# Supplemental Information: Weather impact on racial composition and citation activity of traffic stops in the United States

The following document presents supplemental analysis. All data and code to recreate the analysis in the paper is available at https://www.github.com/trafficstops/Paper.

## Robustness checks regarding weather disaggregation

For data main results in the manuscript, we have used the "deterministic" approached presented in Ormsbee (1989). This section uses the "stochastic" approach including for the 20-minute interval. Our results are robust to a different method in distributing the precipitation data over the interval of one hour.

**City data and 20-min intervals**

```
##
## ================================================================================
##                                    Dependent variable:
##                    -------------------------------------------------------------
##                                          black
##                    (1)         (2)         (3)         (4)         (5)         (6)
## -------------------------------------------------------------------------------
## night              0.002       0.005       -0.0001     -0.0003     -0.0003     0.003
##                    (0.008)     (0.008)     (0.008)     (0.008)     (0.008)     (0.009)
## sto20              0.034*      0.100***    0.035*                  -1.756**    -0.899
##                    (0.020)     (0.026)     (0.020)                 (0.884)     (0.919)
## night:sto20                    -0.160***                                      -0.148***
##                                (0.040)                                        (0.042)
## tempk                                      -0.0004     -0.0004     -0.001      -0.0004
##                                            (0.001)     (0.001)     (0.001)     (0.001)
## sto20:tempk                                                        0.006**     0.003
##                                                                    (0.003)     (0.003)
## Constant           0.091       0.090       0.208       0.199       0.241       0.208
##                    (0.192)     (0.192)     (0.244)     (0.244)     (0.245)     (0.245)
## -------------------------------------------------------------------------------
## Observations       458,976     458,976     458,976     458,976     458,976     458,976
## Log Likelihood     -278,012.500 -278,004.700 -278,012.200 -278,013.700 -278,010.100 -278,003.900
## Akaike Inf. Crit.  556,137.000 556,123.400 556,138.400 556,139.400 556,136.300 556,125.800
## ================================================================================
## Note:                                              *p<0.1; **p<0.05; ***p<0.01
```

2

City data and 15-min intervals

```
## 
## ===============================================================================
##                                   Dependent variable:
##                 ---------------------------------------------------------------
##                                          black
##                   (1)        (2)        (3)        (4)        (5)        (6)
## -------------------------------------------------------------------------------
## night           0.002      0.005     -0.0001    -0.0003    -0.0003     0.003
##                 (0.008)    (0.008)    (0.008)    (0.008)    (0.008)    (0.009)
## sto15           0.047*     0.126***   0.047*                -2.302**   -1.251
##                 (0.026)    (0.035)    (0.026)               (1.161)    (1.208)
## night:sto15                -0.194***                                  -0.177***
##                            (0.053)                                     (0.055)
## tempk                                 -0.0004    -0.0004    -0.001     -0.0004
##                                       (0.001)    (0.001)    (0.001)    (0.001)
## sto15:tempk                                                 0.008**    0.005
##                                                             (0.004)    (0.004)
## Constant        0.091      0.090      0.208      0.199      0.241      0.211
##                 (0.192)    (0.192)    (0.244)    (0.244)    (0.245)    (0.245)
## -------------------------------------------------------------------------------
## Observations    458,976    458,976    458,976    458,976    458,976    458,976
## Log Likelihood  -278,012.300 -278,005.700 -278,012.000 -278,013.700 -278,010.000 -278,004.800
## Akaike Inf. Crit. 556,136.700 556,125.400 556,138.100 556,139.400 556,136.000 556,127.600
## ===============================================================================
## Note:                                              *p<0.1; **p<0.05; ***p<0.01
```

**City data and 10-min intervals**

```
## 
## ================================================================================
##                                           Dependent variable:
##                       ----------------------------------------------------------
##                                                 black
##                         (1)         (2)         (3)         (4)         (5)         (6)
## -------------------------------------------------------------------------------
## night                  0.002       0.005      -0.0001     -0.0003     -0.0004      0.003
##                        (0.008)     (0.008)     (0.008)     (0.008)     (0.008)     (0.009)
## sto10                  0.066*      0.194***    0.067*                  -3.529**    -1.905
##                        (0.039)     (0.052)     (0.039)                 (1.746)     (1.812)
## night:sto10                       -0.309***                                       -0.285***
##                                    (0.080)                                         (0.082)
## tempk                                         -0.0004     -0.0004     -0.001      -0.0004
##                                                (0.001)     (0.001)     (0.001)     (0.001)
## sto10:tempk                                                            0.012**     0.007
##                                                                        (0.006)     (0.006)
## Constant               0.091       0.090       0.208       0.199       0.241       0.210
##                        (0.192)     (0.192)     (0.244)     (0.244)     (0.245)     (0.245)
## -------------------------------------------------------------------------------
## Observations           458,976     458,976     458,976     458,976     458,976     458,976
## Log Likelihood     -278,012.500 -278,005.000 -278,012.200 -278,013.700 -278,010.100 -278,004.100
## Akaike Inf. Crit.   556,137.000  556,124.100  556,138.400  556,139.400  556,136.200  556,126.300
## ================================================================================
## Note:                                                    *p<0.1; **p<0.05; ***p<0.01
```

4

**State data and 20-min intervals**

```
## 
## ==============================================================================
##                                       Dependent variable:                    
##                   ------------------------------------------------------------
##                                             black                             
##                   (1)         (2)         (3)         (4)         (5)         (6)
## -----------------------------------------------------------------------------
## night           -0.018**    -0.018**    -0.002      -0.002      -0.002      -0.003
##                 (0.007)     (0.007)     (0.007)     (0.007)     (0.007)     (0.007)
## sto20            0.017       0.011       0.003                  -3.475***   -3.699***
##                 (0.028)     (0.037)     (0.028)                 (1.111)     (1.147)
## night:sto20                  0.014                                           0.046
##                             (0.056)                                         (0.057)
## tempk                                    0.004***    0.004***    0.004***    0.004***
##                                         (0.0004)    (0.0004)    (0.0004)    (0.0004)
## sto20:tempk                                                      0.012***    0.013***
##                                                                 (0.004)     (0.004)
## Constant        -4.447***   -4.447***   -5.519***   -5.520***   -5.496***   -5.493***
##                 (0.710)     (0.710)     (0.721)     (0.721)     (0.721)     (0.721)
## -----------------------------------------------------------------------------
## Observations    981,192     981,192     981,192     981,192     981,192     981,192
## Log Likelihood  -403,316.200 -403,316.100 -403,279.400 -403,279.400 -403,274.500 -403,274.200
## Akaike Inf. Crit. 806,698.300 806,700.300 806,626.900 806,624.900 806,619.000 806,620.300
## ==============================================================================
## Note:                                                    *p<0.1; **p<0.05; ***p<0.01
```

**State data and 15-min intervals**

```
## 
## ================================================================================
##                                    Dependent variable:                          
##               ----------------------------------------------------------------- 
##                                           black                                  
##                   (1)         (2)         (3)         (4)         (5)         (6)    
## -------------------------------------------------------------------------------- 
## night          -0.018**    -0.018**     -0.002      -0.002      -0.002      -0.003   
##                 (0.007)     (0.007)     (0.007)     (0.007)     (0.007)     (0.007)  
## sto15            0.037       0.027       0.018                  -4.360***   -4.694***
##                 (0.036)     (0.048)     (0.036)                 (1.459)     (1.513)  
## night:sto15                  0.021                                           0.065   
##                             (0.073)                                         (0.075)  
## tempk                                  0.004***    0.004***    0.004***    0.004***  
##                                        (0.0004)    (0.0004)    (0.0004)    (0.0004)  
## sto15:tempk                                                    0.015***    0.016***  
##                                                                (0.005)     (0.005)   
## Constant       -4.447***   -4.447***   -5.516***   -5.520***   -5.495***   -5.491*** 
##                 (0.710)     (0.710)     (0.721)     (0.721)     (0.721)     (0.721)  
## -------------------------------------------------------------------------------- 
## Observations    981,192     981,192     981,192     981,192     981,192     981,192  
## Log Likelihood -403,315.900 -403,315.800 -403,279.300 -403,279.400 -403,274.800 -403,274.400
## Akaike Inf. Crit. 806,697.700 806,699.600 806,626.600 806,624.900 806,619.600 806,620.800
## ================================================================================
## Note:                                                 *p<0.1; **p<0.05; ***p<0.01
```

**State data and 10-min intervals**

```
## 
## ================================================================================
##                                        Dependent variable:
##                   -------------------------------------------------------------------
##                                              black
##                    (1)          (2)          (3)          (4)          (5)          (6)
## --------------------------------------------------------------------------------------
## night            -0.018**     -0.018**     -0.002       -0.002       -0.002       -0.003
##                  (0.007)      (0.007)      (0.007)      (0.007)      (0.007)      (0.007)
## sto10             0.042        0.030        0.014                    -6.844***    -7.298***
##                  (0.055)      (0.073)      (0.055)                   (2.199)      (2.274)
## night:sto10                    0.027                                              0.091
##                               (0.110)                                            (0.112)
## tempk                                       0.004***     0.004***     0.004***     0.004***
##                                            (0.0004)     (0.0004)     (0.0004)     (0.0004)
## sto10:tempk                                                           0.024***     0.025***
##                                                                      (0.008)      (0.008)
## Constant         -4.447***    -4.447***    -5.518***    -5.520***    -5.496***    -5.493***
##                  (0.710)      (0.710)      (0.721)      (0.721)      (0.721)      (0.721)
## --------------------------------------------------------------------------------------
## Observations      981,192      981,192      981,192      981,192      981,192      981,192
## Log Likelihood  -403,316.100 -403,316.000 -403,279.400 -403,279.400 -403,274.500 -403,274.200
## Akaike Inf. Crit. 806,698.200  806,700.100  806,626.800  806,624.900  806,619.000  806,620.300
## ================================================================================
## Note:                                                        *p<0.1; **p<0.05; ***p<0.01
```

## Robustness checks regarding rain versus precipitation

The results in the main paper are based on precipitation which includes all forms (e.g., rain, sleet, snow). In this section, we exclude all traffic stops that were conducted below 5 degrees Celsius to ensure that only rain is measured. Again, the results are robust and overlap with results presented in the main text.

**City data**

```
##
## ===============================================================================
##                                    Dependent variable:
##                   -------------------------------------------------------------
##                                            black
##                   (1)         (2)         (3)         (4)         (5)         (6)
## -------------------------------------------------------------------------------
## night            -0.004      -0.001      -0.005      -0.006      -0.006      -0.003
##                  (0.009)     (0.009)     (0.009)     (0.009)     (0.009)     (0.009)
## det              0.039**     0.085***    0.039**                 -1.681      -1.116
##                  (0.019)     (0.024)     (0.019)                 (1.023)     (1.056)
## night:det                    -0.126***                                      -0.117***
##                              (0.039)                                        (0.040)
## tempk                                    -0.001      -0.001      -0.001      -0.001
##                                          (0.001)     (0.001)     (0.001)     (0.001)
## det:tempk                                                        0.006*      0.004
##                                                                  (0.004)     (0.004)
## Constant         0.207       0.206       0.363       0.356       0.406       0.375
##                  (0.225)     (0.225)     (0.312)     (0.312)     (0.313)     (0.313)
## -------------------------------------------------------------------------------
## Observations     374,366     374,366     374,366     374,366     374,366     374,366
## Log Likelihood  -228,855.300 -228,850.200 -228,855.100 -228,857.300 -228,853.700 -228,849.400
## Akaike Inf. Crit. 457,822.700 457,814.500 457,824.200 457,826.600 457,823.300 457,816.800
## ===============================================================================
## Note:                                                  *p<0.1; **p<0.05; ***p<0.01
```

8

**State data**

```
## 
## ================================================================================
##                                          Dependent variable:
##                          -------------------------------------------------------------------
##                                                 black
##                          (1)         (2)        (3)         (4)         (5)         (6)
## --------------------------------------------------------------------------------------------
## night                  0.0003      0.0003      0.009       0.009       0.009       0.009
##                        (0.008)     (0.008)    (0.008)     (0.008)     (0.008)     (0.008)
## det                     0.020       0.019      0.017                  -2.180*     -2.292*
##                        (0.026)     (0.035)    (0.026)                 (1.291)     (1.326)
## night:det                          0.004                                          0.020
##                                    (0.053)                                       (0.054)
## tempk                                         0.002***    0.002***    0.002***    0.002***
##                                               (0.001)     (0.001)     (0.001)     (0.001)
## det:tempk                                                             0.008*      0.008*
##                                                                       (0.004)     (0.005)
## Constant              -4.921***   -4.921***   -5.598***   -5.602***   -5.573***   -5.570***
##                        (0.992)     (0.992)    (1.009)     (1.008)     (1.009)     (1.009)
## --------------------------------------------------------------------------------------------
## Observations          735,020     735,020     735,020     735,020     735,020     735,020
## Log Likelihood     -317,391.200 -317,391.200 -317,384.200 -317,384.400 -317,382.700 -317,382.600
## Akaike Inf. Crit.   634,848.300  634,850.300  634,836.300  634,834.700  634,835.400  634,837.300
## ================================================================================
## Note:                                                    *p<0.1; **p<0.05; ***p<0.01
```