | 2.89007  | 6.17014  | 5.92014  | 6.73015  | 5.05012  |
| a                 | 25.86465 | 25.42370 | 33.19476 | 26.37180 | 24.75035 | 28.53368 | 27.88890 | 28.17320 | 26.94034 |
| b                 | 0.07611  | 0.04828  | 0.02255  | 0.04023  | 0.04797  | 0.03039  | 0.03319  | 0.04198  | 0.05253  |

- 1 sweden females 7 to 1
- 2 sweden females 7 to 2
- 3 sweden females 7 to 3
- 4 sweden females 7 to 4
- 5 sweden females 7 to 5
- 6 sweden females 7 to 6
- 7 sweden females 7 to 7
- 8 sweden females 7 to 8
- 9 sweden females 7 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.38183  | 0.27340  | 0.05905  | 0.06969  | 0.14060  | 0.12371  | 0.18874  | 0.25696  | 1.23702  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 18.86098 | 21.69141 | 43.26056 | 46.54881 | 31.31375 | 43.11542 | 30.34428 | 21.47098 | 13.16657 |
| al                | 0.00952  | 0.02113  | 0.04062  | 0.01238  | 0.02119  | 0.03526  | 0.01626  | 0.02546  | 0.01864  |
| alpha1            | 0.17886  | 0.13154  | 0.14295  | 0.08072  | 0.13550  | 0.19659  | 0.02108  | 0.10434  | 0.12774  |
| a2                | 0.18944  | 0.08158  | 0.03878  | 0.10081  | 0.12901  | 0.07921  | 0.06907  | 0.08401  | 0.09407  |
| mu2               | 17.65371 | 17.81669 | 16.58267 | 18.35035 | 21.31304 | 19.71756 | 19.94039 | 19.04004 | 17.61982 |
| alpha2            | 0.24522  | 0.12533  | 0.06066  | 0.17240  | 0.22503  | 0.13245  | 0.15812  | 0.12736  | 0.14349  |
| lambda2           | 0.80809  | 0.66636  | 0.34064  | 0.48282  | 0.25622  | 0.34455  | 0.59441  | 0.58394  | 0.71070  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00342  | 0.00349  | 0.00333  | 0.00579  | 0.00466  | 0.00514  | 0.00059  | 0.00236  | 0.00319  |
| mean age          | 28.77055 | 29.84952 | 30.68956 | 33.18372 | 30.92452 | 32.20820 | 31.15082 | 27.40088 | 28.99005 |
| % (0-14)          | 9.37675  | 17.46708 | 26.21319 | 15.91877 | 18.17363 | 20.65334 | 19.52086 | 21.35663 | 16.40032 |
| % (15-64)         | 81.17286 | 72.92169 | 63.07484 | 69.90681 | 69.73167 | 66.46802 | 70.77214 | 71.97987 | 74.55523 |
| % (65+ )          | 9.45039  | 9.61123  | 10.71197 | 14.17442 | 12.09470 | 12.87864 | 9.70700  | 6.66350  | 9.04445  |
| deltalc           | 2.78033  | 6.05847  | 12.18264 | 2.13755  | 4.54257  | 6.86314  | 27.38642 | 10.76773 | 5.83805  |
| delta12           | 0.05026  | 0.25907  | 1.04744  | 0.12283  | 0.16424  | 0.44514  | 0.23547  | 0.30304  | 0.19817  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.72939  | 1.04957  | 2.35666  | 0.46819  | 0.60215  | 1.48427  | 0.13332  | 0.81921  | 0.89019  |
| sigma2            | 3.29539  | 5.31678  | 5.61564  | 2.80053  | 1.13861  | 2.60143  | 3.75915  | 4.58478  | 4.95282  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 14.80022 | 14.85023 | 12.35017 | 14.12021 | 13.19019 | 14.19021 | 16.52026 | 15.75025 | 14.77022 |
| x high            | 19.14032 | 20.29035 | 21.13037 | 20.45035 | 21.78038 | 22.45040 | 22.12039 | 21.58038 | 19.85034 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 4.34010  | 5.44012  | 8.78020  | 6.33014  | 8.59020  | 8.26019  | 5.60013  | 5.83013  | 5.08012  |
| a                 | 27.89746 | 29.19032 | 26.81923 | 27.29321 | 26.48809 | 29.40034 | 27.44704 | 27.48036 | 28.31461 |
| b                 | 0.09111  | 0.04401  | 0.01535  | 0.03873  | 0.03958  | 0.02971  | 0.03228  | 0.04328  | 0.05194  |

- 1 sweden females 8 to 1
- 2 sweden females 8 to 2
- 3 sweden females 8 to 3
- 4 sweden females 8 to 4
- 5 sweden females 8 to 5
- 6 sweden females 8 to 6
- 7 sweden females 8 to 7
- 8 sweden females 8 to 8
- 9 sweden females 8 to the rest

UNITED KINGDOM \*

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF  
OBSERVED MODEL MIGRATION SCHEDULES



REGION NUMBER:

- |                             |                |
|-----------------------------|----------------|
| 1. North                    | 6. East Anglia |
| 2. Yorkshire and Humberside | 7. South East  |
| 3. North West               | 8. South West  |
| 4. East Midlands            | 9. Wales       |
| 5. West Midlands            | 10. Scotland   |

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\*Due to lack of data, Northern Ireland has been omitted as a region. Despite this we refer to the nation as the United Kingdom (and not Great Britain) in order to maintain consistency with the IIASA case study report: *Migration and Settlement*:  
1. *United Kingdom*.



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.22294  | 0.16620  | 0.08821  | 0.08591  | 0.05676  | 0.36478  | 0.10290  | 0.02521  | 0.11497  | 1.22788  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 8.87696  | 6.75526  | 11.99752 | 12.86120 | 21.06260 | 10.22629 | 16.88076 | 19.15600 | 12.78098 | 6.98346  |
| a1                | 0.01398  | 0.01306  | 0.01979  | 0.01664  | 0.02053  | 0.01633  | 0.02131  | 0.02772  | 0.02712  | 0.01722  |
| alpha1            | 0.09541  | 0.07374  | 0.10925  | 0.09990  | 0.14345  | 0.11055  | 0.12469  | 0.11561  | 0.24512  | 0.12036  |
| a2                | 0.06628  | 0.07168  | 0.07365  | 0.07791  | 0.00056  | 0.07916  | 0.04106  | 0.06319  | 0.01343  | 0.07683  |
| mu2               | 20.11916 | 22.32955 | 28.09781 | 23.74563 | 48.79612 | 18.56093 | 15.79283 | 19.32491 | 38.26647 | 21.44651 |
| alpha2            | 0.14082  | 0.14342  | 0.21653  | 0.14155  | 0.37431  | 0.12490  | 0.07294  | 0.07563  | 0.28446  | 0.14867  |
| lambda2           | 0.26370  | 0.19365  | 0.14666  | 0.13557  | 0.06901  | 0.28018  | 0.39387  | 0.90653  | 0.08926  | 0.19537  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00493  | 0.00413  | 0.00440  | 0.00321  | 0.00577  | 0.00333  | 0.00327  | 0.00000  | 0.00603  | 0.00429  |
| mean age          | 33.84627 | 32.87267 | 32.44616 | 30.45968 | 34.29527 | 30.41339 | 31.70033 | 27.21038 | 35.80907 | 32.37547 |
| % (0-14)          | 18.20920 | 17.94328 | 20.46432 | 19.44295 | 21.21152 | 17.42621 | 20.80595 | 19.02262 | 19.61034 | 18.69842 |
| % (15-64)         | 67.47767 | 69.89912 | 66.98512 | 71.20827 | 62.66923 | 72.78660 | 67.98071 | 78.68406 | 63.13290 | 68.80686 |
| % (65+ )          | 14.31313 | 12.15761 | 12.55056 | 9.34879  | 16.11925 | 9.78719  | 11.21334 | 2.29332  | 17.25676 | 12.49472 |
| deltal0           | 2.83713  | 3.16411  | 4.49661  | 5.18967  | 3.55662  | 4.90917  | 6.51186  | 0.00000  | 4.49450  | 4.01125  |
| deltal2           | 0.21090  | 0.18215  | 0.26874  | 0.21353  | 36.58858 | 0.20632  | 0.51902  | 0.43875  | 2.01921  | 0.22407  |
| deltal3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.67752  | 0.51414  | 0.50458  | 0.70573  | 0.38324  | 0.88513  | 1.70944  | 1.52852  | 0.86171  | 0.80959  |
| sigma2            | 1.87260  | 1.35021  | 0.67731  | 0.95773  | 0.18437  | 2.24324  | 5.39983  | 11.98600 | 0.31380  | 1.31411  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 12.96018 | 12.43017 | 13.84020 | 9.96011  | 11.16014 | 11.92016 | 11.63015 | 17.19028 | 11.69015 | 11.80016 |
| x high            | 22.36040 | 23.67043 | 25.31046 | 23.14042 | 24.16044 | 21.32037 | 19.79034 | 22.00039 | 25.27046 | 22.70041 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.40022  | 11.24026 | 11.47026 | 13.18030 | 13.00030 | 9.40022  | 8.16019  | 4.81011  | 13.58031 | 10.90025 |
| a                 | 29.43538 | 31.43704 | 29.46427 | 32.27370 | 27.86953 | 30.77489 | 29.40850 | 34.75360 | 30.37041 | 30.10947 |
| b                 | 0.02451  | 0.02359  | 0.02534  | 0.02275  | 0.01808  | 0.03165  | 0.02144  | 0.04390  | 0.01952  | 0.02516  |

- 1 u. k. males 1 to 2
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- 8 u. k. males 1 to 9
- 9 u. k. males 1 to 10
- 10 u. k. males 1 to the rest

|           | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs) | 0.21497  | 0.22672  | 0.20766  | 0.09340  | 0.06732  | 0.33401  | 0.09538  | 0.04966  | 0.05983  | 1.34894  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae%m     | 9.54066  | 5.59109  | 6.44670  | 16.55759 | 11.39950 | 10.45287 | 6.99730  | 7.77756  | 14.56474 | 7.13612  |
| al        | 0.01992  | 0.01248  | 0.01460  | 0.02094  | 0.02588  | 0.01655  | 0.02161  | 0.01622  | 0.02518  | 0.01698  |
| alpha1    | 0.08254  | 0.04351  | 0.07757  | 0.14504  | 0.07219  | 0.03993  | 0.16911  | 0.13892  | 0.18999  | 0.07931  |
| a2        | 0.03995  | 0.04682  | 0.06071  | 0.06634  | 0.05471  | 0.06935  | 0.07285  | 0.07010  | 0.05645  | 0.05788  |
| mu2       | 18.95272 | 19.77922 | 20.35999 | 17.77827 | 21.09718 | 18.57564 | 24.13058 | 26.28913 | 24.85241 | 19.41560 |
| alpha2    | 0.10613  | 0.10065  | 0.12655  | 0.08766  | 0.10340  | 0.12475  | 0.15715  | 0.20789  | 0.11045  | 0.11054  |
| lambda2   | 0.35652  | 0.41907  | 0.37500  | 0.25048  | 0.20079  | 0.36946  | 0.16173  | 0.13783  | 0.13012  | 0.29735  |
| a3        | 0.00009  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00774  | 0.00017  | 0.00000  | 0.00005  |
| mu3       | 73.70760 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 60.34847 | 74.15430 | 0.00000  | 73.78589 |
| alpha3    | 1.46849  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.02797  | 0.86607  | 0.00000  | 1.36737  |
| lambda3   | 0.28066  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.83640  | 0.17807  | 0.00000  | 0.25744  |
| c         | 0.00465  | 0.00333  | 0.00433  | 0.00230  | 0.00205  | 0.00122  | 0.00299  | 0.00468  | 0.00446  | 0.00353  |
| mean age  | 33.24051 | 33.05988 | 33.18350 | 30.07076 | 27.72434 | 27.51451 | 38.23311 | 33.75771 | 34.55931 | 31.67478 |
| %(0-14)   | 23.46336 | 18.37930 | 18.93772 | 17.41665 | 26.71872 | 20.33934 | 16.17408 | 17.76985 | 19.36151 | 19.95467 |
| %(15-64)  | 61.70139 | 70.30312 | 68.27869 | 74.99209 | 66.62426 | 73.95451 | 61.79879 | 67.62906 | 67.31863 | 68.73233 |
| %(65+)    | 14.83526 | 11.31758 | 12.78359 | 7.59126  | 6.65702  | 5.70615  | 22.02713 | 14.60110 | 13.31985 | 11.31300 |
| deltalc   | 4.28111  | 3.74980  | 3.37354  | 9.08818  | 12.65273 | 13.59888 | 7.22247  | 3.46378  | 5.64643  | 4.81194  |
| delta12   | 0.49850  | 0.26664  | 0.24053  | 0.31559  | 0.47307  | 0.23870  | 0.29656  | 0.23136  | 0.44602  | 0.29343  |
| delta32   | 0.00226  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.10628  | 0.00238  | 0.00000  | 0.00080  |
| beta12    | 0.77767  | 0.43227  | 0.61297  | 1.65450  | 0.69816  | 0.32009  | 1.07613  | 0.66823  | 1.72011  | 0.71747  |
| sigma2    | 3.35921  | 4.16366  | 2.96321  | 2.85732  | 1.94182  | 2.96160  | 1.02919  | 0.66296  | 1.17806  | 2.68991  |
| sigma3    | 0.19112  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 29.90363 | 0.20561  | 0.00000  | 0.18827  |
| x low     | 14.19021 | 15.31024 | 15.31024 | 10.96014 | 13.03018 | 13.44019 | 12.21017 | 11.19014 | 11.54015 | 13.40019 |
| x high    | 22.04039 | 23.02041 | 23.14042 | 21.80038 | 23.76043 | 21.35037 | 24.23044 | 23.21042 | 26.01048 | 22.51040 |
| x ret.    | 67.79846 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 64.29771 | 65.26792 | 0.00000  | 67.23834 |
| x shift   | 7.85018  | 7.71018  | 7.83018  | 10.84025 | 10.73025 | 7.91018  | 12.02028 | 12.02028 | 14.47033 | 9.11021  |
| a         | 25.01183 | 31.35367 | 29.40037 | 34.55030 | 26.75273 | 28.47344 | 31.48871 | 30.04675 | 34.56491 | 29.40268 |
| b         | 0.01699  | 0.02385  | 0.02727  | 0.02767  | 0.01663  | 0.03116  | 0.02309  | 0.02491  | 0.01698  | 0.02394  |

- 1 u. k. males 2 to 1
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- 7 u. k. males 2 to 8
- 8 u. k. males 2 to 9
- 9 u. k. males 2 to 10
- 10 u. k. males 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.08110  | 0.13115  | 0.07629  | 0.11226  | 0.03473  | 0.35030  | 0.10867  | 0.12867  | 0.06100  | 1.08418  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 8.80924  | 10.97022 | 6.65980  | 10.71373 | 11.95995 | 11.41041 | 7.64629  | 9.75274  | 7.95409  | 6.22654  |
| a1                | 0.01499  | 0.00852  | 0.01708  | 0.02039  | 0.01165  | 0.01284  | 0.00692  | 0.01150  | 0.02859  | 0.01301  |
| alpha1            | 0.19049  | 0.08597  | 0.19157  | 0.13683  | 0.16197  | 0.09878  | 0.04270  | 0.12425  | 0.09678  | 0.11244  |
| a2                | 0.06561  | 0.06176  | 0.07402  | 0.06057  | 0.02906  | 0.06078  | 0.05482  | 0.03555  | 0.05258  | 0.05976  |
| mu2               | 19.37432 | 20.64613 | 24.25033 | 18.92210 | 32.98133 | 17.95181 | 24.66145 | 19.41898 | 21.08706 | 19.47471 |
| alpha2            | 0.12636  | 0.13563  | 0.22722  | 0.09881  | 0.27413  | 0.10630  | 0.21359  | 0.10031  | 0.08618  | 0.12097  |
| lambda2           | 0.26129  | 0.25569  | 0.19541  | 0.30832  | 0.09951  | 0.32299  | 0.15406  | 0.57327  | 0.36350  | 0.27220  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00008  | 0.00004  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 73.20111 | 72.81990 | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 1.01919  | 1.01507  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.16724  | 0.16412  | 0.00000  |
| c                 | 0.00519  | 0.00568  | 0.00627  | 0.00348  | 0.00519  | 0.00410  | 0.00589  | 0.00581  | 0.00135  | 0.00499  |
| mean age          | 35.14991 | 36.36529 | 36.48852 | 31.95397 | 34.19260 | 32.90668 | 36.64518 | 39.42478 | 29.52324 | 34.68196 |
| % (0-14)          | 15.22722 | 15.19911 | 17.29455 | 17.96739 | 15.99718 | 16.29979 | 16.72345 | 15.94913 | 24.25047 | 16.78263 |
| % (15-64)         | 69.63480 | 68.42731 | 64.64780 | 71.41927 | 69.08401 | 71.50500 | 65.57759 | 65.61382 | 69.78274 | 68.55070 |
| % (65+ )          | 15.13798 | 16.37358 | 18.05765 | 10.61335 | 14.91881 | 12.19521 | 17.69896 | 18.43705 | 5.96680  | 14.66667 |
| deltalc           | 2.88968  | 1.50132  | 2.72565  | 5.86639  | 2.24401  | 3.13015  | 1.17381  | 1.97896  | 21.21980 | 2.60541  |
| delta12           | 0.22850  | 0.13796  | 0.23075  | 0.33669  | 0.40093  | 0.21128  | 0.12618  | 0.32352  | 0.54374  | 0.21774  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00214  | 0.00069  | 0.00000  |
| beta12            | 1.50754  | 0.63387  | 0.84312  | 1.38480  | 0.59085  | 0.92933  | 0.19992  | 1.23866  | 1.12299  | 0.92952  |
| sigma2            | 2.06778  | 1.88518  | 0.85999  | 3.12042  | 0.36299  | 3.03861  | 0.72125  | 5.71492  | 4.21809  | 2.25010  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.16409  | 0.16168  | 0.00000  |
| x low             | 12.01016 | 12.98018 | 13.30019 | 13.12019 | 9.40010  | 12.24017 | 10.53013 | 16.06025 | 16.36026 | 12.64017 |
| x high            | 22.12039 | 23.02041 | 23.46042 | 22.49040 | 22.75041 | 21.26037 | 22.39040 | 22.40040 | 24.80045 | 22.33040 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 62.37792 | 61.57806 | 0.00000  |
| x shift           | 10.11023 | 10.04023 | 10.16023 | 9.37021  | 13.35031 | 9.02021  | 11.86027 | 6.34015  | 8.44019  | 9.69022  |
| a                 | 34.27030 | 33.28700 | 29.09886 | 32.69801 | 31.67259 | 32.51864 | 30.67037 | 32.80030 | 29.76039 | 31.81367 |
| b                 | 0.02634  | 0.02336  | 0.02550  | 0.02724  | 0.02656  | 0.02722  | 0.01909  | 0.02022  | 0.02537  | 0.02391  |

- 1 u. k. males 3 to 1
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|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.09730  | 0.28598  | 0.12533  | 0.22206  | 0.13878  | 0.43105  | 0.15945  | 0.05935  | 0.06961  | 1.58897  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 6.68189  | 6.67073  | 9.42898  | 6.27345  | 7.28509  | 6.54122  | 5.50763  | 11.74034 | 7.51728  | 4.39305  |
| a1                | 0.02424  | 0.01834  | 0.02379  | 0.02233  | 0.01727  | 0.01754  | 0.01866  | 0.01580  | 0.03369  | 0.01965  |
| alpha1            | 0.11290  | 0.06564  | 0.10278  | 0.08592  | 0.07266  | 0.07696  | 0.09379  | 0.06314  | 0.11310  | 0.08483  |
| a2                | 0.07221  | 0.05282  | 0.07054  | 0.06179  | 0.04589  | 0.05046  | 0.05177  | 0.07553  | 0.05493  | 0.05471  |
| mu2               | 19.39803 | 22.63552 | 24.48910 | 20.24434 | 19.52551 | 16.66712 | 17.53373 | 20.15185 | 19.77269 | 18.99803 |
| alpha2            | 0.10510  | 0.11748  | 0.14317  | 0.08756  | 0.09616  | 0.07522  | 0.10509  | 0.22997  | 0.09527  | 0.09565  |
| lambda2           | 0.22654  | 0.18838  | 0.15959  | 0.20658  | 0.20896  | 0.38495  | 0.30739  | 0.46534  | 0.41582  | 0.25293  |
| a3                | 0.00000  | 0.01313  | 0.00003  | 0.00000  | 0.01523  | 0.00531  | 0.01210  | 0.00068  | 0.00000  | 0.00485  |
| mu3               | 0.00000  | 66.90734 | 78.18250 | 0.00000  | 67.78575 | 69.69467 | 64.19685 | 75.09655 | 0.00000  | 70.95700 |
| alpha3            | 0.00000  | 0.34880  | 0.87733  | 0.00000  | 0.40195  | 0.69464  | 0.09157  | 0.93510  | 0.00000  | 0.69842  |
| lambda3           | 0.00000  | 0.46798  | 0.15096  | 0.00000  | 0.37583  | 0.38352  | 0.79255  | 0.20966  | 0.00000  | 0.28797  |
| c                 | 0.00203  | 0.00319  | 0.00317  | 0.00135  | 0.00340  | 0.00166  | 0.00281  | 0.00484  | 0.00203  | 0.00268  |
| mean age          | 28.04778 | 32.49110 | 30.71807 | 28.44329 | 33.08322 | 29.56775 | 34.60312 | 33.97546 | 27.40510 | 30.79822 |
| % (0-14)          | 21.32512 | 22.11421 | 22.85758 | 21.32663 | 21.29940 | 18.73011 | 19.73257 | 21.82602 | 27.02026 | 21.01307 |
| % (15-64)         | 72.30276 | 64.76833 | 66.55785 | 73.46799 | 64.51318 | 73.54926 | 61.07491 | 60.63728 | 66.41678 | 68.45708 |
| % (65+ )          | 6.37212  | 13.11746 | 10.58456 | 5.20538  | 14.18742 | 7.72063  | 19.19253 | 17.53671 | 6.56297  | 10.52985 |
| deltalc           | 11.95894 | 5.74342  | 7.51488  | 16.50515 | 5.07938  | 10.56185 | 6.64641  | 3.26628  | 16.61896 | 7.32314  |
| delta12           | 0.33571  | 0.34716  | 0.33729  | 0.36133  | 0.37634  | 0.34768  | 0.36045  | 0.20915  | 0.61320  | 0.35910  |
| delta32           | 0.00000  | 0.24853  | 0.00041  | 0.00000  | 0.33178  | 0.10524  | 0.23373  | 0.00903  | 0.00000  | 0.08872  |
| beta12            | 1.07421  | 0.55878  | 0.71787  | 0.98124  | 0.75562  | 1.02307  | 0.89246  | 0.27455  | 1.18722  | 0.88687  |
| sigma2            | 2.15539  | 1.60353  | 1.11468  | 2.35928  | 2.17303  | 5.11759  | 2.92508  | 2.02351  | 4.36479  | 2.64421  |
| sigma3            | 0.00000  | 1.34168  | 0.17207  | 0.00000  | 0.93501  | 0.55212  | 8.65535  | 0.22421  | 0.00000  | 0.41231  |
| x low             | 11.85016 | 13.40019 | 13.10019 | 12.26017 | 11.65015 | 12.19016 | 11.96016 | 15.83025 | 15.62024 | 12.33017 |
| x high            | 22.52040 | 24.66045 | 24.87045 | 23.95043 | 22.69040 | 20.62036 | 20.74036 | 21.60038 | 23.11041 | 22.48040 |
| x ret.            | 0.00000  | 67.48840 | 66.44817 | 0.00000  | 67.55841 | 68.02851 | 66.87827 | 67.95850 | 0.00000  | 67.81847 |
| x shift           | 10.67024 | 11.26026 | 11.77027 | 11.69027 | 11.04025 | 8.43019  | 8.78020  | 5.77013  | 7.49017  | 10.15023 |
| a                 | 30.28400 | 29.17580 | 29.17811 | 32.14203 | 29.09949 | 32.05364 | 27.28582 | 22.40042 | 26.83705 | 29.67204 |
| b                 | 0.02645  | 0.01632  | 0.02064  | 0.02231  | 0.01534  | 0.02642  | 0.02135  | 0.02976  | 0.02733  | 0.02127  |

- 1 u. k. males 4 to 1
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|                   | 1        | 2        | 3        | 4         | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.04936  | 0.07635  | 0.13899  | 0.17204   | 0.04391  | 0.35620  | 0.17610  | 0.10016  | 0.05089  | 1.16401  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000   | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 10.68363 | 8.70503  | 11.44903 | 8.03941   | 9.75715  | 9.39325  | 5.33904  | 6.82749  | 9.70032  | 4.98004  |
| a1                | 0.01693  | 0.01577  | 0.02591  | 0.02972   | 0.01202  | 0.01489  | 0.01006  | 0.01157  | 0.01602  | 0.01577  |
| alpha1            | 0.03232  | 0.04369  | 0.11241  | 0.11842   | 0.04622  | 0.04847  | 0.05333  | 0.05624  | 0.02671  | 0.05391  |
| a2                | 0.04709  | 0.04639  | 0.04878  | 0.05600   | 0.06854  | 0.05452  | 0.03143  | 0.04509  | 0.04635  | 0.04641  |
| mu2               | 20.41341 | 18.81785 | 18.99089 | 18.64734  | 16.79836 | 17.76805 | 17.64690 | 28.29313 | 23.98802 | 18.66254 |
| alpha2            | 0.13263  | 0.08024  | 0.07262  | 0.06788   | 0.13621  | 0.08413  | 0.08771  | 0.16933  | 0.18915  | 0.08583  |
| lambda2           | 0.18273  | 0.30424  | 0.21836  | 0.19720   | 0.30491  | 0.28950  | 0.26496  | 0.14346  | 0.16008  | 0.24559  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00005  | 0.00000  | 0.02391  | 0.01811  | 0.00000  | 0.00004  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 74.21849 | 0.00000  | 62.94621 | 60.14665 | 0.00000  | 77.36097 |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.93123  | 0.00000  | 0.31917  | 0.12468  | 0.00000  | 0.69859  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.16277  | 0.00000  | 0.35319  | 0.70798  | 0.00000  | 0.12271  |
| c                 | 0.00214  | 0.00148  | 0.00203  | 0.00027   | 0.00318  | 0.00140  | 0.00471  | 0.00421  | 0.00222  | 0.00228  |
| mean age          | 30.52016 | 30.31791 | 30.20394 | 27.50444  | 31.05492 | 29.28909 | 37.69732 | 39.28757 | 32.13730 | 31.57236 |
| % (0-14)          | 23.96080 | 19.45400 | 22.33414 | 22.92942  | 19.60168 | 18.53567 | 17.77162 | 17.62050 | 22.99648 | 20.06045 |
| % (15-64)         | 65.96537 | 73.40089 | 69.77203 | 73.36755  | 69.24969 | 75.24615 | 64.55030 | 62.18994 | 64.88725 | 70.52917 |
| % (65+ )          | 10.07383 | 7.14510  | 7.89384  | 3.70303   | 11.14863 | 6.21819  | 17.67808 | 20.18956 | 12.11627 | 9.41038  |
| deltalc           | 7.90862  | 10.67477 | 12.76014 | 108.15191 | 3.77669  | 10.62163 | 2.13474  | 2.74653  | 7.22953  | 6.92492  |
| delta12           | 0.35941  | 0.33986  | 0.53125  | 0.53063   | 0.17540  | 0.27320  | 0.32017  | 0.25670  | 0.34557  | 0.33985  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00067  | 0.00000  | 0.76076  | 0.40165  | 0.00000  | 0.00096  |
| beta12            | 0.24371  | 0.54448  | 1.54780  | 1.74464   | 0.33934  | 0.57609  | 0.60796  | 0.33216  | 0.14121  | 0.62804  |
| sigma2            | 1.37775  | 3.79160  | 3.00678  | 2.90528   | 2.23856  | 3.44088  | 3.02072  | 0.84721  | 0.84631  | 2.86128  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.17479  | 0.00000  | 1.10658  | 5.67828  | 0.00000  | 0.17566  |
| x low             | 10.54013 | 13.07018 | 12.01016 | 11.18014  | 10.51013 | 11.65015 | 11.18014 | 14.49022 | 11.54015 | 11.77015 |
| x high            | 21.58038 | 22.82041 | 23.53042 | 23.50042  | 19.28033 | 21.70038 | 21.38037 | 26.80050 | 22.52040 | 22.45040 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 63.41775 | 0.00000  | 63.17779 | 62.56789 | 0.00000  | 62.73786 |
| x shift           | 11.04025 | 9.75022  | 11.52026 | 12.32028  | 8.77020  | 10.05023 | 10.20023 | 12.31028 | 10.98025 | 10.68024 |
| a                 | 27.24041 | 32.52802 | 31.08870 | 32.01854  | 28.27035 | 33.30940 | 30.68035 | 31.06471 | 26.71133 | 31.30490 |
| b                 | 0.01369  | 0.02134  | 0.01825  | 0.02016   | 0.02704  | 0.02443  | 0.01281  | 0.01364  | 0.01355  | 0.01819  |

- 1 u. k. males 5 to 1
- 2 u. k. males 5 to 2
- 3 u. k. males 5 to 3
- 4 u. k. males 5 to 4
- 5 u. k. males 5 to 6
- 6 u. k. males 5 to 7
- 7 u. k. males 5 to 8
- 8 u. k. males 5 to 9
- 9 u. k. males 5 to 10
- 10 u. k. males 5 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.05899  | 0.11424  | 0.08190  | 0.21566  | 0.12636  | 0.95593  | 0.19056  | 0.06129  | 0.08329  | 1.88821  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 27.40051 | 14.70262 | 9.72690  | 12.31840 | 21.72359 | 8.13979  | 18.10026 | 18.38355 | 10.71077 | 6.98508  |
| a1                | 0.00561  | 0.03024  | 0.03073  | 0.01549  | 0.01401  | 0.01947  | 0.01660  | 0.04154  | 0.03195  | 0.01971  |
| alpha1            | -0.00362 | 0.13279  | 0.07483  | 0.03467  | 0.02167  | 0.09434  | 0.05390  | 0.17102  | 0.11091  | 0.08881  |
| a2                | 0.04787  | 0.04930  | 0.06925  | 0.04328  | 0.02765  | 0.05034  | 0.02965  | 0.04008  | 0.06790  | 0.05085  |
| mu2               | 19.87450 | 16.94341 | 25.89662 | 19.81439 | 32.00511 | 18.99990 | 14.68744 | 20.16502 | 27.97781 | 19.33869 |
| alpha2            | 0.10805  | 0.06427  | 0.10367  | 0.09421  | 0.25793  | 0.09458  | 0.09146  | 0.06457  | 0.21961  | 0.09740  |
| lambda2           | 0.47378  | 0.32047  | 0.13935  | 0.34415  | 0.10198  | 0.25395  | 0.85556  | 0.29484  | 0.16325  | 0.23183  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00074  | 0.00103  | 0.00000  | 0.00193  | 0.00131  | 0.00364  | 0.00464  | 0.00255  | 0.00390  | 0.00357  |
| mean age          | 42.56368 | 28.49302 | 25.53633 | 31.38336 | 31.50180 | 31.83249 | 32.58454 | 31.52439 | 29.85622 | 31.50874 |
| % (0-14)          | 8.79131  | 21.78117 | 27.39969 | 20.49685 | 20.46828 | 21.13978 | 23.93802 | 25.13882 | 28.45695 | 21.88372 |
| % (15-64)         | 68.64955 | 72.45959 | 71.24297 | 70.46066 | 68.66469 | 67.66784 | 61.97354 | 64.87994 | 60.27293 | 67.15668 |
| % (65+ )          | 22.55914 | 5.75924  | 1.35734  | 9.04248  | 10.86703 | 11.19238 | 14.08844 | 9.98124  | 11.27012 | 10.95959 |
| deltac            | 7.56029  | 29.43777 | 0.00000  | 8.01610  | 10.69091 | 5.34948  | 3.57651  | 16.27077 | 8.18516  | 5.51904  |
| delta12           | 0.11715  | 0.61341  | 0.44372  | 0.35799  | 0.50676  | 0.38682  | 0.55990  | 1.03657  | 0.47058  | 0.38758  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | -0.03351 | 2.06621  | 0.72179  | 0.36798  | 0.08403  | 0.99743  | 0.58935  | 2.64845  | 0.50506  | 0.91175  |
| sigma2            | 4.38470  | 4.98652  | 1.34409  | 3.65306  | 0.39538  | 2.68496  | 9.35399  | 4.56583  | 0.74339  | 2.38011  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 5.02000  | 12.05016 | 14.05021 | 14.58022 | 9.02009  | 12.42017 | 12.61017 | 14.76022 | 15.75025 | 12.18016 |
| x high            | 23.02041 | 21.61038 | 27.28051 | 23.28042 | 22.60040 | 22.54040 | 17.11028 | 25.11046 | 25.96048 | 22.66040 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 18.00041 | 9.56022  | 13.23030 | 8.70020  | 13.58031 | 10.12023 | 4.50010  | 10.35024 | 10.21023 | 10.48024 |
| a                 | 0.00000  | 31.54365 | 30.48758 | 30.54465 | 30.08928 | 29.49037 | 22.33532 | 34.34668 | 25.61761 | 28.96872 |
| b                 | 0.02485  | 0.02383  | 0.01785  | 0.02003  | 0.01873  | 0.01945  | 0.01817  | 0.01913  | 0.02144  | 0.01827  |

- 1 u. k. males 6 to 1
- 2 u. k. males 6 to 2
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- 5 u. k. males 6 to 5
- 6 u. k. males 6 to 7
- 7 u. k. males 6 to 8
- 8 u. k. males 6 to 9
- 9 6 to 10
- 10 6 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.06000  | 0.07420  | 0.10359  | 0.11835  | 0.09805  | 0.16702  | 0.31744  | 0.05750  | 0.08268  | 1.07885  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 5.83271  | 7.38496  | 8.41947  | 6.69783  | 6.72153  | 4.50555  | 4.68979  | 7.19781  | 5.76557  | 5.06424  |
| a1                | 0.01251  | 0.01950  | 0.01401  | 0.01885  | 0.01486  | 0.02112  | 0.01190  | 0.01051  | 0.01595  | 0.01520  |
| alpha1            | 0.03347  | 0.07092  | 0.03983  | 0.07539  | 0.05967  | 0.12886  | 0.10054  | 0.09493  | 0.07481  | 0.08677  |
| a2                | 0.07079  | 0.05147  | 0.04681  | 0.06071  | 0.05144  | 0.04125  | 0.03733  | 0.05094  | 0.05937  | 0.04780  |
| mu2               | 21.51935 | 19.38480 | 19.50933 | 20.96864 | 18.87114 | 20.42344 | 19.18581 | 18.75728 | 19.65493 | 19.63392 |
| alpha2            | 0.16919  | 0.09045  | 0.09462  | 0.12341  | 0.09009  | 0.09323  | 0.09719  | 0.09542  | 0.09863  | 0.09992  |
| lambda2           | 0.25700  | 0.36555  | 0.59710  | 0.32642  | 0.34045  | 0.21362  | 0.23702  | 0.26372  | 0.27547  | 0.28373  |
| a3                | 0.01334  | 0.00013  | 0.00008  | 0.00026  | 0.00007  | 0.01887  | 0.01918  | 0.00036  | 0.00972  | 0.00022  |
| mu3               | 66.21512 | 76.09473 | 77.95498 | 77.57504 | 74.21283 | 66.15350 | 68.64459 | 77.64317 | 66.05274 | 79.38982 |
| alpha3            | 0.30293  | 0.93178  | 0.78271  | 0.73938  | 1.37692  | 0.27590  | 0.31977  | 0.73503  | 0.27127  | 0.65376  |
| lambda3           | 0.48507  | 0.18648  | 0.14822  | 0.15212  | 0.25955  | 0.21764  | 0.19586  | 0.15166  | 0.72368  | 0.12832  |
| c                 | 0.00257  | 0.00220  | 0.00205  | 0.00315  | 0.00256  | 0.00410  | 0.00506  | 0.00415  | 0.00248  | 0.00393  |
| mean age          | 33.01301 | 30.28433 | 31.93402 | 31.87375 | 31.42825 | 36.31681 | 38.94732 | 36.03389 | 31.76651 | 34.87429 |
| %(0-14)           | 18.32842 | 21.02692 | 18.56429 | 21.27191 | 18.37023 | 20.08238 | 16.84312 | 14.81974 | 18.03602 | 18.40761 |
| %(15-64)          | 67.87358 | 70.06650 | 71.47316 | 66.50820 | 71.94803 | 62.58488 | 61.93052 | 68.84426 | 70.92965 | 66.17580 |
| %(65+ )           | 13.79800 | 8.90658  | 9.96255  | 12.21989 | 9.68175  | 17.33273 | 21.22636 | 16.33600 | 11.03433 | 15.41660 |
| deltal0           | 4.87351  | 8.86625  | 6.85235  | 5.98498  | 5.79413  | 5.15624  | 2.34874  | 2.53601  | 6.43314  | 3.86666  |
| deltal2           | 0.17678  | 0.37884  | 0.29940  | 0.31042  | 0.28877  | 0.51202  | 0.31866  | 0.20641  | 0.26864  | 0.31807  |
| delta32           | 0.18844  | 0.00254  | 0.00168  | 0.00432  | 0.00140  | 0.45745  | 0.51381  | 0.00712  | 0.16371  | 0.00458  |
| beta12            | 0.19783  | 0.78409  | 0.42089  | 0.61087  | 0.66235  | 1.38213  | 1.03449  | 0.99495  | 0.75855  | 0.86841  |
| sigma2            | 1.51897  | 4.04156  | 6.31024  | 2.64495  | 3.77908  | 2.29116  | 2.43865  | 2.76392  | 2.79307  | 2.83946  |
| sigma3            | 1.60123  | 0.20013  | 0.18936  | 0.20574  | 0.18850  | 0.78883  | 0.61250  | 0.20633  | 2.66772  | 0.19628  |
| x low             | 13.70020 | 14.59022 | 16.32026 | 15.36024 | 13.61020 | 12.83018 | 11.97016 | 11.89016 | 13.18019 | 13.44019 |
| x high            | 23.00041 | 22.94041 | 22.47040 | 23.76043 | 22.53040 | 23.99043 | 22.66040 | 22.43040 | 23.13041 | 23.06041 |
| x ret.            | 67.12832 | 67.32836 | 66.42817 | 67.11832 | 67.70844 | 64.93785 | 66.07809 | 67.16833 | 67.34837 | 66.60821 |
| x shift           | 9.30021  | 8.35019  | 6.15014  | 8.40019  | 8.92020  | 11.16026 | 10.69024 | 10.54024 | 9.95023  | 9.62022  |
| a                 | 28.90039 | 29.91894 | 31.28366 | 28.31373 | 32.12263 | 29.61539 | 31.44218 | 35.62120 | 32.20727 | 30.82959 |
| b                 | 0.02508  | 0.02484  | 0.02766  | 0.02543  | 0.02455  | 0.01470  | 0.01422  | 0.02178  | 0.02506  | 0.02000  |

- 1 u. k. males 7 to 1
- 2 u. k. males 7 to 2
- 3 u. k. males 7 to 3
- 4 u. k. males 7 to 4
- 5 u. k. males 7 to 5
- 6 u. k. males 7 to 6
- 7 u. k. males 7 to 8
- 8 u. k. males 7 to 9
- 9 u. k. males 7 to 10
- 10 u. k. males 7 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.06452  | 0.09630  | 0.10696  | 0.08890  | 0.18434  | 0.07907  | 1.05541  | 0.10742  | 0.11342  | 1.89635  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 13.27858 | 11.37527 | 11.02086 | 9.86638  | 9.07446  | 10.93198 | 6.38007  | 8.44318  | 8.64010  | 5.34540  |
| a1                | 0.02213  | 0.02857  | 0.01409  | 0.02205  | 0.01992  | 0.02318  | 0.01648  | 0.02262  | 0.01762  | 0.01738  |
| alpha1            | 0.04602  | 0.11705  | 0.04402  | 0.06440  | 0.13337  | 0.18856  | 0.10221  | 0.10473  | 0.04514  | 0.08579  |
| a2                | 0.05386  | 0.05411  | 0.07934  | 0.06424  | 0.06654  | 0.06028  | 0.06682  | 0.05171  | 0.08785  | 0.06461  |
| mu2               | 19.53182 | 19.88111 | 24.65755 | 25.90015 | 18.85185 | 19.17024 | 19.67608 | 19.31091 | 20.76601 | 19.87180 |
| alpha2            | 0.08682  | 0.09673  | 0.13938  | 0.15609  | 0.10291  | 0.11068  | 0.11611  | 0.10082  | 0.12991  | 0.11107  |
| lambda2           | 0.31027  | 0.53814  | 0.16629  | 0.16958  | 0.29693  | 0.27421  | 0.24042  | 0.28325  | 0.25087  | 0.25405  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00000  | 0.00280  | 0.00177  | 0.00299  | 0.00313  | 0.00447  | 0.00369  | 0.00371  | 0.00026  | 0.00316  |
| mean age          | 26.47881 | 29.70070 | 30.04129 | 29.89884 | 31.09959 | 33.43036 | 31.81380 | 31.41025 | 25.74566 | 30.87166 |
| % (0-14)          | 23.30060 | 23.80729 | 18.02760 | 25.18680 | 17.58805 | 18.12263 | 18.41298 | 22.38946 | 19.65072 | 19.41935 |
| % (15-64)         | 73.87492 | 67.48685 | 75.40887 | 65.67078 | 72.84753 | 68.66145 | 70.57726 | 66.38984 | 78.03653 | 70.97009 |
| % (65+)           | 2.82448  | 8.70586  | 6.56353  | 9.14242  | 9.56441  | 13.21593 | 11.00976 | 11.22070 | 2.31275  | 9.61057  |
| deltalc           | 0.00000  | 10.19692 | 7.95104  | 7.36250  | 6.35929  | 5.18369  | 4.46326  | 6.10055  | 67.74433 | 5.49433  |
| delta12           | 0.41094  | 0.52810  | 0.17764  | 0.34321  | 0.29929  | 0.38450  | 0.24663  | 0.43748  | 0.20061  | 0.26895  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.53006  | 1.21014  | 0.31584  | 0.41256  | 1.29605  | 1.70368  | 0.88025  | 1.03879  | 0.34751  | 0.77240  |
| sigma2            | 3.57383  | 5.56361  | 1.19311  | 1.08644  | 2.88543  | 2.47749  | 2.07064  | 2.80944  | 1.93113  | 2.28733  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 13.99021 | 16.49026 | 12.88018 | 14.95023 | 12.78018 | 12.54017 | 12.17016 | 13.34019 | 13.18019 | 12.83018 |
| x high            | 23.22042 | 22.95041 | 25.44047 | 25.99048 | 22.30040 | 22.41040 | 22.51040 | 22.67040 | 23.17042 | 22.89041 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.23021  | 6.46015  | 12.56029 | 11.04025 | 9.52022  | 9.87023  | 10.34024 | 9.33021  | 9.99023  | 10.06023 |
| a                 | 29.84345 | 28.54370 | 33.93203 | 28.21188 | 32.61699 | 32.30199 | 31.17702 | 28.12423 | 30.71652 | 30.76537 |
| b                 | 0.02331  | 0.03024  | 0.02549  | 0.01845  | 0.02922  | 0.02521  | 0.02515  | 0.02077  | 0.03329  | 0.02506  |

|    |       |       |               |
|----|-------|-------|---------------|
| 1  | u. k. | males | 8 to 1        |
| 2  | u. k. | males | 8 to 2        |
| 3  | u. k. | males | 8 to 3        |
| 4  | u. k. | males | 8 to 4        |
| 5  | u. k. | males | 8 to 5        |
| 6  | u. k. | males | 8 to 6        |
| 7  | u. k. | males | 8 to 7        |
| 8  | u. k. | males | 8 to 8        |
| 9  | u. k. | males | 8 to 9        |
| 10 | u. k. | males | 8 to 10       |
|    | u. k. | males | 8 to the rest |



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.04453  | 0.06882  | 0.17775  | 0.07295  | 0.16836  | 0.03950  | 0.38492  | 0.22049  | 0.05209  | 1.22941  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 14.86221 | 14.73480 | 10.37785 | 7.48895  | 15.46997 | 18.49577 | 8.99503  | 8.28681  | 16.98272 | 6.46742  |
| a1                | 0.02590  | 0.01942  | 0.03207  | 0.01945  | 0.01656  | 0.02837  | 0.01281  | 0.01408  | 0.01489  | 0.01724  |
| alpha1            | 0.03759  | 0.14724  | 0.26591  | 0.07205  | 0.16268  | 0.16302  | 0.02631  | 0.07982  | 0.08364  | 0.10892  |
| a2                | 0.05215  | 0.06948  | 0.05611  | 0.07564  | 0.06432  | 0.06578  | 0.10518  | 0.05982  | 0.11192  | 0.07350  |
| mu2               | 21.35913 | 19.09846 | 18.58907 | 22.54169 | 25.43963 | 18.22945 | 20.37463 | 21.99571 | 24.04869 | 19.61499 |
| alpha2            | 0.13066  | 0.14171  | 0.10843  | 0.11777  | 0.21307  | 0.09775  | 0.20192  | 0.14674  | 0.16720  | 0.13163  |
| lambda2           | 0.17182  | 0.39854  | 0.26598  | 0.15995  | 0.14499  | 0.20912  | 0.29711  | 0.18638  | 0.21284  | 0.25275  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00003  | 0.00007  | 0.00000  | 0.00023  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 70.54176 | 71.94368 | 0.00000  | 68.98553 |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 1.21025  | 1.09282  | 0.00000  | 1.08736  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.20551  | 0.18689  | 0.00000  | 0.23986  |
| c                 | 0.00000  | 0.00498  | 0.00477  | 0.00170  | 0.00587  | 0.00294  | 0.00085  | 0.00463  | 0.00252  | 0.00376  |
| mean age          | 25.15435 | 33.41851 | 33.65080 | 28.09419 | 35.16558 | 29.67155 | 29.36502 | 34.68768 | 30.07489 | 31.70537 |
| %(0-14)           | 29.69068 | 18.47845 | 19.10428 | 21.13855 | 18.19299 | 21.80897 | 17.00618 | 19.24777 | 15.92676 | 18.56290 |
| %(15-64)          | 66.28230 | 67.22566 | 66.82527 | 73.39342 | 65.16485 | 69.30323 | 75.40620 | 66.37491 | 76.80897 | 70.18353 |
| %(65+)            | 4.02702  | 14.29589 | 14.07045 | 5.46803  | 16.64217 | 8.88780  | 7.58762  | 14.37732 | 7.26427  | 11.25358 |
| deltac            | 0.00000  | 3.90301  | 6.71718  | 11.41588 | 2.82270  | 9.65754  | 15.00028 | 3.03911  | 5.90501  | 4.58211  |
| deltal2           | 0.49661  | 0.27948  | 0.57154  | 0.25709  | 0.25745  | 0.43127  | 0.12176  | 0.23532  | 0.13305  | 0.23457  |
| deltal32          | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00033  | 0.00116  | 0.00000  | 0.00306  |
| beta12            | 0.28768  | 1.03900  | 2.45236  | 0.61176  | 0.76352  | 1.66775  | 0.13028  | 0.54393  | 0.50022  | 0.82745  |
| sigma2            | 1.31494  | 2.81226  | 2.45305  | 1.35809  | 0.68048  | 2.13927  | 1.47139  | 1.27019  | 1.27297  | 1.92011  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.16981  | 0.17101  | 0.00000  | 0.22059  |
| x low             | 11.44015 | 14.25021 | 11.75015 | 11.41015 | 11.13014 | 10.46012 | 13.24019 | 12.00016 | 14.47022 | 12.31017 |
| x high            | 22.07039 | 21.64038 | 21.94039 | 24.02044 | 22.71041 | 21.65038 | 21.61038 | 23.01041 | 25.09046 | 22.04039 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 61.83801 | 62.47791 | 0.00000  | 62.63788 |
| x shift           | 10.63024 | 7.39017  | 10.19023 | 12.61029 | 11.58027 | 11.19026 | 8.37019  | 11.01025 | 10.62024 | 9.73022  |
| a                 | 24.68860 | 28.50464 | 32.14940 | 31.83856 | 29.11948 | 30.04035 | 27.95653 | 28.98539 | 32.59037 | 29.68204 |
| b                 | 0.01280  | 0.03093  | 0.02371  | 0.02272  | 0.02227  | 0.02272  | 0.03823  | 0.01830  | 0.03812  | 0.02736  |

- 1 u. k. males 9 to 1
- 2 u. k. males 9 to 2
- 3 u. k. males 9 to 3
- 4 u. k. males 9 to 4
- 5 u. k. males 9 to 5
- 6 u. k. males 9 to 6
- 7 u. k. males 9 to 7
- 8 u. k. males 9 to 8
- 9 u. k. males 9 to 10
- 10 u. k. males 9 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.09454  | 0.06962  | 0.10850  | 0.07085  | 0.07212  | 0.03553  | 0.36742  | 0.08281  | 0.02684  | 0.92824  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 14.11027 | 12.45214 | 7.56567  | 6.22875  | 18.91117 | 25.51109 | 7.29819  | 10.97879 | 32.79396 | 6.97174  |
| a1                | 0.01706  | 0.02393  | 0.02396  | 0.03048  | 0.02352  | 0.01218  | 0.01576  | 0.02059  | 0.01978  | 0.01939  |
| alpha1            | 0.11140  | 0.06060  | 0.09429  | 0.10010  | 0.09094  | 0.07924  | 0.09952  | 0.08943  | 0.18042  | 0.09007  |
| a2                | 0.07472  | 0.05508  | 0.01559  | 0.06776  | 0.07819  | 0.01641  | 0.08361  | 0.06620  | 0.01076  | 0.07247  |
| mu2               | 25.88999 | 22.68012 | 43.96579 | 26.92472 | 24.65378 | 41.85244 | 19.83059 | 20.33858 | 68.12185 | 21.66901 |
| alpha2            | 0.16973  | 0.10733  | 0.25252  | 0.13091  | 0.14121  | 0.17221  | 0.11848  | 0.14224  | 0.11167  | 0.11994  |
| lambda2           | 0.16166  | 0.16624  | 0.07664  | 0.13973  | 0.14278  | 0.06051  | 0.23743  | 0.24298  | 0.03285  | 0.19141  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00463  | 0.00178  | 0.00232  | 0.00217  | 0.00243  | 0.00465  | 0.00246  | 0.00408  | 0.00000  | 0.00276  |
| mean age          | 33.76117 | 27.90628 | 29.08770 | 28.33683 | 28.41570 | 33.60046 | 29.63773 | 31.02501 | 32.48024 | 29.98635 |
| % (0-14)          | 18.73578 | 26.21401 | 22.77812 | 26.79263 | 23.01377 | 21.07672 | 16.42043 | 22.77896 | 18.88765 | 20.31649 |
| % (15-64)         | 68.00159 | 67.58566 | 70.46665 | 66.57387 | 69.89328 | 65.76669 | 76.13954 | 65.35132 | 75.96676 | 71.32703 |
| % (65+ )          | 13.26263 | 6.20034  | 6.75523  | 6.63351  | 7.09295  | 13.15659 | 7.44003  | 11.86972 | 5.14559  | 8.35648  |
| deltac            | 3.68591  | 13.40721 | 10.32322 | 14.04074 | 9.66812  | 2.62008  | 6.40383  | 5.04160  | 0.00000  | 7.01303  |
| delta12           | 0.22830  | 0.43451  | 1.53679  | 0.44979  | 0.30083  | 0.74234  | 0.18851  | 0.31104  | 1.83879  | 0.26752  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.65635  | 0.56456  | 0.37341  | 0.76465  | 0.64401  | 0.46013  | 0.83999  | 0.62871  | 1.61564  | 0.75091  |
| sigma2            | 0.95244  | 1.54885  | 0.30349  | 1.06738  | 1.01109  | 0.35136  | 2.00396  | 1.70815  | 0.29420  | 1.59583  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 13.62020 | 12.78018 | 13.60020 | 14.36021 | 11.90016 | 6.91004  | 11.99016 | 12.92018 | 8.04007  | 12.33017 |
| x high            | 25.45047 | 24.53045 | 28.14053 | 26.96050 | 24.35044 | 23.84043 | 22.61040 | 22.29040 | 30.58059 | 23.82043 |
| x rel.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 11.83027 | 11.75027 | 14.54033 | 12.60029 | 12.45028 | 16.93039 | 10.62024 | 9.37021  | 22.54052 | 11.49026 |
| a                 | 31.54270 | 28.05543 | 32.24043 | 29.47582 | 29.97768 | 34.25704 | 33.19215 | 26.48207 | 44.75533 | 31.11205 |
| b                 | 0.02351  | 0.01487  | 0.02298  | 0.01852  | 0.02160  | 0.01107  | 0.03207  | 0.02221  | 0.01094  | 0.02388  |

- 1 u. k. males 10 to 1
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- 10 u. k. males 10 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8         | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|
| gmr (obs)         | 0.21400  | 0.18181  | 0.09869  | 0.08296  | 0.04850  | 0.33332  | 0.08541  | 0.02993   | 0.12210  | 1.19672  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000   | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 12.52512 | 9.50414  | 13.64031 | 11.70459 | 15.96011 | 8.72454  | 13.05194 | 20.00457  | 9.10668  | 9.19358  |
| al                | 0.01255  | 0.01738  | 0.01519  | 0.01983  | 0.02339  | 0.00799  | 0.03061  | 0.05213   | 0.02593  | 0.01531  |
| alpha1            | 0.02744  | 0.08559  | 0.18725  | 0.05638  | 0.11133  | 0.06013  | 0.31639  | 0.24129   | 0.17209  | 0.09978  |
| a2                | 0.09059  | 0.04636  | 0.05022  | 0.07035  | 0.08493  | 0.09802  | 0.06534  | 0.00028   | 0.08774  | 0.07606  |
| mu2               | 21.93612 | 19.77155 | 19.22537 | 20.34945 | 22.50157 | 22.34231 | 24.46429 | 46.15773  | 22.15394 | 20.39246 |
| alpha2            | 0.30080  | 0.12709  | 0.14175  | 0.16083  | 0.19275  | 0.23369  | 0.21992  | 0.49109   | 0.18427  | 0.17087  |
| lambda2           | 0.28530  | 0.37870  | 0.44664  | 0.42265  | 0.32685  | 0.20610  | 0.16674  | 0.08249   | 0.22885  | 0.28373  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| c                 | 0.00316  | 0.00533  | 0.00685  | 0.00305  | 0.00466  | 0.00476  | 0.00629  | 0.00488   | 0.00459  | 0.00507  |
| mean age          | 32.64029 | 34.24154 | 37.86541 | 29.26378 | 32.08269 | 33.30120 | 35.90631 | 30.70637  | 32.18434 | 33.47692 |
| % (0-14)          | 19.58761 | 21.95369 | 17.06611 | 24.02023 | 23.02774 | 15.17723 | 18.70259 | 27.13298  | 20.35320 | 19.03308 |
| % (15-64)         | 67.16833 | 62.52325 | 63.37134 | 66.47674 | 63.70286 | 70.86909 | 63.31134 | 59.16213  | 66.39281 | 66.31562 |
| % (65+ )          | 13.24406 | 15.52306 | 19.56255 | 9.50303  | 13.26940 | 13.95367 | 17.98607 | 13.70489  | 13.25400 | 14.65130 |
| deltal0           | 3.97036  | 3.26161  | 2.21903  | 6.49852  | 5.02188  | 1.67804  | 4.86463  | 10.68670  | 5.65220  | 3.02273  |
| deltal2           | 0.13857  | 0.37485  | 0.30251  | 0.28192  | 0.27536  | 0.08148  | 0.46857  | 184.24281 | 0.29555  | 0.20132  |
| deltal3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| beta12            | 0.09121  | 0.67343  | 1.32100  | 0.35058  | 0.57758  | 0.25732  | 1.43867  | 0.49133   | 0.93391  | 0.58397  |
| sigma2            | 0.94848  | 2.97973  | 3.15091  | 2.62787  | 1.69574  | 0.88191  | 0.75818  | 0.16798   | 1.24194  | 1.66053  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| x low             | 14.20021 | 15.00023 | 14.75022 | 15.84025 | 16.44026 | 11.69015 | 11.57015 | 13.05018  | 13.48019 | 13.53020 |
| x high            | 21.69038 | 22.47040 | 21.78038 | 22.51040 | 24.05044 | 21.67038 | 22.81041 | 24.51045  | 23.05041 | 22.08039 |
| x ref.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| x shift           | 7.49017  | 7.47017  | 7.03016  | 6.67015  | 7.61017  | 9.98023  | 11.24026 | 11.46026  | 9.57022  | 8.55020  |
| a                 | 23.96899 | 25.76373 | 30.13033 | 24.83042 | 25.98376 | 29.16129 | 29.42855 | 25.40135  | 27.96578 | 27.17270 |
| b                 | 0.03089  | 0.01993  | 0.02365  | 0.02990  | 0.03095  | 0.03362  | 0.02331  | 0.02594   | 0.02987  | 0.02747  |

- 1 u.k. females 1 to 2
- 2 u.k. females 1 to 3
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- 10 u.k. females 1 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.20557  | 0.20687  | 0.22067  | 0.09700  | 0.06787  | 0.34301  | 0.09401  | 0.03500  | 0.05294  | 1.32293  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 6.86912  | 5.18392  | 6.10101  | 12.50024 | 6.05857  | 14.27068 | 8.11063  | 9.25885  | 11.08178 | 6.73470  |
| al                | 0.01502  | 0.01629  | 0.02087  | 0.02581  | 0.02511  | 0.01452  | 0.01523  | 0.01804  | 0.02151  | 0.01655  |
| alpha1            | 0.09505  | 0.10786  | 0.10208  | 0.11904  | 0.07424  | 0.05282  | 0.08610  | 0.12243  | 0.04333  | 0.07815  |
| a2                | 0.04956  | 0.05916  | 0.06526  | 0.06697  | 0.04430  | 0.07618  | 0.07320  | 0.05811  | 0.02625  | 0.05955  |
| mu2               | 18.33251 | 20.08730 | 19.77335 | 18.46343 | 20.04011 | 18.56927 | 21.14650 | 18.97346 | 18.86192 | 18.97633 |
| alpha2            | 0.10616  | 0.14248  | 0.13744  | 0.10627  | 0.08945  | 0.13615  | 0.16949  | 0.09939  | 0.05408  | 0.12344  |
| lambda2           | 0.39209  | 0.29737  | 0.34080  | 0.39535  | 0.48961  | 0.42678  | 0.26921  | 0.33477  | 0.80827  | 0.39956  |
| a3                | 0.00537  | 0.00041  | 0.00597  | 0.00182  | 0.00000  | 0.00218  | 0.00000  | 0.00000  | 0.00000  | 0.00005  |
| mu3               | 64.20721 | 74.94084 | 61.58718 | 64.39221 | 0.00000  | 65.29458 | 0.00000  | 0.00000  | 0.00000  | 78.78619 |
| alpha3            | 0.32268  | 0.79576  | 0.24055  | 0.03644  | 0.00000  | 0.05627  | 0.00000  | 0.00000  | 0.00000  | 0.74000  |
| lambda3           | 0.25668  | 0.19772  | 0.40021  | 1.22555  | 0.00000  | 1.56080  | 0.00000  | 0.00000  | 0.00000  | 0.14327  |
| c                 | 0.00451  | 0.00522  | 0.00394  | 0.00218  | 0.00234  | 0.00241  | 0.00490  | 0.00372  | 0.00071  | 0.00389  |
| mean age          | 34.14443 | 34.75120 | 31.89460 | 29.46260 | 28.96846 | 30.34726 | 33.33884 | 32.54587 | 29.98178 | 31.93832 |
| % (0-14)          | 18.39073 | 19.50133 | 21.52542 | 20.90268 | 25.86113 | 18.09901 | 19.68362 | 17.64724 | 24.44290 | 20.04651 |
| % (15-64)         | 67.38979 | 64.10796 | 65.93875 | 69.31106 | 66.34695 | 71.17068 | 66.06663 | 71.04097 | 68.32845 | 67.61781 |
| % (65+ )          | 14.21949 | 16.39070 | 12.53583 | 9.78626  | 7.79192  | 10.73030 | 14.24975 | 11.31179 | 7.22865  | 12.33568 |
| deltal0           | 3.33160  | 3.11844  | 5.29163  | 11.82692 | 10.74503 | 6.03252  | 3.10723  | 4.85021  | 30.12875 | 4.25702  |
| deltal2           | 0.30308  | 0.27540  | 0.31983  | 0.38537  | 0.56679  | 0.19055  | 0.20813  | 0.31039  | 0.81961  | 0.27799  |
| delta32           | 0.10844  | 0.00699  | 0.09151  | 0.02723  | 0.00000  | 0.02859  | 0.00000  | 0.00000  | 0.00000  | 0.00076  |
| beta12            | 0.89537  | 0.75699  | 0.74268  | 1.12017  | 0.82993  | 0.38791  | 0.50802  | 1.23178  | 0.80114  | 0.63308  |
| sigma2            | 3.69354  | 2.08704  | 2.47961  | 3.72027  | 5.47340  | 3.13456  | 1.58837  | 3.36820  | 14.94503 | 3.23684  |
| sigma3            | 0.79546  | 0.24847  | 1.66373  | 33.63388 | 0.00000  | 27.73760 | 0.00000  | 0.00000  | 0.00000  | 0.19361  |
| x low             | 13.70020 | 13.81020 | 14.37021 | 13.92020 | 16.49026 | 14.02021 | 13.94020 | 13.56020 | 16.72027 | 14.33021 |
| x high            | 21.51038 | 22.43040 | 22.30040 | 21.65038 | 23.26042 | 21.15037 | 22.74041 | 22.47040 | 21.87039 | 21.77038 |
| x ret.            | 63.04781 | 67.87848 | 62.74786 | 66.81825 | 0.00000  | 67.24834 | 0.00000  | 0.00000  | 0.00000  | 67.13832 |
| x shift           | 7.81018  | 8.62020  | 7.93018  | 7.73018  | 6.77015  | 7.13016  | 8.80020  | 8.91020  | 5.15012  | 7.44017  |
| a                 | 29.47958 | 27.69193 | 26.57896 | 28.61189 | 26.71374 | 28.10036 | 27.40963 | 32.57032 | 27.65703 | 27.62752 |
| b                 | 0.02375  | 0.02281  | 0.02687  | 0.03212  | 0.02366  | 0.03499  | 0.02586  | 0.02711  | 0.01806  | 0.02740  |

- 1 u.k. females 2 to 1
- 2 u.k. females 2 to 3
- 3 u.k. females 2 to 4
- 4 u.k. females 2 to 5
- 5 u.k. females 2 to 6
- 6 u.k. females 2 to 7
- 7 u.k. females 2 to 8
- 8 u.k. females 2 to 9
- 9 u.k. females 2 to 10
- 10 u.k. females 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.07934  | 0.12507  | 0.07542  | 0.11373  | 0.03495  | 0.32844  | 0.10511  | 0.12168  | 0.05646  | 1.04021  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 9.02247  | 5.08797  | 9.63653  | 9.05580  | 9.29101  | 10.41264 | 7.68624  | 13.92243 | 10.60628 | 6.37926  |
| a1                | 0.01129  | 0.01469  | 0.00813  | 0.02590  | 0.01308  | 0.01204  | 0.01446  | 0.01272  | 0.02403  | 0.01224  |
| alpha1            | 0.04496  | 0.03933  | 0.04164  | 0.21273  | 0.03157  | 0.04719  | 0.01585  | 0.07476  | 0.14081  | 0.06246  |
| a2                | 0.06667  | 0.04132  | 0.07634  | 0.08367  | 0.06246  | 0.06204  | 0.02900  | 0.02338  | 0.08600  | 0.05448  |
| mu2               | 19.78269 | 19.47022 | 20.63908 | 20.61229 | 24.98457 | 18.98447 | 19.03256 | 17.77303 | 21.47308 | 19.32369 |
| alpha2            | 0.18547  | 0.09685  | 0.19329  | 0.18341  | 0.33556  | 0.12546  | 0.12759  | 0.05467  | 0.16173  | 0.13083  |
| lambda2           | 0.49638  | 0.51326  | 0.35881  | 0.35789  | 0.18944  | 0.45986  | 0.57030  | 0.56652  | 0.25921  | 0.45593  |
| a3                | 0.00017  | 0.00439  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 69.47646 | 65.00684 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 1.02016  | 0.01154  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.21584  | 1.07738  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00474  | 0.00171  | 0.00519  | 0.00533  | 0.00354  | 0.00345  | 0.00115  | 0.00499  | 0.00403  | 0.00481  |
| mean age          | 34.43119 | 35.60436 | 35.31242 | 33.92331 | 32.54466 | 31.91283 | 35.39969 | 37.31621 | 31.26737 | 34.03160 |
| % (0-14)          | 18.85730 | 18.68781 | 16.28852 | 19.05691 | 20.42582 | 17.67727 | 20.51687 | 18.15096 | 20.52040 | 18.64907 |
| % (15-64)         | 66.16161 | 63.47242 | 67.87744 | 65.54810 | 66.15902 | 71.35597 | 64.15962 | 65.01492 | 67.82098 | 67.02964 |
| % (65+ )          | 14.98109 | 17.83978 | 15.83404 | 15.39500 | 13.41516 | 10.96676 | 15.32351 | 16.83412 | 11.65862 | 14.32129 |
| delta1c           | 2.37994  | 8.60339  | 1.56871  | 4.86024  | 3.69223  | 3.49504  | 12.55246 | 2.54868  | 5.95881  | 2.54372  |
| delta12           | 0.16936  | 0.35541  | 0.10655  | 0.30959  | 0.20946  | 0.19411  | 0.49864  | 0.54387  | 0.27940  | 0.22468  |
| delta32           | 0.00256  | 0.10627  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.24242  | 0.40607  | 0.21544  | 1.15989  | 0.09407  | 0.37615  | 0.12422  | 1.36739  | 0.87062  | 0.47741  |
| sigma2            | 2.67630  | 5.29964  | 1.85632  | 1.95137  | 0.56455  | 3.66533  | 4.46979  | 10.36208 | 1.60272  | 3.48492  |
| sigma3            | 0.21157  | 93.39887 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 15.70024 | 15.86025 | 14.79022 | 14.84023 | 12.87018 | 14.74022 | 15.67024 | 14.74022 | 14.03021 | 15.11023 |
| x high            | 21.71038 | 22.55040 | 22.31040 | 22.47040 | 21.86039 | 21.71038 | 21.54038 | 21.58038 | 23.21042 | 21.96039 |
| x ret.            | 62.21795 | 68.34858 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 6.01014  | 6.69015  | 7.52017  | 7.63017  | 8.99021  | 6.97016  | 5.87013  | 6.84016  | 9.18021  | 6.85016  |
| a                 | 25.44373 | 29.37703 | 28.30323 | 28.18466 | 24.71042 | 29.69606 | 26.07372 | 33.30172 | 28.26039 | 28.06703 |
| b                 | 0.02946  | 0.02255  | 0.02983  | 0.03374  | 0.02601  | 0.03077  | 0.01522  | 0.01456  | 0.03089  | 0.02627  |

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|                   | 1        | 2        | 3        | 4        | 5          | 6        | 7        | 8         | 9        | 10       |
|-------------------|----------|----------|----------|----------|------------|----------|----------|-----------|----------|----------|
| gmr (obs)         | 0.08785  | 0.27811  | 0.11590  | 0.20912  | 0.14221    | 0.42446  | 0.16018  | 0.05187   | 0.06640  | 1.53610  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000    | 1.00000  | 1.00000  | 1.00000   | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 9.79257  | 6.24527  | 4.17964  | 8.53641  | 6.72373    | 11.00968 | 7.08140  | 15.57727  | 7.33874  | 5.95921  |
| a1                | 0.02538  | 0.02567  | 0.01267  | 0.02078  | 0.02174    | 0.01315  | 0.01432  | 0.01740   | 0.04165  | 0.01849  |
| alpha1            | 0.07242  | 0.17125  | 0.02458  | 0.09001  | 0.04434    | 0.03518  | 0.07554  | 0.18136   | 0.12861  | 0.09210  |
| a2                | 0.05559  | 0.07222  | 0.06778  | 0.06571  | 0.02852    | 0.07653  | 0.02528  | 0.00012   | 0.06983  | 0.06027  |
| mu2               | 18.93057 | 23.04140 | 26.36231 | 22.27494 | 16.96162   | 19.27554 | 31.82464 | 54.19686  | 23.15558 | 19.82969 |
| alpha2            | 0.10632  | 0.17486  | 0.20964  | 0.13499  | 0.06385    | 0.17303  | 0.24193  | 0.40667   | 0.15638  | 0.12918  |
| lambda2           | 0.33593  | 0.18168  | 0.15457  | 0.19395  | 0.30609    | 0.36200  | 0.10949  | 0.06511   | 0.16547  | 0.25906  |
| a3                | 0.00006  | 0.00000  | 0.00000  | 0.00000  | 0.00368    | 0.00000  | 0.00854  | 0.00000   | 0.00007  | 0.00000  |
| mu3               | 71.19465 | 0.00000  | 0.00000  | 0.00000  | 58.95318   | 0.00000  | 60.61970 | 0.00000   | 71.05727 | 0.00000  |
| alpha3            | 1.10239  | 0.00000  | 0.00000  | 0.00000  | 0.00100    | 0.00000  | 0.22742  | 0.00000   | 1.13151  | 0.00000  |
| lambda3           | 0.19264  | 0.00000  | 0.00000  | 0.00000  | 1.17614    | 0.00000  | 0.86151  | 0.00000   | 0.19595  | 0.00000  |
| c                 | 0.00183  | 0.00496  | 0.00170  | 0.00371  | 0.00007    | 0.00291  | 0.00583  | 0.00661   | 0.00239  | 0.00432  |
| mean age          | 27.75458 | 33.05495 | 31.77008 | 31.05409 | 32.91177   | 31.02993 | 36.58940 | 37.31443  | 26.72770 | 32.11528 |
| %(0-14)           | 25.59084 | 21.20710 | 18.39618 | 22.47904 | 24.09133   | 19.20912 | 21.39213 | 18.41409  | 31.41287 | 21.35295 |
| %(15-64)          | 67.84553 | 64.39725 | 71.38181 | 66.80013 | 61.56136   | 69.88423 | 60.30930 | 62.82021  | 60.92595 | 65.95133 |
| %(65+)            | 6.56363  | 14.39565 | 10.22202 | 10.92083 | 14.34731   | 10.90665 | 18.29857 | 18.76571  | 7.66117  | 12.69572 |
| deltalc           | 13.85740 | 5.17458  | 7.46044  | 5.60632  | 295.30698  | 4.52065  | 2.45805  | 2.63291   | 17.45453 | 4.28464  |
| delta12           | 0.45663  | 0.35548  | 0.18687  | 0.31619  | 0.76240    | 0.17184  | 0.56647  | 149.50015 | 0.59639  | 0.30685  |
| delta32           | 0.00116  | 0.00000  | 0.00000  | 0.00000  | 0.12892    | 0.00000  | 0.33792  | 0.00000   | 0.00102  | 0.00000  |
| beta12            | 0.68113  | 0.97937  | 0.11726  | 0.66684  | 0.69442    | 0.20330  | 0.31224  | 0.44596   | 0.82240  | 0.71294  |
| sigma2            | 3.15955  | 1.03904  | 0.73730  | 1.43678  | 4.79398    | 2.09212  | 0.45257  | 0.16010   | 1.05807  | 2.00541  |
| sigma3            | 0.17475  | 0.00000  | 0.00000  | 0.00000  | 1176.60681 | 0.00000  | 3.78810  | 0.00000   | 0.17317  | 0.00000  |
| x low             | 13.86020 | 12.46017 | 12.33017 | 13.04018 | 12.05016   | 13.72020 | 12.40017 | 12.10016  | 12.79018 | 12.92018 |
| x high            | 22.01039 | 23.16042 | 24.20044 | 23.83043 | 21.09037   | 21.22037 | 24.19044 | 26.02048  | 23.11041 | 22.28040 |
| x ret.            | 62.06797 | 0.00000  | 0.00000  | 0.00000  | 61.66804   | 0.00000  | 62.15796 | 0.00000   | 62.09797 | 0.00000  |
| x shift           | 8.15019  | 10.70024 | 11.87027 | 10.79025 | 9.04021    | 7.50017  | 11.79027 | 13.92032  | 10.32024 | 9.36021  |
| a                 | 25.57963 | 27.91873 | 30.80872 | 28.36118 | 25.19873   | 26.77423 | 26.61545 | 30.61209  | 23.49932 | 27.55540 |
| b                 | 0.02300  | 0.02305  | 0.02357  | 0.02050  | 0.01167    | 0.03045  | 0.01172  | 0.01785   | 0.01798  | 0.02185  |

- 1 u.k. females 4 to 1
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|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.04901  | 0.06951  | 0.13736  | 0.16715  | 0.04096  | 0.34624  | 0.19402  | 0.09370  | 0.04837  | 1.14633  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 18.97625 | 13.52192 | 8.84962  | 7.36534  | 12.35967 | 12.26192 | 4.74971  | 13.19653 | 14.46758 | 7.81483  |
| a1                | 0.02836  | 0.02230  | 0.01517  | 0.02078  | 0.01996  | 0.01352  | 0.00805  | 0.01084  | 0.00955  | 0.01500  |
| alpha1            | 0.10788  | 0.05773  | 0.05818  | 0.04542  | 0.03819  | 0.03332  | 0.02976  | 0.02459  | 0.03084  | 0.02864  |
| a2                | 0.04488  | 0.05426  | 0.04394  | 0.05562  | 0.02207  | 0.05649  | 0.02868  | 0.04125  | 0.04398  | 0.05263  |
| mu2               | 19.69723 | 18.03213 | 18.54572 | 19.51739 | 19.45717 | 17.63140 | 18.85316 | 19.55087 | 20.76096 | 19.45270 |
| alpha2            | 0.08567  | 0.08244  | 0.09102  | 0.11240  | 0.06058  | 0.10364  | 0.10814  | 0.13693  | 0.11175  | 0.13073  |
| lambda2           | 0.39981  | 0.24170  | 0.29608  | 0.45662  | 0.27759  | 0.41280  | 0.31985  | 0.46753  | 0.28929  | 0.31907  |
| a3                | 0.00000  | 0.00000  | 0.00012  | 0.00000  | 0.00000  | 0.00000  | 0.00016  | 0.00000  | 0.00022  | 0.00013  |
| mu3               | 0.00000  | 0.00000  | 71.85282 | 0.00000  | 0.00000  | 0.00000  | 72.38482 | 78.94814 | 70.90856 | 92.11662 |
| alpha3            | 0.00000  | 0.00000  | 0.97287  | 0.00000  | 0.00000  | 0.00000  | 1.00876  | 0.85005  | 1.08648  | 0.22387  |
| lambda3           | 0.00000  | 0.00000  | 0.17698  | 0.00000  | 0.00000  | 0.00000  | 0.17637  | 0.11252  | 0.20234  | 0.04584  |
| c                 | 0.00329  | 0.00058  | 0.00312  | 0.00121  | 0.00207  | 0.00150  | 0.00497  | 0.00340  | 0.00373  | 0.00119  |
| mean age          | 30.78690 | 26.33766 | 32.94578 | 27.36766 | 32.11124 | 29.79236 | 39.27069 | 36.35325 | 36.55508 | 31.93938 |
| % (0-14)          | 24.74078 | 24.00727 | 19.69921 | 24.05901 | 25.10686 | 18.00952 | 16.79429 | 17.98322 | 16.38950 | 19.78975 |
| % (15-64)         | 65.05900 | 72.34756 | 69.29033 | 70.34268 | 64.13981 | 74.35451 | 64.94437 | 66.99525 | 69.39497 | 70.21273 |
| % (65+)           | 10.20023 | 3.64517  | 11.01046 | 5.59830  | 10.75333 | 7.63597  | 18.26134 | 15.02153 | 14.21554 | 9.99752  |
| deltalc           | 8.62090  | 38.47168 | 4.86682  | 17.24802 | 9.63670  | 9.01204  | 1.61997  | 3.19151  | 2.56381  | 12.63477 |
| delta1            | 0.63198  | 0.41087  | 0.34529  | 0.37367  | 0.90435  | 0.23943  | 0.28066  | 0.26268  | 0.21725  | 0.28504  |
| delta32           | 0.00000  | 0.00000  | 0.00274  | 0.00000  | 0.00000  | 0.00000  | 0.00546  | 0.00006  | 0.00499  | 0.00253  |
| beta1             | 1.25926  | 0.70021  | 0.63918  | 0.40404  | 0.63033  | 0.32151  | 0.27523  | 0.17955  | 0.27595  | 0.21907  |
| sigma2            | 4.66687  | 2.93176  | 3.25281  | 4.06233  | 4.58231  | 3.98290  | 2.95765  | 3.41433  | 2.58874  | 2.44076  |
| sigma3            | 0.00000  | 0.00000  | 0.18191  | 0.00000  | 0.00000  | 0.00000  | 0.17484  | 0.13237  | 0.18624  | 0.20474  |
| x low             | 15.46024 | 11.31014 | 12.72018 | 15.52024 | 14.15021 | 13.02018 | 13.02018 | 15.35024 | 14.14021 | 13.52020 |
| x high            | 23.30042 | 21.86039 | 22.16039 | 22.39040 | 23.72043 | 20.83036 | 22.01039 | 22.08039 | 23.85043 | 22.04039 |
| x ret.            | 0.00000  | 0.00000  | 62.13796 | 0.00000  | 0.00000  | 0.00000  | 62.47791 | 60.82818 | 62.57789 | 85.00214 |
| x shift           | 7.84018  | 10.55024 | 9.44022  | 6.87016  | 9.57022  | 7.81018  | 8.99021  | 6.73015  | 9.71022  | 8.52020  |
| a                 | 27.65372 | 29.27856 | 29.98536 | 26.71039 | 25.59185 | 30.98416 | 30.35649 | 27.93371 | 33.02891 | 28.20961 |
| b                 | 0.02166  | 0.02021  | 0.01855  | 0.02742  | 0.00831  | 0.02821  | 0.01235  | 0.01952  | 0.01821  | 0.02134  |

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|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.05500  | 0.11507  | 0.09191  | 0.20002  | 0.10902  | 0.94260  | 0.16793  | 0.04799  | 0.06746  | 1.79701  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 22.13955 | 6.27442  | 11.85574 | 10.60507 | 6.14318  | 8.07300  | 14.42910 | 24.68377 | 17.68710 | 7.05357  |
| a1                | 0.02702  | 0.02462  | 0.02957  | 0.02778  | 0.03826  | 0.01836  | 0.02385  | 0.02715  | 0.04371  | 0.02238  |
| alpha1            | 0.24502  | 0.10767  | 0.07692  | 0.12283  | 0.15726  | 0.09459  | 0.06470  | 0.21149  | 0.12328  | 0.10204  |
| a2                | 0.04701  | 0.04592  | 0.05187  | 0.04547  | 0.00208  | 0.06496  | 0.02740  | 0.03828  | 0.06675  | 0.05529  |
| mu2               | 18.00047 | 21.71740 | 20.27872 | 19.31718 | 48.40627 | 20.15956 | 19.71295 | 16.49495 | 22.35429 | 20.05312 |
| alpha2            | 0.08835  | 0.10637  | 0.09171  | 0.09758  | 0.31486  | 0.13994  | 0.07207  | 0.04724  | 0.12062  | 0.11997  |
| lambda2           | 0.50659  | 0.25736  | 0.60718  | 0.47968  | 0.06708  | 0.28070  | 0.64787  | 0.27654  | 0.27011  | 0.30908  |
| a3                | 0.00789  | 0.00000  | 0.00000  | 0.00513  | 0.00587  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 67.04560 | 0.00000  | 0.00000  | 66.87171 | 59.93228 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.09005  | 0.00000  | 0.00000  | 0.08048  | 0.11863  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.51434  | 0.00000  | 0.00000  | 0.57835  | 1.33824  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00399  | 0.00438  | 0.00113  | 0.00341  | 0.00269  | 0.00446  | 0.00330  | 0.00226  | 0.00200  | 0.00419  |
| mean age          | 36.76263 | 32.85767 | 26.14247 | 33.05217 | 28.97298 | 32.31660 | 31.28817 | 35.08103 | 25.90645 | 31.82425 |
| % (0-14)          | 15.85610 | 24.29453 | 27.57769 | 23.48115 | 27.13762 | 20.95922 | 26.85364 | 16.02444 | 31.87480 | 22.94744 |
| % (15-64)         | 65.06975 | 62.61424 | 68.18102 | 61.05479 | 62.49874 | 66.03596 | 62.06953 | 71.87095 | 62.17348 | 64.70090 |
| % (65+)           | 19.07415 | 13.09122 | 4.24129  | 15.46406 | 10.36364 | 13.00481 | 11.07683 | 12.10461 | 5.95173  | 12.35165 |
| delta1e           | 6.76998  | 5.62235  | 26.13570 | 8.15349  | 14.24127 | 4.11537  | 7.23110  | 11.98644 | 21.84157 | 5.33612  |
| delta12           | 0.57482  | 0.53609  | 0.57012  | 0.61094  | 18.40574 | 0.28265  | 0.87039  | 0.70916  | 0.65491  | 0.40467  |
| delta32           | 0.16780  | 0.00000  | 0.00000  | 0.11282  | 2.82485  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 2.77330  | 1.01225  | 0.83877  | 1.25879  | 0.49948  | 0.67593  | 0.89768  | 4.47670  | 1.02199  | 0.85060  |
| sigma2            | 5.73387  | 2.41949  | 6.62068  | 4.91598  | 0.21307  | 2.00589  | 8.98956  | 5.85384  | 2.23930  | 2.57636  |
| sigma3            | 5.71168  | 0.00000  | 0.00000  | 7.18665  | 11.28111 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 14.17021 | 15.15023 | 17.34028 | 15.64024 | 12.00016 | 13.60020 | 17.12028 | 10.91014 | 16.00025 | 14.34021 |
| x high            | 21.43038 | 24.86045 | 23.21042 | 22.48040 | 25.17046 | 22.46040 | 22.76041 | 22.75041 | 25.10046 | 22.90041 |
| x rel.            | 70.26899 | 0.00000  | 0.00000  | 70.09895 | 61.74803 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 7.26017  | 9.71022  | 5.87013  | 6.84016  | 13.17030 | 8.86020  | 5.64013  | 11.84027 | 9.10021  | 8.56020  |
| a                 | 37.58021 | 27.58708 | 26.66373 | 26.80037 | 27.09044 | 27.36040 | 24.10708 | 42.72019 | 25.90042 | 26.87183 |
| b                 | 0.02688  | 0.01718  | 0.03013  | 0.02376  | 0.01967  | 0.02415  | 0.01606  | 0.01947  | 0.02444  | 0.02218  |

- 1 u.k. females 6 to 1
- 2 u.k. females 6 to 2
- 3 u.k. females 6 to 3
- 4 u.k. females 6 to 4
- 5 u.k. females 6 to 5
- 6 u.k. females 6 to 7
- 7 u.k. females 6 to 8
- 8 u.k. females 6 to 9
- 9 u.k. females 6 to 10
- 10 u.k. females 6 to the rest



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.04829  | 0.07200  | 0.09957  | 0.11669  | 0.09184  | 0.16114  | 0.31923  | 0.05315  | 0.07428  | 1.03620  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 8.99942  | 8.74074  | 8.69925  | 6.92991  | 9.45552  | 5.04471  | 5.08563  | 9.55528  | 7.30295  | 5.06283  |
| al                | 0.02172  | 0.02109  | 0.01371  | 0.01905  | 0.02059  | 0.01965  | 0.00816  | 0.00829  | 0.01432  | 0.01507  |
| alpha1            | 0.10671  | 0.12249  | 0.02812  | 0.08956  | 0.10974  | 0.11031  | 0.10231  | 0.02206  | 0.03091  | 0.08855  |
| a2                | 0.07195  | 0.06632  | 0.04898  | 0.07016  | 0.05833  | 0.03916  | 0.04314  | 0.06772  | 0.06190  | 0.05065  |
| mu2               | 21.62655 | 19.72382 | 19.63808 | 20.45384 | 19.13243 | 19.79182 | 21.10878 | 21.83313 | 22.31581 | 19.88078 |
| alpha2            | 0.13922  | 0.13733  | 0.13281  | 0.15375  | 0.11271  | 0.10412  | 0.16279  | 0.23011  | 0.20601  | 0.12786  |
| lambda2           | 0.24675  | 0.39795  | 0.55092  | 0.33991  | 0.39944  | 0.40692  | 0.26337  | 0.25664  | 0.26947  | 0.35358  |
| a3                | 0.00004  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00004  | 0.00002  | 0.00000  | 0.00000  | 0.00001  |
| mu3               | 86.24116 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 82.75182 | 90.38014 | 0.00000  | 0.00000  | 91.84480 |
| alpha3            | 0.38643  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.47935  | 0.40945  | 0.00000  | 0.00000  | 0.36267  |
| lambda3           | 0.06484  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.08023  | 0.06354  | 0.00000  | 0.00000  | 0.05775  |
| c                 | 0.00311  | 0.00448  | 0.00247  | 0.00430  | 0.00392  | 0.00473  | 0.00692  | 0.00449  | 0.00332  | 0.00477  |
| mean age          | 32.20114 | 32.36158 | 32.46232 | 31.77659 | 31.73974 | 35.86030 | 40.77051 | 36.40533 | 33.06323 | 35.54308 |
| % (0-14)          | 20.49481 | 20.64176 | 20.04111 | 21.66739 | 20.53595 | 20.92563 | 16.09617 | 16.73290 | 21.50932 | 19.15673 |
| % (15-64)         | 68.78252 | 66.31176 | 68.40372 | 65.76556 | 67.83284 | 63.43728 | 61.88543 | 66.12823 | 65.19626 | 65.20875 |
| % (65+ )          | 10.72268 | 13.04649 | 11.55516 | 12.56705 | 11.63121 | 15.63709 | 22.01840 | 17.13888 | 13.29442 | 15.63452 |
| deltalc           | 6.99362  | 4.70828  | 5.55336  | 4.42783  | 5.24755  | 4.15667  | 1.17883  | 1.84657  | 4.32061  | 3.16214  |
| deltal2           | 0.30191  | 0.31803  | 0.27985  | 0.27157  | 0.35296  | 0.50177  | 0.18914  | 0.12239  | 0.23141  | 0.29757  |
| deltal3           | 0.00051  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00103  | 0.00035  | 0.00000  | 0.00000  | 0.00029  |
| beta12            | 0.76646  | 0.89198  | 0.21174  | 0.58253  | 0.97357  | 1.05940  | 0.62847  | 0.09588  | 0.15005  | 0.69252  |
| sigma2            | 1.77239  | 2.89784  | 4.14821  | 2.21076  | 3.54382  | 3.90814  | 1.61781  | 1.11530  | 1.30804  | 2.76535  |
| sigma3            | 0.16780  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.16738  | 0.15519  | 0.00000  | 0.00000  | 0.15923  |
| x low             | 14.15021 | 14.97023 | 16.09025 | 14.89023 | 14.56022 | 15.45024 | 13.68020 | 13.33019 | 14.82022 | 14.66022 |
| x high            | 23.78043 | 22.31040 | 22.13039 | 22.66040 | 22.17039 | 22.97041 | 22.84041 | 22.19039 | 23.16042 | 22.61040 |
| x ret.            | 58.04865 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 60.11830 | 60.94816 | 0.00000  | 0.00000  | 59.21845 |
| x shift           | 9.63022  | 7.34017  | 6.04014  | 7.77018  | 7.61017  | 7.52017  | 9.16021  | 8.86020  | 8.34019  | 7.95018  |
| a                 | 28.56611 | 27.53895 | 27.65704 | 26.39612 | 28.58465 | 27.34372 | 28.95577 | 27.91347 | 25.77472 | 27.76039 |
| b                 | 0.02544  | 0.02972  | 0.02546  | 0.02790  | 0.02768  | 0.01859  | 0.01526  | 0.02299  | 0.02060  | 0.02146  |

- 1 u.k. females 7 to 1
- 2 u.k. females 7 to 2
- 3 u.k. females 7 to 3
- 4 u.k. females 7 to 4
- 5 u.k. females 7 to 5
- 6 u.k. females 7 to 6
- 7 u.k. females 7 to 8
- 8 u.k. females 7 to 9
- 9 u.k. females 7 to 10
- 10 u.k. females 7 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.05551  | 0.09626  | 0.09801  | 0.08827  | 0.18236  | 0.06562  | 1.01236  | 0.09285  | 0.08119  | 1.77243  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mac% <sub>m</sub> | 11.13289 | 6.34223  | 5.79112  | 8.16200  | 11.85289 | 7.20267  | 8.02589  | 6.94351  | 5.38445  | 6.11258  |
| a1                | 0.02554  | 0.02050  | 0.01277  | 0.01818  | 0.01935  | 0.01464  | 0.01466  | 0.01825  | 0.02980  | 0.01593  |
| alpha1            | 0.10257  | 0.08775  | 0.05650  | 0.06268  | 0.14714  | 0.02697  | 0.09906  | 0.17947  | 0.09325  | 0.08805  |
| a2                | 0.07954  | 0.06116  | 0.06075  | 0.04453  | 0.05125  | 0.05741  | 0.06928  | 0.02220  | 0.05577  | 0.06175  |
| mu2               | 25.39885 | 29.41678 | 22.55259 | 30.57491 | 17.98743 | 22.99182 | 19.58713 | 36.08138 | 21.62440 | 19.79077 |
| alpha2            | 0.13277  | 0.30422  | 0.14737  | 0.17668  | 0.09877  | 0.25562  | 0.14774  | 0.27325  | 0.11665  | 0.13084  |
| lambda2           | 0.15148  | 0.15078  | 0.25482  | 0.09786  | 0.31111  | 0.26606  | 0.31015  | 0.09244  | 0.33114  | 0.29503  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00007  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 84.41957 | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.31151  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.05481  | 0.00000  | 0.00000  |
| c                 | 0.00211  | 0.00405  | 0.00458  | 0.00326  | 0.00465  | 0.00321  | 0.00491  | 0.00389  | 0.00286  | 0.00449  |
| mean age          | 28.76025 | 30.83423 | 34.14838 | 30.16189 | 33.77581 | 33.70362 | 33.48400 | 34.46955 | 28.72060 | 32.87231 |
| %(0-14)           | 22.61685 | 22.66183 | 19.28901 | 23.88796 | 18.55322 | 22.31947 | 18.42365 | 16.19365 | 27.94860 | 19.65259 |
| %(15-64)          | 71.01447 | 65.56864 | 66.91901 | 66.22997 | 67.65799 | 63.32986 | 67.31214 | 71.40600 | 63.39834 | 67.15348 |
| %(65+)            | 6.36868  | 11.76952 | 13.79198 | 9.88207  | 13.78879 | 14.35068 | 14.26421 | 12.40036 | 8.65306  | 13.19393 |
| deltac            | 12.09310 | 5.06298  | 2.78722  | 5.57120  | 4.16260  | 4.55614  | 2.98770  | 4.68926  | 10.40173 | 3.54682  |
| delta12           | 0.32109  | 0.33512  | 0.21021  | 0.40817  | 0.37759  | 0.25496  | 0.21163  | 0.82193  | 0.53424  | 0.25800  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00317  | 0.00000  | 0.00000  |
| beta12            | 0.77253  | 0.28843  | 0.38340  | 0.35479  | 1.48972  | 0.10550  | 0.67053  | 0.65679  | 0.79935  | 0.67298  |
| sigma2            | 1.14093  | 0.49564  | 1.72915  | 0.55388  | 3.14981  | 1.04084  | 2.09932  | 0.33830  | 2.83865  | 2.25498  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.17596  | 0.00000  | 0.00000  |
| x low             | 13.41019 | 14.53022 | 15.00023 | 10.32012 | 12.35017 | 15.18023 | 13.43019 | 10.77013 | 16.37026 | 13.54020 |
| x high            | 25.98048 | 24.64045 | 24.52045 | 23.87043 | 21.54038 | 23.01041 | 21.87039 | 24.31044 | 24.53045 | 22.38040 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 52.01966 | 0.00000  | 0.00000  |
| x shift           | 12.57029 | 10.11023 | 9.52022  | 13.55031 | 9.19021  | 7.83018  | 8.44019  | 13.54031 | 8.16019  | 8.84020  |
| a                 | 31.42656 | 26.27616 | 29.51372 | 29.17042 | 31.09033 | 23.79711 | 28.17807 | 33.72036 | 25.93710 | 28.44961 |
| b                 | 0.02362  | 0.02910  | 0.02188  | 0.01438  | 0.02262  | 0.01875  | 0.02720  | 0.02460  | 0.02308  | 0.02429  |

- 1 u.k. females 8 to 1
- 2 u.k. females 8 to 2
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- 7 u.k. females 8 to 7
- 8 u.k. females 8 to 9
- 9 u.k. females 8 to 10
- 10 u.k. females 8 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.03536  | 0.05321  | 0.20387  | 0.06474  | 0.17267  | 0.03748  | 0.36614  | 0.19399  | 0.04295  | 1.17039  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 35.50578 | 19.96043 | 10.79404 | 17.59876 | 13.32238 | 24.13642 | 13.95000 | 9.88207  | 15.61230 | 10.47847 |
| a1                | 0.01887  | 0.04496  | 0.02550  | 0.03171  | 0.01204  | 0.02827  | 0.00936  | 0.01078  | 0.03456  | 0.01677  |
| alpha1            | 0.03727  | 0.41038  | 0.16970  | 0.20517  | 0.09229  | 0.36197  | 0.02744  | 0.02637  | 0.11692  | 0.12889  |
| a2                | 0.05443  | 0.06173  | 0.06373  | 0.08541  | 0.06288  | 0.07515  | 0.11110  | 0.01233  | 0.09092  | 0.07841  |
| mu2               | 19.88280 | 19.54664 | 25.44642 | 23.33902 | 19.90735 | 27.43083 | 20.54686 | 30.70615 | 23.48164 | 20.24015 |
| alpha2            | 0.08352  | 0.16522  | 0.22155  | 0.16565  | 0.16885  | 0.34375  | 0.24875  | 0.49309  | 0.18218  | 0.17202  |
| lambda2           | 0.71288  | 0.59432  | 0.15354  | 0.17438  | 0.30048  | 0.20741  | 0.34180  | 0.14423  | 0.33743  | 0.29393  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00002  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 69.10982 | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 1.62553  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.25295  | 0.00000  | 0.00000  |
| o                 | 0.00000  | 0.00657  | 0.00547  | 0.00407  | 0.00613  | 0.00718  | 0.00326  | 0.00396  | 0.00318  | 0.00523  |
| mean age          | 28.59029 | 36.05703 | 33.61654 | 31.27566 | 35.87149 | 37.95687 | 32.38882 | 35.04512 | 28.34656 | 33.82628 |
| % (0-14)          | 19.60645 | 19.38582 | 21.88326 | 20.52125 | 18.29967 | 17.04199 | 15.87972 | 18.90520 | 28.12855 | 18.48226 |
| % (15-64)         | 76.41191 | 62.25159 | 62.39882 | 67.89032 | 64.12856 | 63.20535 | 71.67616 | 65.57494 | 62.80445 | 66.41570 |
| % (65+)           | 3.98164  | 18.36259 | 15.71792 | 11.58843 | 17.57177 | 19.75266 | 12.44411 | 15.51986 | 9.06701  | 15.10204 |
| delta1c           | 0.00000  | 6.84362  | 4.66357  | 7.79516  | 1.96379  | 3.93892  | 2.87129  | 2.72523  | 10.85489 | 3.20554  |
| delta12           | 0.34675  | 0.72830  | 0.40016  | 0.37128  | 0.19151  | 0.37621  | 0.08424  | 0.87399  | 0.38008  | 0.21394  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00145  | 0.00000  | 0.00000  |
| beta12            | 0.44627  | 2.48385  | 0.76599  | 1.23853  | 0.54657  | 1.05299  | 0.11032  | 0.05347  | 0.64178  | 0.74931  |
| sigma2            | 8.53512  | 3.59714  | 0.69305  | 1.05265  | 1.77955  | 0.60337  | 1.37410  | 0.29251  | 1.85213  | 1.70870  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.15561  | 0.00000  | 0.00000  |
| x low             | 17.21028 | 15.68024 | 12.21017 | 12.21017 | 13.42019 | 15.26023 | 14.09021 | 12.77018 | 17.72029 | 13.56020 |
| x high            | 22.77041 | 21.71038 | 22.97041 | 23.59043 | 21.72038 | 25.00046 | 21.45038 | 22.11039 | 25.23046 | 21.99039 |
| x ref.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 61.73803 | 0.00000  | 0.00000  |
| x shift           | 5.56013  | 6.03014  | 10.76025 | 11.38026 | 8.30019  | 9.74022  | 7.36017  | 9.34021  | 7.51017  | 8.43019  |
| a                 | 32.45698 | 33.33026 | 26.41208 | 29.97371 | 26.96654 | 30.20038 | 26.50039 | 24.41876 | 25.98379 | 27.52885 |
| b                 | 0.03227  | 0.03075  | 0.02162  | 0.02753  | 0.02302  | 0.03054  | 0.04026  | 0.02447  | 0.03403  | 0.02899  |

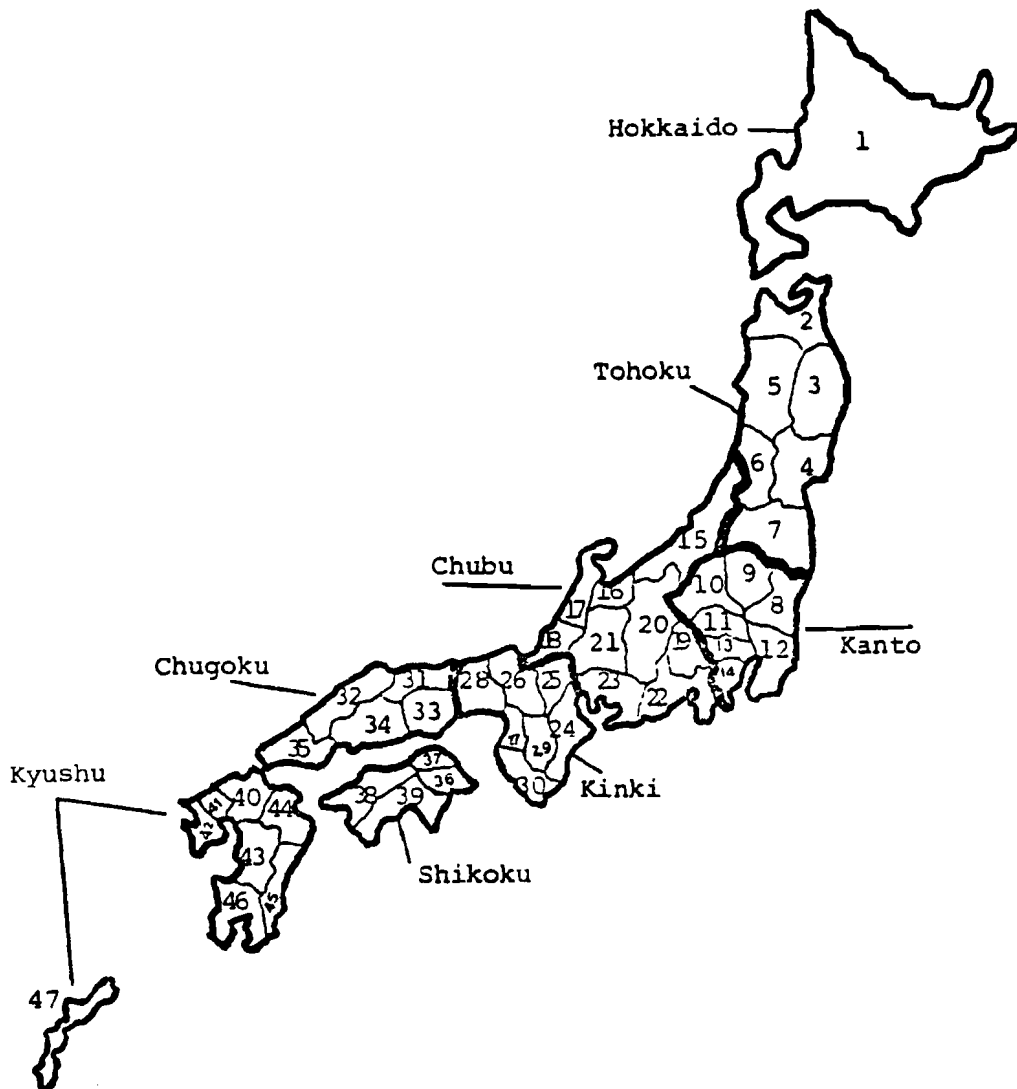
- 1 u.k. females 9 to 1
- 2 u.k. females 9 to 2
- 3 u.k. females 9 to 3
- 4 u.k. females 9 to 4
- 5 u.k. females 9 to 5
- 6 u.k. females 9 to 6
- 7 u.k. females 9 to 7
- 8 u.k. females 9 to 8
- 9 u.k. females 9 to 10
- 10 u.k. females 9 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.07106  | 0.06565  | 0.10618  | 0.06874  | 0.05976  | 0.02613  | 0.31964  | 0.07216  | 0.02365  | 0.81298  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 0.81905  |
| mae% <sub>m</sub> | 9.16043  | 7.09817  | 10.40557 | 11.75336 | 8.84351  | 15.07422 | 8.77298  | 7.38690  | 13.61625 | 5.48159  |
| ai                | 0.03017  | 0.03991  | 0.01820  | 0.02809  | 0.03405  | 0.01868  | 0.01944  | 0.02485  | 0.00974  | 0.01876  |
| alpha1            | 0.09635  | 0.11656  | 0.11693  | 0.05280  | 0.13630  | 0.08534  | 0.08600  | 0.09919  | 0.10877  | 0.08994  |
| a2                | 0.07279  | 0.05264  | 0.05969  | 0.03944  | 0.07181  | 0.05013  | 0.08578  | 0.06082  | 0.07930  | 0.05667  |
| mu2               | 23.41203 | 19.93013 | 30.38914 | 21.03768 | 19.52420 | 17.72740 | 20.16519 | 19.14946 | 21.98233 | 20.52069 |
| alpha2            | 0.12107  | 0.07502  | 0.20621  | 0.09966  | 0.11356  | 0.06824  | 0.14291  | 0.10169  | 0.14642  | 0.12104  |
| lambda2           | 0.22168  | 0.16689  | 0.11725  | 0.50977  | 0.24309  | 0.40104  | 0.26283  | 0.27056  | 0.17815  | 0.24281  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00177  | 0.00055  | 0.00431  | 0.00133  | 0.00218  | 0.00139  | 0.00274  | 0.00247  | 0.00463  | 0.00213  |
| mean age          | 27.39830 | 25.52103 | 32.79805 | 26.54068 | 26.93507 | 30.06597 | 28.62317 | 28.63106 | 34.12550 | 28.67661 |
| % (0-14)          | 26.26693 | 30.41049 | 19.21118 | 30.63025 | 25.33808 | 17.59880 | 20.43806 | 23.18692 | 14.64687 | 22.90644 |
| % (15-64)         | 68.24979 | 65.83649 | 68.38385 | 63.81711 | 68.03619 | 75.95855 | 71.49069 | 69.10609 | 71.98289 | 69.22408 |
| % (65+ )          | 5.48328  | 3.75301  | 12.40498 | 5.55264  | 6.62572  | 6.44265  | 8.07125  | 7.70699  | 13.37024 | 7.86949  |
| delta1c           | 17.06072 | 72.47650 | 4.22648  | 21.10043 | 15.58598 | 13.43114 | 7.10572  | 10.04466 | 2.10577  | 8.80598  |
| delta12           | 0.41441  | 0.75819  | 0.30496  | 0.71214  | 0.47414  | 0.37255  | 0.22664  | 0.40854  | 0.12283  | 0.33112  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.79580  | 1.55386  | 0.56704  | 0.52977  | 1.20020  | 1.25050  | 0.60176  | 0.97544  | 0.74287  | 0.74308  |
| sigma2            | 1.83092  | 2.22480  | 0.56861  | 5.11494  | 2.14057  | 5.87658  | 1.83911  | 2.66073  | 1.21672  | 2.00595  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 15.47024 | 11.86016 | 12.44017 | 17.68029 | 12.57017 | 13.41019 | 13.03018 | 12.90018 | 10.86013 | 13.26019 |
| x high            | 25.86048 | 23.81043 | 25.42047 | 23.93043 | 22.42040 | 21.88039 | 22.31040 | 22.46040 | 22.98041 | 23.11041 |
| x ref.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 10.39024 | 11.95027 | 12.98030 | 6.25014  | 9.85023  | 8.47019  | 9.28021  | 9.56022  | 12.12028 | 9.85023  |
| a                 | 29.01376 | 26.48541 | 31.32874 | 23.99045 | 27.10372 | 34.76490 | 28.27961 | 28.22705 | 34.79032 | 28.23347 |
| b                 | 0.02519  | 0.01353  | 0.02314  | 0.01996  | 0.02602  | 0.02738  | 0.03151  | 0.02389  | 0.02640  | 0.02055  |

- 1 u.k. females 10 to 1
- 2 u.k. females 10 to 2
- 3 u.k. females 10 to 3
- 4 u.k. females 10 to 4
- 5 u.k. females 10 to 5
- 6 u.k. females 10 to 6
- 7 u.k. females 10 to 7
- 8 u.k. females 10 to 8
- 9 u.k. females 10 to 9
- 10 u.k. females 10 to the rest

JAPAN

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF OBSERVED MODEL MIGRATION SCHEDULES



REGION NUMBER:

- |             |            |
|-------------|------------|
| 1. Hokkaido | 5. Kinki   |
| 2. Tohoku   | 6. Chugoku |
| 3. Kanto    | 7. Shikoku |
| 4. Chubu    | 8. Kyushu  |

|           | 1        | 2        | 3        | 4        | 5        | 6        | 7         | 8        |
|-----------|----------|----------|----------|----------|----------|----------|-----------|----------|
| gmr (obs) | 0.16743  | 1.23077  | 0.28445  | 0.16103  | 0.02932  | 0.01349  | 0.08019   | 1.96667  |
| gmr (mas) | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000   | 1.00000  |
| mae%m     | 10.68774 | 13.45336 | 9.71055  | 12.65566 | 20.68660 | 17.43085 | 21.06837  | 11.90650 |
| a1        | 0.01036  | 0.00469  | 0.00917  | 0.01063  | 0.01729  | 0.01699  | 0.02495   | 0.00704  |
| alpha1    | 0.04058  | 0.02197  | 0.04746  | 0.12113  | 0.06337  | 0.06703  | 0.06172   | 0.03663  |
| a2        | 0.04290  | 0.09936  | 0.04355  | 0.07338  | 0.04591  | 0.07210  | 0.00023   | 0.06959  |
| mu2       | 16.41261 | 16.46173 | 15.40624 | 17.13399 | 18.86104 | 22.29335 | 66.07513  | 16.08470 |
| alpha2    | 0.08383  | 0.14978  | 0.07733  | 0.10852  | 0.06186  | 0.13736  | 0.31339   | 0.10998  |
| lambda2   | 0.44840  | 0.47975  | 0.61984  | 0.41403  | 0.76354  | 0.42429  | 0.05242   | 0.53106  |
| a3        | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| mu3       | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| alpha3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| lambda3   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| c         | 0.00433  | 0.00369  | 0.00434  | 0.00452  | 0.00124  | 0.00460  | 0.00181   | 0.00367  |
| mean age  | 34.27404 | 32.32303 | 34.11668 | 33.17442 | 31.44515 | 33.14957 | 29.12758  | 32.27902 |
| %( 0-14)  | 16.57357 | 11.33294 | 15.33434 | 13.06161 | 16.98163 | 19.83718 | 25.20244  | 13.13354 |
| %(15-64)  | 70.10349 | 76.66982 | 71.61319 | 74.71610 | 75.98978 | 68.00319 | 69.36111  | 75.67094 |
| %(65+ )   | 13.32294 | 11.99725 | 13.05247 | 12.22228 | 7.02859  | 12.15963 | 5.43645   | 11.19553 |
| deltalc   | 2.38926  | 1.27243  | 2.11457  | 2.35220  | 13.97167 | 3.69356  | 13.80953  | 1.91795  |
| delta12   | 0.24139  | 0.04720  | 0.21062  | 0.14481  | 0.37666  | 0.23564  | 107.74816 | 0.10119  |
| delta32   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| beta12    | 0.48409  | 0.14671  | 0.61371  | 1.11620  | 1.02442  | 0.48796  | 0.19694   | 0.33304  |
| sigma2    | 5.34894  | 3.20311  | 8.01597  | 3.81526  | 12.34237 | 3.08883  | 0.16726   | 4.82874  |
| sigma3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| x low     | 12.24017 | 11.82016 | 12.31017 | 12.41017 | 16.41026 | 17.71029 | 15.77025  | 12.21017 |
| x high    | 19.98034 | 18.88032 | 18.65031 | 20.32035 | 22.01039 | 24.86045 | 31.45061  | 19.01032 |
| x ret.    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  |
| x shift   | 7.74018  | 7.06016  | 6.34015  | 7.91018  | 5.60013  | 7.15016  | 15.68036  | 6.80016  |
| a         | 33.59694 | 35.84386 | 35.72521 | 35.85357 | 36.57024 | 29.82706 | 33.42381  | 35.52688 |
| b         | 0.02137  | 0.04420  | 0.02494  | 0.03406  | 0.02978  | 0.02958  | 0.01713   | 0.03569  |

- 1 japan males 1 to 2
- 2 japan males 1 to 3
- 3 japan males 1 to 4
- 4 japan males 1 to 5
- 5 japan males 1 to 6
- 6 japan males 1 to 7
- 7 japan males 1 to 8
- 8 japan males 1 to the rest

|           | 1         | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs) | 0.28040   | 0.52527  | 1.74588  | 0.26364  | 0.09419  | 0.01601  | 0.00539  | 0.02143  | 2.42693  |
| gmr (mms) | 1.00000   | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae7m     | 12.08950  | 11.51803 | 15.06905 | 16.10538 | 35.05441 | 10.67559 | 11.44661 | 8.43004  | 15.34299 |
| a1        | 0.00740   | 0.01740  | 0.00341  | 0.00333  | -0.01238 | 0.01888  | 0.02405  | 0.03517  | 0.00320  |
| alpha1    | 0.25947   | 0.15358  | -0.00554 | -0.00686 | 0.09849  | 0.09977  | 0.13945  | 0.16767  | -0.00787 |
| a2        | 0.03806   | 0.05396  | 0.12785  | 0.04664  | 0.05735  | 0.08967  | 0.06987  | 0.08322  | 0.09129  |
| mu2       | 16.34628  | 16.07860 | 16.53250 | 15.75680 | 16.03065 | 20.86334 | 21.26972 | 30.72656 | 16.12955 |
| alpha2    | 0.03471   | 0.06486  | 0.18779  | 0.08366  | 0.05962  | 0.12559  | 0.15507  | 0.18165  | 0.14217  |
| lambda2   | 0.44864   | 0.46568  | 0.49075  | 0.70111  | 0.45623  | 0.35992  | 0.51061  | 0.13707  | 0.55985  |
| a3        | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3    | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3   | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c         | 0.00159   | 0.00210  | 0.00225  | 0.00304  | 0.00255  | 0.00265  | 0.00634  | 0.00366  | 0.00237  |
| mean age  | 40.53283  | 32.03585 | 36.54566 | 41.25540 | 0.00000  | 29.96431 | 34.87301 | 31.72617 | 38.54094 |
| %(0-14)   | 4.92484   | 13.19736 | 8.23181  | 8.19601  | -4.64591 | 17.33112 | 20.91126 | 22.55832 | 7.77064  |
| %(15-64)  | 79.68277  | 78.26610 | 73.51883 | 70.15396 | 92.82899 | 75.15857 | 62.99514 | 67.50928 | 72.19482 |
| %(65+)    | 15.39240  | 8.53654  | 18.24936 | 21.65003 | 11.81691 | 7.51031  | 16.09360 | 9.93239  | 20.03454 |
| deltalc   | 4.65082   | 8.29685  | 1.51806  | 1.09623  | -4.85193 | 7.12359  | 3.79282  | 9.60814  | 1.35055  |
| deltal2   | 0.19458   | 0.32236  | 0.02670  | 0.07143  | -0.21594 | 0.21058  | 0.34422  | 0.42261  | 0.03503  |
| deltas2   | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12    | 7.47530   | 2.36778  | -0.02949 | -0.08205 | 1.65206  | 0.79440  | 0.89927  | 0.92306  | -0.05533 |
| sigma2    | 12.92530  | 7.17957  | 2.61332  | 8.38015  | 7.65278  | 2.86585  | 3.29281  | 0.75459  | 3.93792  |
| sigma3    | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low     | 11.89016  | 12.18016 | 5.02000  | 5.02000  | 0.00000  | 15.49024 | 17.40028 | 15.65024 | 5.02000  |
| x high    | 22.05039  | 20.21035 | 18.50031 | 18.81032 | 0.00000  | 23.71043 | 23.60043 | 28.62054 | 18.60031 |
| x ret.    | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift   | 10.16023  | 8.03018  | 13.48031 | 13.79032 | 0.00000  | 8.22019  | 6.20014  | 12.97030 | 13.58031 |
| a         | 102.41312 | 42.46013 | 0.00000  | 0.00000  | 0.00000  | 31.99034 | 27.55373 | 33.18708 | 0.00000  |
| b         | 0.02458   | 0.03093  | 0.04869  | 0.02575  | 0.00000  | 0.03865  | 0.02951  | 0.02687  | 0.04003  |

|   |       |       |               |
|---|-------|-------|---------------|
| 1 | japan | males | 2 to 1        |
| 2 | japan | males | 2 to 2        |
| 3 | japan | males | 2 to 3        |
| 4 | japan | males | 2 to 4        |
| 5 | japan | males | 2 to 5        |
| 6 | japan | males | 2 to 6        |
| 7 | japan | males | 2 to 7        |
| 8 | japan | males | 2 to 8        |
| 9 | japan | males | 2 to the rest |

|                   | 1        | 2        | 3        | 4        | 5         | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|
| gmr (obs)         | 0.05550  | 0.18560  | 1.81309  | 0.27030  | 0.17186   | 0.05512  | 0.02151  | 0.08464  | 0.84453  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000   | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 8.67614  | 15.29815 | 9.32037  | 7.94231  | 6.18281   | 6.03747  | 12.08855 | 5.59445  | 8.42122  |
| a1                | 0.01527  | 0.01532  | 0.02105  | 0.01411  | 0.01916   | 0.02044  | 0.02213  | 0.02283  | 0.01574  |
| alpha1            | 0.08922  | 0.15892  | 0.17995  | 0.10301  | 0.06581   | 0.08150  | 0.12890  | 0.11362  | 0.10516  |
| a2                | 0.07029  | 0.03934  | 0.07850  | 0.04907  | 0.04909   | 0.05137  | 0.04203  | 0.05126  | 0.04860  |
| mu2               | 18.14864 | 18.73384 | 22.61861 | 19.30083 | 19.41326  | 19.98803 | 19.82886 | 20.24656 | 19.38639 |
| alpha2            | 0.08583  | 0.04488  | 0.12334  | 0.07181  | 0.06275   | 0.07012  | 0.06235  | 0.07742  | 0.06888  |
| lambda2           | 0.32909  | 0.29679  | 0.16413  | 0.35967  | 0.49302   | 0.56156  | 0.55563  | 0.43421  | 0.38220  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00147  | 0.00286  | 0.00438  | 0.00375  | 0.00016   | 0.00123  | 0.00340  | 0.00292  | 0.00330  |
| mean age          | 29.38956 | 38.60592 | 33.45847 | 35.14930 | 29.75835  | 30.55445 | 34.92460 | 32.50695 | 34.67368 |
| % (0-14)          | 14.55829 | 11.43617 | 16.51688 | 14.69780 | 17.89258  | 18.55914 | 17.55348 | 19.14676 | 15.15302 |
| % (15-64)         | 80.06683 | 74.11632 | 71.55068 | 73.18559 | 77.82458  | 75.39609 | 70.35868 | 71.20167 | 73.52961 |
| % (65+)           | 5.37488  | 14.44752 | 11.93244 | 12.11661 | 4.28284   | 6.04478  | 12.08784 | 9.65157  | 11.31738 |
| deltal            | 10.37027 | 5.35392  | 4.80511  | 3.75965  | 121.60875 | 16.63011 | 6.50694  | 7.80694  | 4.77378  |
| deltal2           | 0.21722  | 0.38950  | 0.26808  | 0.28762  | 0.39036   | 0.39792  | 0.52642  | 0.44549  | 0.32394  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.03953  | 3.54120  | 1.45900  | 1.43452  | 1.04879   | 1.16222  | 2.06745  | 1.46753  | 1.52679  |
| sigma2            | 3.83442  | 6.61352  | 1.33072  | 5.00862  | 7.85650   | 8.00797  | 8.91162  | 5.60830  | 5.54901  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 12.61017 | 12.95018 | 11.33014 | 14.28021 | 15.79025  | 16.73027 | 16.54026 | 16.10025 | 14.68022 |
| x high            | 22.07039 | 24.98046 | 24.29044 | 23.63043 | 23.36042  | 23.53042 | 23.65043 | 24.07044 | 23.71043 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.46022  | 12.03028 | 12.96030 | 9.35021  | 7.57017   | 6.80016  | 7.11016  | 7.97018  | 9.03021  |
| a                 | 36.67859 | 56.28001 | 35.49942 | 40.15879 | 36.36693  | 35.30362 | 38.84356 | 34.72364 | 39.96737 |
| b                 | 0.03360  | 0.02035  | 0.02417  | 0.02411  | 0.02957   | 0.03114  | 0.02459  | 0.02697  | 0.02481  |

- 1 japan males 3 to 1
- 2 japan males 3 to 2
- 3 japan males 3 to 3
- 4 japan males 3 to 4
- 5 japan males 3 to 5
- 6 japan males 3 to 6
- 7 japan males 3 to 7
- 8 japan males 3 to 8
- 9 japan males 3 to the rest



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7         | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|
| gmr (obs)         | 0.02860  | 0.06123  | 0.76236  | 0.46656  | 0.28178  | 0.03819  | 0.01609   | 0.06144  | 1.24970  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000   | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 9.51923  | 14.62149 | 12.99929 | 8.34610  | 10.62882 | 12.76985 | 9.21374   | 8.54049  | 12.57627 |
| a1                | 0.01265  | 0.01597  | 0.00582  | 0.01350  | 0.01350  | 0.01912  | 0.02137   | 0.02253  | 0.01027  |
| a2                | 0.15652  | 0.16876  | 0.02351  | 0.15397  | 0.15041  | 0.10371  | 0.07686   | 0.12710  | 0.15277  |
| a2                | 0.08108  | 0.04208  | 0.13715  | 0.05604  | 0.08835  | 0.07518  | 0.05285   | 0.07254  | 0.09909  |
| mu2               | 16.89764 | 15.79576 | 16.11796 | 15.42453 | 16.29744 | 17.93573 | 19.62303  | 19.62303 | 15.78278 |
| alpha2            | 0.10983  | 0.04443  | 0.17938  | 0.06922  | 0.11045  | 0.09449  | 0.06545   | 0.11200  | 0.12546  |
| lambda2           | 0.39885  | 0.49561  | 0.54897  | 0.58994  | 0.47119  | 0.38154  | 0.50212   | 0.32327  | 0.57245  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| c                 | 0.00377  | 0.00153  | 0.00226  | 0.00241  | 0.00284  | 0.00158  | 0.00003   | 0.00362  | 0.00339  |
| mean age          | 31.73321 | 35.48758 | 28.67082 | 31.68022 | 29.52953 | 28.17549 | 28.81195  | 31.23837 | 29.78923 |
| % (0-14)          | 12.68382 | 10.65071 | 11.35619 | 12.77210 | 12.53794 | 16.31617 | 18.45617  | 18.76638 | 11.60865 |
| % (15-64)         | 76.87747 | 78.22839 | 80.13762 | 78.49864 | 79.45185 | 78.50732 | 78.10737  | 71.11207 | 79.22618 |
| % (65+ )          | 10.43871 | 11.12090 | 8.50619  | 8.72926  | 8.01021  | 5.17652  | 3.43647   | 10.12155 | 9.16516  |
| deltale           | 3.35685  | 10.45285 | 2.57013  | 6.34804  | 4.75933  | 12.09132 | 712.88135 | 6.21691  | 3.03045  |
| deltal2           | 0.15606  | 0.37944  | 0.04243  | 0.27251  | 0.15275  | 0.25431  | 0.40425   | 0.31062  | 0.10365  |
| deltal32          | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| beta12            | 1.42521  | 3.79859  | 0.13104  | 2.22431  | 1.36182  | 1.09767  | 1.17435   | 1.13482  | 1.21766  |
| sigma2            | 3.63163  | 11.15562 | 3.06042  | 8.52234  | 4.26620  | 4.03806  | 7.67179   | 2.88637  | 4.56271  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| x low             | 11.98016 | 12.17016 | 12.01016 | 12.23017 | 12.10016 | 13.13019 | 15.73025  | 13.94020 | 12.17016 |
| x high            | 20.10035 | 20.55036 | 18.15030 | 18.99032 | 19.34033 | 21.46038 | 23.13041  | 22.79041 | 18.42031 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| x shift           | 8.12019  | 8.38019  | 6.14014  | 6.76015  | 7.24017  | 8.33019  | 7.40017   | 8.85020  | 6.25014  |
| a                 | 36.42751 | 55.78328 | 31.73360 | 42.22345 | 35.73189 | 33.43722 | 35.59027  | 31.17496 | 35.34521 |
| b                 | 0.03795  | 0.02625  | 0.06075  | 0.03411  | 0.04462  | 0.03667  | 0.03175   | 0.02993  | 0.05076  |

|   |       |       |               |
|---|-------|-------|---------------|
| 1 | japan | males | 4 to 1        |
| 2 | japan | males | 4 to 2        |
| 3 | japan | males | 4 to 3        |
| 4 | japan | males | 4 to 4        |
| 5 | japan | males | 4 to 5        |
| 6 | japan | males | 4 to 6        |
| 7 | japan | males | 4 to 7        |
| 8 | japan | males | 4 to 8        |
| 9 | japan | males | 4 to the rest |

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.02011  | 0.02293  | 0.39577  | 0.27016  | 1.00688  | 0.15006  | 0.07597  | 0.13534  | 1.07034  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 13.10527 | 14.57140 | 9.33477  | 8.32320  | 7.24850  | 7.09668  | 8.14622  | 4.75751  | 6.88829  |
| a1                | 0.01355  | 0.01254  | 0.01712  | 0.01791  | 0.01474  | 0.02112  | 0.01790  | 0.02361  | 0.01867  |
| alpha1            | 0.13641  | 0.09337  | 0.09313  | 0.11455  | 0.12958  | 0.13954  | 0.11618  | 0.11995  | 0.11123  |
| a2                | 0.08477  | 0.03492  | 0.06547  | 0.05227  | 0.05919  | 0.06809  | 0.05508  | 0.05961  | 0.05889  |
| mu2               | 17.22884 | 18.51671 | 16.84731 | 15.50012 | 17.50075 | 20.22708 | 19.67385 | 20.96512 | 17.27411 |
| alpha2            | 0.10792  | 0.04619  | 0.07697  | 0.05726  | 0.08092  | 0.10653  | 0.09817  | 0.09825  | 0.07463  |
| lambda2           | 0.39117  | 0.50672  | 0.39722  | 0.56379  | 0.30220  | 0.28517  | 0.40332  | 0.27896  | 0.36091  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00300  | 0.00342  | 0.00078  | 0.00034  | 0.00344  | 0.00412  | 0.00497  | 0.00385  | 0.00183  |
| mean age          | 30.44643 | 37.88949 | 27.99488 | 29.57160 | 33.03647 | 32.92361 | 34.47334 | 32.58365 | 30.25580 |
| % (0-14)          | 12.76497 | 13.15339 | 15.26092 | 13.91900 | 14.48646 | 17.59651 | 17.77464 | 20.18189 | 16.02601 |
| % (15-64)         | 78.73419 | 72.25594 | 80.81866 | 81.06340 | 74.95909 | 70.91914 | 68.64829 | 68.76479 | 77.05957 |
| % (65+)           | 8.50085  | 14.59068 | 3.92041  | 5.01760  | 10.55444 | 11.48435 | 13.57706 | 11.05332 | 6.91442  |
| delta1c           | 4.51421  | 3.66659  | 22.00955 | 52.61811 | 4.28631  | 5.12097  | 3.60457  | 6.12674  | 10.18004 |
| delta12           | 0.15983  | 0.35896  | 0.26146  | 0.34268  | 0.24896  | 0.31021  | 0.32504  | 0.39615  | 0.31697  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.26397  | 2.02149  | 1.20986  | 2.00073  | 1.60139  | 1.30979  | 1.18351  | 1.22094  | 1.49047  |
| sigma2            | 3.62461  | 10.97090 | 5.16049  | 9.84686  | 3.73460  | 2.67681  | 4.10846  | 2.83935  | 4.83605  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 12.26017 | 14.97023 | 12.32017 | 12.32017 | 11.61015 | 13.80020 | 15.09023 | 14.64022 | 12.42017 |
| x high            | 20.47035 | 23.04041 | 20.80036 | 19.39033 | 21.73038 | 23.58043 | 23.07041 | 24.53045 | 21.45038 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.21019  | 8.07018  | 8.48019  | 7.07016  | 10.12023 | 9.78022  | 7.98018  | 9.89023  | 9.03021  |
| a                 | 36.03691 | 48.64722 | 36.10025 | 40.92348 | 38.40296 | 33.44187 | 32.84365 | 32.15179 | 36.12526 |
| b                 | 0.03984  | 0.02060  | 0.03495  | 0.03349  | 0.02670  | 0.02706  | 0.02534  | 0.02358  | 0.02966  |

- 1 japan males 5 to 1
- 2 japan males 5 to 2
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- 4 japan males 5 to 4
- 5 japan males 5 to 5
- 6 japan males 5 to 6
- 7 japan males 5 to 7
- 8 japan males 5 to 8
- 9 japan males 5 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.01691  | 0.02488  | 0.53678  | 0.18742  | 0.78384  | 0.61701  | 0.10972  | 0.21867  | 1.87821  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 19.13116 | 25.89611 | 15.75611 | 13.50549 | 12.10580 | 9.49476  | 10.29196 | 9.94802  | 12.87610 |
| a1                | 0.00425  | 0.01587  | 0.00777  | 0.00842  | 0.00571  | 0.01725  | 0.02258  | 0.01610  | 0.00749  |
| alpha1            | 0.06762  | 0.04833  | 0.03719  | 0.14963  | 0.01738  | 0.13224  | 0.09165  | 0.13505  | 0.02753  |
| a2                | 0.13630  | 0.05796  | 0.13916  | 0.10864  | 0.13573  | 0.05424  | 0.07130  | 0.07120  | 0.11380  |
| mu2               | 17.10550 | 17.33040 | 16.48124 | 15.89997 | 16.65762 | 15.59141 | 18.57564 | 15.66182 | 16.32595 |
| alpha2            | 0.14625  | 0.08435  | 0.16569  | 0.14393  | 0.18477  | 0.06615  | 0.09245  | 0.09257  | 0.15344  |
| lambda2           | 0.41743  | 0.60842  | 0.49016  | 0.57075  | 0.46602  | 0.51907  | 0.27408  | 0.54340  | 0.51315  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00219  | 0.00139  | 0.00139  | 0.00421  | 0.00215  | 0.00189  | 0.00120  | 0.00263  | 0.00186  |
| mean age          | 27.94888 | 28.87664 | 26.02538 | 30.83747 | 29.84097 | 30.91900 | 27.14603 | 29.47733 | 28.40489 |
| % (0-14)          | 7.76242  | 17.31359 | 11.74156 | 11.46495 | 11.07663 | 14.34613 | 20.04016 | 14.67392 | 12.27323 |
| % (15-64)         | 86.29065 | 76.87386 | 83.22778 | 77.52082 | 79.31654 | 77.89323 | 75.69763 | 77.47961 | 80.25551 |
| % (65+ )          | 5.94693  | 5.81255  | 5.03066  | 11.01423 | 9.60683  | 7.76064  | 4.26221  | 7.84647  | 7.47126  |
| deltalc           | 1.94073  | 11.40734 | 5.58207  | 2.00072  | 2.65418  | 9.14141  | 18.80500 | 6.11827  | 4.02620  |
| delta12           | 0.03119  | 0.27379  | 0.05586  | 0.07754  | 0.04206  | 0.31812  | 0.31668  | 0.22608  | 0.06581  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.46238  | 0.57305  | 0.22449  | 1.03954  | 0.09405  | 1.99909  | 0.99131  | 1.45893  | 0.17940  |
| sigma2            | 2.85424  | 7.21336  | 2.95837  | 3.96531  | 2.52213  | 7.84708  | 2.96459  | 5.87030  | 3.34428  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.85016 | 14.22021 | 12.06016 | 12.19016 | 11.76015 | 12.10016 | 12.29017 | 12.16016 | 12.10016 |
| x high            | 19.61033 | 20.45035 | 18.68031 | 18.31030 | 18.64031 | 19.44033 | 22.26040 | 18.85032 | 18.66031 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 7.76018  | 6.23014  | 6.62015  | 6.12014  | 6.88016  | 7.34017  | 9.97023  | 6.69015  | 6.56015  |
| a                 | 38.18292 | 32.33599 | 31.19695 | 34.00190 | 32.94935 | 39.50684 | 31.50201 | 34.83356 | 32.24360 |
| b                 | 0.06000  | 0.03288  | 0.06235  | 0.05187  | 0.05590  | 0.03194  | 0.02917  | 0.03950  | 0.05288  |

- 1 japan males 6 to 1
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- 6 japan males 6 to 6
- 7 japan males 6 to 7
- 8 japan males 6 to 8
- 9 japan males 6 to the rest

|           | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs) | 0.02071  | 0.01336  | 0.50883  | 0.26321  | 1.29355  | 0.29650  | 0.39835  | 0.09618  | 2.49229  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae%m     | 37.80335 | 21.79872 | 16.22446 | 17.88891 | 14.75879 | 10.61577 | 10.81065 | 8.95066  | 14.50877 |
| a1        | 0.01314  | 0.00863  | 0.00516  | 0.00439  | 0.00479  | 0.01843  | 0.01612  | 0.00978  | 0.00526  |
| alpha1    | 0.02646  | 0.00671  | 0.01762  | 0.00312  | 0.00529  | 0.15147  | 0.08921  | 0.14460  | 0.01042  |
| a2        | 0.07869  | 0.00213  | 0.22707  | 0.09899  | 0.13996  | 0.06740  | 0.05199  | 0.09014  | 0.13246  |
| mu2       | 15.32094 | 34.29626 | 18.93717 | 15.50040 | 16.41437 | 15.10364 | 16.85459 | 15.75823 | 16.29585 |
| alpha2    | 0.10652  | 0.63010  | 0.29735  | 0.15066  | 0.19500  | 0.07727  | 0.06618  | 0.12414  | 0.18118  |
| lambda2   | 0.90290  | 0.12576  | 0.30480  | 0.75643  | 0.50717  | 0.65291  | 0.37187  | 0.61392  | 0.52423  |
| a3        | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3       | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c         | 0.00000  | 0.00217  | 0.00143  | 0.00253  | 0.00189  | 0.00118  | 0.00190  | 0.00418  | 0.00189  |
| mean age  | 26.83075 | 36.49166 | 27.06978 | 34.27962 | 32.28432 | 27.97299 | 31.33546 | 31.30108 | 30.92058 |
| %(0-14)   | 15.05817 | 13.08612 | 10.15966 | 9.74091  | 9.81077  | 13.97733 | 15.67762 | 12.08566 | 10.32734 |
| %(15-64)  | 80.41034 | 69.26746 | 82.66295 | 75.41554 | 77.34460 | 81.10298 | 76.43403 | 76.80387 | 78.73573 |
| %(65+ )   | 4.53149  | 17.64642 | 7.17739  | 14.84355 | 12.84463 | 4.91969  | 7.88835  | 11.11047 | 10.93694 |
| deltalc   | 0.00000  | 3.97124  | 3.61980  | 1.73646  | 2.54108  | 15.68045 | 8.50336  | 2.33853  | 2.78724  |
| delta12   | 0.16694  | 4.04569  | 0.02274  | 0.04431  | 0.03424  | 0.27341  | 0.31000  | 0.10852  | 0.03972  |
| delta32   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12    | 0.24838  | 0.01065  | 0.05925  | 0.02070  | 0.02715  | 1.96020  | 1.34805  | 1.16490  | 0.05749  |
| sigma2    | 8.47611  | 0.19959  | 1.02508  | 5.02095  | 2.60084  | 8.44949  | 5.61906  | 4.94559  | 2.89337  |
| sigma3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low     | 13.03018 | 10.87013 | 10.91014 | 12.27017 | 11.64015 | 12.19016 | 12.18016 | 12.40017 | 11.84016 |
| x high    | 17.66029 | 21.46038 | 19.02032 | 17.64029 | 18.31030 | 18.31030 | 21.25037 | 18.35031 | 18.32030 |
| x ret.    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift   | 4.63011  | 10.59024 | 8.11019  | 5.37012  | 6.67015  | 6.12014  | 9.07021  | 5.95014  | 6.48015  |
| a         | 32.17562 | 27.81040 | 29.56032 | 43.59007 | 36.82837 | 38.21016 | 37.37523 | 34.81689 | 35.05658 |
| b         | 0.04613  | 0.03690  | 0.07343  | 0.04878  | 0.05603  | 0.04231  | 0.02653  | 0.04652  | 0.05626  |

- 1 japan males 7 to 1
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- 8 japan males 7 to 8
- 9 japan males 7 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.03365  | 0.01780  | 0.91160  | 0.46738  | 0.97875  | 0.24989  | 0.03597  | 0.81747  | 2.69505  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 11.18192 | 26.51394 | 16.76453 | 18.65621 | 17.13717 | 9.38432  | 14.66735 | 11.16185 | 16.34085 |
| a1                | 0.01602  | 0.01241  | 0.00443  | 0.00173  | 0.00557  | 0.01625  | 0.01247  | 0.01449  | 0.00468  |
| alpha1            | 0.09940  | 0.05878  | 0.00679  | 0.00009  | 0.00036  | 0.11805  | 0.05520  | 0.10954  | 0.00493  |
| a2                | 0.07125  | 0.08373  | 0.14085  | 0.06573  | 0.07929  | 0.05279  | 0.05029  | 0.05345  | 0.08725  |
| mu2               | 17.28231 | 18.87131 | 17.11779 | 15.29715 | 15.96399 | 15.78001 | 18.14141 | 15.89735 | 16.12027 |
| alpha2            | 0.07921  | 0.10706  | 0.18538  | 0.10322  | 0.12273  | 0.05547  | 0.06337  | 0.06769  | 0.12832  |
| lambda2           | 0.34974  | 0.77190  | 0.41636  | 0.73873  | 0.57989  | 0.51422  | 0.51359  | 0.49288  | 0.54574  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00063  | 0.00163  | 0.00173  | 0.00459  | 0.00087  | 0.00024  | 0.00108  | 0.00225  | 0.00198  |
| mean age          | 28.28290 | 29.02914 | 31.49781 | 36.44346 | 35.95842 | 30.48429 | 31.78649 | 31.50854 | 34.04624 |
| % (0-14)          | 13.80448 | 13.50076 | 9.08697  | 9.02899  | 8.94033  | 12.21906 | 13.40765 | 13.95493 | 9.37286  |
| % (15-64)         | 82.55400 | 81.19608 | 79.63946 | 74.93193 | 75.25149 | 82.47110 | 80.01569 | 77.65881 | 77.25526 |
| % (65+ )          | 3.64152  | 5.30316  | 11.27357 | 16.03909 | 15.80818 | 5.30984  | 6.57667  | 8.38626  | 13.37189 |
| deltalc           | 25.31219 | 7.59732  | 2.56393  | 0.37762  | 6.43140  | 67.57146 | 11.59484 | 6.43651  | 2.36195  |
| delta12           | 0.22481  | 0.14827  | 0.03147  | 0.02637  | 0.07020  | 0.30792  | 0.24799  | 0.27108  | 0.05358  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.25478  | 0.54898  | 0.03660  | 0.00092  | 0.00297  | 2.12823  | 0.87102  | 1.61820  | 0.03843  |
| sigma2            | 4.41513  | 7.20974  | 2.24592  | 7.15705  | 4.72493  | 9.27062  | 8.10413  | 7.28143  | 4.25292  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 12.10016 | 16.23026 | 11.35015 | 11.58015 | 11.54015 | 12.28017 | 14.50022 | 12.21017 | 11.80016 |
| x high            | 21.37037 | 21.40038 | 19.06032 | 17.97030 | 18.65031 | 19.96034 | 22.05039 | 19.79034 | 18.78032 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.27021  | 5.17012  | 7.71018  | 6.39015  | 7.11016  | 7.68018  | 7.55017  | 7.58017  | 6.98016  |
| a                 | 38.07022 | 34.48026 | 38.05110 | 0.00000  | 62.58617 | 44.47677 | 40.96446 | 39.43184 | 45.69825 |
| b                 | 0.03601  | 0.04927  | 0.05465  | 0.03650  | 0.03892  | 0.03335  | 0.03043  | 0.03083  | 0.04212  |

- 1 japan males 8 to 1
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- 6 japan males 8 to 6
- 7 japan males 8 to 7
- 8 japan males 8 to 8
- 9 japan males 8 to the rest

|                   | 1         | 2        | 3        | 4        | 5        | 6        | 7        | 8        |
|-------------------|-----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.12274   | 0.81643  | 0.26310  | 0.11914  | 0.01834  | 0.01162  | 0.06218  | 1.41354  |
| gmr (mas)         | 1.00000   | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 13.57428  | 5.01904  | 22.63592 | 9.80660  | 8.49904  | 15.91917 | 10.99874 | 7.87757  |
| a1                | 0.01377   | 0.01014  | 0.00930  | 0.01409  | 0.01132  | 0.02091  | 0.03190  | 0.01224  |
| alpha1            | 0.08230   | 0.08728  | 0.02367  | 0.07105  | 0.05840  | 0.04084  | 0.09163  | 0.06886  |
| a2                | 0.00008   | 0.05194  | 0.08298  | 0.04018  | 0.04903  | 0.04833  | 0.07716  | 0.04161  |
| mu2               | 70.71729  | 15.50782 | 14.71241 | 15.02169 | 23.82629 | 25.31195 | 31.81717 | 14.77228 |
| alpha2            | 0.27219   | 0.09397  | 0.16459  | 0.07326  | 0.09604  | 0.16769  | 0.21342  | 0.07514  |
| lambda2           | 0.04320   | 0.51842  | 0.95520  | 0.94094  | 0.35127  | 0.54109  | 0.18552  | 0.78055  |
| a3                | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| o                 | 0.00673   | 0.00542  | 0.00366  | 0.00423  | 0.00516  | 0.00402  | 0.00395  | 0.00442  |
| mean age          | 36.84278  | 34.46325 | 31.98556 | 32.83047 | 37.10249 | 32.82603 | 31.13368 | 33.25758 |
| %(0-14)           | 19.94828  | 15.85703 | 17.30789 | 17.99014 | 16.67266 | 25.88292 | 28.80454 | 17.47784 |
| %(15-64)          | 63.03078  | 69.52030 | 69.57932 | 69.58736 | 68.76881 | 61.39814 | 60.55278 | 69.65860 |
| %(65+)            | 17.02094  | 14.62267 | 13.11279 | 12.42249 | 14.55854 | 12.71894 | 10.64268 | 12.86356 |
| deltal0           | 2.04575   | 1.86879  | 2.53811  | 3.33505  | 2.19610  | 5.19697  | 8.07335  | 2.76693  |
| deltal2           | 169.08086 | 0.19513  | 0.11208  | 0.35074  | 0.23097  | 0.43265  | 0.41343  | 0.29415  |
| delta32           | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.30236   | 0.92881  | 0.14380  | 0.96988  | 0.60808  | 0.24357  | 0.42936  | 0.91654  |
| sigma2            | 0.15871   | 5.51715  | 5.80338  | 12.84448 | 3.65757  | 3.22671  | 0.86927  | 10.38861 |
| sigma3            | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 10.61013  | 11.86016 | 12.46017 | 13.03018 | 18.41031 | 21.79038 | 20.80036 | 12.37017 |
| x high            | 27.50051  | 18.70031 | 16.55026 | 17.62029 | 27.38051 | 27.37051 | 30.92059 | 17.65029 |
| x ret.            | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 16.89039  | 6.84016  | 4.09009  | 4.59011  | 8.97021  | 5.58013  | 10.12023 | 5.28012  |
| a                 | 33.69042  | 33.13662 | 27.07530 | 30.78180 | 37.24700 | 26.73049 | 30.04717 | 32.11691 |
| b                 | 0.00878   | 0.02650  | 0.04365  | 0.02579  | 0.02155  | 0.02008  | 0.02304  | 0.02550  |

- 1 japan females 1 to 2
- 2 japan females 1 to 3
- 3 japan females 1 to 4
- 4 japan females 1 to 5
- 5 japan females 1 to 6
- 6 japan females 1 to 7
- 7 japan females 1 to 8
- 8 japan females 1 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.09666  | 0.33804  | 1.21585  | 0.18910  | 0.05934  | 0.00916  | 0.00388  | 0.01847  | 1.59243  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 12.09467 | 7.48789  | 11.65592 | 17.67876 | 22.10011 | 13.80179 | 22.99329 | 12.43543 | 10.96779 |
| a1                | 0.01786  | 0.02052  | 0.00533  | 0.00754  | 0.00527  | 0.02349  | 0.02626  | 0.04003  | 0.00687  |
| alpha1            | 0.27608  | 0.10233  | 0.09450  | 0.01953  | 0.10874  | 0.09760  | 0.10630  | 0.11836  | 0.12665  |
| a2                | 0.11729  | 0.07558  | 0.18839  | 0.13387  | 0.08640  | 0.05791  | 0.06155  | 0.06298  | 0.15984  |
| mu2               | 21.04212 | 19.50647 | 17.62378 | 15.30267 | 15.54127 | 34.94383 | 21.44862 | 22.24777 | 16.85883 |
| alpha2            | 0.23366  | 0.10874  | 0.23334  | 0.18669  | 0.13299  | 0.26704  | 0.10700  | 0.09571  | 0.20134  |
| lambda2           | 0.25720  | 0.23719  | 0.36375  | 0.76399  | 0.72475  | 0.11416  | 0.52995  | 0.39973  | 0.42514  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00669  | 0.00273  | 0.00379  | 0.00167  | 0.00590  | 0.00256  | 0.00397  | 0.00117  | 0.00406  |
| mean age          | 35.40110 | 29.59417 | 29.02125 | 28.30133 | 33.97446 | 29.15670 | 31.82497 | 26.61131 | 29.70021 |
| % (0-14)          | 14.09799 | 19.22553 | 10.78336 | 13.32674 | 11.62033 | 20.58182 | 22.29664 | 28.58230 | 11.29004 |
| % (15-64)         | 69.03499 | 72.83615 | 79.38590 | 78.01120 | 73.75299 | 72.47914 | 67.00704 | 67.22710 | 78.18089 |
| % (65+ )          | 16.86702 | 7.93832  | 9.83074  | 8.66206  | 14.62668 | 6.93904  | 10.69632 | 4.19060  | 10.52908 |
| deltalc           | 2.66896  | 7.51039  | 1.40717  | 4.50541  | 0.89359  | 9.17204  | 6.61221  | 34.12621 | 1.69443  |
| delta12           | 0.15227  | 0.27146  | 0.02828  | 0.05632  | 0.06100  | 0.40561  | 0.42670  | 0.63553  | 0.04299  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.18155  | 0.94106  | 0.40499  | 0.10464  | 0.81769  | 0.36547  | 0.99340  | 1.23663  | 0.62902  |
| sigma2            | 1.10077  | 2.18125  | 1.55892  | 4.09226  | 5.44969  | 0.42748  | 4.95262  | 4.17658  | 2.11150  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 12.34017 | 12.05016 | 11.40015 | 12.35017 | 12.58017 | 14.88023 | 17.90030 | 17.80029 | 11.69015 |
| x high            | 21.42038 | 22.57040 | 18.84032 | 17.15028 | 17.87029 | 27.38051 | 24.38044 | 25.67047 | 18.61031 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.08021  | 10.52024 | 7.44017  | 4.80011  | 5.29012  | 12.50029 | 6.48015  | 7.87018  | 6.92016  |
| a                 | 30.17034 | 31.31202 | 29.64941 | 29.40028 | 35.59520 | 31.28757 | 29.78038 | 29.08375 | 30.41030 |
| b                 | 0.03627  | 0.02712  | 0.06488  | 0.06495  | 0.04334  | 0.03346  | 0.02997  | 0.03075  | 0.06066  |

- 1 japan females 2 to 1
- 2 japan females 2 to 2
- 3 japan females 2 to 3
- 4 japan females 2 to 4
- 5 japan females 2 to 5
- 6 japan females 2 to 6
- 7 japan females 2 to 7
- 8 japan females 2 to 8
- 9 japan females 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.03508  | 0.09779  | 1.59564  | 0.18750  | 0.12463  | 0.04006  | 0.01635  | 0.07272  | 0.57414  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 13.50488 | 5.79892  | 7.24872  | 6.20230  | 7.39255  | 10.35964 | 13.46437 | 7.83569  | 6.50278  |
| a1                | 0.02017  | 0.02578  | 0.02164  | 0.02193  | 0.02329  | 0.03142  | 0.02748  | 0.01963  | 0.02311  |
| alpha1            | 0.09991  | 0.13611  | 0.19170  | 0.12613  | 0.11046  | 0.12252  | 0.16243  | 0.12212  | 0.12106  |
| a2                | 0.06356  | 0.08444  | 0.03443  | 0.07376  | 0.06935  | 0.07682  | 0.07766  | 0.07996  | 0.07518  |
| mu2               | 22.18778 | 21.79240 | 33.21281 | 23.07742 | 24.10309 | 25.75635 | 21.62909 | 24.53657 | 23.28538 |
| alpha2            | 0.13659  | 0.15757  | 0.28581  | 0.16097  | 0.14412  | 0.17586  | 0.14753  | 0.19442  | 0.15884  |
| lambda2           | 0.32355  | 0.28525  | 0.11123  | 0.26990  | 0.25107  | 0.23707  | 0.40818  | 0.19309  | 0.25429  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00590  | 0.00484  | 0.00656  | 0.00601  | 0.00524  | 0.00506  | 0.00547  | 0.00620  | 0.00557  |
| mean age          | 34.70906 | 32.33368 | 35.61066 | 34.85173 | 33.93269 | 32.53871 | 33.75098 | 34.88129 | 34.01875 |
| %(0-14)           | 20.90361 | 21.12490 | 17.92651 | 20.62856 | 21.94827 | 25.67194 | 20.44427 | 19.69995 | 21.29762 |
| %(15-64)          | 63.98947 | 66.03690 | 65.31857 | 63.78653 | 64.20841 | 61.04613 | 65.40488 | 64.36980 | 64.14049 |
| %(65+)            | 15.10692 | 12.83821 | 16.75492 | 15.58491 | 13.84332 | 13.28193 | 14.15084 | 15.93025 | 14.56189 |
| deltalc           | 3.41990  | 5.32990  | 3.30026  | 3.64767  | 4.44721  | 6.20893  | 5.02601  | 3.16769  | 4.15003  |
| delta12           | 0.31728  | 0.30528  | 0.62862  | 0.29735  | 0.33587  | 0.40901  | 0.35380  | 0.24554  | 0.30739  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.73147  | 0.86378  | 0.67072  | 0.78357  | 0.76642  | 0.69669  | 1.10099  | 0.62812  | 0.76214  |
| sigma2            | 2.36879  | 1.81030  | 0.38917  | 1.67672  | 1.74208  | 1.34806  | 2.76673  | 0.99314  | 1.60093  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 16.38026 | 15.04023 | 12.25017 | 15.88025 | 16.58027 | 17.57029 | 16.75027 | 14.13021 | 15.72025 |
| x high            | 24.73045 | 23.80043 | 24.70045 | 24.91046 | 26.19049 | 26.91050 | 24.09044 | 24.40044 | 25.04046 |
| x rel.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.35019  | 8.76020  | 12.45028 | 9.03021  | 9.61022  | 9.34021  | 7.34017  | 10.27024 | 9.32021  |
| a                 | 28.81041 | 28.19373 | 30.13374 | 28.87041 | 29.77709 | 27.90379 | 29.54371 | 28.49327 | 28.74042 |
| b                 | 0.02272  | 0.02900  | 0.02363  | 0.02406  | 0.02272  | 0.02344  | 0.03138  | 0.02299  | 0.02409  |

- 1 japan females 3 to 1
- 2 japan females 3 to 2
- 3 japan females 3 to 3
- 4 japan females 3 to 4
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- 6 japan females 3 to 6
- 7 japan females 3 to 7
- 8 japan females 3 to 8
- 9 japan females 3 to the rest



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.01671  | 0.03298  | 0.57411  | 0.35904  | 0.21855  | 0.02746  | 0.01295  | 0.05723  | 0.93998  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 10.93430 | 8.88063  | 9.44844  | 7.02314  | 7.06525  | 11.96549 | 8.63437  | 8.58961  | 8.29468  |
| al                | 0.03500  | 0.02038  | 0.00977  | 0.01800  | 0.01603  | 0.02267  | 0.02716  | 0.02654  | 0.01431  |
| alpha1            | 0.21084  | 0.05726  | 0.14842  | 0.13169  | 0.11823  | 0.09950  | 0.13220  | 0.13579  | 0.14709  |
| a2                | 0.07980  | 0.06090  | 0.11217  | 0.08912  | 0.10495  | 0.08097  | 0.08204  | 0.10290  | 0.10375  |
| mu2               | 23.01160 | 20.63923 | 16.40168 | 17.71858 | 19.27689 | 21.16880 | 21.45365 | 19.99025 | 17.30556 |
| alpha2            | 0.16124  | 0.10878  | 0.14891  | 0.12477  | 0.15730  | 0.13359  | 0.13218  | 0.16159  | 0.14325  |
| lambda2           | 0.17308  | 0.32844  | 0.44823  | 0.31935  | 0.26922  | 0.30906  | 0.33636  | 0.36504  | 0.35223  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00525  | 0.00231  | 0.00401  | 0.00337  | 0.00395  | 0.00359  | 0.00360  | 0.00351  | 0.00387  |
| mean age          | 32.63620 | 29.29474 | 30.63832 | 29.87614 | 30.62858 | 30.57299 | 30.75740 | 29.23967 | 30.45205 |
| % (0-14)          | 21.39866 | 22.37625 | 12.34512 | 16.55660 | 16.34709 | 20.87570 | 21.07211 | 20.40160 | 14.44475 |
| % (15-64)         | 64.90886 | 70.25679 | 76.85147 | 74.12564 | 73.00685 | 69.33620 | 69.05502 | 70.05296 | 75.12081 |
| % (65+ )          | 13.69247 | 7.36696  | 10.80341 | 9.31776  | 10.64606 | 9.78810  | 9.87287  | 9.54544  | 10.43444 |
| deltalc           | 6.66212  | 8.81427  | 2.43292  | 5.33385  | 4.05393  | 6.31851  | 7.55238  | 7.55894  | 3.69288  |
| deltal2           | 0.43855  | 0.33460  | 0.08708  | 0.20198  | 0.15272  | 0.27999  | 0.33105  | 0.25795  | 0.13788  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.30762  | 0.52636  | 0.99667  | 1.05543  | 0.75161  | 0.74484  | 1.00014  | 0.84035  | 1.02683  |
| sigma2            | 1.07345  | 3.01933  | 3.00996  | 2.55946  | 1.71154  | 2.31358  | 2.54461  | 2.25908  | 2.45890  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 12.05016 | 15.17023 | 11.76015 | 11.82016 | 11.98016 | 15.11023 | 15.80025 | 14.63022 | 11.67015 |
| x high            | 23.37042 | 23.75043 | 18.85032 | 20.58036 | 21.20037 | 23.75043 | 24.15044 | 22.17039 | 19.82034 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 11.32026 | 8.58020  | 7.09016  | 8.76020  | 9.22021  | 8.64020  | 8.35019  | 7.54017  | 8.15019  |
| a                 | 28.92039 | 28.86373 | 32.85026 | 31.02578 | 29.88217 | 29.01706 | 29.93038 | 27.32038 | 31.40212 |
| b                 | 0.02310  | 0.02503  | 0.04875  | 0.03587  | 0.03629  | 0.03038  | 0.03290  | 0.04008  | 0.04175  |

- 1 japan females 4 to 1
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- 8 japan females 4 to 8
- 9 japan females 4 to the rest

|                      | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)            | 0.01179  | 0.01218  | 0.26798  | 0.18350  | 0.85823  | 0.11912  | 0.06536  | 0.12261  | 0.78254  |
| gmr (mms)            | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mac% <sub>m</sub>    | 22.12844 | 13.79767 | 6.41872  | 7.19609  | 5.78641  | 5.13658  | 9.21773  | 5.28353  | 4.81641  |
| a1                   | 0.03564  | 0.02411  | 0.02208  | 0.01950  | 0.01555  | 0.02509  | 0.02209  | 0.02724  | 0.02247  |
| alpha1               | 0.12347  | 0.13123  | 0.10399  | 0.11578  | 0.16031  | 0.12817  | 0.11766  | 0.14399  | 0.11308  |
| a2                   | 0.06321  | 0.03340  | 0.06935  | 0.08403  | 0.08812  | 0.07842  | 0.06560  | 0.08435  | 0.08275  |
| mu2                  | 21.10093 | 37.76019 | 28.93451 | 20.12739 | 22.23117 | 20.75924 | 19.96488 | 22.70716 | 32.02081 |
| alpha2               | 0.12040  | 0.20318  | 0.19901  | 0.13509  | 0.17753  | 0.14451  | 0.12865  | 0.17085  | 0.15918  |
| lambda2              | 0.40926  | 0.08367  | 0.13141  | 0.21580  | 0.19742  | 0.42386  | 0.56426  | 0.21942  | 0.19980  |
| a3                   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3                  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3              | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                    | 0.00420  | 0.00471  | 0.00462  | 0.00400  | 0.00613  | 0.00462  | 0.00509  | 0.00510  | 0.00458  |
| mean age             | 30.40351 | 33.10007 | 32.30339 | 31.06645 | 35.12310 | 32.01712 | 33.07037 | 32.47279 | 32.04726 |
| % (0-14)             | 26.48080 | 20.93411 | 21.45457 | 18.99696 | 16.06873 | 21.15543 | 20.44180 | 21.68831 | 20.86518 |
| % (15-64)            | 62.53955 | 66.68256 | 66.23101 | 70.14651 | 68.10283 | 66.48267 | 66.08070 | 64.86194 | 66.88760 |
| % (65+ )             | 10.97965 | 12.38333 | 12.31442 | 10.85652 | 15.82845 | 12.36191 | 13.47750 | 13.44975 | 12.24722 |
| deltal <sub>c</sub>  | 8.48843  | 5.11524  | 4.77902  | 4.87713  | 2.53741  | 5.42787  | 4.34057  | 5.34665  | 4.90653  |
| deltal <sub>2</sub>  | 0.56376  | 0.72176  | 0.31840  | 0.23206  | 0.17644  | 0.31990  | 0.33675  | 0.32296  | 0.27150  |
| deltal <sub>32</sub> | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta <sub>12</sub>   | 1.02547  | 0.64588  | 0.52254  | 0.85703  | 0.90304  | 0.88692  | 0.91463  | 0.84277  | 0.71042  |
| sigma <sub>2</sub>   | 3.39914  | 0.41183  | 0.66034  | 1.59745  | 1.11205  | 2.93315  | 4.38613  | 1.28428  | 1.25517  |
| sigma <sub>3</sub>   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low                | 16.68027 | 12.24017 | 13.43019 | 11.60015 | 11.98016 | 16.19026 | 16.54026 | 13.94020 | 13.52020 |
| x high               | 23.96043 | 26.96050 | 25.57047 | 22.13039 | 22.72041 | 23.24042 | 22.53040 | 23.75043 | 24.00043 |
| x ret.               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift              | 7.28017  | 14.72034 | 12.14028 | 10.53024 | 10.74025 | 7.05016  | 5.99014  | 9.81022  | 10.48024 |
| a                    | 26.26708 | 32.28542 | 29.64735 | 30.04855 | 31.12036 | 27.94039 | 28.08370 | 27.78887 | 28.88503 |
| b                    | 0.02596  | 0.01769  | 0.02153  | 0.02677  | 0.02648  | 0.03293  | 0.03151  | 0.02554  | 0.02454  |

- 1 japan females 5 to 1
- 2 japan females 5 to 2
- 3 japan females 5 to 3
- 4 japan females 5 to 4
- 5 japan females 5 to 5
- 6 japan females 5 to 6
- 7 japan females 5 to 7
- 8 japan females 5 to 8
- 9 japan females 5 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.00631  | 0.01386  | 0.32589  | 0.11311  | 0.70285  | 0.46613  | 0.08105  | 0.15269  | 1.39575  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 24.51994 | 12.30600 | 10.69618 | 11.72753 | 10.06412 | 6.96881  | 7.28987  | 7.00913  | 8.59574  |
| a1                | 0.02196  | 0.03383  | 0.01750  | 0.01631  | 0.00611  | 0.02116  | 0.03219  | 0.02062  | 0.01376  |
| a2                | 0.14403  | 0.10288  | 0.15916  | 0.15823  | 0.10223  | 0.11496  | 0.13464  | 0.11773  | 0.15029  |
| a2                | 0.09953  | 0.05981  | 0.11383  | 0.08186  | 0.15687  | 0.06751  | 0.08130  | 0.10180  | 0.10958  |
| mu2               | 21.21478 | 29.20333 | 18.35597 | 15.49970 | 16.90454 | 16.73691 | 22.26298 | 21.49677 | 16.60332 |
| alpha2            | 0.14096  | 0.09763  | 0.15995  | 0.10406  | 0.19438  | 0.09529  | 0.13437  | 0.14212  | 0.14534  |
| lambda2           | 0.50362  | 0.10400  | 0.28461  | 0.56273  | 0.40983  | 0.35500  | 0.18028  | 0.19195  | 0.41852  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00435  | 0.00140  | 0.00385  | 0.00274  | 0.00366  | 0.00264  | 0.00305  | 0.00432  | 0.00359  |
| mean age          | 32.31285 | 28.97122 | 30.05593 | 28.92150 | 29.14690 | 28.99750 | 28.73516 | 31.68656 | 29.56494 |
| % (0-14)          | 16.65003 | 27.08500 | 15.73173 | 14.25770 | 11.12763 | 19.12057 | 24.07109 | 19.67212 | 13.95349 |
| % (15-64)         | 72.49081 | 67.43401 | 73.93960 | 77.93995 | 79.21366 | 73.00977 | 67.46162 | 68.69307 | 76.37206 |
| % (65+)           | 10.85915 | 5.48100  | 10.32867 | 7.80235  | 9.65871  | 7.86966  | 8.46729  | 11.63481 | 9.67445  |
| delta1c           | 5.05265  | 24.16923 | 4.54273  | 5.95425  | 1.67154  | 8.00199  | 10.56894 | 4.77284  | 3.83319  |
| delta12           | 0.22059  | 0.56561  | 0.15374  | 0.19923  | 0.03896  | 0.31340  | 0.39591  | 0.25208  | 0.12554  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.02182  | 1.05383  | 0.99502  | 1.52050  | 0.52593  | 1.20635  | 1.00199  | 0.82836  | 1.03405  |
| sigma2            | 3.57290  | 1.06522  | 1.77930  | 5.40764  | 2.10842  | 3.72536  | 1.34163  | 1.35058  | 2.87965  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 17.14028 | 13.98021 | 11.39015 | 12.03016 | 11.55015 | 11.78016 | 12.48017 | 11.87016 | 11.78016 |
| x high            | 23.73043 | 29.07055 | 20.34035 | 18.46031 | 18.72031 | 20.26035 | 23.67043 | 22.88041 | 19.10032 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 6.59015  | 15.09035 | 8.95020  | 6.43015  | 7.17016  | 8.48019  | 11.19026 | 11.01025 | 7.32017  |
| a                 | 32.23034 | 32.17043 | 30.04943 | 34.44356 | 31.02938 | 30.50578 | 28.27874 | 29.88948 | 31.19120 |
| b                 | 0.04309  | 0.01296  | 0.04039  | 0.04450  | 0.06053  | 0.03046  | 0.02361  | 0.02435  | 0.04732  |

|   |       |         |               |
|---|-------|---------|---------------|
| 1 | japan | females | 6 to 1        |
| 2 | japan | females | 6 to 2        |
| 3 | japan | females | 6 to 3        |
| 4 | japan | females | 6 to 4        |
| 5 | japan | females | 6 to 5        |
| 6 | japan | females | 6 to 6        |
| 7 | japan | females | 6 to 7        |
| 8 | japan | females | 6 to 8        |
| 9 | japan | females | 6 to the rest |

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7         | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|
| gmr (obs)         | 0.00913  | 0.00900  | 0.31548  | 0.13968  | 1.01300  | 0.19008  | 0.29465   | 0.05973  | 1.73603  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000   | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 27.60073 | 28.38801 | 12.06607 | 13.34243 | 10.74830 | 10.66397 | 8.22838   | 5.91310  | 9.49843  |
| a1                | 0.03926  | 0.02000  | 0.00790  | 0.01227  | 0.00526  | 0.01809  | 0.02285   | 0.02116  | 0.00917  |
| alpha1            | 0.11792  | 0.05000  | 0.15816  | 0.12575  | 0.12044  | 0.11052  | 0.07185   | 0.23111  | 0.13703  |
| a2                | 0.00040  | 0.09015  | 0.15475  | 0.09040  | 0.17026  | 0.09179  | 0.04817   | 0.00645  | 0.13703  |
| mu2               | 55.48544 | 24.43313 | 17.09580 | 15.06610 | 17.14894 | 18.09050 | 15.47044  | 38.01075 | 16.64835 |
| alpha2            | 0.37309  | 0.2493   | 0.18619  | 0.11970  | 0.21313  | 0.13003  | 0.06431   | 0.43712  | 0.17354  |
| lambda2           | 0.06338  | 0.23714  | 0.38581  | 0.77571  | 0.39419  | 0.29284  | 0.49180   | 0.10542  | 0.42996  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| c                 | 0.00141  | 0.00450  | 0.00355  | 0.00326  | 0.00410  | 0.00319  | 0.00012   | 0.00671  | 0.00382  |
| mean age          | 25.08721 | 31.52501 | 29.12490 | 28.95347 | 29.84775 | 29.21664 | 25.92860  | 35.83644 | 29.67910 |
| % (0-14)          | 27.68680 | 23.30968 | 10.79291 | 14.03145 | 10.63559 | 17.74239 | 22.07081  | 16.32066 | 11.72289 |
| % (15-64)         | 68.26564 | 64.51952 | 79.84567 | 77.12186 | 78.72223 | 73.48717 | 74.93811  | 66.57557 | 78.16459 |
| % (65+)           | 4.04755  | 12.17080 | 9.36142  | 8.84669  | 10.64218 | 8.77044  | 2.99108   | 17.10378 | 10.11252 |
| delta1c           | 27.94174 | 4.44666  | 2.22317  | 3.75843  | 1.28382  | 5.67636  | 192.60318 | 3.15210  | 2.39774  |
| delta12           | 98.07555 | 0.22189  | 0.05103  | 0.13574  | 0.03091  | 0.19705  | 0.47442   | 3.27955  | 0.06691  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| beta12            | 0.31607  | 0.20415  | 0.84944  | 1.05058  | 0.56509  | 0.84997  | 1.11737   | 0.52871  | 0.90681  |
| sigma2            | 0.16988  | 0.96822  | 2.07209  | 6.48060  | 1.84956  | 2.25208  | 7.64776   | 0.24117  | 2.47760  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| x low             | 13.75020 | 15.72025 | 11.45015 | 12.44017 | 11.46015 | 11.69015 | 12.04016  | 12.76018 | 11.68015 |
| x high            | 27.32051 | 24.15044 | 18.98032 | 17.45028 | 18.71031 | 20.75036 | 19.25033  | 24.52045 | 18.75031 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000   | 0.00000  | 0.00000  |
| x shift           | 13.57031 | 8.43019  | 7.53017  | 5.01011  | 7.25017  | 9.06021  | 7.21017   | 11.76027 | 7.07016  |
| a                 | 29.22816 | 25.13712 | 32.25301 | 32.27523 | 31.00120 | 29.95034 | 29.77531  | 29.21208 | 31.75028 |
| b                 | 0.02717  | 0.02498  | 0.05930  | 0.05143  | 0.06188  | 0.03465  | 0.02757   | 0.03080  | 0.05596  |

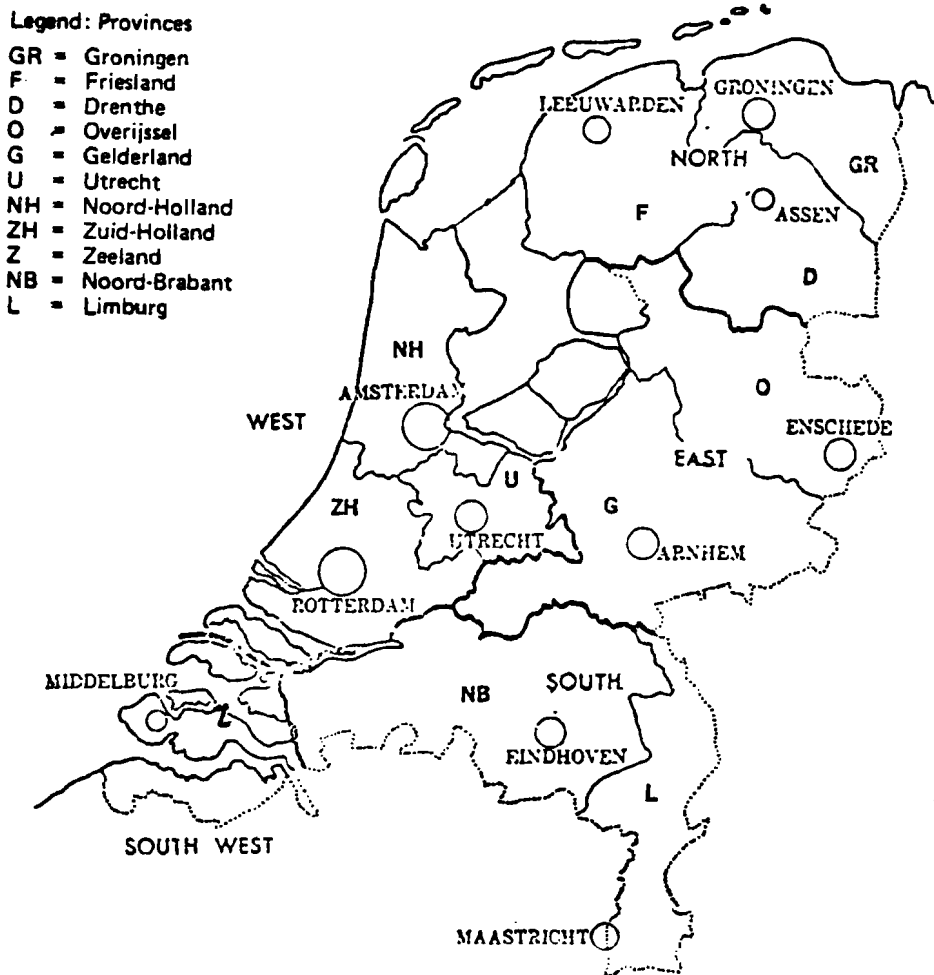
- 1 japan females 7 to 1
- 2 japan females 7 to 2
- 3 japan females 7 to 3
- 4 japan females 7 to 4
- 5 japan females 7 to 5
- 6 japan females 7 to 6
- 7 japan females 7 to 7
- 8 japan females 7 to 8
- 9 japan females 7 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.01749  | 0.01036  | 0.58999  | 0.34801  | 0.74777  | 0.16428  | 0.02643  | 0.62524  | 1.90433  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 14.02071 | 11.91897 | 8.54619  | 18.97226 | 8.61834  | 11.09735 | 11.09142 | 7.46784  | 9.07453  |
| a1                | 0.03939  | 0.02691  | 0.00895  | 0.00794  | 0.00768  | 0.01955  | 0.02632  | 0.01795  | 0.01078  |
| alpha1            | 0.11781  | 0.10573  | 0.14815  | 0.02444  | 0.12112  | 0.13179  | 0.16014  | 0.12318  | 0.11751  |
| a2                | 0.07709  | 0.05327  | 0.12694  | 0.12987  | 0.11991  | 0.07882  | 0.06480  | 0.06577  | 0.09735  |
| mu2               | 23.99502 | 22.21686 | 16.72615 | 15.20293 | 15.93400 | 18.16344 | 22.53665 | 19.05868 | 15.43128 |
| alpha2            | 0.13505  | 0.09261  | 0.16228  | 0.18471  | 0.15838  | 0.11736  | 0.13917  | 0.10658  | 0.12600  |
| lambda2           | 0.28061  | 0.38841  | 0.41619  | 0.80120  | 0.53456  | 0.26599  | 0.22685  | 0.24845  | 0.63551  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00263  | 0.00350  | 0.00379  | 0.00205  | 0.00399  | 0.00382  | 0.00614  | 0.00449  | 0.00301  |
| mean age          | 27.92160 | 32.11752 | 29.96013 | 28.03261 | 30.07642 | 30.88583 | 35.03150 | 33.02763 | 28.75644 |
| %(0-14)           | 29.12714 | 23.01517 | 11.69631 | 14.15018 | 12.03158 | 18.10935 | 20.80804 | 17.72110 | 13.18692 |
| %(15-64)          | 63.55435 | 66.68923 | 78.21330 | 77.32667 | 77.40143 | 71.41866 | 63.35246 | 69.95377 | 78.37339 |
| %(65+)            | 7.31851  | 10.29559 | 10.09039 | 8.52315  | 10.56699 | 10.47198 | 15.83950 | 12.32513 | 8.43970  |
| deltalc           | 14.94925 | 7.67731  | 2.36322  | 3.86379  | 1.92597  | 5.12191  | 4.28532  | 3.99765  | 3.58234  |
| delta12           | 0.51097  | 0.50509  | 0.07050  | 0.06113  | 0.06406  | 0.24803  | 0.40612  | 0.27298  | 0.11070  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 0.87235  | 1.14175  | 0.91295  | 0.13232  | 0.76472  | 1.12302  | 1.15068  | 1.15579  | 0.93262  |
| sigma2            | 2.07782  | 4.19420  | 2.56466  | 4.33751  | 3.37516  | 2.26650  | 1.63001  | 2.33113  | 5.04390  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 17.49029 | 17.60029 | 11.65015 | 12.43017 | 11.96016 | 11.36015 | 14.33021 | 11.90016 | 12.22017 |
| x high            | 26.45049 | 25.75047 | 18.98032 | 17.03028 | 18.20030 | 21.11037 | 24.60045 | 22.30040 | 17.96030 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.96021  | 8.15019  | 7.33017  | 4.60011  | 6.24014  | 9.75022  | 10.27024 | 10.40024 | 5.74013  |
| a                 | 27.67044 | 31.12373 | 32.64391 | 28.49695 | 32.05481 | 30.85579 | 29.74325 | 32.27307 | 32.68524 |
| b                 | 0.02755  | 0.02466  | 0.05272  | 0.06458  | 0.05484  | 0.02891  | 0.02033  | 0.02374  | 0.05205  |

- 1 japan females 8 to 1
- 2 japan females 8 to 2
- 3 japan females 8 to 3
- 4 japan females 8 to 4
- 5 japan females 8 to 5
- 6 japan females 8 to 6
- 7 japan females 8 to 7
- 8 japan females 8 to 8
- 9 japan females 8 to the rest

NETHERLANDS

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF OBSERVED MODEL MIGRATION SCHEDULES \*



REGION NUMBER:

- |               |                                  |
|---------------|----------------------------------|
| 1. Groningen  | 7. Noord-Holland                 |
| 2. Friesland  | 8. Zuid-Holland                  |
| 3. Drenthe    | 9. Zeeland                       |
| 4. Overijssel | 10. Noord-Brabant                |
| 5. Gelderland | 11. Limburg                      |
| 6. Utrecht    | 12. IJsselmeerpolders and Dronte |

\*All schedules are outmigration flows from each region to the rest of the country.

|                   |   |          |          |          |          |          |          |          |          |          |          |          |          |          |
|-------------------|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 1 | 4.75493  | 3        | 3.67821  | 4        | 3.17845  | 5        | 3.81677  | 6        | 4.81395  | 7        | 4.39682  | 8        | 4.23647  |
| gmr (mms)         |   | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> |   | 5.30331  | 5.20980  | 5.40258  | 6.40490  | 6.40490  | 6.34158  | 6.34158  | 4.73144  | 4.73144  | 4.16903  | 4.16903  | 3.02542  | 3.02542  |
| a1                |   | 0.01574  | 0.01078  | 0.01212  | 0.01310  | 0.01310  | 0.01070  | 0.01070  | 0.01065  | 0.01065  | 0.01365  | 0.01365  | 0.01444  | 0.01444  |
| alpha1            |   | 0.08992  | 0.06953  | 0.08846  | 0.08561  | 0.08561  | 0.08642  | 0.08642  | 0.07597  | 0.07597  | 0.10731  | 0.10731  | 0.08613  | 0.08613  |
| a2                |   | 0.06656  | 0.06376  | 0.06759  | 0.06621  | 0.06621  | 0.06826  | 0.06826  | 0.05812  | 0.05812  | 0.06196  | 0.06196  | 0.05424  | 0.05424  |
| mu2               |   | 22.93296 | 21.04934 | 20.38829 | 20.53458 | 20.53458 | 20.26918 | 20.26918 | 20.42789 | 20.42789 | 22.05448 | 22.05448 | 21.90435 | 21.90435 |
| alpha2            |   | 0.14746  | 0.14982  | 0.14407  | 0.12240  | 0.12240  | 0.13123  | 0.13123  | 0.11925  | 0.11925  | 0.12695  | 0.12695  | 0.11478  | 0.11478  |
| lambda2           |   | 0.22094  | 0.28627  | 0.31668  | 0.30015  | 0.30015  | 0.30101  | 0.30101  | 0.30352  | 0.30352  | 0.20297  | 0.20297  | 0.25700  | 0.25700  |
| a3                |   | 0.00001  | 0.00001  | 0.00001  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               |   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            |   | 0.07850  | 0.07551  | 0.07588  | 0.10053  | 0.10053  | 0.06587  | 0.06587  | 0.07535  | 0.07535  | 0.04398  | 0.04398  | 0.06183  | 0.06183  |
| lambda3           |   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| o                 |   | 0.00355  | 0.00418  | 0.00389  | 0.00336  | 0.00336  | 0.00393  | 0.00393  | 0.00422  | 0.00422  | 0.00373  | 0.00373  | 0.00389  | 0.00389  |
| mean age          |   | 39.31461 | 40.05135 | 39.73194 | 38.02990 | 38.02990 | 37.93359 | 37.93359 | 37.91038 | 37.91038 | 38.43335 | 38.43335 | 37.73109 | 37.73109 |
| %(0-14)           |   | 17.17444 | 15.34456 | 14.95404 | 15.15449 | 15.15449 | 14.13296 | 14.13296 | 15.11558 | 15.11558 | 15.49279 | 15.49279 | 17.27305 | 17.27305 |
| %(15-64)          |   | 60.10563 | 61.14225 | 61.73774 | 64.91174 | 64.91174 | 66.26878 | 66.26878 | 65.81244 | 65.81244 | 64.51496 | 64.51496 | 63.92394 | 63.92394 |
| %(65+)            |   | 22.71992 | 23.51319 | 23.30822 | 19.93378 | 19.93378 | 19.59825 | 19.59825 | 19.07198 | 19.07198 | 19.99225 | 19.99225 | 18.80301 | 18.80301 |
| delta1            |   | 4.43373  | 2.57695  | 3.11352  | 3.89330  | 3.89330  | 2.72578  | 2.72578  | 2.52201  | 2.52201  | 3.66226  | 3.66226  | 3.70920  | 3.70920  |
| delta2            |   | 0.23650  | 0.16905  | 0.17937  | 0.19784  | 0.19784  | 0.15677  | 0.15677  | 0.18334  | 0.18334  | 0.22037  | 0.22037  | 0.26615  | 0.26615  |
| delta3            |   | 0.00010  | 0.00012  | 0.00012  | 0.00001  | 0.00001  | 0.00019  | 0.00019  | 0.00008  | 0.00008  | 0.00140  | 0.00140  | 0.00028  | 0.00028  |
| beta1             |   | 0.60976  | 0.46411  | 0.61402  | 0.69945  | 0.69945  | 0.65856  | 0.65856  | 0.63704  | 0.63704  | 0.84526  | 0.84526  | 0.75034  | 0.75034  |
| sigma2            |   | 1.49832  | 1.91067  | 1.98005  | 2.45220  | 2.45220  | 2.29371  | 2.29371  | 2.54521  | 2.54521  | 1.59876  | 1.59876  | 2.23897  | 2.23897  |
| sigma3            |   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             |   | 14.33021 | 14.21021 | 14.24021 | 14.20021 | 14.20021 | 13.80020 | 13.80020 | 14.14021 | 14.14021 | 12.85018 | 12.85018 | 14.77022 | 14.77022 |
| x high            |   | 24.60045 | 23.20042 | 22.78041 | 23.40042 | 23.40042 | 22.94041 | 22.94041 | 23.38042 | 23.38042 | 24.22044 | 24.22044 | 24.86045 | 24.86045 |
| x ret.            |   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           |   | 10.27024 | 8.99021  | 8.54020  | 9.20021  | 9.20021  | 9.14021  | 9.14021  | 9.24021  | 9.24021  | 11.37026 | 11.37026 | 10.09023 | 10.09023 |
| a                 |   | 30.07896 | 29.92180 | 30.10179 | 32.11462 | 32.11462 | 32.74802 | 32.74802 | 32.81604 | 32.81604 | 33.49535 | 33.49535 | 32.26036 | 32.26036 |
| b                 |   | 0.02157  | 0.02322  | 0.02608  | 0.02634  | 0.02634  | 0.02722  | 0.02722  | 0.02394  | 0.02394  | 0.02098  | 0.02098  | 0.02060  | 0.02060  |

|                     | 1       | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---------------------|---------|---|---|---|---|---|---|---|
| 1 netherlands males | region= |   |   |   |   |   |   |   |
| 2 netherlands males | region= |   |   |   |   |   |   |   |
| 3 netherlands males | region= |   |   |   |   |   |   |   |
| 4 netherlands males | region= |   |   |   |   |   |   |   |
| 5 netherlands males | region= |   |   |   |   |   |   |   |
| 6 netherlands males | region= |   |   |   |   |   |   |   |
| 7 netherlands males | region= |   |   |   |   |   |   |   |
| 8 netherlands males | region= |   |   |   |   |   |   |   |

|           | 1        | 2        | 3        | 4        |
|-----------|----------|----------|----------|----------|
| gmr (obs) | 3.63964  | 3.49814  | 3.60536  | 6.10455  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae%m     | 5.26467  | 4.42435  | 6.41094  | 33.06621 |
| a1        | 0.01505  | 0.01161  | 0.01234  | 0.00170  |
| alpha1    | 0.04667  | 0.06402  | 0.10277  | 0.04802  |
| a2        | 0.05449  | 0.06205  | 0.07066  | 0.05272  |
| mu2       | 19.46053 | 20.94606 | 20.69522 | 20.15953 |
| alpha2    | 0.11257  | 0.12854  | 0.12823  | 0.28452  |
| lambda2   | 0.35961  | 0.28208  | 0.23926  | 0.61428  |
| a3        | 0.00005  | 0.00000  | 0.00000  | 0.00003  |
| mu3       | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3    | 0.05744  | 0.08839  | 0.08579  | 0.07284  |
| lambda3   | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c         | 0.00104  | 0.00294  | 0.00328  | 0.00687  |
| mean age  | 37.75279 | 41.49833 | 39.51237 | 54.18848 |
| %(0-14)   | 16.91562 | 14.39038 | 13.69166 | 9.84636  |
| %(15-64)  | 62.40010 | 59.97063 | 63.94981 | 45.59629 |
| %(65+ )   | 20.68428 | 25.63899 | 22.35854 | 44.55735 |
| deltalc   | 14.47297 | 3.95485  | 3.75886  | 0.24693  |
| delta12   | 0.27627  | 0.18714  | 0.17467  | 0.03217  |
| delta32   | 0.00095  | 0.00006  | 0.00005  | 0.00053  |
| beta12    | 0.41455  | 0.49807  | 0.80146  | 0.16878  |
| sigma2    | 3.19446  | 2.19452  | 1.86595  | 2.15901  |
| sigma3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low     | 14.31021 | 14.17021 | 12.72018 | 16.37026 |
| x high    | 22.50040 | 23.58043 | 23.19042 | 21.42038 |
| x ret.    | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift   | 8.19019  | 9.41022  | 10.47024 | 5.05012  |
| a         | 29.53608 | 31.48035 | 33.37366 | 29.13463 |
| b         | 0.02355  | 0.02303  | 0.02522  | 0.01849  |

1 netherlands males region= 9  
2 netherlands males region= 10  
3 netherlands males region= 11  
4 netherlands males region= 12



|                     | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        |
|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)           | 4.92170  | 4.35758  | 3.99291  | 3.49217  | 3.93347  | 4.76774  | 4.26515  | 4.26010  |
| gmr (mms)           | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub>   | 5.57032  | 8.90725  | 9.83422  | 7.42851  | 7.66944  | 7.22708  | 5.54579  | 5.40977  |
| al                  | 0.01413  | 0.00994  | 0.01251  | 0.01249  | 0.01273  | 0.01164  | 0.01353  | 0.01320  |
| alpha1              | 0.11015  | 0.11311  | 0.10605  | 0.12274  | 0.10759  | 0.09932  | 0.09611  | 0.08771  |
| a2                  | 0.07648  | 0.09284  | 0.09417  | 0.10087  | 0.09170  | 0.07325  | 0.06611  | 0.06480  |
| mu2                 | 20.57280 | 19.75573 | 19.98286 | 20.65245 | 19.99189 | 19.91326 | 20.26254 | 20.23706 |
| alpha2              | 0.16826  | 0.18906  | 0.18936  | 0.18754  | 0.17388  | 0.15139  | 0.14934  | 0.14553  |
| lambda2             | 0.26334  | 0.29692  | 0.29169  | 0.25254  | 0.30909  | 0.35494  | 0.32392  | 0.33443  |
| a3                  | 0.00000  | 0.00001  | 0.00019  | 0.00001  | 0.00003  | 0.00000  | 0.00007  | 0.00001  |
| mu3                 | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3              | 0.11854  | 0.07400  | 0.03847  | 0.06928  | 0.06297  | 0.10061  | 0.05122  | 0.07127  |
| lambda3             | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                   | 0.00451  | 0.00457  | 0.00321  | 0.00351  | 0.00317  | 0.00427  | 0.00374  | 0.00440  |
| mean age            | 38.72398 | 37.79747 | 37.89417 | 37.42063 | 39.00070 | 39.32231 | 39.56654 | 37.57629 |
| % (0-14)            | 16.13089 | 13.55699 | 14.03498 | 13.46208 | 13.50458 | 14.46851 | 15.60823 | 16.78795 |
| % (15-64)           | 61.32296 | 65.44514 | 64.36825 | 65.69346 | 63.18933 | 62.78499 | 60.98086 | 63.07958 |
| % (65+ )            | 22.54615 | 20.99786 | 21.59677 | 20.84447 | 23.30609 | 22.74649 | 23.41092 | 20.13247 |
| delta <sub>lc</sub> | 3.13535  | 2.17413  | 3.90162  | 3.55805  | 4.01671  | 2.72376  | 3.61493  | 3.00319  |
| delta <sub>l2</sub> | 0.18475  | 0.10707  | 0.13280  | 0.12384  | 0.13879  | 0.15884  | 0.20471  | 0.20377  |
| delta <sub>l3</sub> | 0.00000  | 0.00007  | 0.00202  | 0.00012  | 0.00031  | 0.00001  | 0.00103  | 0.00011  |
| beta <sub>l2</sub>  | 0.65461  | 0.59827  | 0.56003  | 0.65445  | 0.61874  | 0.65607  | 0.64356  | 0.60265  |
| sigma <sub>2</sub>  | 1.56509  | 1.57049  | 1.54044  | 1.34659  | 1.77764  | 2.34448  | 2.16903  | 2.29798  |
| sigma <sub>3</sub>  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low               | 13.12019 | 12.78018 | 12.98018 | 12.51017 | 13.45019 | 14.32021 | 14.28021 | 14.47022 |
| x high              | 22.18039 | 21.24037 | 21.42038 | 21.78038 | 21.80038 | 22.25039 | 22.57040 | 22.63040 |
| x ret.              | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift             | 9.06021  | 8.46019  | 8.44019  | 9.27021  | 8.35019  | 7.93018  | 8.29019  | 8.16019  |
| a                   | 28.33423 | 29.25703 | 28.51204 | 29.73870 | 29.20036 | 29.90750 | 29.07037 | 28.86609 |
| b                   | 0.02591  | 0.03316  | 0.03316  | 0.03423  | 0.03341  | 0.02930  | 0.02583  | 0.02568  |

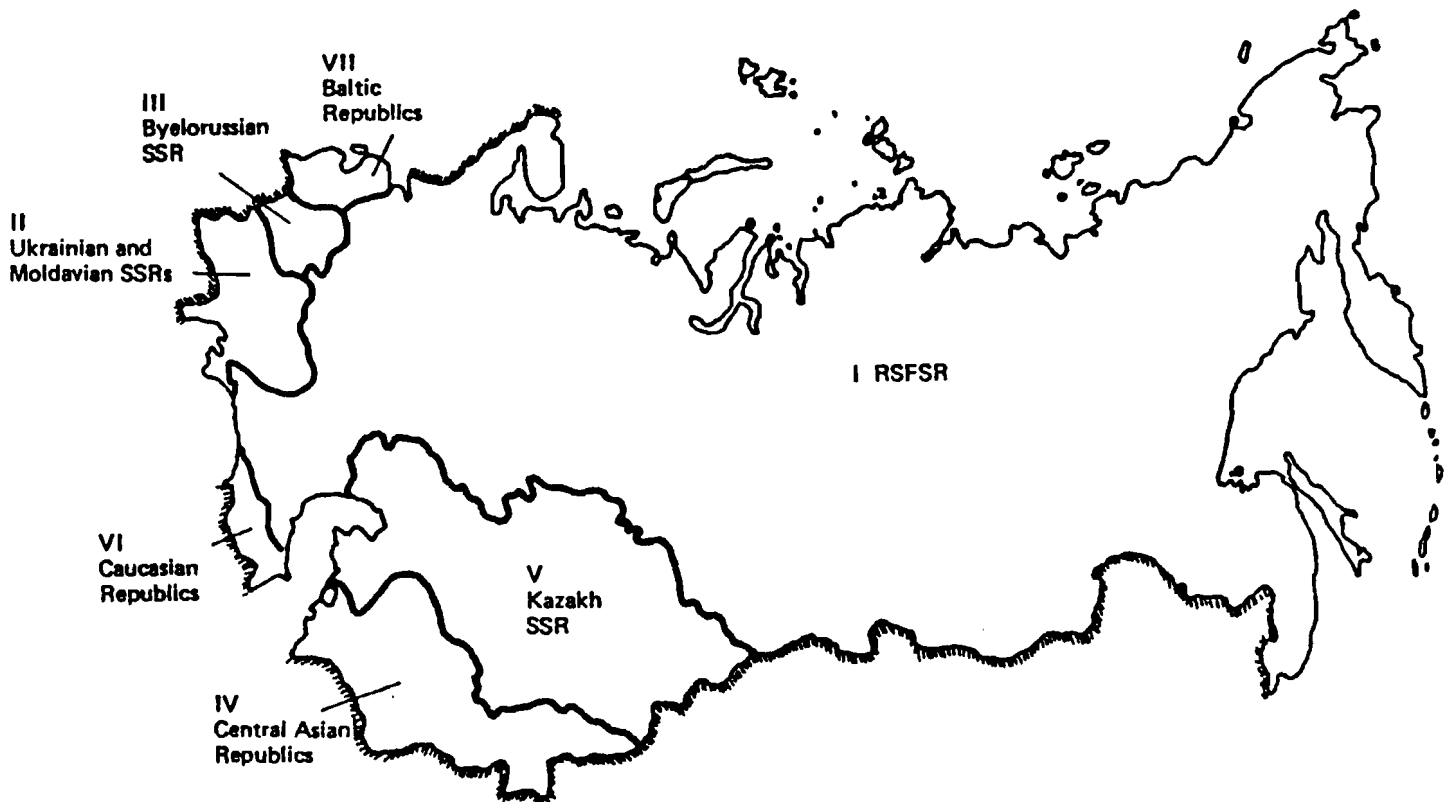
- 1 netherlands females region= 1
- 2 netherlands females region= 2
- 3 netherlands females region= 3
- 4 netherlands females region= 4
- 5 netherlands females region= 5
- 6 netherlands females region= 6
- 7 netherlands females region= 7
- 8 netherlands females region= 8

|                     | 1        | 2        | 3        | 4        |
|---------------------|----------|----------|----------|----------|
| gmr (obs)           | 3.80067  | 3.52109  | 3.54463  | 6.29654  |
| gmr (mms)           | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub>   | 11.05379 | 9.69440  | 9.52443  | 17.46382 |
| a1                  | 0.01161  | 0.01082  | 0.01274  | 0.00547  |
| alpha1              | 0.06176  | 0.08619  | 0.11502  | 0.03255  |
| a2                  | 0.08373  | 0.09071  | 0.10439  | 0.02616  |
| mu2                 | 19.80263 | 20.04311 | 20.44422 | 15.18870 |
| alpha2              | 0.18463  | 0.18125  | 0.20475  | 0.10894  |
| lambda2             | 0.30026  | 0.32388  | 0.26981  | 0.69389  |
| a3                  | 0.00001  | 0.00006  | 0.00003  | 0.00002  |
| mu3                 | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3              | 0.07932  | 0.05432  | 0.06266  | 0.08343  |
| lambda3             | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                   | 0.00318  | 0.00322  | 0.00315  | 0.00197  |
| mean age            | 39.77856 | 39.29827 | 39.19236 | 60.38743 |
| % (0-14)            | 15.04061 | 13.21536 | 13.26212 | 8.04937  |
| % (15-64)           | 59.85442 | 63.21149 | 62.51197 | 35.69372 |
| % (65+ )            | 25.10497 | 23.57315 | 24.22591 | 56.25691 |
| delta1 <sub>0</sub> | 3.64903  | 3.36197  | 4.04725  | 2.77502  |
| delta1 <sub>2</sub> | 0.13866  | 0.11925  | 0.12208  | 0.20906  |
| delta3 <sub>2</sub> | 0.00010  | 0.00066  | 0.00030  | 0.00081  |
| beta1 <sub>2</sub>  | 0.33449  | 0.47555  | 0.56177  | 0.29878  |
| sigma2              | 1.62627  | 1.78688  | 1.31773  | 6.36929  |
| sigma3              | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low               | 13.08018 | 13.72020 | 12.75018 | 12.32017 |
| x high              | 21.33037 | 21.79038 | 21.42038 | 17.80029 |
| x ret.              | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift             | 8.25019  | 8.07018  | 8.67020  | 5.48013  |
| a                   | 27.02269 | 28.99037 | 28.21204 | 30.90860 |
| b                   | 0.02866  | 0.03367  | 0.03485  | 0.01259  |

- 1 netherlands females region= 9
- 2 netherlands females region= 10
- 3 netherlands females region= 11
- 4 netherlands females region= 12

USSR

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF OBSERVED MODEL MIGRATION SCHEDULES \*



REGION NUMBER :

1. Urban areas of the Russian Federal Republic (the RSFSR)
2. Urban areas of the Ukrainian and Moldavian SSRs
3. Urban areas of Byelorussian SSR
4. Urban areas of the Central Asian Republics except the Kazakh SSR (the Uzbek, Kirghiz, Tadzhik, and Turkmen SSRs)
5. Urban areas of the Kazakh SSR
6. Urban areas of the Caucasian Republics (the Georgian, Azerbaijan, and Armenian SSRs)
7. Urban areas of the Baltic Republics (the Estonian, Latvian, and Lithuanian SSRs)
8. All rural areas of the USSR

\*Total (male plus female) flows only.

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 3.90378  | 0.26384  | 0.03529  | 0.08091  | 0.10665  | 0.02118  | 0.03368  | 0.74666  | 1.28820  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 15.43382 | 13.97125 | 14.46018 | 17.19613 | 16.17655 | 19.10940 | 12.66977 | 15.77127 | 15.13050 |
| a1                | 0.00740  | 0.01027  | 0.01283  | 0.00955  | 0.01018  | 0.00261  | 0.00941  | 0.00669  | 0.00806  |
| alpha1            | 0.25542  | 0.22269  | 0.19168  | 0.22322  | 0.21732  | 0.27777  | 0.22316  | 0.27713  | 0.24947  |
| a2                | 0.12476  | 0.13803  | 0.15321  | 0.12242  | 0.12071  | 0.11152  | 0.09174  | 0.12811  | 0.13036  |
| mu2               | 19.37082 | 19.91893 | 19.36453 | 19.19405 | 19.48024 | 18.17423 | 25.15442 | 19.50022 | 19.62549 |
| alpha2            | 0.17544  | 0.20040  | 0.20086  | 0.15816  | 0.17651  | 0.13280  | 0.29121  | 0.17940  | 0.18426  |
| lambda2           | 0.27116  | 0.24813  | 0.26071  | 0.29122  | 0.27809  | 0.32370  | 0.16128  | 0.27206  | 0.26470  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00475  | 0.00443  | 0.00336  | 0.00397  | 0.00485  | 0.00379  | 0.00590  | 0.00477  | 0.00466  |
| mean age          | 33.12405 | 31.85361 | 29.18485 | 31.93547 | 33.08696 | 32.58033 | 34.52554 | 33.22263 | 32.80618 |
| % (0-14)          | 9.76629  | 11.20723 | 12.07090 | 9.69270  | 11.14441 | 6.73093  | 12.61459 | 9.28182  | 9.95290  |
| % (15-64)         | 77.60664 | 76.93344 | 78.81831 | 79.63146 | 75.96701 | 83.03870 | 71.85881 | 78.04827 | 77.63486 |
| % (65+ )          | 12.62706 | 11.85933 | 9.11079  | 10.67583 | 12.88858 | 10.23037 | 15.52660 | 12.66991 | 12.41225 |
| deltalc           | 1.55935  | 2.31922  | 3.81763  | 2.40569  | 2.09692  | 0.68710  | 1.59392  | 1.40206  | 1.72924  |
| delta12           | 0.05934  | 0.07440  | 0.08373  | 0.07801  | 0.08434  | 0.02337  | 0.10253  | 0.05221  | 0.06181  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.45586  | 1.11122  | 0.95429  | 1.41139  | 1.23120  | 2.09166  | 0.76632  | 1.54480  | 1.35391  |
| sigma2            | 1.54557  | 1.23818  | 1.29793  | 1.84134  | 1.57544  | 2.43754  | 0.55383  | 1.51655  | 1.43654  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.14014 | 11.05014 | 11.10014 | 11.77015 | 11.70015 | 11.01014 | 10.43012 | 11.15014 | 11.19014 |
| x high            | 20.98037 | 20.78036 | 20.36035 | 21.29037 | 21.12037 | 20.94036 | 21.49038 | 21.04037 | 21.00037 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.84023  | 9.73022  | 9.26021  | 9.52022  | 9.42022  | 9.93023  | 11.06025 | 9.89023  | 9.81022  |
| a                 | 38.18932 | 33.49847 | 31.40577 | 37.82660 | 34.90209 | 52.99454 | 31.13035 | 39.23112 | 36.85479 |
| b                 | 0.04389  | 0.04617  | 0.05220  | 0.04577  | 0.04230  | 0.04624  | 0.03803  | 0.04489  | 0.04502  |

- 1 ussr migration flow 1 to 1
- 2 ussr migration flow 1 to 2
- 3 ussr migration flow 1 to 3
- 4 ussr migration flow 1 to 4
- 5 ussr migration flow 1 to 5
- 6 ussr migration flow 1 to 6
- 7 ussr migration flow 1 to 7
- 8 ussr migration flow 1 to 8
- 9 ussr migration 1 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.74295  | 3.22573  | 0.03461  | 0.03150  | 0.05294  | 0.01769  | 0.02588  | 0.74597  | 1.65154  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 17.30169 | 15.39872 | 15.24740 | 19.14019 | 18.33680 | 19.83373 | 12.41132 | 17.83611 | 17.43248 |
| a1                | 0.00602  | 0.00856  | 0.01090  | 0.00805  | 0.00844  | 0.00172  | 0.00757  | 0.00535  | 0.00593  |
| alpha1            | 0.25019  | 0.21649  | 0.18493  | 0.21458  | 0.20793  | 0.29489  | 0.21958  | 0.27283  | 0.25578  |
| a2                | 0.12443  | 0.14021  | 0.15735  | 0.12180  | 0.12076  | 0.10677  | 0.12539  | 0.12812  | 0.12673  |
| mu2               | 18.51724 | 18.87225 | 18.63266 | 18.54950 | 18.66835 | 17.74494 | 21.34220 | 18.66712 | 18.61592 |
| alpha2            | 0.16647  | 0.18987  | 0.19647  | 0.15069  | 0.16749  | 0.12669  | 0.24243  | 0.17045  | 0.16923  |
| lambda2           | 0.31416  | 0.29037  | 0.29502  | 0.33258  | 0.32041  | 0.36602  | 0.21619  | 0.31362  | 0.31235  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00455  | 0.00426  | 0.00326  | 0.00371  | 0.00466  | 0.00375  | 0.00579  | 0.00457  | 0.00454  |
| mean age          | 32.74375 | 31.52018 | 28.95403 | 31.52636 | 32.74770 | 32.64215 | 34.34806 | 32.82865 | 32.72173 |
| % (0-14)          | 9.02934  | 10.35562 | 11.15127 | 8.80433  | 10.28457 | 6.22074  | 11.76062 | 8.57336  | 8.90437  |
| % (15-64)         | 78.86940 | 78.23232 | 80.02923 | 81.18977 | 77.35104 | 83.61852 | 72.98672 | 79.29259 | 79.01865 |
| % (65+ )          | 12.10126 | 11.41206 | 8.81950  | 10.00591 | 12.36439 | 10.16074 | 15.25265 | 12.13406 | 12.07699 |
| deltalc           | 1.32343  | 2.00749  | 3.34882  | 2.16853  | 1.81104  | 0.45824  | 1.30741  | 1.17121  | 1.30453  |
| delta12           | 0.04838  | 0.06102  | 0.06929  | 0.06611  | 0.06990  | 0.01609  | 0.06034  | 0.04178  | 0.04675  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.50296  | 1.14023  | 0.94125  | 1.42400  | 1.24143  | 2.32761  | 0.90575  | 1.60061  | 1.51140  |
| sigma2            | 1.88722  | 1.52935  | 1.50159  | 2.20713  | 1.91296  | 2.88908  | 0.89176  | 1.83995  | 1.84569  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.37015 | 11.27014 | 11.29014 | 12.01016 | 11.89016 | 11.25014 | 10.75013 | 11.37015 | 11.38015 |
| x high            | 20.55036 | 20.34035 | 20.01034 | 20.93036 | 20.69036 | 20.65036 | 20.81036 | 20.62036 | 20.59036 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.18021  | 9.07021  | 8.72020  | 8.92020  | 8.80020  | 9.40022  | 10.06023 | 9.25021  | 9.21021  |
| a                 | 39.74110 | 34.45845 | 31.88303 | 39.33019 | 36.03571 | 58.33173 | 32.31031 | 40.91108 | 39.81747 |
| b                 | 0.04670  | 0.04944  | 0.05578  | 0.04868  | 0.04511  | 0.04722  | 0.04068  | 0.04769  | 0.04723  |

- 1 ussr migration flow 2 to 1
- 2 ussr migration flow 2 to 2
- 3 ussr migration flow 2 to 3
- 4 ussr migration flow 2 to 4
- 5 ussr migration flow 2 to 5
- 6 ussr migration flow 2 to 6
- 7 ussr migration flow 2 to 7
- 8 ussr migration flow 2 to 8
- 9 ussr migration 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.84880  | 0.25583  | 3.38349  | 0.02896  | 0.04914  | 0.01023  | 0.13446  | 0.79702  | 2.12445  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 17.82011 | 13.78570 | 13.79104 | 16.47050 | 15.44687 | 20.60185 | 13.88206 | 19.40097 | 14.95314 |
| a1                | 0.00475  | 0.00562  | 0.00878  | 0.00521  | 0.00513  | 0.00210  | 0.00380  | 0.00469  | 0.00285  |
| alpha1            | 0.28273  | 0.31129  | 0.22236  | 0.29642  | 0.32583  | 0.20063  | 0.39775  | 0.28467  | 0.43442  |
| a2                | 0.09011  | 0.12529  | 0.14294  | 0.10477  | 0.10804  | 0.08058  | 0.07519  | 0.08741  | 0.11377  |
| mu2               | 17.52632 | 19.67572 | 18.99844 | 18.64510 | 19.35196 | 16.45198 | 24.70615 | 17.33772 | 19.35604 |
| alpha2            | 0.13220  | 0.21323  | 0.20797  | 0.15220  | 0.19025  | 0.09206  | 0.31647  | 0.12355  | 0.19393  |
| lambda2           | 0.36707  | 0.26359  | 0.27894  | 0.32742  | 0.29481  | 0.46355  | 0.17016  | 0.38709  | 0.28354  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| o                 | 0.00502  | 0.00606  | 0.00469  | 0.00534  | 0.00664  | 0.00292  | 0.00785  | 0.00466  | 0.00648  |
| mean age          | 34.62718 | 35.08406 | 31.99901 | 34.76283 | 36.48198 | 32.64874 | 38.25883 | 34.26372 | 36.27256 |
| % (0-14)          | 9.13685  | 10.47530 | 11.17833 | 9.00827  | 10.40155 | 5.88439  | 11.77189 | 8.62854  | 9.63470  |
| % (15-64)         | 77.06323 | 73.70399 | 76.32208 | 76.92258 | 72.46465 | 85.22771 | 68.24343 | 78.39834 | 73.59016 |
| % (65+ )          | 13.79992 | 15.82071 | 12.49959 | 14.06915 | 17.13380 | 8.88790  | 19.98468 | 12.97313 | 16.77514 |
| delta10           | 0.94694  | 0.92799  | 1.87115  | 0.97529  | 0.77313  | 0.71935  | 0.48368  | 1.00701  | 0.44045  |
| delta12           | 0.05275  | 0.04486  | 0.06141  | 0.04971  | 0.04749  | 0.02607  | 0.05048  | 0.05367  | 0.02509  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 2.13856  | 1.45990  | 1.06918  | 1.94759  | 1.71266  | 2.17941  | 1.25681  | 2.30415  | 2.24012  |
| sigma2            | 2.77656  | 1.23619  | 1.34126  | 2.15130  | 1.54962  | 5.03545  | 0.53769  | 3.13320  | 1.46209  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.42015 | 10.78013 | 11.03014 | 11.67015 | 11.40015 | 11.61015 | 9.57010  | 11.54015 | 10.61013 |
| x high            | 20.32035 | 20.49035 | 20.05034 | 20.99037 | 20.85036 | 19.95034 | 21.07037 | 20.30035 | 20.71036 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.90020  | 9.71022  | 9.02021  | 9.32021  | 9.45022  | 8.34019  | 11.50026 | 8.76020  | 10.10023 |
| a                 | 46.64735 | 36.78024 | 32.82301 | 44.10832 | 39.68656 | 63.18620 | 35.19250 | 48.89095 | 45.22012 |
| b                 | 0.03936  | 0.04121  | 0.04846  | 0.04073  | 0.03702  | 0.04375  | 0.03171  | 0.04024  | 0.03858  |

- 1 ussr migration flow 3 to 1
- 2 ussr migration flow 3 to 2
- 3 ussr migration flow 3 to 3
- 4 ussr migration flow 3 to 4
- 5 ussr migration flow 3 to 5
- 6 ussr migration flow 3 to 6
- 7 ussr migration flow 3 to 7
- 8 ussr migration flow 3 to 8
- 9 ussr migration 3 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.81042  | 0.10792  | 0.01158  | 2.28019  | 0.20570  | 0.01830  | 0.01056  | 0.78857  | 0.00000  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 19.36504 | 20.09077 | 15.88228 | 22.83461 | 23.17047 | 20.80673 | 23.05523 | 20.74260 | 23.39912 |
| a1                | 0.00281  | 0.00273  | 0.00246  | 0.00362  | 0.00341  | 0.00179  | 0.00286  | 0.00278  | 0.00220  |
| alpha1            | 0.49997  | 0.29510  | 0.33518  | 0.21287  | 0.23634  | 0.57948  | 0.27677  | 0.49304  | 0.28915  |
| a2                | 0.07616  | 0.10031  | 0.15076  | 0.08274  | 0.07642  | 0.09224  | 0.06952  | 0.07473  | 0.07846  |
| mu2               | 16.96264 | 17.81606 | 20.04278 | 17.51655 | 17.35113 | 16.90253 | 17.06651 | 16.85721 | 17.17540 |
| alpha2            | 0.09113  | 0.12653  | 0.20627  | 0.09261  | 0.09369  | 0.09565  | 0.09508  | 0.08706  | 0.09332  |
| lambda2           | 0.37651  | 0.35350  | 0.25441  | 0.40816  | 0.42365  | 0.37327  | 0.39915  | 0.39241  | 0.41983  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00326  | 0.00379  | 0.00452  | 0.00263  | 0.00348  | 0.00204  | 0.00424  | 0.00302  | 0.00328  |
| mean age          | 33.84592 | 33.01665 | 32.63004 | 32.80481 | 34.00835 | 31.38017 | 35.14887 | 33.73206 | 33.74567 |
| Z(0-14)           | 6.08737  | 6.89080  | 7.70615  | 5.56025  | 6.46757  | 4.51009  | 7.52218  | 5.68420  | 5.75610  |
| Z(15-64)          | 83.88099 | 82.34645 | 80.29090 | 86.17969 | 83.13242 | 88.90569 | 79.99117 | 84.77604 | 84.34225 |
| Z(65+)            | 10.03164 | 10.76275 | 12.00295 | 8.26006  | 10.40002 | 6.58423  | 12.48666 | 9.53976  | 9.90165  |
| deltalc           | 0.86085  | 0.71969  | 0.54423  | 1.37589  | 0.97939  | 0.87728  | 0.67333  | 0.92319  | 0.67156  |
| deltal2           | 0.03689  | 0.02720  | 0.01632  | 0.04376  | 0.04462  | 0.01943  | 0.04111  | 0.03726  | 0.02808  |
| deltal32          | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 5.48607  | 2.33220  | 1.62495  | 2.29843  | 2.52272  | 6.05851  | 2.91096  | 5.66354  | 3.09836  |
| sigma2            | 4.13136  | 2.79371  | 1.23340  | 4.40713  | 4.52200  | 3.90257  | 4.19803  | 4.50761  | 4.49862  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 10.54013 | 11.25014 | 10.39012 | 12.13016 | 12.11016 | 10.14012 | 11.44015 | 10.69013 | 11.67015 |
| x high            | 20.74036 | 20.73036 | 20.88036 | 21.16037 | 20.92036 | 20.56036 | 20.67036 | 20.71036 | 20.77036 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 10.20023 | 9.48022  | 10.49024 | 9.03021  | 8.81020  | 10.42024 | 9.23021  | 10.02023 | 9.10021  |
| a                 | 77.89963 | 54.32088 | 43.46015 | 59.77655 | 60.45321 | 85.90950 | 62.13349 | 80.34959 | 68.06976 |
| b                 | 0.03947  | 0.04505  | 0.05072  | 0.04335  | 0.04011  | 0.04708  | 0.03600  | 0.03986  | 0.04134  |

- 1 ussr migration flow 4 to 1
- 2 ussr migration flow 4 to 2
- 3 ussr migration flow 4 to 3
- 4 ussr migration flow 4 to 4
- 5 ussr migration flow 4 to 5
- 6 ussr migration flow 4 to 6
- 7 ussr migration flow 4 to 7
- 8 ussr migration flow 4 to 8
- 9 ussr migration 4 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 1.41594  | 0.26158  | 0.03253  | 0.25463  | 3.24671  | 0.01573  | 0.01607  | 0.95578  | 2.95226  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 21.61075 | 15.34025 | 15.64809 | 17.74339 | 16.75016 | 20.98951 | 15.74293 | 22.86763 | 21.65283 |
| a1                | 0.00456  | 0.00344  | 0.00672  | 0.00366  | 0.00314  | 0.00328  | 0.00194  | 0.00437  | 0.00478  |
| alpha1            | 0.28232  | 0.39391  | 0.25995  | 0.37259  | 0.41210  | 0.42631  | 0.58017  | 0.27414  | 0.26737  |
| a2                | 0.07775  | 0.12794  | 0.14547  | 0.10658  | 0.10757  | 0.07263  | 0.07051  | 0.07578  | 0.07957  |
| mu2               | 16.98397 | 19.90734 | 19.54174 | 18.93031 | 19.44199 | 16.32335 | 25.92217 | 16.87382 | 17.01580 |
| alpha2            | 0.10164  | 0.20772  | 0.20776  | 0.15532  | 0.17852  | 0.07831  | 0.32309  | 0.09591  | 0.10305  |
| lambda2           | 0.41400  | 0.25868  | 0.26216  | 0.31315  | 0.29634  | 0.40644  | 0.16014  | 0.43276  | 0.41309  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00402  | 0.00593  | 0.00470  | 0.00554  | 0.00646  | 0.00230  | 0.00769  | 0.00373  | 0.00392  |
| mean age          | 34.05502 | 35.11594 | 32.37814 | 35.23263 | 36.51470 | 33.08001 | 38.16673 | 33.88333 | 33.77938 |
| % (0-14)          | 7.70707  | 9.36415  | 9.82615  | 8.51753  | 9.35920  | 5.31695  | 10.86187 | 7.23988  | 7.72610  |
| % (15-64)         | 80.73326 | 75.21132 | 77.72881 | 77.00342 | 74.00200 | 86.55075 | 69.61584 | 81.83045 | 81.00541 |
| % (65+ )          | 11.55967 | 15.42453 | 12.44505 | 14.47906 | 16.63879 | 8.13230  | 19.52230 | 10.92967 | 11.26849 |
| delta1c           | 1.13303  | 0.58040  | 1.43010  | 0.65994  | 0.48632  | 1.42162  | 0.25178  | 1.17265  | 1.21934  |
| delta12           | 0.05864  | 0.02688  | 0.04620  | 0.03433  | 0.02921  | 0.04510  | 0.02745  | 0.05769  | 0.06005  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 2.77766  | 1.89641  | 1.25122  | 2.39879  | 2.30843  | 5.44375  | 1.79571  | 2.85826  | 2.59447  |
| sigma2            | 4.07325  | 1.24537  | 1.26187  | 2.01614  | 1.65998  | 5.19002  | 0.49567  | 4.51212  | 4.00857  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.62015 | 10.42012 | 10.80013 | 11.30014 | 11.16014 | 10.59013 | 8.80009  | 11.75015 | 11.68015 |
| x high            | 20.38035 | 20.77036 | 20.44035 | 21.18037 | 21.16037 | 20.39035 | 21.55038 | 20.36035 | 20.38035 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.76020  | 10.35024 | 9.64022  | 9.88023  | 10.00023 | 9.80022  | 12.75029 | 8.61020  | 8.70020  |
| a                 | 55.59813 | 42.30017 | 35.74026 | 49.06188 | 47.09646 | 80.37959 | 40.47522 | 57.81446 | 53.92543 |
| b                 | 0.03929  | 0.04214  | 0.04869  | 0.04023  | 0.03760  | 0.04042  | 0.03300  | 0.03970  | 0.04004  |

- 1 ussr migration flow 5 to 1
- 2 ussr migration flow 5 to 2
- 3 ussr migration flow 5 to 3
- 4 ussr migration flow 5 to 4
- 5 ussr migration flow 5 to 5
- 6 ussr migration flow 5 to 6
- 7 ussr migration flow 5 to 7
- 8 ussr migration flow 5 to 8
- 9 ussr migration 5 to the rest



|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.49872  | 0.12434  | 0.01042  | 0.04449  | 0.02638  | 1.68190  | 0.01052  | 0.26806  | 0.98293  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 20.79895 | 14.23162 | 14.98932 | 18.40946 | 16.24944 | 24.94810 | 22.26801 | 22.06684 | 20.22377 |
| a1                | 0.00364  | 0.00288  | 0.00534  | 0.00320  | 0.00236  | 0.00190  | 0.00532  | 0.00355  | 0.00376  |
| alpha1            | 0.30360  | 0.42778  | 0.26899  | 0.41946  | 0.51047  | 0.19729  | 0.17883  | 0.29977  | 0.29875  |
| a2                | 0.10404  | 0.13412  | 0.15616  | 0.13776  | 0.13523  | 0.09250  | 0.08815  | 0.10082  | 0.10993  |
| mu2               | 18.17587 | 23.32381 | 22.42364 | 20.57639 | 21.96799 | 17.33011 | 17.69685 | 17.96126 | 18.44110 |
| alpha2            | 0.12856  | 0.27061  | 0.26144  | 0.18317  | 0.23858  | 0.09646  | 0.11662  | 0.12126  | 0.13684  |
| lambda2           | 0.33415  | 0.19184  | 0.20021  | 0.27485  | 0.22801  | 0.38898  | 0.33901  | 0.35316  | 0.32193  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00366  | 0.00531  | 0.00412  | 0.00462  | 0.00594  | 0.00221  | 0.00364  | 0.00339  | 0.00372  |
| mean age          | 32.80619 | 34.04960 | 31.33650 | 33.76804 | 35.49295 | 31.74539 | 32.90876 | 32.56586 | 32.69172 |
| % (0-14)          | 6.87864  | 8.48463  | 8.65126  | 7.00704  | 8.52652  | 4.59769  | 8.74702  | 6.44278  | 7.00571  |
| % (15-64)         | 82.75321 | 77.53228 | 80.34999 | 80.77261 | 76.02892 | 88.48264 | 80.55811 | 83.84788 | 82.51522 |
| % (65+ )          | 10.36814 | 13.98309 | 10.99875 | 12.22036 | 15.44456 | 6.91967  | 10.69487 | 9.70934  | 10.47907 |
| deltalc           | 0.99382  | 0.54169  | 1.29747  | 0.69162  | 0.39758  | 0.85977  | 1.45954  | 1.04703  | 1.01045  |
| deltal2           | 0.03500  | 0.02145  | 0.03420  | 0.02320  | 0.01748  | 0.02050  | 0.06035  | 0.03521  | 0.03419  |
| deltal3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 2.36150  | 1.58081  | 1.02886  | 2.28999  | 2.13956  | 2.04526  | 1.53347  | 2.47219  | 2.18317  |
| sigma2            | 2.59911  | 0.70893  | 0.76579  | 1.50052  | 0.95570  | 4.03254  | 2.90696  | 2.91256  | 2.35250  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.28014 | 9.82011  | 10.31012 | 11.47015 | 10.45012 | 11.51015 | 11.46015 | 11.45015 | 11.27014 |
| x high            | 21.04037 | 21.54038 | 21.10037 | 22.06039 | 21.78038 | 20.92036 | 20.84036 | 21.00037 | 21.11037 |
| x rel.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 9.76022  | 11.72027 | 10.79025 | 10.59024 | 11.33026 | 9.41022  | 9.38021  | 9.55022  | 9.84023  |
| a                 | 52.44910 | 40.41799 | 35.41027 | 48.90553 | 45.21014 | 63.93801 | 45.02194 | 54.43634 | 50.22823 |
| b                 | 0.04533  | 0.04723  | 0.05400  | 0.04823  | 0.04364  | 0.04677  | 0.04065  | 0.04596  | 0.04621  |

- 1 ussr migration flow 6 to 1
- 2 ussr migration flow 6 to 2
- 3 ussr migration flow 6 to 3
- 4 ussr migration flow 6 to 4
- 5 ussr migration flow 6 to 5
- 6 ussr migration flow 6 to 6
- 7 ussr migration flow 6 to 7
- 8 ussr migration flow 6 to 8
- 9 ussr migration 6 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.47795  | 0.12159  | 0.05184  | 0.01464  | 0.01628  | 0.00815  | 3.17145  | 0.79717  | 1.48763  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 16.62291 | 14.75313 | 14.61459 | 17.87389 | 17.62901 | 21.79218 | 10.18453 | 17.10256 | 16.67365 |
| a1                | 0.00418  | 0.00682  | 0.00917  | 0.00631  | 0.00658  | 0.00239  | 0.00659  | 0.00349  | 0.00427  |
| alpha1            | 0.26717  | 0.21620  | 0.17472  | 0.20642  | 0.21821  | 0.20229  | 0.20163  | 0.29741  | 0.27105  |
| a2                | 0.14225  | 0.15678  | 0.17553  | 0.13318  | 0.14042  | 0.10181  | 0.13539  | 0.14752  | 0.14727  |
| mu2               | 18.69174 | 18.97563 | 18.67719 | 18.31773 | 19.01538 | 16.81462 | 20.25211 | 18.96427 | 18.85492 |
| alpha2            | 0.20288  | 0.22405  | 0.22895  | 0.17834  | 0.20925  | 0.11916  | 0.25247  | 0.21081  | 0.20941  |
| lambda2           | 0.30988  | 0.29089  | 0.29911  | 0.34070  | 0.30576  | 0.44446  | 0.24101  | 0.30346  | 0.30434  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00504  | 0.00457  | 0.00351  | 0.00448  | 0.00518  | 0.00351  | 0.00572  | 0.00507  | 0.00496  |
| mean age          | 33.09775 | 31.68408 | 29.00556 | 32.17664 | 33.17437 | 31.86658 | 33.92292 | 33.18422 | 32.90334 |
| %(0-14)           | 9.08924  | 10.27342 | 11.11928 | 9.35592  | 10.21479 | 6.58682  | 11.89336 | 8.67734  | 9.00576  |
| %(15-64)          | 77.59209 | 77.50744 | 79.37590 | 78.73714 | 76.13875 | 83.88265 | 72.92715 | 77.95373 | 77.85927 |
| %(65+ )           | 13.31867 | 12.21915 | 9.50482  | 11.90694 | 13.64646 | 9.53053  | 15.17949 | 13.36893 | 13.13497 |
| deltal0           | 0.83085  | 1.49128  | 2.60978  | 1.40973  | 1.27010  | 0.68274  | 1.15205  | 0.68903  | 0.85908  |
| deltal2           | 0.02942  | 0.04350  | 0.05224  | 0.04739  | 0.04684  | 0.02352  | 0.04870  | 0.02367  | 0.02896  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 1.31689  | 0.96497  | 0.76316  | 1.15745  | 1.04280  | 1.69760  | 0.79861  | 1.41082  | 1.29435  |
| sigma2            | 1.52742  | 1.29834  | 1.30646  | 1.91038  | 1.46120  | 3.72993  | 0.95462  | 1.43951  | 1.45335  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.12014 | 11.14014 | 11.23014 | 11.78016 | 11.60015 | 11.70015 | 10.73013 | 11.06014 | 11.11014 |
| x high            | 20.07034 | 19.88034 | 19.57033 | 20.22035 | 20.26035 | 19.78034 | 20.06034 | 20.17035 | 20.09035 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 8.95020  | 8.74020  | 8.34019  | 8.44019  | 8.66020  | 8.08018  | 9.33021  | 9.11021  | 8.98021  |
| a                 | 38.00657 | 32.76210 | 30.17941 | 36.41115 | 33.93301 | 52.49817 | 31.08032 | 39.20656 | 37.56294 |
| b                 | 0.04986  | 0.05316  | 0.06023  | 0.05013  | 0.04821  | 0.04914  | 0.04399  | 0.05087  | 0.05099  |

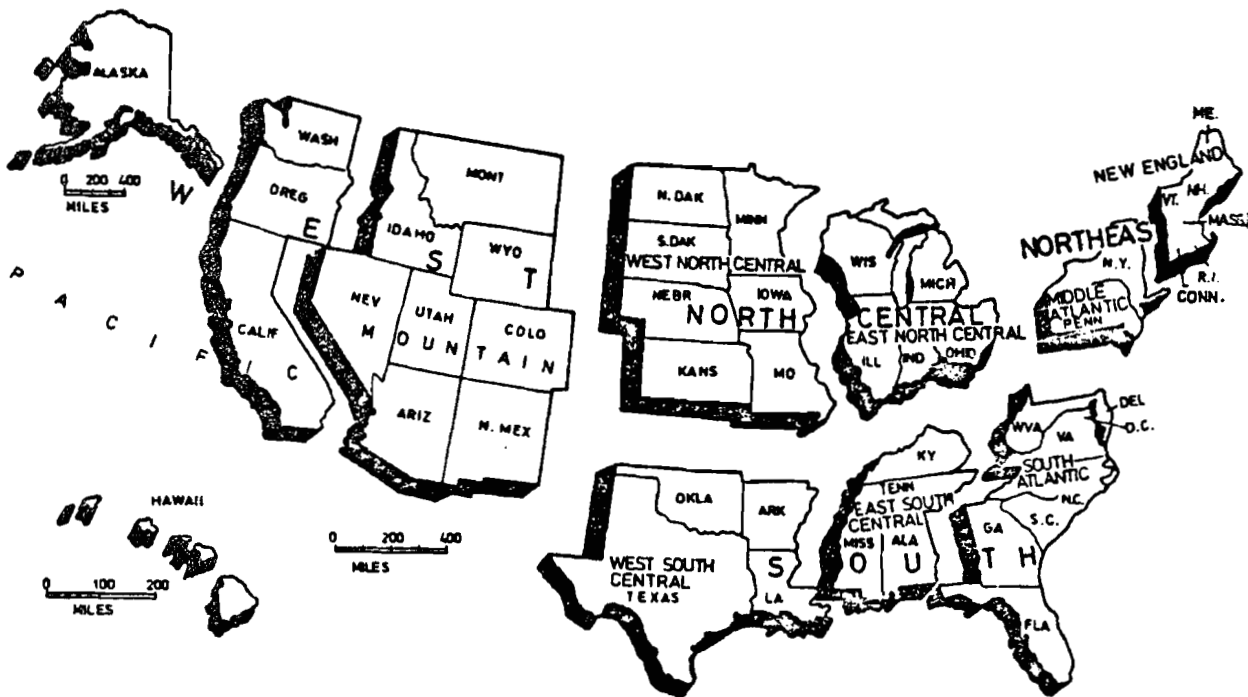
- 1 ussr migration flow 7 to 1
- 2 ussr migration flow 7 to 2
- 3 ussr migration flow 7 to 3
- 4 ussr migration flow 7 to 4
- 5 ussr migration flow 7 to 5
- 6 ussr migration flow 7 to 6
- 7 ussr migration flow 7 to 7
- 8 ussr migration flow 7 to 8
- 9 ussr migration 7 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 2.08243  | 0.64151  | 0.15750  | 0.15997  | 0.19186  | 0.06921  | 0.10956  | 2.08784  | 3.41203  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 19.77567 | 17.85011 | 17.58186 | 20.27826 | 20.61487 | 22.12993 | 12.39695 | 20.18340 | 19.13835 |
| a1                | 0.00146  | 0.00309  | 0.00451  | 0.00239  | 0.00284  | 0.00197  | 0.00325  | 0.00105  | 0.00201  |
| alpha1            | 0.50371  | 0.34371  | 0.25227  | 0.41417  | 0.39042  | 0.28812  | 0.36425  | 0.60651  | 0.43109  |
| a2                | 0.18230  | 0.19182  | 0.19473  | 0.18634  | 0.18197  | 0.14781  | 0.15448  | 0.18617  | 0.18745  |
| mu2               | 20.73207 | 21.85970 | 22.74473 | 20.71696 | 20.71533 | 18.54066 | 23.78566 | 20.73124 | 21.10195 |
| alpha2            | 0.22417  | 0.26324  | 0.29446  | 0.22185  | 0.22889  | 0.14269  | 0.29517  | 0.22754  | 0.23748  |
| lambda2           | 0.28591  | 0.24150  | 0.21644  | 0.30128  | 0.30283  | 0.32645  | 0.19983  | 0.29337  | 0.26999  |
| a3                | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00371  | 0.00350  | 0.00285  | 0.00349  | 0.00396  | 0.00146  | 0.00431  | 0.00370  | 0.00367  |
| mean age          | 31.47373 | 30.59669 | 28.82425 | 31.13516 | 31.85790 | 28.33398 | 32.27386 | 31.45947 | 31.23992 |
| % (0-14)          | 5.42096  | 5.94196  | 6.19805  | 5.29621  | 6.02050  | 3.47014  | 7.12047  | 5.24957  | 5.58680  |
| % (15-64)         | 84.67352 | 84.65729 | 86.10035 | 85.37239 | 83.45343 | 92.28165 | 81.28725 | 84.87692 | 84.60210 |
| % (65+ )          | 9.90552  | 9.40075  | 7.70161  | 9.33140  | 10.52608 | 4.24821  | 11.59229 | 9.87350  | 9.81110  |
| deltalc           | 0.39421  | 0.88259  | 1.58089  | 0.68326  | 0.71795  | 1.34693  | 0.75544  | 0.28231  | 0.54813  |
| delta12           | 0.00802  | 0.01609  | 0.02314  | 0.01280  | 0.01562  | 0.01331  | 0.02105  | 0.00561  | 0.01072  |
| delta32           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| beta12            | 2.24698  | 1.30570  | 0.85671  | 1.86684  | 1.70569  | 2.01921  | 1.23402  | 2.66553  | 1.81524  |
| sigma2            | 1.27539  | 0.91741  | 0.73504  | 1.35799  | 1.32303  | 2.28786  | 0.67698  | 1.28935  | 1.13689  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.34015 | 11.28014 | 11.19014 | 12.09016 | 12.22017 | 11.18014 | 10.77013 | 11.26014 | 11.38015 |
| x high            | 21.59038 | 21.51038 | 21.33037 | 21.74038 | 21.65038 | 21.08037 | 21.84039 | 21.61038 | 21.59038 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 10.25023 | 10.23023 | 10.14023 | 9.65022  | 9.43022  | 9.90023  | 11.07025 | 10.35024 | 10.21023 |
| a                 | 49.78097 | 39.39203 | 34.62119 | 46.00677 | 43.49181 | 54.95270 | 38.12025 | 53.52818 | 45.12650 |
| b                 | 0.06237  | 0.06474  | 0.06988  | 0.06473  | 0.06238  | 0.06245  | 0.05719  | 0.06378  | 0.06315  |

- 1 ussr migration flow 8 to 1
- 2 ussr migration flow 8 to 2
- 3 ussr migration flow 8 to 3
- 4 ussr migration flow 8 to 4
- 5 ussr migration flow 8 to 5
- 6 ussr migration flow 8 to 6
- 7 ussr migration flow 8 to 7
- 8 ussr migration flow 8 to 8
- 9 ussr migration 8 to the rest

USA

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF OBSERVED MODEL MIGRATION SCHEDULES \*



REGION NUMBER:

- 1. Northeast
- 2. North Central
- 3. South
- 4. West

\*Total (male plus female) flows only.

|                   | 1        | 2         | 3        | 4        |
|-------------------|----------|-----------|----------|----------|
| gmr (obs)         | 0.24702  | 0.59576   | 0.27675  | 1.11952  |
| gmr (mms)         | 1.00000  | 1.00000   | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 9.53522  | 10.99835  | 6.73047  | 6.71692  |
| a1                | 0.02698  | 0.01889   | 0.01496  | 0.01790  |
| alpha1            | 0.06009  | 0.04951   | 0.03284  | 0.05498  |
| a2                | 0.05313  | 0.04676   | 0.06023  | 0.04999  |
| mu2               | 20.72440 | 20.45247  | 21.05273 | 20.60194 |
| alpha2            | 0.09066  | 0.09880   | 0.15405  | 0.11070  |
| lambda2           | 0.45290  | 0.48690   | 0.47373  | 0.49466  |
| a3                | 0.00000  | 0.00016   | 0.00256  | 0.00039  |
| mu3               | 0.00000  | 103.01308 | 71.97796 | 84.99503 |
| alpha3            | 0.00000  | 0.25885   | 0.32041  | 0.35017  |
| lambda3           | 0.00000  | 0.04643   | 0.11812  | 0.07572  |
| o                 | 0.00029  | 0.00007   | 0.00229  | 0.00237  |
| mean age          | 25.51274 | 34.22953  | 32.45057 | 32.51121 |
| %(0-14)           | 26.84051 | 19.65163  | 20.40582 | 21.15610 |
| %(15-64)          | 70.76598 | 66.47354  | 68.11514 | 67.16240 |
| %(65+ )           | 2.39352  | 13.87483  | 11.47903 | 11.68150 |
| deltalc           | 92.29872 | 256.66367 | 6.51939  | 7.56496  |
| delta12           | 0.50782  | 0.40394   | 0.24833  | 0.35804  |
| delta32           | 0.00000  | 0.00343   | 0.04259  | 0.00777  |
| beta12            | 0.66286  | 0.50109   | 0.21316  | 0.49671  |
| sigma2            | 4.99590  | 4.92829   | 3.07523  | 4.46862  |
| sigma3            | 0.00000  | 0.17938   | 0.36866  | 0.21623  |
| x low             | 16.86027 | 16.72027  | 16.90027 | 16.86027 |
| x high            | 24.01044 | 23.53042  | 23.33042 | 23.47042 |
| x ret.            | 0.00000  | 65.15790  | 62.74786 | 64.14768 |
| x shift           | 7.15016  | 6.81016   | 6.43015  | 6.61015  |
| a                 | 27.83707 | 28.53706  | 27.28374 | 28.07706 |
| b                 | 0.02765  | 0.02439   | 0.02745  | 0.02547  |

- 1 u.s. total 1 to 2
- 2 u.s. total 1 to 3
- 3 u.s. total 1 to 4
- 4 u.s. total 1 to the rest

|                   | 1        | 2        | 3        | 4        |
|-------------------|----------|----------|----------|----------|
| gmr (obs)         | 0.17654  | 0.67502  | 0.46159  | 1.31315  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 12.44090 | 6.35763  | 9.43004  | 7.20855  |
| a1                | 0.01947  | 0.01841  | 0.02078  | 0.01898  |
| alpha1            | 0.05505  | 0.04745  | 0.07332  | 0.05565  |
| a2                | 0.05756  | 0.04074  | 0.05233  | 0.04596  |
| mu2               | 19.37771 | 20.29695 | 20.12657 | 19.99313 |
| alpha2            | 0.09713  | 0.09973  | 0.09538  | 0.09586  |
| lambda2           | 0.65000  | 0.44927  | 0.50268  | 0.51699  |
| a3                | 0.00658  | 0.00057  | 0.00546  | 0.00027  |
| mu3               | 71.91898 | 81.91788 | 71.87231 | 85.60316 |
| alpha3            | 0.23700  | 0.42864  | 0.21260  | 0.39679  |
| lambda3           | 0.22924  | 0.09895  | 0.10588  | 0.08527  |
| c                 | 0.00103  | 0.00235  | 0.00202  | 0.00214  |
| mean age          | 28.73096 | 32.35604 | 31.18867 | 31.45516 |
| %(0-14)           | 20.79651 | 22.54251 | 21.26366 | 21.86411 |
| %(15-64)          | 72.09166 | 65.14907 | 68.91833 | 67.34246 |
| %(65+)            | 7.11183  | 12.30842 | 9.81801  | 10.79343 |
| delta1c           | 18.98871 | 7.83986  | 10.30285 | 8.85518  |
| delta12           | 0.33832  | 0.45183  | 0.39712  | 0.41298  |
| delta32           | 0.11427  | 0.01391  | 0.10441  | 0.00577  |
| beta12            | 0.56678  | 0.47576  | 0.76875  | 0.58056  |
| sigma2            | 6.69236  | 4.50484  | 5.27043  | 5.39323  |
| sigma3            | 0.96724  | 0.23084  | 0.49804  | 0.21489  |
| x low             | 16.48026 | 16.33026 | 16.51026 | 16.49026 |
| x high            | 22.18039 | 23.40042 | 23.27042 | 23.06041 |
| x ret.            | 71.36922 | 66.67822 | 64.00765 | 66.88827 |
| x shift           | 5.70013  | 7.07016  | 6.76015  | 6.57015  |
| a                 | 29.40702 | 27.33374 | 29.31705 | 28.34039 |
| b                 | 0.03405  | 0.02010  | 0.02810  | 0.02471  |

- 1 u.s. total      2 to 1
- 2 u.s. total      2 to 3
- 3 u.s. total      2 to 4
- 4 u.s. total      2 to the rest

|           | 1        | 2        | 3        | 4        |
|-----------|----------|----------|----------|----------|
| gmr (obs) | 0.34037  | 0.53631  | 0.50417  | 1.38084  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae%m     | 9.02917  | 6.46604  | 10.52257 | 6.42383  |
| al        | 0.01723  | 0.02625  | 0.02192  | 0.01998  |
| alpha1    | 0.07852  | 0.10932  | 0.04341  | 0.06182  |
| a2        | 0.06093  | 0.08871  | 0.04156  | 0.05881  |
| mu2       | 20.01309 | 20.64876 | 19.66720 | 19.97921 |
| alpha2    | 0.12798  | 0.17384  | 0.09183  | 0.12799  |
| lambda2   | 0.62537  | 0.44557  | 0.83685  | 0.64390  |
| a3        | 0.00003  | 0.00006  | 0.00000  | 0.00003  |
| mu3       | 88.02872 | 89.54675 | 0.00000  | 86.30420 |
| alpha3    | 0.66147  | 0.57017  | 0.00000  | 0.74832  |
| lambda3   | 0.11304  | 0.10207  | 0.00000  | 0.13138  |
| o         | 0.00387  | 0.00323  | 0.00107  | 0.00288  |
| mean age  | 32.64307 | 30.27998 | 28.00959 | 30.05793 |
| % (0-14)  | 20.08696 | 23.38397 | 25.09613 | 23.13003 |
| % (15-64) | 66.51746 | 63.85034 | 69.01042 | 66.55681 |
| % (65+ )  | 13.39558 | 12.76569 | 5.89346  | 10.31316 |
| deltalo   | 4.45463  | 8.13684  | 20.52768 | 6.92488  |
| delta12   | 0.28273  | 0.29589  | 0.52731  | 0.33965  |
| delta32   | 0.00045  | 0.00070  | 0.00000  | 0.00047  |
| beta12    | 0.61351  | 0.62885  | 0.47273  | 0.48298  |
| sigma2    | 4.88659  | 2.56309  | 9.11293  | 5.03079  |
| sigma3    | 0.17089  | 0.17902  | 0.00000  | 0.17556  |
| x low     | 16.92027 | 16.27026 | 17.46029 | 17.03028 |
| x high    | 22.48040 | 22.70041 | 22.17039 | 22.39040 |
| x ret.    | 72.32943 | 72.68951 | 0.00000  | 72.94956 |
| x shift   | 5.56013  | 6.43015  | 4.71011  | 5.36012  |
| a         | 27.78705 | 25.06041 | 26.62372 | 26.09040 |
| b         | 0.03289  | 0.03806  | 0.02651  | 0.03203  |

1 u.s. total 3 to 1  
2 u.s. total 3 to 2  
3 u.s. total 3 to 4  
4 u.s. total 3 to the rest

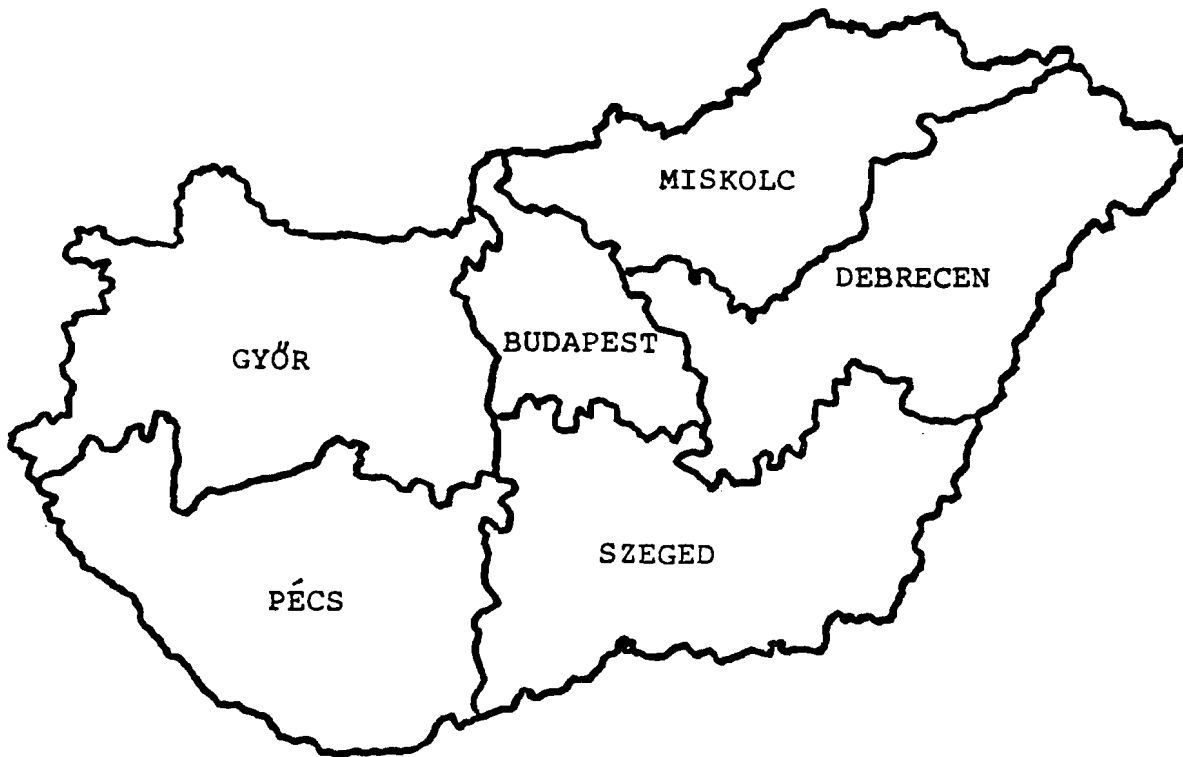
|                   | 1        | 2        | 3        | 4        |
|-------------------|----------|----------|----------|----------|
| gmr (obs)         | 0.22811  | 0.49888  | 0.71901  | 1.44600  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 10.83948 | 8.80822  | 7.23007  | 9.47799  |
| a1                | 0.02682  | 0.02631  | 0.01976  | 0.02157  |
| alpha1            | 0.11438  | 0.09210  | 0.05079  | 0.08481  |
| a2                | 0.06655  | 0.05016  | 0.04271  | 0.04853  |
| mu2               | 20.01781 | 19.57191 | 20.10705 | 19.88227 |
| alpha2            | 0.10559  | 0.08742  | 0.09973  | 0.09896  |
| lambda2           | 0.75143  | 0.65478  | 0.63703  | 0.68499  |
| a3                | 0.00006  | 0.00004  | 0.00808  | 0.00000  |
| mu3               | 90.13589 | 89.00475 | 55.80827 | 0.00000  |
| alpha3            | 0.46137  | 0.55014  | 0.11234  | 0.00000  |
| lambda3           | 0.08569  | 0.10011  | 0.51079  | 0.00000  |
| c                 | 0.00190  | 0.00193  | 0.00189  | 0.00348  |
| mean age          | 29.49303 | 29.51719 | 31.32500 | 31.20384 |
| %(0-14)           | 21.29156 | 23.59063 | 22.92102 | 22.59724 |
| %(15-64)          | 69.90682 | 67.60524 | 67.63663 | 66.92564 |
| %(65+)            | 8.80161  | 8.80413  | 9.44234  | 10.47712 |
| delta1c           | 14.09844 | 13.61792 | 10.47233 | 6.19920  |
| delta12           | 0.40298  | 0.52458  | 0.46259  | 0.44451  |
| delta32           | 0.00093  | 0.00086  | 0.18913  | 0.00000  |
| beta12            | 1.08323  | 1.05347  | 0.50927  | 0.85702  |
| sigma2            | 7.11637  | 7.48964  | 6.38777  | 6.92172  |
| sigma3            | 0.18572  | 0.18198  | 4.54667  | 0.00000  |
| x low             | 17.44028 | 16.80027 | 17.23028 | 17.17028 |
| x high            | 22.57040 | 22.51040 | 22.86041 | 22.60040 |
| x ret.            | 70.09895 | 71.54926 | 58.29861 | 0.00000  |
| x shift           | 5.13012  | 5.71013  | 5.63013  | 5.43012  |
| a                 | 29.67035 | 28.28370 | 26.93373 | 27.98038 |
| b                 | 0.04069  | 0.03021  | 0.02445  | 0.02875  |

1 u.s. total 4 to 1  
2 u.s. total 4 to 2  
3 u.s. total 4 to 3  
4 u.s. total 4 to the rest



HUNGARY

ESTIMATED NATIONAL PARAMETERS AND VARIABLES OF THE FULL SETS OF  
OBSERVED MODEL MIGRATION SCHEDULES\*



REGION NUMBER:

- |             |           |
|-------------|-----------|
| 1. Budapest | 4. Szeged |
| 2. Miskolc  | 5. Győr   |
| 3. Debrecen | 6. Pécs   |

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\*Total (male plus female) flows only.

|                   | 1         | 2        | 3        | 4        | 5        | 6        | 7        |
|-------------------|-----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 1.53971   | 0.53010  | 0.95200  | 0.44711  | 0.51326  | 0.32258  | 2.76505  |
| gmr (mms)         | 1.00000   | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 5.25780   | 12.45141 | 12.42464 | 8.14604  | 8.86041  | 8.63387  | 9.78965  |
| al                | 0.02551   | 0.00890  | 0.00919  | 0.01135  | 0.01248  | 0.01118  | 0.01049  |
| alpha1            | 0.12519   | 0.24450  | 0.18270  | 0.27986  | 0.24982  | 0.31191  | 0.26916  |
| a2                | 0.05870   | 0.07082  | 0.08057  | 0.08106  | 0.10156  | 0.10000  | 0.08204  |
| mu2               | 18.22084  | 15.62418 | 15.45047 | 17.23475 | 19.86622 | 19.55839 | 16.44076 |
| alpha2            | 0.09145   | 0.09495  | 0.10364  | 0.13968  | 0.18086  | 0.18045  | 0.12191  |
| lambda2           | 0.24420   | 0.59629  | 0.64817  | 0.37486  | 0.25428  | 0.26657  | 0.44995  |
| a3                | 0.00036   | 0.00000  | 0.00000  | 0.00003  | 0.00008  | 0.00009  | 0.00002  |
| mu3               | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.03408   | 0.00000  | 0.00000  | 0.05548  | 0.04616  | 0.02840  | 0.04607  |
| lambda3           | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| o                 | 0.00011   | 0.00326  | 0.00286  | 0.00432  | 0.00376  | 0.00486  | 0.00382  |
| mean age          | 35.53704  | 32.00492 | 30.22683 | 37.44696 | 37.67174 | 35.60691 | 33.73262 |
| % (0-14)          | 18.59192  | 9.39894  | 10.19170 | 10.85203 | 10.87484 | 11.31484 | 10.39406 |
| % (15-64)         | 63.55333  | 80.70007 | 81.31631 | 69.50406 | 68.78525 | 72.20003 | 75.92824 |
| % (65+ )          | 17.85475  | 9.90099  | 8.49199  | 19.64391 | 20.33991 | 16.48514 | 13.67770 |
| deltalc           | 226.31602 | 2.72645  | 3.20756  | 2.62911  | 3.32328  | 2.29990  | 2.74814  |
| delta12           | 0.43451   | 0.12569  | 0.11402  | 0.13998  | 0.12288  | 0.11176  | 0.12784  |
| delta32           | 0.00619   | 0.00000  | 0.00000  | 0.00034  | 0.00077  | 0.00086  | 0.00025  |
| beta12            | 1.36894   | 2.57512  | 1.76285  | 2.00363  | 1.38130  | 1.72850  | 2.20787  |
| sigma2            | 2.67029   | 6.28032  | 6.25399  | 2.68376  | 1.40592  | 1.47722  | 3.69084  |
| sigma3            | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.52015  | 12.07016 | 12.24017 | 11.57015 | 11.42015 | 11.24014 | 11.72015 |
| x high            | 21.98039  | 18.71031 | 18.27030 | 19.87034 | 21.21037 | 21.03037 | 19.35033 |
| x ret.            | 0.00000   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 10.46024  | 6.64015  | 6.03014  | 8.30019  | 9.79022  | 9.79022  | 7.63017  |
| a                 | 30.48035  | 47.72670 | 41.41178 | 36.78275 | 34.33252 | 36.83025 | 41.08016 |
| b                 | 0.02197   | 0.04325  | 0.04867  | 0.03599  | 0.03679  | 0.03720  | 0.04170  |

- 1 hungary migration 1 to 1
- 2 hungary migration 1 to 2
- 3 hungary migration 1 to 3
- 4 hungary migration 1 to 4
- 5 hungary migration 1 to 5
- 6 hungary migration 1 to 6
- 7 hungary migration 1 to the rest

|           | 1        | 2        | 3        | 4        | 5        | 6        | 7        |
|-----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs) | 1.36410  | 3.12803  | 0.47229  | 0.13482  | 0.20952  | 0.08893  | 2.26965  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae%m     | 10.22931 | 6.89538  | 10.40858 | 18.81879 | 10.86141 | 9.73715  | 9.98846  |
| a1        | 0.00330  | 0.02273  | 0.01417  | 0.01593  | 0.01240  | 0.01001  | 0.00782  |
| alpha1    | 0.37358  | 0.16662  | 0.20866  | 0.27062  | 0.17430  | 0.15497  | 0.27707  |
| a2        | 0.08451  | 0.09590  | 0.09241  | 0.09825  | 0.10192  | 0.10604  | 0.08859  |
| mu2       | 16.08011 | 18.01274 | 17.53528 | 18.16941 | 18.95611 | 19.65939 | 16.70313 |
| alpha2    | 0.12074  | 0.14661  | 0.13107  | 0.14830  | 0.15195  | 0.18085  | 0.12730  |
| lambda2   | 0.47621  | 0.26804  | 0.34550  | 0.32251  | 0.24078  | 0.25908  | 0.39689  |
| a3        | 0.00000  | 0.00005  | 0.00000  | 0.00000  | 0.00000  | 0.00010  | 0.00000  |
| mu3       | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3    | 0.00000  | 0.04403  | 0.00000  | 0.00000  | 0.00000  | 0.03903  | 0.00000  |
| lambda3   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c         | 0.00414  | 0.00256  | 0.00351  | 0.00428  | 0.00373  | 0.00367  | 0.00400  |
| mean age  | 33.15700 | 30.93939 | 31.10266 | 32.37042 | 31.26282 | 35.47256 | 32.56859 |
| %(0-14)   | 8.39499  | 18.13784 | 12.51663 | 12.43240 | 13.77093 | 11.85914 | 9.95238  |
| %(15-64)  | 79.55819 | 69.19407 | 77.24712 | 75.42102 | 75.41824 | 70.88039 | 78.39197 |
| %(65+ )   | 12.04682 | 12.66809 | 10.23624 | 12.14658 | 10.81083 | 17.26047 | 11.65565 |
| deltalc   | 0.79678  | 8.86830  | 4.03978  | 3.71950  | 3.32747  | 2.72681  | 1.95576  |
| delta12   | 0.03906  | 0.23703  | 0.15336  | 0.16216  | 0.12170  | 0.09439  | 0.08832  |
| delta32   | 0.00000  | 0.00049  | 0.00000  | 0.00000  | 0.00000  | 0.00093  | 0.00000  |
| beta12    | 3.09410  | 1.13652  | 1.59194  | 1.82489  | 1.14709  | 0.85688  | 2.17646  |
| sigma2    | 3.94404  | 1.82823  | 2.63601  | 2.17480  | 1.58466  | 1.43254  | 3.11766  |
| sigma3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low     | 11.14014 | 10.99014 | 11.69015 | 11.67015 | 10.62013 | 11.56015 | 11.25014 |
| x high    | 18.97032 | 20.19035 | 20.33035 | 20.58036 | 20.84036 | 21.03037 | 19.57033 |
| x ret.    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift   | 7.83018  | 9.20021  | 8.64020  | 8.91020  | 10.22023 | 9.47022  | 8.32019  |
| a         | 55.53356 | 28.67035 | 35.42117 | 35.42572 | 33.60030 | 32.43031 | 42.85194 |
| b         | 0.04493  | 0.03538  | 0.04177  | 0.04085  | 0.03795  | 0.03818  | 0.04326  |

- 1 hungary migration 2 to 1
- 2 hungary migration 2 to 2
- 3 hungary migration 2 to 3
- 4 hungary migration 2 to 4
- 5 hungary migration 2 to 5
- 6 hungary migration 2 to 6
- 7 hungary migration 2 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 2.13464  | 0.44009  | 2.55881  | 0.27298  | 0.25194  | 0.08996  | 3.18962  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 10.07720 | 11.11025 | 5.80526  | 7.74481  | 7.33388  | 11.44342 | 9.10435  |
| a1                | 0.00378  | 0.01474  | 0.02065  | 0.01514  | 0.01592  | 0.01715  | 0.00921  |
| alpha1            | 0.26979  | 0.23032  | 0.16503  | 0.18847  | 0.15500  | 0.21865  | 0.21968  |
| a2                | 0.08786  | 0.09351  | 0.10902  | 0.12766  | 0.08585  | 0.10396  | 0.08604  |
| mu2               | 15.62485 | 17.90124 | 17.90246 | 19.18099 | 18.24955 | 20.71630 | 15.93513 |
| alpha2            | 0.11590  | 0.13653  | 0.15747  | 0.19026  | 0.12000  | 0.18821  | 0.11221  |
| lambda2           | 0.54923  | 0.31982  | 0.27478  | 0.24200  | 0.27661  | 0.25921  | 0.46871  |
| a3                | 0.00000  | 0.00046  | 0.00062  | 0.00066  | 0.00021  | 0.00000  | 0.00027  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.00000  | 0.01285  | 0.02198  | 0.01182  | 0.03002  | 0.00000  | 0.02144  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00346  | 0.00292  | 0.00094  | 0.00218  | 0.00188  | 0.00480  | 0.00222  |
| mean age          | 31.58114 | 32.58323 | 31.45789 | 30.49688 | 32.98071 | 33.31239 | 32.11340 |
| %(0-14)           | 8.28110  | 12.05432 | 16.09770 | 14.06630 | 13.40834 | 14.45614 | 9.57393  |
| %(15-64)          | 81.60341 | 75.63367 | 70.30581 | 74.55080 | 73.63125 | 71.79228 | 79.18343 |
| %(65+ )           | 10.11549 | 12.31201 | 13.59649 | 11.38289 | 12.96041 | 13.75158 | 11.24264 |
| deltalo           | 1.09128  | 5.05131  | 21.93596 | 6.95376  | 8.46865  | 3.57497  | 4.14981  |
| delta12           | 0.04303  | 0.15763  | 0.18940  | 0.11863  | 0.18548  | 0.16497  | 0.10707  |
| delta32           | 0.00000  | 0.00492  | 0.00571  | 0.00521  | 0.00250  | 0.00000  | 0.00309  |
| beta12            | 2.32781  | 1.68692  | 1.04801  | 0.99056  | 1.29173  | 1.16177  | 1.95776  |
| sigma2            | 4.73885  | 2.34246  | 1.74496  | 1.27191  | 2.30514  | 1.37728  | 4.17699  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 11.50015 | 11.52015 | 10.85013 | 10.59013 | 11.38015 | 12.57017 | 11.48015 |
| x high            | 18.47031 | 20.56036 | 19.88034 | 20.16035 | 21.22037 | 21.94039 | 18.99032 |
| x ref.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 6.97016  | 9.04021  | 9.03021  | 9.57022  | 9.84023  | 9.37021  | 7.51017  |
| a                 | 50.77908 | 36.48751 | 29.34034 | 30.64033 | 34.87482 | 31.28200 | 42.72347 |
| b                 | 0.04959  | 0.04015  | 0.04032  | 0.04512  | 0.03510  | 0.03758  | 0.04574  |

- 1 hungary migration 3 to 1
- 2 hungary migration 3 to 2
- 3 hungary migration 3 to 3
- 4 hungary migration 3 to 4
- 5 hungary migration 3 to 5
- 6 hungary migration 3 to 6
- 7 hungary migration 3 to the rest

|                    | 1        | 2        | 3        | 4        | 5        | 6        | 7        |
|--------------------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)          | 1.03456  | 0.13064  | 0.27575  | 2.89358  | 0.25232  | 0.21486  | 1.90814  |
| gmr (mms)          | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub>  | 7.75207  | 17.44952 | 12.11837 | 5.12878  | 9.53853  | 12.97295 | 9.12225  |
| α <sub>1</sub>     | 0.00861  | 0.01469  | 0.02042  | 0.01819  | 0.01268  | 0.01703  | 0.01208  |
| α <sub>phal</sub>  | 0.18542  | 0.17236  | 0.19381  | 0.12606  | 0.14835  | 0.15552  | 0.18896  |
| α <sub>2</sub>     | 0.08924  | 0.09396  | 0.12793  | 0.09299  | 0.10579  | 0.09790  | 0.09998  |
| μ <sub>2</sub>     | 17.43157 | 18.57153 | 19.16553 | 17.36615 | 20.77004 | 19.26316 | 18.51746 |
| α <sub>2</sub>     | 0.13708  | 0.15033  | 0.18042  | 0.14373  | 0.18615  | 0.15828  | 0.15655  |
| λ <sub>2</sub>     | 0.31512  | 0.37163  | 0.26017  | 0.28038  | 0.22667  | 0.27056  | 0.27922  |
| α <sub>3</sub>     | 0.00084  | 0.00000  | 0.00002  | 0.00024  | 0.00012  | 0.00010  | 0.00029  |
| μ <sub>3</sub>     | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| α <sub>3</sub>     | 0.02218  | 0.00000  | 0.04636  | 0.03385  | 0.03214  | 0.04452  | 0.02869  |
| λ <sub>3</sub>     | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                  | 0.00158  | 0.00427  | 0.00256  | 0.00159  | 0.00358  | 0.00254  | 0.00280  |
| mean age           | 37.09032 | 32.26546 | 29.63155 | 32.75817 | 33.97644 | 35.44706 | 35.09956 |
| % (0-14)           | 9.48545  | 13.84877 | 15.03129 | 17.30205 | 13.58471 | 13.97981 | 11.70120 |
| % (15-64)          | 71.57917 | 73.97253 | 74.45389 | 67.11803 | 71.26022 | 67.87555 | 71.65627 |
| % (65+ )           | 18.93538 | 12.17871 | 10.51482 | 15.57992 | 15.15507 | 18.14464 | 16.64253 |
| Δ <sub>alc</sub>   | 5.45103  | 3.44301  | 7.96669  | 11.46821 | 3.53747  | 6.69890  | 4.30683  |
| Δ <sub>12</sub>    | 0.09652  | 0.15630  | 0.15962  | 0.19560  | 0.11987  | 0.17392  | 0.12078  |
| Δ <sub>32</sub>    | 0.00936  | 0.00000  | 0.00018  | 0.00257  | 0.00117  | 0.00102  | 0.00285  |
| β <sub>12</sub>    | 1.35263  | 1.14650  | 1.07416  | 0.87707  | 0.79696  | 0.98255  | 1.20700  |
| σ <sub>2</sub>     | 2.29870  | 2.47203  | 1.44200  | 1.95081  | 1.21768  | 1.70936  | 1.78357  |
| σ <sub>3</sub>     | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x <sub>low</sub>   | 10.88013 | 13.09019 | 11.34015 | 10.67013 | 11.63015 | 11.96016 | 11.18014 |
| x <sub>high</sub>  | 20.08035 | 20.99037 | 20.55036 | 19.65034 | 21.61038 | 21.20037 | 20.58036 |
| x <sub>ret.</sub>  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x <sub>shift</sub> | 9.20021  | 7.90018  | 9.21021  | 8.98021  | 9.98023  | 9.24021  | 9.40022  |
| a                  | 38.46357 | 31.98261 | 29.81398 | 28.61034 | 31.19216 | 30.68216 | 34.75299 |
| b                  | 0.03798  | 0.04069  | 0.04574  | 0.03456  | 0.03662  | 0.03551  | 0.03824  |

- 1 hungary migration 4 to 1
- 2 hungary migration 4 to 2
- 3 hungary migration 4 to 3
- 4 hungary migration 4 to 4
- 5 hungary migration 4 to 5
- 6 hungary migration 4 to 6
- 7 hungary migration 4 to the rest

|           | 1        | 2        | 3        | 4        | 5        | 6        | 7        |
|-----------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs) | 0.93843  | 0.13267  | 0.17778  | 0.16579  | 3.10018  | 0.35561  | 1.77028  |
| gmr (mms) | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae%m     | 8.58517  | 8.97152  | 8.22733  | 8.36460  | 4.89345  | 8.68655  | 8.33027  |
| a1        | 0.00769  | 0.01472  | 0.01491  | 0.01441  | 0.02053  | 0.01451  | 0.01103  |
| alpha1    | 0.22120  | 0.11656  | 0.13169  | 0.19794  | 0.15795  | 0.25131  | 0.19673  |
| a2        | 0.10086  | 0.06858  | 0.07316  | 0.08399  | 0.09605  | 0.11470  | 0.09517  |
| mu2       | 19.22001 | 16.90255 | 17.23109 | 17.58621 | 18.41512 | 19.02641 | 18.36112 |
| alpha2    | 0.17414  | 0.09423  | 0.09383  | 0.12691  | 0.15054  | 0.19091  | 0.15126  |
| lambda2   | 0.25506  | 0.35337  | 0.33629  | 0.33538  | 0.22901  | 0.26889  | 0.28489  |
| a3        | 0.00056  | 0.00016  | 0.00005  | 0.00076  | 0.00008  | 0.00178  | 0.00068  |
| mu3       | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3    | 0.02944  | 0.03903  | 0.05280  | 0.01292  | 0.04733  | 0.00436  | 0.02369  |
| lambda3   | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c         | 0.00219  | 0.00102  | 0.00091  | 0.00240  | 0.00206  | 0.00229  | 0.00198  |
| mean age  | 39.95061 | 34.35888 | 34.37377 | 33.49084 | 33.39685 | 32.90005 | 36.83879 |
| %(0-14)   | 8.47520  | 13.03028 | 11.91381 | 12.48294 | 17.47263 | 12.86977 | 10.33891 |
| %(15-64)  | 68.11694 | 72.24844 | 73.69665 | 73.97733 | 66.01612 | 73.22737 | 70.78792 |
| %(65+ )   | 23.40787 | 14.72128 | 14.38954 | 13.53973 | 16.51125 | 13.90286 | 18.87317 |
| deltalc   | 3.51834  | 14.46399 | 16.38572 | 5.99954  | 9.95416  | 6.33304  | 5.57855  |
| delta12   | 0.07625  | 0.21461  | 0.20374  | 0.17155  | 0.21376  | 0.12652  | 0.11594  |
| delta32   | 0.00555  | 0.00231  | 0.00068  | 0.00910  | 0.00079  | 0.01554  | 0.00713  |
| beta12    | 1.27027  | 1.23693  | 1.40358  | 1.55967  | 1.04924  | 1.31638  | 1.30062  |
| sigma2    | 1.46469  | 3.75001  | 3.58419  | 2.64260  | 1.52126  | 1.40845  | 1.88346  |
| sigma3    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low     | 10.70013 | 11.69015 | 11.71015 | 11.66015 | 10.22012 | 11.07014 | 11.12014 |
| x high    | 20.73036 | 20.54036 | 20.94036 | 20.47035 | 20.16035 | 20.30035 | 20.59036 |
| x ret.    | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift   | 10.03023 | 8.85020  | 9.23021  | 8.81020  | 9.94023  | 9.23021  | 9.47022  |
| a         | 37.37028 | 36.00388 | 37.64932 | 36.19751 | 29.04034 | 32.40030 | 36.26527 |
| b         | 0.03688  | 0.03282  | 0.03464  | 0.03721  | 0.03253  | 0.04230  | 0.03759  |

- 1 hungary migration 5 to 1
- 2 hungary migration 5 to 2
- 3 hungary migration 5 to 3
- 4 hungary migration 5 to 4
- 5 hungary migration 5 to 5
- 6 hungary migration 5 to 6
- 7 hungary migration 5 to the rest

|                   | 1        | 2        | 3        | 4        | 5        | 6        | 7        |
|-------------------|----------|----------|----------|----------|----------|----------|----------|
| gmr (obs)         | 0.84305  | 0.08771  | 0.10437  | 0.23001  | 0.56997  | 3.80248  | 1.83512  |
| gmr (mms)         | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  | 1.00000  |
| mae% <sub>m</sub> | 7.68481  | 12.76937 | 11.53180 | 8.73548  | 6.60432  | 5.12441  | 6.97967  |
| al                | 0.00505  | 0.01734  | 0.01988  | 0.01440  | 0.01425  | 0.02013  | 0.01111  |
| alpha1            | 0.33951  | 0.16465  | 0.17129  | 0.17583  | 0.16659  | 0.12791  | 0.20626  |
| a2                | 0.11098  | 0.08770  | 0.09668  | 0.10287  | 0.11181  | 0.08363  | 0.11010  |
| mu2               | 19.94069 | 18.08908 | 19.15297 | 19.23494 | 20.71163 | 18.23812 | 19.89202 |
| alpha2            | 0.19442  | 0.13443  | 0.14527  | 0.16886  | 0.20285  | 0.14595  | 0.18672  |
| lambda2           | 0.24216  | 0.32608  | 0.27337  | 0.24998  | 0.20185  | 0.25502  | 0.23205  |
| a3                | 0.00015  | 0.00029  | 0.00022  | 0.00001  | 0.00019  | 0.00026  | 0.00027  |
| mu3               | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| alpha3            | 0.03854  | 0.02808  | 0.03008  | 0.06211  | 0.03045  | 0.02994  | 0.02994  |
| lambda3           | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| c                 | 0.00382  | 0.00238  | 0.00224  | 0.00346  | 0.00307  | 0.00237  | 0.00304  |
| mean age          | 38.28280 | 33.84722 | 32.84320 | 34.70221 | 33.40453 | 32.86229 | 35.66032 |
| % (0-14)          | 8.28035  | 13.89340 | 14.73857 | 13.67954 | 14.63457 | 18.86661 | 11.30144 |
| % (15-64)         | 71.16774 | 71.06123 | 71.44287 | 69.43501 | 69.93759 | 65.67160 | 71.03381 |
| % (65+ )          | 20.55191 | 15.04538 | 13.81856 | 16.88544 | 15.42784 | 15.46178 | 17.66476 |
| deltalc           | 1.32364  | 7.28508  | 8.86652  | 4.16046  | 4.63804  | 8.48951  | 3.65617  |
| delta12           | 0.04552  | 0.19770  | 0.20565  | 0.13994  | 0.12743  | 0.24074  | 0.10089  |
| delta32           | 0.00134  | 0.00327  | 0.00222  | 0.00014  | 0.00167  | 0.00314  | 0.00250  |
| beta12            | 1.74622  | 1.22479  | 1.17916  | 1.04125  | 0.82123  | 0.87643  | 1.10465  |
| sigma2            | 1.24552  | 2.42560  | 1.88184  | 1.48039  | 0.99508  | 1.74730  | 1.24274  |
| sigma3            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x low             | 10.22012 | 12.12016 | 12.02016 | 11.14014 | 10.39012 | 11.00014 | 10.73013 |
| x high            | 20.86036 | 20.77036 | 21.43038 | 20.78036 | 20.66036 | 20.30035 | 20.83036 |
| x ret.            | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  | 0.00000  |
| x shift           | 10.64024 | 8.65020  | 9.41022  | 9.64022  | 10.27024 | 9.30021  | 10.10023 |
| a                 | 39.83525 | 32.53696 | 31.76365 | 31.24396 | 29.98035 | 27.61854 | 34.06029 |
| b                 | 0.03946  | 0.03649  | 0.03683  | 0.03641  | 0.03734  | 0.02970  | 0.03894  |

- 1 hungary migration 6 to 1
- 2 hungary migration 6 to 2
- 3 hungary migration 6 to 3
- 4 hungary migration 6 to 4
- 5 hungary migration 6 to 5
- 6 hungary migration 6 to 6
- 7 hungary migration 6 to the rest

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