**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)**

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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 |  | 0.309(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**

|  |  |
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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 | - | -0.160 (-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) |