Model Metrics

# Total Population

## Sarimax

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| SARIMAX Results | | | |
| **Dep. Variable:** | Total\_per\_House\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 0)x(0, 0, [1], 12) | **Log Likelihood** | -245.975 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 499.951 |
| **Time:** | 18:41:53 | **BIC** | 513.433 |
| **Sample:** | 11-22-2012 | **HQIC** | 505.398 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1341 | 0.019 | -7.232 | 0.000 | -0.170 | -0.098 |
| **ar.L1** | 0.7540 | 0.033 | 22.758 | 0.000 | 0.689 | 0.819 |
| **ma.S.L12** | 0.0520 | 0.083 | 0.624 | 0.532 | -0.111 | 0.215 |
| **sigma2** | 0.5747 | 0.043 | 13.423 | 0.000 | 0.491 | 0.659 |

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| **Ljung-Box (Q):** | 243.49 | **Jarque-Bera (JB):** | 40.97 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.49 | **Skew:** | -0.19 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 5.10 |

## SARIMA

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| **Dep. Variable:** | Total\_per\_House\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 0)x(1, 0, 0, 12) | **Log Likelihood** | -269.012 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 544.025 |
| **Time:** | 19:54:56 | **BIC** | 554.136 |
| **Sample:** | 11-22-2012 | **HQIC** | 548.110 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **ar.L1** | 0.8235 | 0.033 | 24.622 | 0.000 | 0.758 | 0.889 |
| **ar.S.L12** | 0.0377 | 0.083 | 0.453 | 0.650 | -0.125 | 0.200 |
| **sigma2** | 0.7112 | 0.059 | 12.123 | 0.000 | 0.596 | 0.826 |

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| **Ljung-Box (Q):** | 174.13 | **Jarque-Bera (JB):** | 8.85 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.01 |
| **Heteroskedasticity (H):** | 0.67 | **Skew:** | -0.32 |
| **Prob(H) (two-sided):** | 0.09 | **Kurtosis:** | 3.75 |

## ARIMA

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| --- | --- | --- | --- |
| **Dep. Variable:** | Total\_per\_House\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 0) | **Log Likelihood** | -246.223 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 498.446 |
| **Time:** | 18:42:28 | **BIC** | 508.558 |
| **Sample:** | 11-22-2012 | **HQIC** | 502.531 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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| --- | --- | --- | --- | --- | --- | --- |
|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1337 | 0.018 | -7.303 | 0.000 | -0.170 | -0.098 |
| **ar.L1** | 0.7617 | 0.033 | 23.354 | 0.000 | 0.698 | 0.826 |
| **sigma2** | 0.5761 | 0.042 | 13.823 | 0.000 | 0.494 | 0.658 |

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| **Ljung-Box (Q):** | 244.40 | **Jarque-Bera (JB):** | 42.12 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.48 | **Skew:** | -0.21 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 5.13 |

# Affluent Group

## SARIMAX

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| **Dep. Variable:** | Affluent\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 0)x(1, 0, 0, 12) | **Log Likelihood** | -260.223 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 528.446 |
| **Time:** | 19:55:10 | **BIC** | 541.929 |
| **Sample:** | 11-22-2012 | **HQIC** | 533.894 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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| --- | --- | --- | --- | --- | --- | --- |
|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1912 | 0.020 | -9.592 | 0.000 | -0.230 | -0.152 |
| **ar.L1** | 0.7457 | 0.053 | 14.032 | 0.000 | 0.642 | 0.850 |
| **ar.S.L12** | 0.0996 | 0.081 | 1.229 | 0.219 | -0.059 | 0.258 |
| **sigma2** | 0.6560 | 0.054 | 12.232 | 0.000 | 0.551 | 0.761 |

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| **Ljung-Box (Q):** | 137.37 | **Jarque-Bera (JB):** | 11.57 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.52 | **Skew:** | -0.18 |
| **Prob(H) (two-sided):** | 0.01 | **Kurtosis:** | 4.08 |

## SARIMA

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| --- | --- | --- | --- |
| **Dep. Variable:** | Affluent\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 0)x(1, 0, 0, 12) | **Log Likelihood** | -297.160 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 600.320 |
| **Time:** | 19:55:23 | **BIC** | 610.432 |
| **Sample:** | 11-22-2012 | **HQIC** | 604.406 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **ar.L1** | 0.8453 | 0.035 | 24.257 | 0.000 | 0.777 | 0.914 |
| **ar.S.L12** | 0.0995 | 0.075 | 1.328 | 0.184 | -0.047 | 0.246 |
| **sigma2** | 0.9230 | 0.087 | 10.573 | 0.000 | 0.752 | 1.094 |

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| **Ljung-Box (Q):** | 76.87 | **Jarque-Bera (JB):** | 1.38 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.50 |
| **Heteroskedasticity (H):** | 0.69 | **Skew:** | -0.18 |
| **Prob(H) (two-sided):** | 0.11 | **Kurtosis:** | 3.16 |

## ARIMA

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| **Dep. Variable:** | Affluent\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 1) | **Log Likelihood** | -251.940 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 511.879 |
| **Time:** | 18:43:30 | **BIC** | 525.362 |
| **Sample:** | 11-22-2012 | **HQIC** | 517.327 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1989 | 0.018 | -11.304 | 0.000 | -0.233 | -0.164 |
| **ar.L1** | 0.9047 | 0.035 | 25.648 | 0.000 | 0.836 | 0.974 |
| **ma.L1** | -0.3890 | 0.070 | -5.535 | 0.000 | -0.527 | -0.251 |
| **sigma2** | 0.6072 | 0.052 | 11.779 | 0.000 | 0.506 | 0.708 |

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| **Ljung-Box (Q):** | 97.87 | **Jarque-Bera (JB):** | 5.37 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.07 |
| **Heteroskedasticity (H):** | 0.50 | **Skew:** | -0.09 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 3.75 |

# Comfortable Group

## SARIMAX

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| **Dep. Variable:** | Comfortable\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 1, 1)x(0, 0, 1, 12) | **Log Likelihood** | -248.156 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 506.312 |
| **Time:** | 19:55:38 | **BIC** | 523.142 |
| **Sample:** | 11-22-2012 | **HQIC** | 513.113 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1353 | 0.017 | -8.024 | 0.000 | -0.168 | -0.102 |
| **ar.L1** | 0.2520 | 0.118 | 2.138 | 0.032 | 0.021 | 0.483 |
| **ma.L1** | -0.7695 | 0.083 | -9.230 | 0.000 | -0.933 | -0.606 |
| **ma.S.L12** | -0.0494 | 0.089 | -0.554 | 0.580 | -0.224 | 0.125 |
| **sigma2** | 0.5937 | 0.042 | 14.013 | 0.000 | 0.511 | 0.677 |

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| **Ljung-Box (Q):** | 198.75 | **Jarque-Bera (JB):** | 34.50 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.46 | **Skew:** | -0.57 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 4.61 |

## SARIMA

|  |  |  |  |
| --- | --- | --- | --- |
| **Dep. Variable:** | Comfortable\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 1, 1)x(1, 0, [], 12) | **Log Likelihood** | -273.470 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 554.939 |
| **Time:** | 19:55:52 | **BIC** | 568.403 |
| **Sample:** | 11-22-2012 | **HQIC** | 560.380 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **ar.L1** | 0.4715 | 0.155 | 3.049 | 0.002 | 0.168 | 0.775 |
| **ma.L1** | -0.7877 | 0.105 | -7.525 | 0.000 | -0.993 | -0.583 |
| **ar.S.L12** | -0.0276 | 0.083 | -0.333 | 0.739 | -0.190 | 0.135 |
| **sigma2** | 0.7531 | 0.058 | 12.951 | 0.000 | 0.639 | 0.867 |

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| **Ljung-Box (Q):** | 198.65 | **Jarque-Bera (JB):** | 14.95 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.60 | **Skew:** | -0.37 |
| **Prob(H) (two-sided):** | 0.03 | **Kurtosis:** | 4.06 |

## ARIMA

|  |  |  |  |
| --- | --- | --- | --- |
| **Dep. Variable:** | Comfortable\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 1, 1) | **Log Likelihood** | -248.351 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 504.702 |
| **Time:** | 18:44:31 | **BIC** | 518.166 |
| **Sample:** | 11-22-2012 | **HQIC** | 510.143 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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| --- | --- | --- | --- | --- | --- | --- |
|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1352 | 0.017 | -8.110 | 0.000 | -0.168 | -0.103 |
| **ar.L1** | 0.2620 | 0.115 | 2.278 | 0.023 | 0.037 | 0.487 |
| **ma.L1** | -0.7774 | 0.081 | -9.569 | 0.000 | -0.937 | -0.618 |
| **sigma2** | 0.5949 | 0.042 | 14.005 | 0.000 | 0.512 | 0.678 |

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| **Ljung-Box (Q):** | 204.31 | **Jarque-Bera (JB):** | 33.61 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.47 | **Skew:** | -0.57 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 4.57 |

# Adversity

## SARIMAX

|  |  |  |  |
| --- | --- | --- | --- |
| **Dep. Variable:** | Adversity\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 1, 1)x(1, 0, 1, 12) | **Log Likelihood** | -236.160 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 484.320 |
| **Time:** | 19:56:19 | **BIC** | 504.516 |
| **Sample:** | 11-22-2012 | **HQIC** | 492.481 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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| --- | --- | --- | --- | --- | --- | --- |
|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1088 | 0.015 | -7.285 | 0.000 | -0.138 | -0.079 |
| **ar.L1** | 0.0893 | 0.118 | 0.759 | 0.448 | -0.141 | 0.320 |
| **ma.L1** | -0.7094 | 0.080 | -8.913 | 0.000 | -0.865 | -0.553 |
| **ar.S.L12** | 0.8322 | 0.151 | 5.521 | 0.000 | 0.537 | 1.128 |
| **ma.S.L12** | -0.9937 | 1.055 | -0.942 | 0.346 | -3.061 | 1.074 |
| **sigma2** | 0.5054 | 0.485 | 1.041 | 0.298 | -0.446 | 1.457 |

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| **Ljung-Box (Q):** | 140.91 | **Jarque-Bera (JB):** | 280.82 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.31 | **Skew:** | -1.44 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 7.82 |

## SARIMA

|  |  |  |  |
| --- | --- | --- | --- |
| **Dep. Variable:** | Adversity\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 1, 1)x(1, 0, 1, 12) | **Log Likelihood** | -256.256 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 522.512 |
| **Time:** | 19:56:34 | **BIC** | 539.342 |
| **Sample:** | 11-22-2012 | **HQIC** | 529.313 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

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| --- | --- | --- | --- | --- | --- | --- |
|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **ar.L1** | 0.3614 | 0.147 | 2.453 | 0.014 | 0.073 | 0.650 |
| **ma.L1** | -0.7619 | 0.104 | -7.358 | 0.000 | -0.965 | -0.559 |
| **ar.S.L12** | 0.8726 | 0.167 | 5.223 | 0.000 | 0.545 | 1.200 |
| **ma.S.L12** | -0.9974 | 2.595 | -0.384 | 0.701 | -6.083 | 4.088 |
| **sigma2** | 0.6146 | 1.517 | 0.405 | 0.685 | -2.358 | 3.587 |

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| **Ljung-Box (Q):** | 141.75 | **Jarque-Bera (JB):** | 123.68 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.42 | **Skew:** | -1.12 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 5.97 |

## ARIMA

|  |  |  |  |
| --- | --- | --- | --- |
| **Dep. Variable:** | Total\_per\_House\_diff\_yr | **No. Observations:** | 215 |
| **Model:** | SARIMAX(1, 0, 0) | **Log Likelihood** | -246.223 |
| **Date:** | Fri, 27 Nov 2020 | **AIC** | 498.446 |
| **Time:** | 18:45:52 | **BIC** | 508.558 |
| **Sample:** | 11-22-2012 | **HQIC** | 502.531 |
|  | - 06-24-2013 |  |  |
| **Covariance Type:** | opg |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **coef** | **std err** | **z** | **P>|z|** | **[0.025** | **0.975]** |
| **Average\_Temperature\_diff\_yr** | -0.1337 | 0.018 | -7.303 | 0.000 | -0.170 | -0.098 |
| **ar.L1** | 0.7617 | 0.033 | 23.354 | 0.000 | 0.698 | 0.826 |
| **sigma2** | 0.5761 | 0.042 | 13.823 | 0.000 | 0.494 | 0.658 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Ljung-Box (Q):** | 244.40 | **Jarque-Bera (JB):** | 42.12 |
| **Prob(Q):** | 0.00 | **Prob(JB):** | 0.00 |
| **Heteroskedasticity (H):** | 0.48 | **Skew:** | -0.21 |
| **Prob(H) (two-sided):** | 0.00 | **Kurtosis:** | 5.13 |