**Online supplement to**

**“A Multiple Discrete Extreme Value Choice Model with Grouped Consumption Data and Unobserved Budgets”**

This supplement provides the estimation results for all the models estimated for the time-use case, namely the MDCEV model, MDGEV-M1 model (at 15-minute clustering, the one reported in the paper), MDGEV-M2 model (at 30-minute clustering), MDGEV-M3 model (at 60-minute clustering) and the MDCEV-M4 model (the 60-minute cluster “midpoint” model).

**Table 1. MDCEV result for time-use**

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| --- | --- | --- | --- | --- |
| **Variables** | **Coefficient estimates (t-stats)** | | | |
| **In-home Social**  **(IHS)** | **Out-of-home Social**  **(OHS)** | **In-home Recreational**  **(IHR)** | **Out-of-home Recreational**  **(OHR)** |
| ***Household sociodemographic*** |  |  |  |  |
| Number of kids aged 0-4 years | - | 0.310 (2.99) | - | - |
| Number of kids aged 5-15 years | - | -0.162 (-2.04) | - | - |
| Number of adults | - | - | 0.305 (4.05) | - |
| Number of household vehicles | - | - | -0.188 (-3.14) | - |
| Number of bicycles in the household | - | - | - | 0.092 (3.52) |
| *Household income (Base: >$60,000/yr)* |  |  |  |  |
| Household income less than $35,000/yr | - | - | 0.665 (4.63) | - |
| Household income $35,000/yr-$60,000/yr | - | - | 0.260 (2.34) | - |
| ***Household location attribute*** |  |  |  |  |
| Land-use mix | - | - | 0.673 (2.54) | -0.579 (-2.09) |
| ***Individual characteristics*** |  |  |  |  |
| Female | - | - | -0.327 (-3.61) | - |
| *Age of individual (Base: Less than 50 years)* |  |  |  |  |
| Age 50-65 | - | - | - | -0.245 (-2.11) |
| Age greater than 65 | - | - | 0.648 (3.52) | -0.373 (-2.03) |
| Employed | -0.511 (-2.37) | - | - | - |
| Hispanic | - | 0.606 (2.77) | - | - |
| ***Day and seasonal effects*** |  |  |  |  |
| Weekend day is Sunday (Base: Saturday) | - | - | 0.373 (4.13) | - |
| Winter (Base: Summer and Spring) | - | 0.349 (1.93) | - | -0.388 (-2.05) |
| Fall (Base: Summer and Spring) | - | - | - | -0.279 (-2.51) |
| ***Baseline preference constant*** | -2.423  (-14.79) | -1.222  (-14.23) | -1.291  (-6.29) | -0.559  (-3.79) |
| ***Satiation effects*** |  |  |  |  |
| Household size | - | -0.151 (-1.68) | - | - |
| Weekend day is Sunday (Base: Saturday) | - | -0.314 (-1.27) | - | - |
| Satiation constant | 4.937 (18.85) | 5.104 (17.63) | 5.015 (39.72) | 4.669 (37.83) |

**Table 2. MDGEV-M1 result for time-use (same as the one reported in the paper)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Coefficient estimates (t-stats)** | | | |
| **In-home Social**  **(IHS)** | **Out-of-home Social**  **(OHS)** | **In-home Recreational**  **(IHR)** | **Out-of-home Recreational**  **(OHR)** |
| ***Household sociodemographic*** |  |  |  |  |
| Number of kids aged 0-4 years |  | 0.309 (2.98) |  | - |
| Number of kids aged 5-15 years | - | -0.161 (-2.03) |  | - |
| Number of adults | - |  | 0.312 (4.21) | - |
| Number of household vehicles |  | - | -0.191 (-3.20) | - |
| Number of bicycles in the household |  | - | - | 0.092 (3.54) |
| *Household income (Base: >$60,000/yr)* |  |  |  |  |
| Household income less than $35,000/yr | - | - | 0.676 (4.74) |  |
| Household income $35,000/yr-$60,000/yr | - | - | 0.263 (2.37) | - |
| ***Household location attribute*** |  |  |  |  |
| Land-use mix | - | - | 0.685 (2.59) | -0.576 (-2.08) |
| ***Individual characteristics*** |  |  |  |  |
| Female | - | - | -0.330 (-3.65) | - |
| *Age of individual (Base: Less than 50 years)* |  |  |  |  |
| Age 50-65 | - | - | - | -0.247 (-2.12) |
| Age greater than 65 |  |  | 0.663 (3.62) | -0.373 (-2.02) |
| Employed | -0.512 (-2.38) | - | - | - |
| Hispanic | - | 0.609 (2.79) |  | - |
| ***Day and seasonal effects*** |  |  |  |  |
| Weekend day is Sunday (Base: Saturday) | - |  | 0.369 (4.09) | - |
| Winter (Base: Summer and Spring) |  | 0.348 (1.97) | - | -0.388 (-2.05) |
| Fall (Base: Summer and Spring) |  | - | - | -0.278 (-2.51) |
| ***Baseline preference constant*** | -2.422 (-14.81) | -1.223 (-14.23) | -1.304 (-6.39) | -0.560 (-3.81) |
| ***Satiation effects*** |  |  |  |  |
| Household size | - | -0.156 (-1.78) | - | - |
| Weekend day is Sunday (Base: Saturday) | - | -0.339 (-1.66) | - | - |
| Satiation constant | 4.963 (20.13) | 5.138 (18.53) | 5.056 (43.48) | 4.690 (39.91) |

**Table 3. MDGEV-M2 result for time-use**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Coefficient estimates (t-stats)** | | | |
| **In-home Social**  **(IHS)** | **Out-of-home Social**  **(OHS)** | **In-home Recreational**  **(IHR)** | **Out-of-home Recreational**  **(OHR)** |
| ***Household sociodemographic*** |  |  |  |  |
| Number of kids aged 0-4 years | - | 0.311 (3.01) | - | - |
| Number of kids aged 5-15 years | - | -0.161 (-2.02) | - | - |
| Number of adults | - | - | 0.313 (4.23) | - |
| Number of household vehicles | - | - | -0.191 (-3.20) | - |
| Number of bicycles in the household | - | - | - | 0.092 (3.54) |
| *Household income (Base: >$60,000/yr)* |  |  |  |  |
| Household income less than $35,000/yr | - | - | 0.677 (4.74) | - |
| Household income $35,000/yr-$60,000/yr | - | - | 0.265 (2.39) | - |
| ***Household location attribute*** |  |  |  |  |
| Land-use mix | - | - | 0.685 (2.59) | -0.581 (-2.10) |
| ***Individual characteristics*** |  |  |  |  |
| Female | - | - | -0.331 (-3.66)  - | - |
| *Age of individual (Base: Less than 50 years)* |  |  |  |  |
| Age 50-65 | - | - | - | -0.248 (-2.13) |
| Age greater than 65 | - | - | 0.662 (3.61) | -0.378 (-2.05) |
| Employed | -0.512 (-2.38) | - | - | - |
| Hispanic | - | 0.606 (2.78) | - | - |
| ***Day and seasonal effects*** |  |  |  |  |
| Weekend day is Sunday (Base: Saturday) | - | - | 0.372 (4.12) | - |
| Winter (Base: Summer and Spring) | - | 0.349 (1.93) | - | -0.390 (-2.06) |
| Fall (Base: Summer and Spring) | - | - | - | -0.280 (-2.52) |
| ***Baseline preference constant*** | -2.422  (-14.81) | -1.223  (-14.24) | -1.306  (-6.42) | -0.557  (-3.79) |
| ***Satiation effects*** |  |  |  |  |
| Household size | - | -0.157 (-1.81) | - | - |
| Weekend day is Sunday (Base: Saturday) | - | -0.361 (-1.53) | - | - |
| Satiation constant | 4.932 (20.39) | 5.120 (18.76) | 5.032 (43.53) | 4.663 (40.49) |

**Table 4. MDGEV-M3 result for time-use**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Coefficient estimates (t-stats)** | | | |
| **In-home Social**  **(IHS)** | **Out-of-home Social**  **(OHS)** | **In-home Recreational**  **(IHR)** | **Out-of-home Recreational**  **(OHR)** |
| ***Household sociodemographic*** |  |  |  |  |
| Number of kids aged 0-4 years | - | 0.326 (3.13) | - | - |
| Number of kids aged 5-15 years | - | -0.174 (-2.17) | - | - |
| Number of adults | - | - | 0.259 (3.14) | - |
| Number of household vehicles | - | - | -0.192 (-3.09) | - |
| Number of bicycles in the household | - | - | - | 0.080 (2.98) |
| *Household income (Base: >$60,000/yr)* |  |  |  |  |
| Household income less than $35,000/yr | - | - | 0.554 (3.62) | - |
| Household income $35,000/yr-$60,000/yr | - | - | 0.236 (2.00) | - |
| ***Household location attribute*** |  |  |  |  |
| Land-use mix | - | - | 0.583 (2.13) | -0.591 (-2.08) |
| ***Individual characteristics*** |  |  |  |  |
| Female | - | - | -0.274 (-2.91) | - |
| *Age of individual (Base: Less than 50 years)* |  |  |  |  |
| Age 50-65 | - | - | - | -0.219 (-1.86) |
| Age greater than 65 | - | - | 0.546 (2.78) | -0.295 (-1.59) |
| Employed | -0.513 (-2.32) | - | - | - |
| Hispanic | - | 0.643 (2.92) | - | - |
| ***Day and seasonal effects*** |  |  |  |  |
| Weekend day is Sunday (Base: Saturday) | - | - | 0.373 (3.96) | - |
| Winter (Base: Summer and Spring) | - | 0.373 (2.03) | - | -0.389 (-2.04) |
| Fall (Base: Summer and Spring) | - | - | - | -0.247 (-2.18) |
| ***Baseline preference constant*** | -2.412  (-14.36) | -1.216  (-13.95) | -1.208  (-5.54) | -0.532  (-3.54) |
| ***Satiation effects*** |  |  |  |  |
| Household size | - | -0.117 (-1.14) | - | - |
| Weekend day is Sunday (Base: Saturday) | - | -0.244 (-0.84) | - | - |
| Satiation constant | 5.188 (16.59) | 5.236 (14.90) | 5.152 (31.80) | 4.908 (32.84) |

**Table 5. MDCEV-M4 result for time-use**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Coefficient estimates (t-stats)** | | | |
| **In-home Social**  **(IHS)** | **Out-of-home Social**  **(OHS)** | **In-home Recreational**  **(IHR)** | **Out-of-home Recreational**  **(OHR)** |
| ***Household sociodemographic*** |  |  |  |  |
| Number of kids aged 0-4 years | - | 0.310  (2.99) | - | - |
| Number of kids aged 5-15 years | - | -0.160  (-2.01) | - | - |
| Number of adults | - | - | 0.302  (4.00) | - |
| Number of household vehicles | - | - | -0.185  (-3.10) | - |
| Number of bicycles in the household | - | - | - | 0.092  (3.52) |
| *Household income (Base: >$60,000/yr)* |  |  |  |  |
| Household income less than $35,000/yr | - | - | 0.665  (4.63) | - |
| Household income $35,000/yr-$60,000/yr | - | - | 0.260  (2.33) | - |
| ***Household location attribute*** |  |  |  |  |
| Land-use mix | - | - | 0.665  (2.51) | -0.571  (-2.06) |
| ***Individual characteristics*** |  |  |  |  |
| Female | - | - | -0.325  (-3.58) | - |
| *Age of individual (Base: Less than 50 years)* |  |  |  |  |
| Age 50-65 | - | - | - | -0.244  (-2.09) |
| Age greater than 65 | - | - | 0.647  (3.50) | -0.366  (-1.99) |
| Employed | -0.514  (-2.39) | - | - | - |
| Hispanic | - | 0.590  (2.68) | - | - |
| ***Day and seasonal effects*** |  |  |  |  |
| Weekend day is Sunday (Base: Saturday) | - | - | 0.375  (4.15) | - |
| Winter (Base: Summer and Spring) | - | 0.341  (1.88) | - | -0.389  (-2.06) |
| Fall (Base: Summer and Spring) | - | - | - | -0.275  (-2.48) |
| ***Baseline preference constant*** | -2.421  (-14.81) | -1.221  (-14.20) | -1.290  (-6.26) | -0.564  (-3.82) |
| ***Satiation effects*** |  |  |  |  |
| Household size | - | -0.123  (-1.37) | - | - |
| Weekend day is Sunday (Base: Saturday) | - | -0.316  (-1.22) | - | - |
| Satiation constant | 4.994  (18.25) | 5.109  (16.83) | 5.053  (38.90) | 4.710  (36.95) |