

## Technical Appendix

### Survey Questions

1. In which city and for what agency do you work?
2. What is your role in a local government or governmental agency?
3. Please indicate the extent to which you agree with the below statements (Likert scale—strongly disagree to strongly agree)
  - a. AVs will fundamentally transform transportation in my city for the better
  - b. I believe AVs should be regulated at the municipal level
  - c. I am worried that AVs could pose a serious risk to my city and its citizens
  - d. I believe that AVs will improve the quality of life in my city
  - e. I anticipate public opposition to the introduction of AVs in my city
  - f. I anticipate bureaucratic opposition to the introduction of AVs in my city
  - g. I anticipate political opposition to the introduction of AVs in my city
4. Roughly how many people are employed full-time in your department?
5. What departments or agencies are responsible for AV policy and/or regulation in your city?
6. When do you expect individuals in your city to be able to hail fully automated vehicles (with no test driver) for passenger service?
7. How do you think AVs are likely to change the following in your city? (Likert scale—decrease a lot to increase a lot)
  - a. VMT
  - b. Number of cars on the road
  - c. Traffic congestion
  - d. Personal transportation costs
  - e. Transportation safety
  - f. Transit ridership
  - g. Walking and biking
  - h. Local government revenues
  - i. Employment (transportation)
  - j. Employment (general)
  - k. Class and racial segregation
  - l. Sprawling land uses
  - m. Social equity (mobility)
  - n. Social equity (general)
  - o. Energy use
  - p. Air pollution

8. How well prepared is your organization for the arrival of AVs? (Likert scale—strongly disagree to strongly agree)
  - a. I believe my city is well prepared for AVs
  - b. AV policy is a priority for my city
  - c. It is clear who is responsible for AVs in my city
  - d. My city has developed a clear policy for how to incorporate AVs onto its streets
  - e. My city is waiting for federal and/or state legislation to pursue our own AV policies
  - f. My city treats AVs as a mechanism to make broad policy changes beyond transportation
  - g. My city has a clear plan to regulate AVs
  - h. It is a priority for my city to be at the forefront of technological innovation
  
9. How much time have officials devoted to crafting AV-related policies:
  - a. How much time have city staff debated to developing policies related to AVs?
  - b. How much time have elected officials devoted to developing policies related to AVs?
  
10. Rank these goals in terms of your position as a municipal leader:
  - a. Mobility
  - b. Economic development
  - c. Environmental sustainability
  - d. Efficiency
  - e. Equity
  - f. Safety
  - g. Technological innovation

## **Regressions**

We conducted the regressions presented in Tables A-1, A-2, A-3, and A-4 in multiple ways, only some of which are presented here. We tested all covariates in Table 2, but eliminated from calculations those that were producing high levels of collinearity, such as jobs and population (correlation of 0.99) or density and share of people commuting by transit (correlation of 0.85), or that we did not contribute meaningfully to our understanding of what might induce a city to act one way or another with regards to transportation, such as racial categories. An anonymous reviewer recommended that we use probit models, the results of which we show, but we also conducted logistic regressions, which produced similar outcomes. In addition, we evaluated models with dummy variables for the regions where the cities are located, also on the advice of a reviewer, but found similar results with and without those, and thus have chosen simplicity and not included them here.

To examine Hypothesis 3 we substituted a numeric score for each official's views on whether AVs posed a risk and whether they will face public, bureaucratic, or political opposition (−2 to +2, from strongly disagree to strongly agree). In addition, we created and measured the impact of several variables that assess views on AV risks, such as whether they will increase traffic, reduce equity, or threaten the environment, based on a combination of responses to several related questions mentioned previously. We incorporated the same variables used in the first set of regressions (Tables A-1 and A-2) in several models in Tables A-3 and A-4, in some cases combining questions about opposition and risk in the same regressions (Models 5 and 10).

The variable in Tables A-3 and A-4 assessing concerns about traffic summed each individual's responses about changes in VMT, congestion, and number of cars on the road (each on a -2 to +2 scale, from decrease a lot to increase a lot). That assessing equity summed responses about changes to segregation, equity in mobility (inversed), and equity overall (inversed). That assessing the environment summed responses about changes in sprawl, pollution, and energy consumption.

**Table A-1. Ordered probit models: Preparations for AVs**

| Variable                                     | City is well prepared for AVs |                 | AV policy is a priority |                    | Responsibility is clear |                    | Waiting for federal or state legislation |                 |
|--|-------------------------------|-----------------|-------------------------|--------------------|-------------------------|--------------------|--|-----------------|
|  | (1)                           | (2)             | (3)                     | (4)                | (5)                     | (6)                | (7)                                      | (8)             |
| Per capita expenditures                      | 0.30 (0.19)                   | 0.42 (0.21)**   | 0.29 (0.25)             | 0.38 (0.27)        | 0.09<br>(0.20)          | 0.15 (0.21)        | 0.03 (0.21)                              | 0.10 (0.25)     |
| Political ideology                           | -0.09 (0.23)                  | -0.20 (0.32)    | -0.24 (0.23)            | -0.18<br>(0.29)    | -0.10<br>(0.22)         | 0.01 (0.31)        | -0.09 (0.20)                             | -0.45 (0.25)*   |
| Department employees<br>(log)                | 0.06 (0.21)                   | -0.26 (0.27)    | 0.05 (0.20)             | -0.35<br>(0.25)    | 0.31<br>(0.20)          | -0.08<br>(0.23)    | 0.19 (0.19)                              | 0.15 (0.25)     |
| Population (log)                             | -0.04 (0.18)                  | 0.09 (0.20)     | 0.44 (0.24)*            | 0.64<br>(0.27)**   | 0.20<br>(0.17)          | 0.35<br>(0.19)*    | -0.65<br>(0.19)***                       | -0.58 (0.21)*** |
| Population change                            |                               | 0.71 (0.24)***  |                         | 0.83<br>(0.23)***  |                         | 0.70<br>(0.27)**   |  | -0.20 (0.17)    |
| Share of adults with BA<br>degrees or higher |                               | 0.07 (0.24)     |                         | 0.48<br>(0.26)*    |                         | 0.33 (0.26)        |  | -0.32 (0.26)    |
| Median household<br>income (log)             |                               | -0.11 (0.27)    |                         | -0.49<br>(0.27)*   |                         | -0.27<br>(0.28)    |  | 0.22 (0.24)     |
| Population density (log)                     |                               | 0.01 (0.24)     |                         | 0.10 (0.23)        |                         | 0.27 (0.27)        |  | -0.70 (0.26)*** |
| Member of planning<br>department (dummy)     |                               | -0.37 (0.22)    |                         | -0.47<br>(0.22)**  |                         | -0.52<br>(0.21)**  |  | -0.12 (0.21)    |
| <b>Thresholds</b>                            |                               |                 |                         |                    |                         |                    |  |                 |
| Strongly disagree  <br>Somewhat disagree     | -0.68 (0.11)***               | -0.91 (0.17)*** | -0.60<br>(0.11)***      | -0.89<br>(0.16)*** | -0.52<br>(0.11)***      | -0.83<br>(0.15)*** | -1.39<br>(0.15)***                       | -1.50 (0.19)*** |
| Somewhat disagree  <br>Neutral               | 0.31 (0.10)***                | 0.11 (0.16)     | 0.16 (0.10)             | -0.08<br>(0.15)    | 0.25<br>(0.10)**        | -0.02<br>(0.14)    | -0.77<br>(0.11)***                       | -0.86 (0.17)*** |
| Neutral   Somewhat<br>agree                  | 0.85 (0.12)***                | 0.67 (0.17)***  | 0.60<br>(0.11)***       | 0.37<br>(0.15)**   | 0.65<br>(0.11)***       | 0.41<br>(0.15)***  | -0.01 (0.10)                             | -0.07 (0.15)    |
| Somewhat agree  <br>Strongly agree           | 2.09 (0.24)***                | 2.08 (0.27)***  | 1.43<br>(0.15)***       | 1.30<br>(0.18)***  | 1.38<br>(0.16)***       | 1.18<br>(0.19)***  | 1.26<br>(0.14)***                        | 1.27 (0.17)***  |
| <b>Model</b>                                 |                               |                 |                         |                    |                         |                    |  |                 |
| <i>n</i>                                     | 152                           | 152             | 152                     | 152                | 152                     | 152                | 152                                      | 152             |
| <i>Log-likelihood</i>                        | -212.12                       | -205.78         | -223.89                 | -213.61            | -226.75                 | -218.85            | -216.02                                  | -210.30         |

**Notes:** Standardized coefficients shown to provide comparison between variables; robust standard errors in parentheses.

\*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

**Table A-2. Average marginal effects for ordered probit models: Preparations for AVs**

| Variable                                  | City is well prepared for AVs |          | AV policy is a priority |           | Responsibility is clear |           | Waiting for federal or state legislation |           |
|---|-------------------------------|----------|-------------------------|-----------|-------------------------|-----------|--|-----------|
|   | (1)                           | (2)      | (3)                     | (4)       | (5)                     | (6) X     | (7)                                      | (8)       |
| Per capita expenditures                   | 0.69%                         | 0.94%**  | 0.36%                   | 0.46%     | 0.13%                   | 0.21%     | 0.03%                                    | 0.07%     |
| Political ideology                        | -0.13%                        | -0.28%   | -0.18%                  | -0.12%    | -0.08%                  | 0.01%     | -0.05%                                   | -0.27%    |
| Department employees (log)                | 0.06%                         | -0.27%   | 0.04%                   | -0.23%    | 0.22%                   | -0.05%    | 0.06%                                    | 0.05%     |
| Population (log)                          | -0.07%                        | 0.16%    | 0.56%*                  | 0.74%**   | 0.25%                   | 0.42*     | -0.42%***                                | -0.36%*** |
| Population change                         |                               | 0.38%*** |                         | 0.25%***  |                         | 0.20%**   |  | -0.06%    |
| Share of adults with BA degrees or higher |                               | 0.26%    |                         | 1.11%*    |                         | 0.80%     |  | -0.48%    |
| Median household income (log)             |                               | -0.56%   |                         | -1.56%*   |                         | -0.88%    |  | 0.31%     |
| Population density (log)                  |                               | 0.02%    |                         | 0.14%     |                         | 0.40%     |  | -0.54%*** |
| Member of planning department (dummy)     |                               | -11.35%  |                         | -10.11%** |                         | -11.12%** |  | -1.42%    |

**Notes:** Models are the same as those presented in Table A-1. Average marginal effects indicate the effects of a 10% increase in that variable (except for member of planning department, which is the effect of moving from not being a member to being a member) on an individual's probability of agreeing in response to each question (e.g., a 10% increase in a city's per capita expenditures is associated with a 0.51 percentage-point increase in an official from that city agreeing about that city being well prepared for AVs). Unlike the coefficients presented in Table A-1, these are not standardized across variables and thus the magnitude of each coefficient should not be compared directly with one another.

\*\*\* $p < 0.01$  ; \*\* $p < 0.05$  ; \* $p < 0.1$

**Table A-3. Ordered probit models: Do expected local opposition and perceptions of negative impacts from AVs affect policymaking?**

| Variable                      | AV policy is a municipal priority |                    |                      |                       |                    | AVs should be regulated by municipality |                  |                   |                   |                   |
|-------------------------------|-----------------------------------|--------------------|----------------------|-----------------------|--------------------|---|------------------|-------------------|-------------------|-------------------|
|                               | (1)                               | (2)                | (3)                  | (4)                   | (5)                | (6)                                     | (7)              | (8)               | (9)               | (10)              |
| Public opposition             | 0.14<br>(0.22)                    | 0.19<br>(0.24)     |                      |                       | 0.14 (0.25)        | 0.18<br>(0.20)                          | 0.34 (0.22)      |                   |                   | 0.38 (0.21)*      |
| Bureaucratic opposition       | -0.30<br>(0.25)                   | -0.21<br>(0.28)    |                      |                       | 0.02 (0.30)        | 0.30<br>(0.23)                          | 0.34 (0.21)      |                   |                   | 0.19 (0.23)       |
| Political opposition          | -0.69<br>(0.28)**                 | -0.89<br>(0.28)*** |                      |                       | -0.99<br>(0.29)*** | 0.07<br>(0.26)                          | -0.01<br>(0.24)  |                   |                   | -0.08 (0.25)      |
| AVs pose a risk               |                                   |                    | -0.15<br>(0.19)      | -0.19<br>(0.20)       | -0.02 (0.22)       |   |                  | 0.95<br>(0.22)*** | 0.91<br>(0.23)*** | 0.83<br>(0.23)*** |
| AVs will increase traffic     |                                   |                    | 0.44<br>(0.21)*<br>* | 0.30<br>(0.22)        | 0.19 (0.24)        |   |                  | -0.11<br>(0.22)   | -0.24 (0.23)      | -0.21 (0.23)      |
| AVs will reduce equity        |                                   |                    | -0.21<br>(0.20)      | -0.32<br>(0.22)       | -0.21 (0.21)       |   |                  | 0.13<br>(0.21)    | 0.09 (0.23)       | 0.06 (0.22)       |
| AVs will threaten environment |                                   |                    | -0.31<br>(0.23)      | -0.19<br>(0.23)       | -0.26 (0.24)       |   |                  | 0.11<br>(0.22)    | 0.21 (0.23)       | 0.23 (0.24)       |
| Population (log)              |                                   | 0.69<br>(0.25)***  |                      | 0.60<br>(0.29)**      | 0.65<br>(0.27)**   |   | 0.48<br>(0.20)** |                   | 0.32 (0.20)       | 0.38 (0.21)*      |
| Political ideology            |                                   | -0.13<br>(0.29)    |                      | -0.19<br>(0.29)       | -0.08 (0.30)       |   | 0.05 (0.30)      |                   | 0.11 (0.30)       | 0.15 (0.31)       |
| Population change             |                                   | 0.83<br>(0.24)***  |                      | 0.81<br>(0.23)**<br>* | 0.81<br>(0.25)***  |   | -0.49<br>(1.07)  |                   | -0.66 (1.13)      | -0.43 (1.17)      |
| Department employees (log)    |                                   | -0.34<br>(0.25)    |                      | -0.30<br>(0.26)       | -0.31 (0.27)       |   | 0.12 (0.23)      |                   | 0.23 (0.22)       | 0.23 (0.22)       |
| Per-capita expenditures       |                                   | 0.42<br>(0.23)*    |                      | 0.41<br>(0.28)        | 0.47 (0.25)*       |   | 0.13 (0.22)      |                   | 0.08 (0.21)       | 0.10 (0.22)       |

| Variable                                  | AV policy is a municipal priority |                    |                        |                        |                    | AVs should be regulated by municipality |                    |                    |                    |                    |
|---|-----------------------------------|--------------------|------------------------|------------------------|--------------------|---|--------------------|--------------------|--------------------|--------------------|
|   | (1)                               | (2)                | (3)                    | (4)                    | (5)                | (6)                                     | (7)                | (8)                | (9)                | (10)               |
| Share of adults with BA degrees or higher |                                   | 0.50<br>(0.26)*    |                        | 0.48<br>(0.25)*        | 0.57<br>(0.27)**   |   | 0.11 (0.29)        |                    | 0.21 (0.28)        | 0.23 (0.29)        |
| Median household income (log)             |                                   | -0.51<br>(0.28)*   |                        | -0.52<br>(0.27)*       | -0.56<br>(0.29)*   |   | -0.30<br>(0.25)    |                    | -0.34 (0.26)       | -0.40 (0.26)       |
| Population density (log)                  |                                   | 0.21<br>(0.23)     |                        | 0.14<br>(0.23)         | 0.25 (0.24)        |   | 0.45<br>(0.23)*    |                    | 0.44 (0.24)*       | 0.50 (0.25)*       |
| Member of planning department (dummy)     |                                   | -0.51<br>(0.22)**  |                        | -0.43<br>(0.23)*       | -0.48<br>(0.24)**  |   | 0.10 (0.21)        |                    | 0.04 (0.21)        | 0.07 (0.21)        |
| <b>Thresholds</b>                         |                                   |                    |                        |                        |                    |   |                    |                    |                    |                    |
| Strongly disagree   Somewhat disagree     | -0.61<br>(0.11)**<br>*            | -0.97<br>(0.16)*** | -0.58<br>(0.11)*<br>** | -0.88<br>(0.16)**<br>* | -0.97<br>(0.17)*** | -0.91<br>(0.11)**<br>*                  | -0.84<br>(0.15)*** | -0.95<br>(0.13)*** | -0.92<br>(0.15)*** | -0.93<br>(0.16)*** |
| Somewhat disagree   Neutral               | 0.17<br>(0.10)                    | -0.08<br>(0.16)    | 0.16<br>(0.10)         | -0.06<br>(0.16)        | -0.05 (0.16)       | -0.20<br>(0.10)**                       | -0.10<br>(0.14)    | -0.22<br>(0.11)**  | -0.17 (0.14)       | -0.17 (0.15)       |
| Neutral   Somewhat agree                  | 0.62<br>(0.11)**<br>*             | 0.43<br>(0.16)***  | 0.60<br>(0.11)*<br>**  | 0.43<br>(0.16)**<br>*  | 0.48<br>(0.17)***  | 0.20<br>(0.10)**                        | 0.31<br>(0.14)**   | 0.19<br>(0.10)*    | 0.27 (0.14)*       | 0.28 (0.14)**      |
| Somewhat agree   Strongly agree           | 1.45<br>(0.15)**<br>*             | 1.42<br>(0.19)***  | 1.37<br>(0.15)*<br>**  | 1.34<br>(0.20)**<br>*  | 1.46<br>(0.20)***  | 1.07<br>(0.12)**<br>*                   | 1.22<br>(0.18)***  | 1.13<br>(0.14)***  | 1.25<br>(0.19)***  | 1.29<br>(0.18)***  |
| <b>Model</b>                              |                                   |                    |                        |                        |                    |   |                    |                    |                    |                    |
| <i>n</i>                                  | 157                               | 152                | 153                    | 148                    | 148                | 175                                     | 153                | 153                | 148                | 148                |
| <i>Log-likelihood</i>                     | -230.37                           | -201.72            | -231.84                | -205.03                | -194.56            | -272.26                                 | -226.37            | -227.41            | -211.57            | -208.87            |

**Notes:** Standardized coefficients shown to provide comparison between variables; robust standard errors in parentheses.

\*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

**Table A-4. Average marginal effects for ordered probit models: Do expected local opposition and perceptions of negative impacts from AVs impact policymaking?**

| Variable                                  | AV policy is a municipal priority |           |         |          |           | AVs should be regulated by municipality |         |           |           |           |
|---|-----------------------------------|-----------|---------|----------|-----------|---|---------|-----------|-----------|-----------|
|   | (1)                               | (2)       | (3)     | (4)      | (5)       | (6)                                     | (7)     | (8)       | (9)       | (10)      |
| Public opposition                         | 0.16%                             | 0.11%     |         |          | 0.08%     | 0.03%                                   | 0.06%   |           |           | 0.05%*    |
| Bureaucratic opposition                   | -0.26%                            | -0.02%    |         |          | 0.00%     | -0.12%                                  | -0.10%  |           |           | -0.06%    |
| Political opposition                      | -0.79%**                          | -0.16%*** |         |          | -0.18%*** | -0.02%                                  | 0.00%   |           |           | 0.02%     |
| AVs pose a risk                           |                                   |           | 0.03%   | 0.04%    | 0.01%     |   |         | -0.85%*** | -0.75%*** | -0.66%*** |
| AVs will increase traffic                 |                                   |           | 0.01%** | 0.01%    | -0.01%    |   |         | 0.01%     | 0.02%     | 0.01%     |
| AVs will reduce equity                    |                                   |           | 0.00%   | -0.02%   | -0.00%    |   |         | -0.04%    | -0.02%    | -0.01%    |
| AVs will threaten environment             |                                   |           | -0.03%  | -0.01%   | 0.02%     |   |         | -0.02%    | -0.04%    | -0.03%    |
| Population (log)                          |                                   | 0.72%***  |         | 0.69%**  | 0.65%**   |   | 0.41%** |           | 0.25%     | 0.30%*    |
| Political ideology                        |                                   | -0.08%    |         | -0.13%   | -0.05%    |   | 0.02    |           | 0.03%     | 0.05%     |
| Population change                         |                                   | 0.23%***  |         | 0.25%*** | 0.20%***  |   | -0.04%  |           | -0.05%    | -0.03%    |
| Department employees (log)                |                                   | -0.20%    |         | -0.19%   | -0.18%    |   | 0.06%   |           | 0.10%     | 0.10%     |
| Per capita expenditures                   |                                   | 0.43%*    |         | 0.49%    | 0.47%*    |   | 0.10%   |           | 0.06%     | 0.07%     |
| Share of adults with BA degrees or higher |                                   | 1.02%*    |         | 1.10%*   | 1.14%**   |   | 0.21%   |           | 0.36%     | 0.40%     |
| Median household income (log)             |                                   | -1.46%*   |         | -1.60%*  | -1.54%*   |   | -0.70%  |           | -0.75%    | -0.87%    |
| Population density (log)                  |                                   | 0.26%     |         | 0.20%    | 0.30%     |   | 0.46%** |           | 0.42%*    | 0.47%*    |

| Variable                              | AV policy is a municipal priority |         |     |        |          | AVs should be regulated by municipality |       |     |       |       |
|---------------------------------------|-----------------------------------|---------|-----|--------|----------|---|-------|-----|-------|-------|
|                                       | (1)                               | (2)     | (3) | (4)    | (5)      | (6)                                     | (7)   | (8) | (9)   | (10)  |
| Member of planning department (dummy) |                                   | -9.77%* |     | 9.07%* | -9.09%** |   | 1.32% |     | 0.49% | 0.96% |

**Notes:** Models are the same as those presented in Table A-3. Average marginal effects indicate the effects of a 10% increase in that variable (except for member of planning department, which is the effect of moving from not being a member to being a member) on an individual's probability of agreeing in response to each question. Unlike the coefficients presented in Table A-3, these are not standardized across variables and thus the magnitude of each coefficient should not be compared directly with one another.

\*\*\* $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .