

The Effects of Pollution on Travel Mode Choice

A Thesis

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of
Master of Science

by

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August 2019

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ABSTRACT

For my Masters thesis, I analyze how air pollution affects travel mode decisions in China using a large and detailed hourly household-level data set on hourly household-level travel mode decisions in Beijing; and hourly air pollution, weather, wind speed, and wind direction in and around Beijing. I use machine learning, LASSO regressions, and atmospheric chemistry to select and construct instruments for air pollution to address its endogeneity. My selected instruments for air pollution include wind speeds at high altitude that disperse pollution and wind blowing from upwind industrial areas towards Beijing that may increase pollution. I compare the effects of air pollution on travel mode before and after China launched a nation-wide, real-time air quality monitoring and disclosure program. According to the results of my IV regressions for 2010, prior to the reform, air pollution makes people less likely to walk; and more likely to bicycle, take bus, take car, take subway, and take other modes of transport; and air pollution decreases both the number and share of household members in each household who took at least 1 trip that hour. In contrast, in 2014, after the reform, air pollution makes people more likely to walk and take a taxi; and less likely to bicycle, take bus, take car, take subway, and take other modes of transport; and air pollution increases the number of members in household who took at least 1 trip that hour.

BIOGRAPHICAL SKETCH

Dingyi Li was born in Beijing, China. He has held a sincere devotion to math and economics ever since he was a college student at Renmin University of China, where he was one of 20 participants selected for the Economics and Math dual degree program out of more than 500 students in his undergraduate class. The intellectual rigor of math and the power of using economics to understand the world are truly fascinating to him. After completing his undergraduate degree in math and economics at Renmin University and earning second place in his undergraduate class, Dingyi came to Cornell University to pursue his Master's degree in Applied Economics and Management in the environmental, energy, and resource economics concentration. Dingyi is interested in combining statistical learning with economic theory. Dingyi will be joining the Ph.D. program in Applied Economics and Management at Cornell University this Fall Semester 2019.

ACKNOWLEDGMENTS

To begin with, I would like to thank Prof. C.-Y. Cynthia Lin Lawell and Prof. Shanjun Li for being my advisors. They are helpful, informative, and knowledgeable. I have greatly appreciated all their help, mentorship, and advice throughout my thesis process, not only with research but also outside of research.

I would like to thank Avralt-Od Purevjav for his kindly help in arranging the data. Thanks to Prof. Yongmiao Hong for providing some potential topics about my thesis. I also appreciate Shuyang Si and Tong Wu for their helpful comments and discussions.

Last but not least, I would like to thank Shuo Yu and my parents for their unconditional love and support, and for always believing in me.

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1. Introduction

Air pollution is an important issue worldwide, particularly in developing countries, and has adverse impacts on human health and the environment. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks; irregular heartbeat; aggravated asthma; and decreased lung function and increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing (U.S. Environmental Protection Agency, 2019). There is a growing literature in economics that tries to quantify the causal impact of air pollution on health (Barwick, Li, Rao, Zahur, 2018 and references therein).

How air pollution influences human behavior is also of importance. Air pollution may influence human behavior by merely affecting one's mood; through the realization of and awareness to the harmfulness of the pollution; via physiological or health effects; and/or via environmental effects.

In this paper, we analyze the effect of air pollution on travel mode choice and behavior. Our focus is on China, where the daily average concentration of fine particulate matter (PM_{2.5}) is over 60 $\mu\text{g}/\text{m}^3$, or about six times of the World Health Organization guideline (Barwick, Li, Lin, and Zou, 2019). In 2013, China launched a nation-wide, real-time air quality monitoring and disclosure program, the first-of-its-kind in history. Until perhaps very shortly prior to the reform, there was a lack of awareness in air pollution exposure and people in China thought that the air pollution was merely “fog” (Barwick, Li, Lin, and Zou, 2019). We compare the effects of air pollution on travel mode in 2010, prior to the reform; as well as in 2014, after the reform.

Travel mode decisions are an important outcome to examine. China is experiencing rapid

economic growth and, along with it, rapid growth in vehicle ownership. This rapid increase in vehicle ownership and vehicle usage is associated with issues such as congestion, local air pollution, and global climate change (Lin and Zeng, 2014; Chen and Lin Lawell, 2019; Chen, Lin Lawell and Wang, 2019). As some argue that public transportation could help to lower air pollution, reduce noise levels, and ease traffic congestion (Apel, 1992), environmentalists have advocated for and some policy-makers have implemented policies to attract more people to take public transportation, instead of driving cars, to reduce pollution and congestion. Nevertheless, a contentious issue currently confronting transportation analysts and policy-makers is what the effects of public transit investment on traffic congestion and on air quality are, and therefore what the appropriate level of public transit investment should be (Beaudoin, Farzin and Lin Lawell, 2015; Beaudoin and Lin Lawell, 2017; Beaudoin and Lin Lawell, 2018). Under certain circumstances, however, due to substitution, the purchase of a second car, the use of alternative modes of transportation, and/or atmospheric chemistry, it is possible for license plate-based driving restrictions to increase rather than decrease air pollution (Zhang, Lin Lawell and Umanskaya, 2017).

Although it is widely believed that the congestion increases air pollution, there has been little research that focuses on the reverse causality that how air pollution influence people's travel decisions. If air pollution decreases the propensity to drive, then it is possible that policies that decrease air pollution will also help mitigate the congestion problem.

We analyze how air pollution affects travel mode decisions in China using a large and detailed hourly household-level data set on hourly household-level travel mode decisions in Beijing; and hourly air pollution, weather, wind speed, and wind direction in and around Beijing. We use machine learning, LASSO regressions, and atmospheric chemistry to select and construct

instruments for air pollution to address its endogeneity. Our selected instruments for air pollution include wind speeds at high altitude that disperse pollution and wind blowing from upwind industrial areas towards Beijing that may increase pollution.

Our results from using machine learning and LASSO regressions to select instruments, show that, for Beijing, wind speed at high altitude, wind blowing from polluted cities elsewhere, and wind speed and direction at other locations are more related to the endogenous pollution than traditional instruments such as temperature inversion.

We compare the effects of air pollution on travel mode before and after China launched a nation-wide, real-time air quality monitoring and disclosure program. According to the results of our IV regressions for 2010, prior to the reform, air pollution makes people less likely to walk; and more likely to bicycle, take bus, take car, take subway, and take other modes of transport; and air pollution decreases both the number and share of household members in each household who took at least 1 trip that hour. In contrast, in 2014, after the reform, air pollution makes people more likely to walk and take a taxi; and less likely to bicycle, take bus, take car, take subway, and take other modes of transport; and air pollution increases the number of members in household who took at least 1 trip that hour.

The balance of our paper proceeds as follows. We review the previous literature in Section 2. We describe our data in Section 3 and present exploratory plots in Section 4. We describe our empirical strategy in Section 5. We present our results in Section 6. Section 7 concludes.

2. Previous Literature

We build on the previous literature on the effects of pollution on travel behavior. It is widely believed air pollution is an obstacle to cycling as it has negative effects on cyclists' health outcomes

and deteriorates their cycling experiences. Empirical studies investigating the impact of air pollution on cycling behavior remains scarce, however. Zhao et al. (2018) conduct a survey of 307 cyclists in Beijing on the days with different levels of air quality in terms of concentration of PM_{2.5} in 2015. The results show that in the polluted weather, those who persist in cycling are more likely to be male, over 30 years old, lower income or those who travel short distances. A higher perception of comfort and safety is related to a higher possibility of continuing cycling when air quality became polluted. Cycling for commuting trips is less likely to be replaced by other modes than cycling for non-commuting trips, such as shopping.

Using administrative data from Sydney, Australia, Saberian, Heyes and Rivers (2017) find that when an air quality alert is issued, the amount of cycling is reduced by 14–35%, which is a substantial behavioral response, and that cycling is reduced more on leisure trips than on work trips.

Tribby et al. (2013) examine evidence for the effectiveness of air quality alert systems in reducing traffic over a 10-year period in Salt Lake and Davis counties, Utah, and find that while air quality alerts have some effectiveness for reducing traffic in the center city, these small reductions are exceeded by larger increases in traffic near the edge of the metropolitan area. These effects are stronger during the PM_{2.5} alert season than during the ozone alert season. These increases can be explained as discretionary trips by individuals escaping poor air quality by driving to the mountains.

We also build on the literature on the effects of air pollution in China. Many of these papers use temperature inversions as a source of instruments for air pollution to address its endogeneity.

Qin, Wu and Yan (2019) examine the immediate effect of air pollution in Beijing on housing purchase behavior, and find that the transaction prices on a severely polluted day are 0.65%

higher than those of the days without pollution, other things being equal.

He et al. (2019) examine day-to-day fluctuations in worker-level output at two manufacturing sites in China. Ambient fine-particle ($PM_{2.5}$) pollution is severe but significantly variable, largely due to exogenous atmospheric ventilation. They obtain an insignificant immediate output response from concurrent (same-shift) variation in particle pollution. They then allow worker outcomes to respond to day-to-day variation in pollution with up to 30 days of delay. They uncover statistically significant adverse output effects from more prolonged exposure, but effects are not large. A substantial $+10 \mu\text{g}/\text{m}^3$ $PM_{2.5}$ variation sustained over 25 days reduces daily output by 1%.

Little is known about the impact of air pollution on school children in developing countries. Chen, Guo and Huan (2018) fill this gap by quantifying the causal effects of air pollution on the health status and the school attendance of the Chinese students. They relate the arguably exogenous daily variation in air pollution-instrumented by the occurrence of temperature inversion-with student illnesses and absences from more than 3000 schools in Guangzhou City. They find a sizable deleterious effect of air pollution on school attendance through the health channel. The impact persists for at least four days and displays a monotonically increasing pattern. Notably, this harmful effect is non-negligible even when pollution levels are below the official standards for air quality in China, suggesting that the current ambient air quality standards in China are not low enough to protect students.

Liu and Salvo (forthcoming) examine how absences respond to particle pollution in a multi-year individual panel comprising 6500 children enrolled at international schools situated in a major economic hub in north China. These schools (and their parents) have been willing and able to respond to the dire state of air quality, by implementing defensive procedures (thresholds for

outdoor play) and capital (air-tight windows and central air-conditioned filtration systems). Even in this setting, they find substantial heterogeneity in the response to ambient PM_{2.5}. Pollution sensitivity is stronger among US/Canadian/European than Chinese, children who miss school the most, and a minority of children who depart within one year of arrival, but overall is modest compared to estimates for the US. This suggests that to some extent the school response can substitute, through defensive behavior, for the absence response. They offer a benchmark for school administrators in polluted middle-income countries, yet caution that more research is needed on the long-term implications of PM_{2.5} exposure.

In addition to temperature inversion, another source of instruments for air quality used in the literature is wind direction. Deryugina et al. (2016) estimate the causal effects of acute fine particulate matter exposure on mortality, health care use, and medical costs among the US elderly using Medicare data and a novel instrument for air pollution: changes in local wind direction.

3. Data

3.1. Travel mode data

Our travel mode data is from the Beijing Household Travel Survey (BHTS), a confidential data set on travel mode choice from surveys conducted in 2010 and 2014 by the Beijing Municipal Commission of Transport (BTRC). The cross sectional data set includes the characteristics individual household members, including their occupations, ages, and education; as well as the characteristics of each trip taken during a designated 24-hour period, including the mode, the distance, the time, and the districts.

For the 2010 Beijing Household Travel Survey, the BTRC randomly selected 642 TAZs of the 1,911 in the entire city. TAZs are geocoded areas defined by the BTRC for traffic analysis.

Each of the administrative districts in Beijing has 16 to 238 TAZs, based on the size of the area and the population of the district. TAZs are smaller in districts with higher population densities. The average TAZ is about 1.5 square kilometers. In the inner eight districts, on which the sampling focuses, TAZs range from 0.21 to 16 square kilometers. On average, about 75 households in each TAZ are randomly selected for in-person interviews to collect data on trips taken during a designated 24-hour period. The survey covered 116,142 individuals from 46,900 households. Table 1a presents the weekday frequency of the 2010 travel data.

Table 1a. Weekday frequency of 2010 travel data

Day of week	Freq.	Percent	Cum.
Sunday	7	14.29	14.29
Monday	6	12.24	26.53
Tuesday	7	14.29	40.82
Wednesday	8	16.33	57.14
Thursday	6	12.24	69.39
Friday	8	16.33	85.71
Saturday	7	14.29	100
Total	49	100	

For 2014, there are 69 24-hour periods in the data set, From September 1, 2014 to November 30, 2014. Table 1b presents the weekday frequency of the 2014 travel data.

Table 1b. Weekday frequency of 2014 travel data

Day of week	Freq.	Percent	Cum.
Sunday	10	14.49	14.49
Monday	10	14.49	28.99
Tuesday	11	15.94	44.93
Wednesday	11	15.94	60.87
Thursday	10	14.49	75.36
Friday	10	14.49	89.86

Saturday	7	10.14	100
Total	69	100	

We have 46,900 households investigated in year 2010, of which members of 458 households went outside but they are not in the travel mode data set. We have 40,006 households investigated in year 2014, of which members of 10 households went outside but they are not in the travel mode data set. For our empirical analysis, we exclude households that were surveyed were not recorded in the travel mode data set, since these households are a small fraction of the households surveyed, and since some of these households might include members that travel and some of these households might include members that stay at home.

There are 214 observations in 2010 and 372 observations in 2014 observations where the trip date is different for different members of the same household, when the trip date should be within the same 24 hours for all members of the same household. For our empirical analysis, we exclude households for which the trip dates of different members of the household differ by more than 24 hours.

We do not have trip purpose variable for 2014.

We classify the modes in the 2014 data (Table 2) to match the modes in 2010 data as follows. We classify walking as walk. We classify rental bicycle, bicycle and e-bicycle as bicycle. We designate bus as bus. We classify car, van and truck as car. We classify subway as subway. We classify taxi and illegal taxi as taxi. We classify mixed, motorcycle, company shuttle, and school bus as “others”; we did not classify them as bus because their nature is different with bus, as they have a fixed schedule while bus does not.

Table 2: Travel modes in 2014 data

	Freq.	Percent	Cum.
Walking	79,869	38.79	38.79
Car	35,898	17.43	56.22
Van	201	0.1	56.32
Truck	163	0.08	56.4
Motorcycle	373	0.18	56.58
Subway	6,872	3.34	59.92
Bus	29,084	14.12	74.04
Taxi	1,024	0.5	74.54
Company Shuttle	2,354	1.14	75.68
School Bus	362	0.18	75.86
Illegal taxi	200	0.1	75.96
Rental Bicycle	113	0.05	76.01
Bicycle	26,967	13.1	89.11
E-Bicycle	14,692	7.14	96.24
Mixed	7,739	3.76	100
Total	205,911	100	

The individual travel mode variables are tabulated for each hour in Table 3a for 2010 and Table 3b for 2014. There are no observations of trips taken at 2am in 2014. We did not consider the outside option of no travel because we do not have information for some of them if the person never went outside.

Table 3a. Individual travel mode variables by hour, 2010

Hour = 0 (midnight)	Freq.	Percent	Cum.
Walk	34	20.36	20.36
Bicycle	50	29.94	50.3
Bus	6	3.59	53.89
Car	58	34.73	88.62
Subway	1	0.6	89.22
Taxi	9	5.39	94.61

Others	9	5.39	100
Total	167	100	

Hour = 1am

	Freq.	Percent	Cum.
Walk	5	10.42	10.42
Bicycle	7	14.58	25
Bus	1	2.08	27.08
Car	25	52.08	79.17
Subway	1	2.08	81.25
Taxi	5	10.42	91.67
Others	4	8.33	100
Total	48	100	

Hour = 2am

Trip modes	Freq.	Percent	Cum.
Walk	18	36.73	36.73
Bicycle	8	16.33	53.06
Car	14	28.57	81.63
Taxi	9	18.37	100
Total	49	100	

Hour = 3am

	Freq.	Percent	Cum.
Walk	32	38.55	38.55
Bicycle	14	16.87	55.42
Bus	3	3.61	59.04
Car	26	31.33	90.36
Subway	1	1.2	91.57
Taxi	2	2.41	93.98
Others	5	6.02	100
Total	83	100	

Hour = 4am

	Freq.	Percent	Cum.
Walk	122	31.77	31.77
Bicycle	106	27.6	59.38
Bus	39	10.16	69.53
Car	73	19.01	88.54
Subway	6	1.56	90.1
Taxi	12	3.13	93.23
Others	26	6.77	100
Total	384	100	

Hour = 5am			
	Freq.	Percent	Cum.
Walk	725	30.42	30.42
Bicycle	371	15.57	45.99
Bus	769	32.27	78.26
Car	286	12	90.26
Subway	160	6.71	96.98
Taxi	14	0.59	97.57
Others	58	2.43	100
Total	2,383	100	

Hour = 6am			
	Freq.	Percent	Cum.
Walk	4,195	25.45	25.45
Bicycle	2,526	15.32	40.77
Bus	4,836	29.33	70.1
Car	2,721	16.5	86.61
Subway	1,390	8.43	95.04
Taxi	109	0.66	95.7
Others	709	4.3	100
Total	16,486	100	

Hour = 7am			
	Freq.	Percent	Cum.
Walk	12,258	31.11	31.11
Bicycle	8,665	21.99	53.09
Bus	7,132	18.1	71.19
Car	6,809	17.28	88.47
Subway	2,816	7.15	95.62
Taxi	304	0.77	96.39
Others	1,424	3.61	100
Total	39,408	100	

Hour = 8am			
	Freq.	Percent	Cum.
Walk	10,985	41.94	41.94
Bicycle	4,821	18.41	60.35
Bus	4,831	18.44	78.79
Car	3,485	13.31	92.1
Subway	1,425	5.44	97.54
Taxi	230	0.88	98.42
Others	415	1.58	100
Total	26,192	100	

Hour = 9am			
	Freq.	Percent	Cum.
Walk	9,380	53.37	53.37
Bicycle	2,705	15.39	68.77
Bus	2,786	15.85	84.62
Car	1,795	10.21	94.83
Subway	415	2.36	97.19
Taxi	207	1.18	98.37
Others	286	1.63	100
Total	17,574	100	

Hour = 10am			
	Freq.	Percent	Cum.
Walk	7,199	52.41	52.41
Bicycle	2,270	16.53	68.94
Bus	2,295	16.71	85.65
Car	1,356	9.87	95.52
Subway	214	1.56	97.08
Taxi	166	1.21	98.29
Others	235	1.71	100
Total	13,735	100	

Hour = 11am			
	Freq.	Percent	Cum.
Walk	7,357	47.69	47.69
Bicycle	3,532	22.9	70.59
Bus	2,309	14.97	85.56
Car	1,649	10.69	96.25
Subway	182	1.18	97.43
Taxi	159	1.03	98.46
Others	238	1.54	100
Total	15,426	100	

Hour = 12pm (noon)			
	Freq.	Percent	Cum.
Walk	4,833	49.74	49.74
Bicycle	1,730	17.8	67.54
Bus	1,388	14.28	81.83
Car	1,260	12.97	94.79
Subway	216	2.22	97.02
Taxi	134	1.38	98.39
Others	156	1.61	100
Total	9,717	100	

Hour = 13 (1pm)			
	Freq.	Percent	Cum.
Walk	4,478	41.15	41.15
Bicycle	2,854	26.22	67.37
Bus	1,511	13.88	81.26
Car	1,522	13.99	95.24
Subway	242	2.22	97.46
Taxi	120	1.1	98.57
Others	156	1.43	100
Total	10,883	100	

Hour = 14 (2pm)			
	Freq.	Percent	Cum.
Walk	3,006	37.63	37.63
Bicycle	1,548	19.38	57
Bus	1,662	20.8	77.81
Car	1,288	16.12	93.93
Subway	209	2.62	96.55
Taxi	134	1.68	98.22
Others	142	1.78	100
Total	7,989	100	

Hour = 15 (3pm)			
	Freq.	Percent	Cum.
Walk	4,254	41.99	41.99
Bicycle	1,896	18.71	60.7
Bus	1,956	19.31	80
Car	1,352	13.34	93.35
Subway	339	3.35	96.69
Taxi	123	1.21	97.91
Others	212	2.09	100
Total	1,0132	100	

Hour = 16 (4pm)			
	Freq.	Percent	Cum.
Walk	6,190	38.63	38.63
Bicycle	3,230	20.16	58.79
Bus	3,026	18.88	77.67
Car	2,208	13.78	91.45
Subway	644	4.02	95.47
Taxi	176	1.1	96.57
Others	550	3.43	100
Total	16,024	100	

Hour = 17 (5pm)			
	Freq.	Percent	Cum.
Walk	7,787	25.31	25.31
Bicycle	6,391	20.77	46.08
Bus	6,882	22.37	68.45
Car	5,626	18.29	86.74
Subway	2,670	8.68	95.42
Taxi	226	0.73	96.15
Others	1,183	3.85	100
Total	30,765	100	

Hour = 18 (6pm)			
	Freq.	Percent	Cum.
Walk	4,623	28.65	28.65
Bicycle	2,975	18.44	47.09
Bus	3,073	19.04	66.13
Car	3,285	20.36	86.49
Subway	1,685	10.44	96.93
Taxi	187	1.16	98.09
Others	308	1.91	100
Total	16,136	100	

Hour = 19 (7pm)			
	Freq.	Percent	Cum.
Walk	3,847	50.93	50.93
Bicycle	930	12.31	63.25
Bus	994	13.16	76.41
Car	1,288	17.05	93.46
Subway	325	4.3	97.76
Taxi	97	1.28	99.05
Others	72	0.95	100
Total	7,553	100	

Hour = 20 (8pm)			
	Freq.	Percent	Cum.
Walk	2,701	48.73	48.73
Bicycle	701	12.65	61.37
Bus	772	13.93	75.3
Car	985	17.77	93.07
Subway	213	3.84	96.92
Taxi	108	1.95	98.86
Others	63	1.14	100
Total	5,543	100	

Hour = 21 (9pm)			
	Freq.	Percent	Cum.
Walk	1,475	42.13	42.13
Bicycle	530	15.14	57.27
Bus	518	14.8	72.07
Car	676	19.31	91.37
Subway	165	4.71	96.09
Taxi	97	2.77	98.86
Others	40	1.14	100
Total	3,501	100	

Hour = 22 (10pm)			
	Freq.	Percent	Cum.
Walk	404	28.98	28.98
Bicycle	254	18.22	47.2
Bus	222	15.93	63.13
Car	353	25.32	88.45
Subway	86	6.17	94.62
Taxi	62	4.45	99.07
Others	13	0.93	100
Total	1,394	100	

Hour = 23 (11pm)			
	Freq.	Percent	Cum.
Walk	99	22.81	22.81
Bicycle	111	25.58	48.39
Bus	22	5.07	53.46
Car	148	34.1	87.56
Subway	6	1.38	88.94
Taxi	39	8.99	97.93
Others	9	2.07	100
Total	434	100	

Table 3b. Individual travel mode variables by hour, 2014

Hour = 0 (midnight)			
	Freq.	Percent	Cum.
Walk	1	50	50
Bicycle	1	50	100
Total	2	100	

Hour = 1am

	Freq.	Percent	Cum.
Bicycle	1	100	100
Total	1	100	

Hour = 3am

	Freq.	Percent	Cum.
Walk	13	21.67	21.67
Bicycle	15	25	46.67
Car	29	48.33	95
Taxi	1	1.67	96.67
Other	2	3.33	100
Total	60	100	

Hour = 4am

	Freq.	Percent	Cum.
Walk	74	25.61	25.61
Bicycle	69	23.88	49.48
Bus	25	8.65	58.13
Car	89	30.8	88.93
Subway	5	1.73	90.66
Taxi	7	2.42	93.08
Other	20	6.92	100
Total	289	100	

Hour = 5am

	Freq.	Percent	Cum.
Walk	554	29.64	29.64
Bicycle	370	19.8	49.44
Bus	341	18.25	67.68
Car	328	17.55	85.23
Subway	48	2.57	87.8
Taxi	18	0.96	88.76
Other	210	11.24	100
Total	1,869	100	

Hour = 6am

	Freq.	Percent	Cum.
Walk	2,950	23.36	23.36
Bicycle	2,043	16.18	39.53
Bus	2,661	21.07	60.6
Car	2,863	22.67	83.27
Subway	558	4.42	87.69
Taxi	76	0.6	88.29
Other	1,479	11.71	100

Total	12,630	100
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Hour = 7am

	Freq.	Percent	Cum.
Walk	10,408	29.78	29.78
Bicycle	7,722	22.1	51.88
Bus	4,899	14.02	65.89
Car	7,825	22.39	88.28
Subway	1,535	4.39	92.68
Taxi	138	0.39	93.07
Other	2,422	6.93	100
Total	34,949	100	

Hour = 8am

	Freq.	Percent	Cum.
Walk	10,036	42.21	42.21
Bicycle	4,669	19.64	61.85
Bus	3,489	14.67	76.52
Car	3,826	16.09	92.61
Subway	872	3.67	96.28
Taxi	130	0.55	96.82
Other	755	3.18	100
Total	23,777	100	

Hour = 9am

	Freq.	Percent	Cum.
Walk	8,035	56.09	56.09
Bicycle	2,263	15.8	71.89
Bus	1,948	13.6	85.49
Car	1,399	9.77	95.26
Subway	228	1.59	96.85
Taxi	131	0.91	97.77
Other	320	2.23	100
Total	14324	100	

Hour = 10am

	Freq.	Percent	Cum.
Walk	6,368	56.63	56.63
Bicycle	1,930	17.16	73.8
Bus	1,704	15.15	88.95
Car	889	7.91	96.86
Subway	87	0.77	97.63
Taxi	76	0.68	98.31
Other	190	1.69	100

Total	11,244	100
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Hour = 11am

	Freq.	Percent	Cum.
Walk	5,948	47.47	47.47
Bicycle	3,383	27	74.46
Bus	1,583	12.63	87.1
Car	1,152	9.19	96.29
Subway	95	0.76	97.05
Taxi	59	0.47	97.52
Other	311	2.48	100
Total	12,531	100	

Hour = 12pm (noon)

	Freq.	Percent	Cum.
Walk	3024	54.53	54.53
Bicycle	965	17.4	71.93
Bus	643	11.59	83.52
Car	677	12.21	95.73
Subway	68	1.23	96.95
Taxi	38	0.69	97.64
Other	131	2.36	100
Total	5,546	100	

Hour = 13 (1pm)

	Freq.	Percent	Cum.
Walk	3,311	43.51	43.51
Bicycle	2,394	31.46	74.98
Bus	673	8.84	83.82
Car	928	12.2	96.02
Subway	60	0.79	96.81
Taxi	41	0.54	97.35
Other	202	2.65	100
Total	7,609	100	

Hour = 14 (2pm)

	Freq.	Percent	Cum.
Walk	2,308	42.75	42.75
Bicycle	1,389	25.73	68.48
Bus	720	13.34	81.81
Car	737	13.65	95.46
Subway	59	1.09	96.55
Taxi	33	0.61	97.17
Other	153	2.83	100

Total	5,399	100
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Hour = 15 (3pm)

	Freq.	Percent	Cum.
Walk	3,490	47.44	47.44
Bicycle	1,560	21.21	68.65
Bus	1,016	13.81	82.46
Car	851	11.57	94.03
Subway	112	1.52	95.55
Taxi	51	0.69	96.25
Other	276	3.75	100
Total	7,356	100	

Hour = 16 (4pm)

	Freq.	Percent	Cum.
Walk	5,216	41.85	41.85
Bicycle	2,689	21.57	63.42
Bus	1,674	13.43	76.85
Car	1,884	15.11	91.96
Subway	257	2.06	94.02
Taxi	60	0.48	94.5
Other	685	5.5	100
Total	12,465	100	

Hour = 17 (5pm)

	Freq.	Percent	Cum.
Walk	6,885	24.35	24.35
Bicycle	6,089	21.53	45.88
Bus	4,473	15.82	61.7
Car	6,868	24.29	85.99
Subway	1,580	5.59	91.57
Taxi	105	0.37	91.94
Other	2,278	8.06	100
Total	28,278	100	

Hour = 18 (6pm)

	Freq.	Percent	Cum.
Walk	3,547	26.61	26.61
Bicycle	2,497	18.73	45.33
Bus	2,013	15.1	60.43
Car	3,289	24.67	85.1
Subway	936	7.02	92.12
Taxi	80	0.6	92.72
Other	970	7.28	100

Total	13,332	100
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Hour = 19 (7pm)

	Freq.	Percent	Cum.
Walk	3,615	57.79	57.79
Bicycle	670	10.71	68.51
Bus	514	8.22	76.72
Car	1,052	16.82	93.54
Subway	165	2.64	96.18
Taxi	36	0.58	96.75
Other	203	3.25	100
Total	6,255	100	

Hour = 20 (8pm)

	Freq.	Percent	Cum.
Walk	2,510	57.19	57.19
Bicycle	504	11.48	68.67
Bus	345	7.86	76.53
Car	767	17.48	94.01
Subway	100	2.28	96.29
Taxi	40	0.91	97.2
Other	123	2.8	100
Total	4,389	100	

Hour = 21 (9pm)

	Freq.	Percent	Cum.
Walk	1,210	51.47	51.47
Bicycle	307	13.06	64.53
Bus	233	9.91	74.44
Car	446	18.97	93.41
Subway	66	2.81	96.21
Taxi	35	1.49	97.7
Other	54	2.3	100
Total	2,351	100	

Hour = 22 (10pm)

	Freq.	Percent	Cum.
Walk	208	28.07	28.07
Bicycle	146	19.7	47.77
Bus	89	12.01	59.78
Car	208	28.07	87.85
Subway	36	4.86	92.71
Taxi	23	3.1	95.82
Other	31	4.18	100

Total	741	100	
Hour = 23 (11pm)			
	Freq.	Percent	Cum.
Walk	46	20.35	20.35
Bicycle	47	20.8	41.15
Bus	16	7.08	48.23
Car	92	40.71	88.94
Taxi	21	9.29	98.23
Other	4	1.77	100
Total	226	100	

For the analyses using hourly individual travel mode variables, we use only the data for hours 4am-11pm, and exclude the data for hours midnight to 3am, which have few observations (especially in 2014), and which are hours when the subway is closed. During some hours subway, taxi and bus may not really be available options. For hours the subways run each day in Beijing, different lines have different schedules.¹ Generally speaking a station opens at 5:00 am and closes at 11:00pm. For hours the bus runs each day in Beijing, according to google “Beijing Bus Schedule”, regular bus routes, such as downtown, special and Yuntong lines, start running 5:00am-5:30am and stop 10:00pm-11:00pm. Some suburban lines may stop operation 6pm-7pm.

The individual travel mode variables using data for all hours except midnight to 3am are tabulated in Table 4a for 2010 and Table 4b for 2014.

Table 4a. Individual travel mode variables, 2010

	Freq.	Percent	Cum.
Walk	95,918	38.11	38.11
Bicycle	48,146	19.13	57.25

¹ <http://www.beijingchina.net.cn/transportation/subway.html>

Bus	47,023	18.69	75.93
Car	38,165	15.17	91.1
Subway	13,408	5.33	96.42
Taxi	2,704	1.07	97.5
Other	6,295	2.5	100
Total	251,659	100	

Table 4b. Individual travel mode variables, 2014

	Freq.	Percent	Cum.
Walk	79,855	38.79	38.79
Bicycle	41,755	20.28	59.08
Bus	29,084	14.13	73.21
Car	36,233	17.6	90.81
Subway	6,872	3.34	94.15
Taxi	1,223	0.59	94.74
Other	10,826	5.26	100
Total	205,848	100	

We construct a daily variable for the reason an individual household member either stayed at home instead of taking a trip outside, or was not at home. Its tabulation is presented in Table 5a for 2010 and Table 5b for 2014. For each year, we have double checked that the total number of observations for the reason for staying home (i.e., 22,797 in 2010 and 17,541 in 2014) is the same as the number of household members surveyed that stayed at home. There are no missing values for the reasons for staying home.

Table 5a. Reasons an individual stayed at home or was not at home, 2010

	Freq.	Percent	Cum.
physical discomfort or cannot move	4,450	28.92	28.92
rest at home	4,024	26.15	55.07

studying at home	625	4.06	59.13
housework	2,840	18.46	77.59
caring for family	1,403	9.12	86.71
weather reason	610	3.96	90.67
stay in neighborhood or working near home	133	0.86	91.54
other staying at home	372	2.42	93.96
not at home for hospital	73	0.47	94.43
not at home for reasons other than hospital	857	5.57	100
Total	15,387	100	

Table 5b. Reasons an individual stayed at home or was not at home, 2014

	Freq.	Percent	Cum.
physical discomfort or cannot move	3,295	29.1	29.1
rest at home	3,180	28.08	57.18
studying at home	222	1.96	59.14
housework	2,246	19.83	78.97
caring for family	1,359	12	90.97
weather reason	223	1.97	92.94
stay in neighborhood or working near home	106	0.94	93.88
other staying at home	477	4.21	98.09
not at home for hospital	18	0.16	98.25
not at home for reasons other than hospital	198	1.75	100
Total	11,324	100	

We also create a dummy variable for staying at home. Its tabulation is presented in Table 6a for 2010 and Table 6b for 2014.

Table 6a. Dummy variable for staying at home, 2010

	Freq.	Percent	Cum.
0	97,188	86.96	86.96
1	14,572	13.04	100
Total	111,760	100	

Table 6b. Dummy variable for staying at home, 2014

	Freq.	Percent	Cum.
0	83,194	88.2	88.2
1	11,134	11.8	100
Total	94,328	100	

When calculating the travel decision share variables, we do not wish to include the individuals who are not at home for now (even though some may be not at home because they are at the hospital owing to air pollution). We therefore create a dummy variable for “not at home”, which is equal to 1 if they indicated they were “not at home for hospital” or “not at home for reasons other than hospital”. Its tabulation is presented in Table 7a for 2010 and Table 7b for 2014. For our empirical analysis, we exclude individuals who are not at home.

Table 7a. Dummy variable for not at home, 2010

	Freq.	Percent	Cum.
0	110,830	99.17	99.17
1	930	0.83	100
Total	111,760	100	

Table 7b. Dummy variable for not at home, 2014

	Freq.	Percent	Cum.
0	94,112	99.77	99.77
1	216	0.23	100
Total	94,328	100	

For each hour from 3am to 11pm, we create the following hourly travel mode share variables:

Share of all trips that hour whose main mode was x . For each mode x in {walk, bicycle, bus, car, subway, taxi, others}, share of all trips taken during that hour whose main mode was x

Share of all households who took at least 1 trip that hour whose main mode was x . For each mode x in {walk, bicycle, bus, car, subway, taxi, others}, share of all households surveyed during that 24-hour period who took at least 1 trip that hour whose main mode was x . These shares will not add up to 1, since some households might take more than 1 trip and others might take none.

Average number of trips taken per household that hour whose main mode was x . For each mode x in {walk, bicycle, bus, car, subway, taxi, others}, average number of trips taken that hour per household surveyed whose main mode was x . This is calculated as the number of trips taken during that hour whose main mode was x , divided by number of households surveyed during that 24-hour period.

Average number of trips taken per individual that hour whose main mode was x . For each mode x in {walk, bicycle, bus, car, subway, taxi, others}, average number of trips taken that hour per individual surveyed whose main mode was x . This is calculated as the number of trips taken during that hour whose main mode was x , divided by number of households members surveyed during that 24-hour period. In other words, the denominator is the total number of household members over 6 years old in all households surveyed during that 24-hour period.

Share of all trips of taken that hour whose purpose was y . For each trip purpose y in {work, leisure, etc.}, share of all trips of taken hat hour whose purpose was y

Share of all trips of purpose y that hour whose main mode was x . For each mode x in {walk, bicycle, bus, car, subway, taxi, others} and trip purpose y in {work, leisure, etc.}, share of all trips of purpose y taken during that hour whose main mode was x . For each trip purpose y , the shares should add up to 1.

Summary statistics for the hourly travel mode share variables are presented in Table 8a for 2010 and Table 8b for 2014.

Table 8a. Summary statistics for hourly travel mode share variables, 2010

	Year 2010				
	Obs.	Mean	Std. Dev.	Min	Max
Share of all trips whose main mode was:					
walk	782	0.3764998	0.1502333	0	1
bicycle	782	0.1941022	0.1026777	0	1
bus	782	0.1786066	0.1142983	0	1
car	782	0.1673069	0.1023706	0	1
subway	782	0.0422915	0.0518139	0	1
taxi	782	0.01883	0.0486815	0	1
others	782	0.0223629	0.0312219	0	0.4285714
Share of all households who took at least 1 trip whose main mode was:					
walk	782	0.3847952	0.1484663	0	1
bicycle	782	0.2170625	0.1041061	0	1
bus	782	0.206481	0.1193398	0	1
car	782	0.1655731	0.0955502	0	1
subway	782	0.0517973	0.0568921	0	1
taxi	782	0.0203522	0.0496917	0	1
others	782	0.0269427	0.0385578	0	0.5
Average number of trips taken per household whose main mode was:					
walk	782	0.5066753	0.2262416	0	20.333333
bicycle	782	0.2568012	0.1377411	0	2
bus	782	0.239886	0.1664964	0	2
car	782	0.2199767	0.1291218	0	10.5
subway	782	0.0574529	0.0858075	0	2
taxi	782	0.0230433	0.0506186	0	1

others	782	0.0298614	0.0397724	0	0.5
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Average number of trips taken per individual whose main mode was:

walk	782	0.3978064	0.16073	0	1
bicycle	782	0.2046229	0.1098704	0	1
bus	782	0.1872452	0.115455	0	1
car	782	0.174876	0.1032017	0	1
subway	782	0.0442601	0.0526455	0	1
taxi	782	0.0194821	0.0489103	0	1
others	782	0.0234459	0.0316485	0	0.4285714

Share of all trips of taken whose purpose was y

business-business	782	0.001185	0.0029593	0	0.0338983
business-home	782	0.0041955	0.0097339	0	0.1428571
business-shopping	782	0.0012276	0.0033516	0	0.037037
business-picking up	782	0.0001568	0.0010881	0	0.019802
business-work	782	0.0021092	0.0040392	0	0.0263158
home-business	782	0.0034824	0.0105857	0	0.1428571
home-home	782	0.0035845	0.0100972	0	0.1538462
home-shopping	782	0.1973619	0.1638283	0	1
home-picking up	782	0.0224603	0.0330753	0	0.5
home-school	782	0.0204247	0.0481975	0	0.5
home-work	782	0.1623556	0.2139749	0	1
shopping-business	782	0.0006307	0.0020748	0	0.0178571
shopping-home	782	0.24788	0.1880135	0	1
shopping-shopping	782	0.0338249	0.0369421	0	0.2666667
shopping-picking up	782	0.0027903	0.0065755	0	0.0769231
shopping-school	782	0.0009784	0.0034116	0	0.0301205
shopping-work	782	0.0139155	0.0328944	0	0.3333333
picking up-business	782	0.000068	0.0004421	0	0.0055866
picking up-home	782	0.0225417	0.0303546	0	0.5
picking up-shopping	782	0.0039092	0.0186138	0	0.5
picking up-picking up	782	0.0015164	0.0049487	0	0.0833333
picking up-school	782	0.0000278	0.0002695	0	0.0040816
picking up-work	782	0.0028921	0.0076127	0	0.0500431
school-business	782	40.01e-06	0.00008	0	0.001773
school-home	782	0.0245778	0.0525248	0	1
school-shopping	782	0.001473	0.0036932	0	0.0285714
school-picking up	782	0.0000228	0.0002085	0	0.003012
school-school	782	0.0000957	0.000691	0	0.0119048
work-business	782	0.002961	0.0062221	0	0.0833333
work-home	782	0.1990965	0.2269889	0	1
work-shopping	782	0.0175788	0.0303007	0	0.1926606

work-picking up	782	0.0035744	0.0076409	0	0.0645161
work-work	782	0.0010976	0.0031481	0	0.0454545

Table 8b. Summary statistics for hourly travel mode share variables, 2014

	Obs0.	Year 2014			
		Mean	Std. Dev.	Min	Max
Share of all trips whose main mode was:					
walk	1099	0.3933235	0.2385041	0	1
bicycle	1099	0.1787891	0.1572855	0	1
bus	1099	0.1374064	0.1561129	0	1
car	1099	0.1978951	0.2095879	0	1
subway	1099	0.0279675	0.0662364	0	1
taxi	1099	0.0120145	0.06098	0	1
others	1099	0.052604	0.1130195	0	1
Share of all households who took at least 1 trip whose main mode was:					
walk	1099	0.4048111	0.2388726	0	1
bicycle	1099	0.2009638	0.1675524	0	1
bus	1099	0.1575302	0.1663202	0	1
car	1099	0.2062572	0.2124241	0	1
subway	1099	0.0344345	0.0805667	0	1
taxi	1099	0.0117962	0.0555273	0	1
others	1099	0.062007	0.120906	0	1
Average number of trips taken per household whose main mode was:					
walk	1099	0.5246248	0.3539739	0	3
bicycle	1099	0.2339551	0.1984918	0	2
bus	1099	0.1801626	0.1998868	0	2
car	1099	0.2606337	0.2804936	0	2
subway	1099	0.0371878	0.0833046	0	1
taxi	1099	0.0159048	0.0994938	0	2
others	1099	0.0689895	0.1434752	0	2
Average number of trips taken per individual whose main mode was:					
walk	1099	0.4154186	0.2620851	0	2
bicycle	1099	0.1870395	0.1634124	0	10.333333
bus	1099	0.1426273	0.1574563	0	1
car	1099	0.2047918	0.2121052	0	1

subway	1099	0.0290489	0.0673348	0	1
taxi	1099	0.012256	0.0612281	0	1
others	1099	0.0545896	0.1146695	0	1

For each hour from 3am to 11pm, we create the following hourly travel decision time series variables:

Share of all households surveyed that 24-hour period who took at least 1 trip that hour

Share of all households' members surveyed during that 24-hour period who took at least 1 trip that hour

Average number of members per household surveyed during that 24-hour period who took at least 1 trip that hour. This is calculated as the households members surveyed during that 24-hour period who took at least 1 trip that hour, divided by the number of households surveyed during that 24-hour period

Summary statistics for the hourly travel decision time series variables are presented in Table 9a for 2010 and Table 9b for 2014.

Table 9a. Summary statistics for hourly travel decision time series variables, 2010

Year 2010				
Obs.	Mean	Std. Dev.	Min	Max
Share of all households surveyed that hour who took at least 1 trip				
820	18.29%	0.15	0.00	1.00
Share of all members of all households surveyed that hour who took at least 1 trip				
820	10.18%	0.09	0.00	0.40

Average number of members surveyed that hour who took at least 1 trip	820	24.20%	.21	0.00	0.10
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Table 9b. Summary statistics for hourly travel decision time series variables, 2014

Year 2014					
Obs.	Mean	Std. Dev.	Min	Max	
Share of all households surveyed that hour who took at least 1 trip					
1280	17.10%	0.17	0.00	1.00	
Share of all members of all households surveyed that hour who took at least 1 trip					
1280	9.82%	0.11	0.00	1.00	
Average number of members surveyed that hour who took at least 1 trip					
1280	22.72%	0.24	0.00	1.40	

For each household-hour, we create the following hourly travel decision panel variables using data from 3am to 11pm only. We have values for each hourly travel decision variable for each household-hour from 3am to 11pm, for a total of 20 hourly values for each household of each of the variables below:

For each household surveyed that 24-hour period: Share of household members in that household that who took at least 1 trip that hour.

For each household surveyed that 24-hour period: Number of members in that household who took at least 1 trip that hour.

For each household surveyed that 24-hour period: Number of members in that household who did not take any trip that hour.

Summary statistics for the hourly travel decision panel variables are presented in Table 10a

for 2010 and Table 10b for 2014.

Table 10a. Summary statistics for hourly travel decision panel variables, 2010

Year 2010				
Obs.	Mean	Std. Dev.	Min	Max
Share of household members in that household that who took at least 1 trip that hour				
1,125,480	8.94%	0.23	0.00	1.00
Number of members in that household who took at least 1 trip that hour				
1,125,480	0.21	0.53	0.00	7.00
Number of members in that household who did not take any trip that hour				
1,125,480	2.15	0.99	0.00	8.00

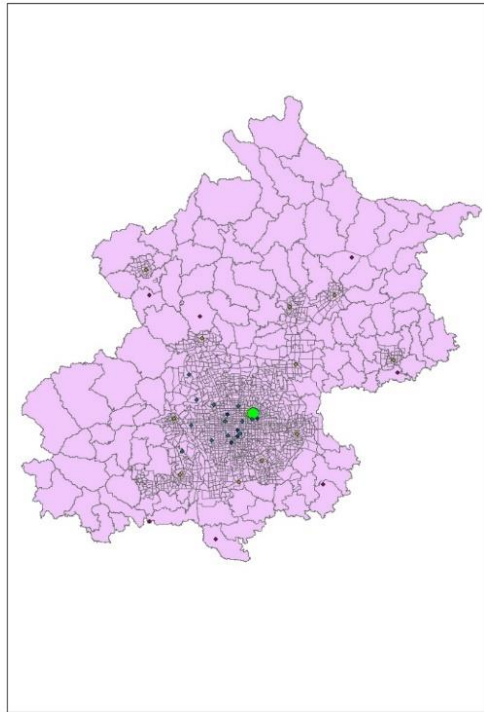
Table 10b. Summary statistics for hourly travel decision panel variables, 2014

Year 2014				
Obs.	Mean	Std. Dev.	Min	Max
Share of household members in that household that who took at least 1 trip that hour				
960,144	8.51%	0.23	0.00	1.00
Number of members in that household who took at least 1 trip that hour				
960,144	0.20	0.52	0.00	6.00
Number of members in that household who did not take any trip that hour				
960,144	2.15	0.98	0.00	7.00

3.2. *Air pollution*

We use pollution data (PM_{2.5}) from the U.S embassy in Beijing. Figure 1 presents a map of the air pollution monitors in Beijing in our data set. We have 35 observation stations from Chinese government for year 2014, but for year 2010 we only have one U.S. embassy station.

Figure 1. PM 2.5 monitors in Beijing



Notes: The U.S. embassy monitoring station is designated by the green dot. Additional monitors in 2014 data set are designated by the black dots.

For 2010, we have 43 days of travel data in September and October; we do not have air quality data for 10 days (almost whole 24 hours) of them. For 2014, we have 64 days of travel data in September, October, and November; we do not have air quality data for 7 days (only 1-3 hours a day) of them.

Summary statistics for the hourly PM_{2.5} pollution concentration are presented in Table 11a

for 2010 and Table 11b for 2014. The large variations in PM_{2.5} during the periods of our travel more data ensure that we have enough pollution information to use as regressors during the short time period.

Table 11a. Summary statistics for air pollution during the survey period, 2010

	Obs	Mean	Std. Dev.	Min	Max
hourly PM _{2.5} (µg/m ³)	946	126.7939	118.1229	1	534

Table 11b. Summary statistics for air pollution during the survey period, 2014

	Obs	Mean	Std. Dev.	Min	Max
hourly PM _{2.5} (µg/m ³)	1,458	106.1523	97.26256	2	472

After China launched a nation-wide, real-time air quality monitoring and disclosure program in 2013, air pollution levels were classified into several categories of air pollution severity. The categories that were used to classify the severity of air pollution are presented in Table 12.

Table 12. Categories for severity of air pollution

PM_{2.5} (µg/m³)	Name	Color	Advisory
0 to 50	Good	Green	None
51 to 100	Moderate	Yellow	Unusually sensitive individuals should consider limiting prolonged outdoor exertion
101 to 150	Unhealthy for Sensitive Groups	Orange	Children, active adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion

151 to 200	Unhealthy	Red	Children, active adults, and people with respiratory disease, such as asthma, should avoid outdoor exertion; everyone else should limit outdoor exertion
201 to 300	Very Unhealthy	Purple	Children, active adults, and people with respiratory disease, such as asthma, should avoid outdoor exertion; everyone else should limit outdoor exertion
301 to 500	Hazardous	Maroon	Everyone should limit outdoor exertion

We apply the air pollution severity categories in Table 12 to our hourly air pollution data to categorize the hourly air pollution severity in Beijing over the period of our analysis. A tabulation of this hourly air pollution severity in Beijing is presented in Table 13a for 2010 and Table 13b for 2014.

Table 13a. Severity of hourly air pollution in Beijing, 2010

PM_{2.5} (µg/m³)	Freq.	Percent	Cum.
0 to 50	2,828	34.95	34.95
51 to 100	2,105	26.02	60.97
101 to 150	1,206	14.91	75.87
151 to 200	829	10.25	86.12
201 to 300	810	10.01	96.13
301 to 500	279	3.45	99.58
500 or above	34	0.42	100

Table 13b. Severity of hourly air pollution in Beijing, 2014

PM_{2.5} (µg/m³)	Freq.	Percent	Cum.
0 to 50	3,306	38.17	38.17
51 to 100	2,243	25.9	64.07
101 to 150	1,375	15.88	79.94

151 to 200	701	8.09	88.04
201 to 300	580	6.7	94.74
301 to 500	423	4.88	99.62
500 or above	33	0.38	100

3.3. *Weather and other controls*

Our data for our weather controls, which include precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude, and wind direction in Beijing, come from NOAA. We divide the wind directions into eight 45-degree intervals: North, Northeast, East, Southeast, South, Southwest, West, and Northwest. Summary statistics for the weather controls in Beijing are presented in Table 14a for 2010 and Table 14b for 2014.

Table 14a. Weather controls in September and October, 2010

	Obs.	Mean	Std. Dev.	Min	Max
precipitation (mm)	742	2.354987	5.961439	0	25.4
temperature (°C)	782	14.68887	7.122441	-2	34
dew point temperature (°C)	782	8.124936	36.40508	-19.3	999.9
wind speed (km/h)	782	2.355499	1.773027	0	13
sea level pressure (hPa)	782	7277.966	4130.282	1005.5	9999.9
cloud ceiling (km)	782	73.9757	41.21199	0	99
altitude (m)	782	1065.042	641.1135	1006.1	9999.9
wind from the North (dummy)	782	0.746803	0.435121	0	1
wind from the Northeast (dummy)	782	0.092072	0.289312	0	1
wind from the East (dummy)	782	0.094629	0.292889	0	1
wind from the Southeast (dummy)	782	0.080563	0.272337	0	1
wind from the South (dummy)	782	0.163683	0.370224	0	1
wind from the Southwest (dummy)	782	0.044757	0.206902	0	1
wind from the West (dummy)	782	0.05243	0.223035	0	1
wind from the Northwest (dummy)	782	0.05243	0.223035	0	1

Table 14b. Weather controls in September, October and November, 2014

	Obs.	Mean	Std. Dev.	Min	Max
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precipitation (mm)	1,018	0.654106	2.863853	0	15.49
temperature (°C)	1,095	15.0179	7.159552	-3	34
dew point temperature (°C)	1,095	7.623105	8.612725	-15	21
wind speed (km/h)	1,095	2.096804	1.483529	0	11
sea level pressure (hPa)	1,095	7186.455	4167.723	1003.4	9999.9
cloud ceiling (km)	1,095	81.97169	35.93967	1	99
altitude (m)	1,095	1042.623	469.7402	1003	9999.9
wind from the North (dummy)	1,095	0.654795	0.475653	0	1
wind from the Northeast (dummy)	1,095	0.065753	0.247964	0	1
wind from the East (dummy)	1,095	0.130594	0.337109	0	1
wind from the Southeast (dummy)	1,095	0.124201	0.329961	0	1
wind from the South (dummy)	1,095	0.136073	0.343023	0	1
wind from the Southwest (dummy)	1,095	0.034703	0.183111	0	1
wind from the West (dummy)	1,095	0.018265	0.133969	0	1
wind from the Northwest (dummy)	1,095	0.03379	0.180771	0	1

Our individual and household controls come from the Beijing Household Travel Survey data set. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver’s license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Summary statistics for our individual- and household-level controls are in Table 15a for 2010 and Table 15b for 2014. We also control for the following trip characteristics: trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, and distance from destination to the nearest subway.

Table 15a. Individual- and household-level controls, 2010

	Obs.	Mean	Std. Dev.	Min	Max
<i>Individual-level controls</i>					
age	205,848	45.60564	16.87311	6	121

number of years of schooling	205,848	11.92785	3.445464	0	19
<i>Household-level controls</i>					
number of cars owned	205,848	0.588614	0.655779	0	3
number of bicycles owned	205,848	1.011708	0.894743	0	5
number of motorcycles owned	205,848	0.38235	0.618176	0	5
household size	205,848	2.882491	1.033116	1	5
number of household members with a job	205,848	1.403808	0.938984	0	4

Table 15b. Individual- and household-level controls, 2010

	Obs.	Mean	Std. Dev.	Min	Max
<i>Individual-level controls</i>					
age	251,659	43.9706	17.37338	0	129
number of years of schooling	251,659	11.975	3.498129	0	19
<i>Household-level controls</i>					
number of cars owned	251,659	0.37693	0.548013	0	3
number of bicycles owned	251,513	1.1148	0.971179	0	5
number of motorcycles owned	250,764	0.03722	0.200836	0	3
household size	251,659	2.79342	0.991513	1	5
number of household members with a job	251,659	1.37122	0.936332	0	4

We control for the major holidays that took place in Beijing during our period of analysis. In 2010, the major holidays during our period of analysis was the Moon Festival from Wednesday, September 22, 2010 to Friday, September 24, 2010; and National Day from Friday, October 1, 2010 to Thursday, October 7, 2010. In 2014, the major holidays during our period of analysis was the Moon Festival from Saturday, September 6, 2014 to Monday, September 8, 2010; and National Day from Wednesday, October 1, 2014 to Tuesday, October 7, 2014. There was no major holiday

during November 2014.

We also control for the Makeup Day, which represents the weekend that people have to work because the holiday borrows the weekend to make the holiday look longer. In 2010, the Makeup Day for the National Day took place Saturday, October 8, 2010 to Sunday, October 9, 2010. In 2014, the Makeup Day for the National Day took place Saturday, September 28, 2014 and Saturday, October 11, 2014.

3.4. *Potential IVs*

We use atmospheric chemistry from a set of potential instruments for air pollution to address its endogeneity.

One common source of instruments that have been used for air pollution are temperature inversions. Under most circumstances, the temperature of the atmosphere decreases with height, meaning it gets colder the higher you go. A temperature inversion occurs when the atmosphere actually becomes warmer as altitude increases. This typically occurs within a defined layer of the atmosphere. Temperature inversions affect air pollution because they change the dynamics of air movement. Warm air rises in the atmosphere because it is less dense and, therefore, more buoyant than the cooler air above it. This tendency to rise is what creates the vertical development found in thunderstorms. A temperature inversion prevents this vertical movement, also known as convection. Stated differently, inversions function like an atmospheric lid or blanket. This smothering effect traps air pollutants and allows their concentrations to increase (Bennett, 2018). We assume that temperature at high altitudes would not affect travel mode decisions except through their effect on air pollution.

A second source of instruments are wind speeds and wind blowing from locations other than Beijing that may have high pollution that might blow into Beijing. We control for wind directions and wind speeds in Beijing, since wind in Beijing may directly affect travel decisions in Beijing, but we assume that wind at and from other locations would not affect travel mode decisions except through their effect on air pollution.

A third source of instruments are wind speeds at high altitudes. There is some evidence for a correlation between wind speed and air quality. Enz, Hofman and Thostenson (2017) find that as the wind speed increases, inversions are weakened and only weak ones will form. We assume that, controlling for wind directions and wind speeds in Beijing, wind speeds at high altitudes would not affect travel mode decisions except through their effect on air pollution.

In their study of air pollution in China, Zeng and Zhang (2017) find that adverse atmospheric circulation, unfavorable meteorological conditions (lower air temperature and wind speed, higher air pressure and relative humidity), a frequently occurring inversion layer (with a strong intensity and lower bottom), and the low height of the mixing layer resulted in this haze. This study suggests that not only surface meteorological factors, but also the boundary layer structure, played an important role in the vertical diffusion of the pollutants.

Factory production near Beijing is also a common used instrument for air pollution in Beijing. As economic activity and factory production near Beijing may be correlated with travel decisions in and to and from Beijing, however, we do not use factory production near Beijing as an instrument.

For our set of potential instruments, we use data on weather conditions above and around Beijing from NOAA. For the temperature at high altitude, we have data for every 12 hours, specifically, at midnight and noon, for pressure levels at 1000, 925, 850, 700, 500, 400, 300, 250,

200, 150, 100, 70, 50, 30, 20 and 10 mb. NOAA collects temperature at high altitude using a balloon every 12 hours. For our temperature inversion variables we use the temperature differences between consecutive pressure points. Summary statistics for our temperature inversion variables are in Table 16a for 2010 and Table 16b for 2014.

As the same time that NOAA collects temperature at high altitude using a balloon every 12 hours, wind speeds and directions at high altitude are also gathered, which serve as our novel instruments. Summary statistics for wind speeds at high altitude are presented in Table 17a for 2010 and 17b for 2014. Figure 2 presents histograms of wind directions above Beijing.

For wind speeds and wind blowing from locations other than Beijing that may have high pollution that might blow into Beijing, NOAA has 333 weather stations in China, of which we make use of 235 stations data around Beijing, found in its light-weather source. Cruder than data in Beijing, most data in these stations are 3-hour based. Summary statistics for wind directions at locations other than Beijing are presented in Table 18a for 2010 and 18b for 2014. We use the wind directions at locations other than Beijing to create dummy variables for each location for its wind direction being one of eight 45-degree intervals: North, Northeast, East, Southeast, South, Southwest, West, and Northwest. Summary statistics for wind speeds at locations other than Beijing are presented in Table 19a for 2010 and 19b for 2014.

Table 16a. Temperature inversion variables in September and October, 2010

	Obs.	Mean	Std. Dev.	Min	Max
temperature at 1,000 pressure level minus the Temperature at 2,000 pressure level	113	5.109735	2.360991	0	10.6
temperature at 2,000 pressure level minus the temperature at 3,000 pressure level	115	3.721739	2.069273	-1.6	8.599998
temperature at 3,000 pressure level minus the temperature at 5,000 pressure level	116	5.005172	2.321537	-1	11.2
temperature at 5,000 pressure level minus the temperature at 7,000 pressure level	118	2.830508	2.288676	-4.8	6.200005
temperature at 7,000 pressure level minus the temperature at 10,000 pressure level	119	1.033614	2.534952	-5	7.199997
temperature at 10,000 pressure level minus the temperature at 15,000 pressure level	120	-5.53833	3.179958	-12.6	3.799999
temperature at 15,000 pressure level minus the temperature at 20,000 pressure level	121	-5.99008	4.428232	-15.2	5.200001
temperature at 20,000 pressure level minus the temperature at 25,000 pressure level	122	-4.99344	4.449751	-13.6	4.799999
temperature at 25,000 pressure level minus the temperature at 30,000 pressure level	122	-7.20492	2.950889	-11.2	3.200001
temperature at 30,000 pressure level minus the temperature at 40,000 pressure level	122	-13.8508	2.440101	-17.8	-6.2
temperature at 40,000 pressure level minus the temperature at 50,000 pressure level	122	-11.2361	1.733103	-14.4	-6.4
temperature at 50,000 pressure level minus the temperature at 70,000 pressure level	122	-14.8508	2.392766	-18.9	-4.8
temperature at 70,000 pressure level minus the temperature at 85,000 pressure level	122	-8.62951	3.490712	-14.7	0
temperature at 85000 pressure level minus the temperature at 92,500 pressure level	122	-4.22869	1.786704	-6.8	2.200001
temperature at 92,500 pressure level minus the temperature at 100,000 pressure level	122	-3.23197	2.327886	-6.2	4.6

Table 16b. Temperature inversion variables in September, October and November, 2014

	Obs.	Mean	Std. Dev.	Min	Max
temperature at 1,000 pressure level minus the Temperature at 2,000 pressure level	166	5.142169	3.252677	-5.2	15
temperature at 2,000 pressure level minus the temperature at 3,000 pressure level	171	2.85614	2.379052	-5	11.2
temperature at 3,000 pressure level minus the temperature at 5,000 pressure level	175	4.568	2.722555	-3.8	12.6
temperature at 5,000 pressure level minus the temperature at 7,000 pressure level	176	3.161364	3.296455	-7.2	11.6
temperature at 7,000 pressure level minus the temperature at 10,000 pressure level	178	0.770786	2.730957	-6.4	9.199997
temperature at 10,000 pressure level minus the temperature at 15,000 pressure level	182	-4.07912	3.102788	-13.6	3
temperature at 15,000 pressure level minus the temperature at 20,000 pressure level	182	-3.76923	4.620868	-13.4	7.399998
temperature at 20,000 pressure level minus the temperature at 25,000 pressure level	182	-4.15604	4.359715	-12.4	4.799999

temperature at 25,000 pressure level minus the temperature at 30,000 pressure level	182	-7.08132	2.694948	-11.6	1
temperature at 30,000 pressure level minus the temperature at 40,000 pressure level	182	-14.144	2.485881	-18.6	-5.4
temperature at 40,000 pressure level minus the temperature at 50,000 pressure level	182	-11.4121	1.85653	-14.6	-4.6
temperature at 50,000 pressure level minus the temperature at 70,000 pressure level	182	-15.4044	2.399213	-21.2	-4
temperature at 70,000 pressure level minus the temperature at 85,000 pressure level	182	-8.96044	2.921359	-14.8	0.2
temperature at 85000 pressure level minus the temperature at 92,500 pressure level	182	-3.85934	2.400689	-6.8	5.4
temperature at 92,500 pressure level minus the temperature at 100,000 pressure level	182	-2.90714	2.660205	-6.2	6.999999

Table 17a. Wind speed at high altitude in September and October, 2010

	Obs.	Mean	Std. Dev.	Min	Max
wind speed at 1,000 pressure level	113	89.29204	72.36708	10	300
wind speed at 2,000 pressure level	113	74.77876	67.40201	10	260
wind speed at 3,000 pressure level	115	77.13043	56.95128	10	280
wind speed at 5,000 pressure level	118	94.49153	60.63196	10	260
wind speed at 7,000 pressure level	119	140	80.14817	10	330
wind speed at 10,000 pressure level	119	233.7815	93.67263	80	490
wind speed at 15,000 pressure level	121	331.405	112.4226	130	580
wind speed at 20,000 pressure level	122	359.918	130.8933	90	650
wind speed at 25,000 pressure level	122	333.9344	138.2449	20	640
wind speed at 30,000 pressure level	122	285.4098	119.8011	20	550
wind speed at 40,000 pressure level	121	198.2645	86.46461	30	420
wind speed at 50,000 pressure level	122	139.3443	75.24876	10	340
wind speed at 70,000 pressure level	122	90.32787	51.11863	10	250
wind speed at 85,000 pressure level	122	78.19672	43.08393	10	190
wind speed at 92,500 pressure level	120	71.08333	40.26792	10	190
wind speed at 100,000 pressure level	121	43.71901	28.46437	10	140

Table 17b. Wind speed at high altitude in September, October and November, 2014

Variable	Obs.	Mean	Std. Dev.	Min	Max
wind speed at 1,000 pressure level	164	72.86585	45.65495	10	220
wind speed at 2,000 pressure level	171	71.52047	56.82816	10	340
wind speed at 3,000 pressure level	174	89.94253	63.33229	10	360
wind speed at 5,000 pressure level	175	137.2571	73.7066	10	370
wind speed at 7,000 pressure level	178	196.6854	74.64963	30	400
wind speed at 10,000 pressure level	181	287.1271	70.58903	70	450
wind speed at 15,000 pressure level	181	369.6685	98.0017	110	580
wind speed at 20,000 pressure level	182	381.3736	119.1117	130	650
wind speed at 25,000 pressure level	182	350.2198	131.8796	40	600
wind speed at 30,000 pressure level	182	297.8022	118.0112	60	590
wind speed at 40,000 pressure level	182	211.0989	87.73328	30	430
wind speed at 50,000 pressure level	182	153.7363	68.35313	20	410
wind speed at 70,000 pressure level	182	94.72527	47.45083	20	290
wind speed at 85,000 pressure level	182	79.50549	39.65706	10	200
wind speed at 92,500 pressure level	182	68.07692	37.43332	10	170
wind speed at 100,000 pressure level	164	72.86585	45.65495	10	220

Figure 2. Histograms of Wind Direction above Beijing

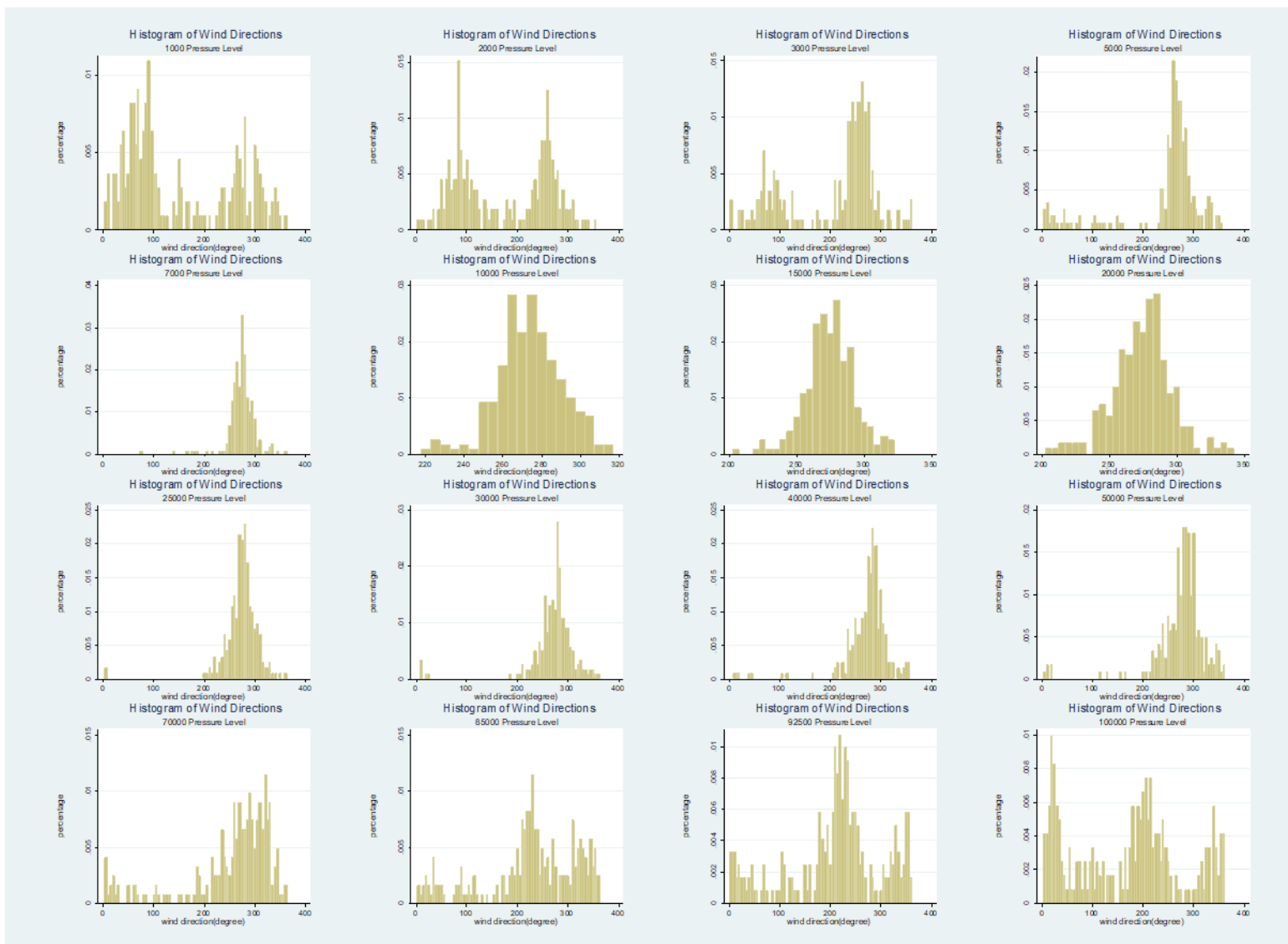


Table 18a. Wind direction from elsewhere in September and October, 2010

	Obs.	Mean	Std. Dev.	Min	Max
wind direction at location 450320	0				
wind direction at location 450390	1,444	119.6122	110.171	0	360
wind direction at location 450440	1,464	125.0273	105.4883	0	360
wind direction at location 503530	1,271	220.716	116.9651	0	360
wind direction at location 504680	1,419	248.3791	100.2601	0	360
wind direction at location 505270	1,446	206.639	87.92127	0	360
wind direction at location 507450	1,434	210.0767	96.82861	0	360
wind direction at location 507740	1,274	188.1554	111.1999	0	360
wind direction at location 507880	1,444	222.5	86.44305	0	360
wind direction at location 508440	1,140	198.5526	103.3398	0	360
wind direction at location 508540	1,176	201.3946	100.9728	0	360
wind direction at location 508880	1,104	213.3333	89.80554	0	360
wind direction at location 509490	1,381	197.4873	104.3357	0	360
wind direction at location 509530	1,360	192.1838	101.7912	0	360
wind direction at location 509780	1,442	255.104	89.46923	0	360
wind direction at location 510760	1,436	198.2033	122.0286	0	360
wind direction at location 511330	1,436	181.4903	121.9985	0	360
wind direction at location 512430	1,420	217.9225	114.1527	0	360
wind direction at location 513340	1,102	180.3267	112.0695	0	360
wind direction at location 514310	1,374	145.6987	98.41822	0	360
wind direction at location 514630	1,438	206.4325	115.807	0	360
wind direction at location 514635	1,441	201.7627	108.2949	0	360
wind direction at location 515730	1,232	150.8523	101.5797	0	360
wind direction at location 517090	1,462	194.8495	120.3291	0	360
wind direction at location 517300	989	153.8625	124.2265	0	360
wind direction at location 518280	1,450	220.6069	89.29239	0	360
wind direction at location 522030	1,415	127.8375	102.9906	0	360
wind direction at location 525330	1,437	182.0807	104.3613	0	360
wind direction at location 525331	1,396	141.7085	126.7285	0	360
wind direction at location 526520	1,414	222.9915	95.88285	0	360
wind direction at location 526810	1,446	174.9308	109.039	0	360
wind direction at location 527370	1,095	149.6164	106.5413	0	360
wind direction at location 527540	1,427	198.6545	124.3463	0	360
wind direction at location 527870	1,204	238.6711	110.3018	0	360
wind direction at location 528660	1,111	159.532	110.6645	0	360
wind direction at location 528890	9	276.6667	125	110	360
wind direction at location 529550	1,301	189.216	108.423	0	360
wind direction at location 529960	1,202	177.8869	92.51249	0	360
wind direction at location 534630	1,464	153.5587	109.5455	0	360
wind direction at location 534800	1,009	191.1001	107.5525	0	360
wind direction at location 534870	1,202	234.2679	116.9499	0	360
wind direction at location 535020	1,178	169.9491	120.9787	0	360

wind direction at location 535130	1,310	161.2595	111.7204	0	360
wind direction at location 535430	1,448	207.9351	91.30902	0	360
wind direction at location 536140	1,391	177.6348	124.1724	0	360
wind direction at location 536460	1,440	198.1528	98.72532	0	360
wind direction at location 536730	1,086	226.7772	115.012	0	360
wind direction at location 536980	1,147	197.803	115.2365	0	360
wind direction at location 537050	1,100	161.4636	105.4292	0	360
wind direction at location 537640	1,160	251.4483	104.0208	0	360
wind direction at location 537720	1,464	158.4085	105.7011	0	360
wind direction at location 537980	1,404	183.1339	115.4884	0	360
wind direction at location 538450	1,406	176.8777	97.10541	0	360
wind direction at location 538980	1,088	192.5276	122.9616	0	360
wind direction at location 539150	1,436	199.1643	102.8866	0	360
wind direction at location 539230	1,194	200.4941	87.07123	0	360
wind direction at location 539590	1,377	136.0712	90.54601	0	360
wind direction at location 539750	1,066	171.5103	92.39672	0	360
wind direction at location 540940	1,318	202.9894	96.25809	0	360
wind direction at location 541020	1,453	197.9147	94.00187	0	360
wind direction at location 541350	1,437	194.7669	98.43499	0	360
wind direction at location 541570	1,081	187.2433	104.6501	0	360
wind direction at location 541610	1,458	190.4492	99.54092	0	360
wind direction at location 542180	1,331	204.29	99.14827	0	360
wind direction at location 542360	1,422	201.4205	117.9879	0	360
wind direction at location 542920	1,370	200.7299	101.0582	0	360
wind direction at location 543240	1,206	182.8856	96.75292	0	360
wind direction at location 543370	1,396	212.7221	112.1969	0	360
wind direction at location 543420	1,410	175.4184	115.8142	0	360
wind direction at location 543424	1,415	157.6007	107.0038	0	360
wind direction at location 543460	1,152	174.8438	110.9652	0	360
wind direction at location 543740	1,232	189.9188	137.5083	0	360
wind direction at location 543770	945	149.3968	106.0958	0	360
wind direction at location 544010	1,442	249.2926	102.2823	0	360
wind direction at location 544230	1,376	194.4331	119.4227	0	360
wind direction at location 544360	1,178	163.3616	111.814	0	360
wind direction at location 544710	1,439	163.2106	110.4447	0	360
wind direction at location 544970	1,407	164.0867	129.8511	0	360
wind direction at location 545270	1,196	193.2107	105.2253	0	360
wind direction at location 545340	1,164	187.1649	110.4787	0	360
wind direction at location 546020	1,109	151.2714	106.3859	0	360
wind direction at location 546180	1,438	181.516	100.6807	0	360
wind direction at location 546620	1,463	206.1586	119.8399	0	360
wind direction at location 547150	1,102	151.9873	106.3162	0	360
wind direction at location 547250	1,190	168.9916	103.3159	0	360
wind direction at location 547510	1,176	204.0561	118.5104	0	360

wind direction at location 547760	1,448	236.9544	112.5432	0	360
wind direction at location 548080	1,133	193.8658	118.5665	0	360
wind direction at location 548230	1,443	153.4858	93.99577	0	360
wind direction at location 548260	1,196	184.214	97.07505	0	360
wind direction at location 548360	1,192	140.6124	101.7985	0	360
wind direction at location 548430	1,246	161.4848	117.3453	0	360
wind direction at location 548570	1,461	198.4326	120.8036	0	360
wind direction at location 549090	1,303	187.5979	122.1705	0	360
wind direction at location 549160	1,040	164.0192	115.9602	0	360
wind direction at location 549290	1,239	158.2163	99.04454	0	360
wind direction at location 549450	1,321	214.648	109.4139	0	360
wind direction at location 552280	1,240	216.7419	98.47849	0	360
wind direction at location 552990	1,268	173.3517	115.7374	0	360
wind direction at location 555910	1,256	172.8424	106.6108	0	360
wind direction at location 560290	1,107	158.9612	109.1439	0	360
wind direction at location 560460	1,338	169.7683	101.3943	0	360
wind direction at location 560650	1,055	170.0379	104.9659	0	360
wind direction at location 560800	1,422	230.4852	114.9316	0	360
wind direction at location 560960	1,428	167.381	105.7499	0	360
wind direction at location 561370	1,220	211.2869	121.0898	0	360
wind direction at location 561720	998	173.4669	124.8028	0	360
wind direction at location 561960	1,211	174.4839	120.5105	0	360
wind direction at location 562870	948	124.0084	100.157	0	360
wind direction at location 562940	1,272	153.3608	135.1371	0	360
wind direction at location 563120	1,044	142.4617	102.7128	0	360
wind direction at location 563740	1,159	124.9612	88.9828	0	360
wind direction at location 563850	1,236	202.3058	97.51125	0	360
wind direction at location 564440	1,248	186.1298	110.8833	0	360
wind direction at location 564920	1,199	182.6272	119.4493	0	360
wind direction at location 565710	1,228	189.2345	123.0629	0	360
wind direction at location 565860	1,144	217.5962	132.5168	0	360
wind direction at location 566510	1,383	163.3261	90.66525	0	360
wind direction at location 566710	1,100	199.3273	115.875	0	360
wind direction at location 566910	1,439	185.4621	115.4608	0	360
wind direction at location 567390	1,428	177.2619	109.7107	0	360
wind direction at location 567480	1,167	155.2099	83.59485	0	360
wind direction at location 567510	1,182	198.1641	107.1062	0	360
wind direction at location 567680	1,179	172.095	83.98159	0	360
wind direction at location 567780	1,459	150.8533	82.83622	0	360
wind direction at location 567860	1,223	212.641	80.5554	0	360
wind direction at location 569510	1,270	166.0394	109.0643	0	360
wind direction at location 569590	1,055	178.9953	106.0698	0	360
wind direction at location 569640	1,171	196.7891	114.7428	0	360
wind direction at location 569850	1,434	170.8229	81.38469	0	360

wind direction at location 570140	1,179	174.9109	90.43503	0	360
wind direction at location 570250	1,193	196.8567	104.7613	0	360
wind direction at location 570360	1,349	124.8629	107.1879	0	360
wind direction at location 570460	1,157	187.5713	85.58811	0	360
wind direction at location 570710	1,182	189.1032	117.2001	0	360
wind direction at location 570830	1,458	133.0453	114.2813	0	360
wind direction at location 571270	1,357	140.199	87.89847	0	360
wind direction at location 571310	1,435	148.6969	112.1747	0	360
wind direction at location 571780	1,355	121.9779	102.8935	0	360
wind direction at location 571930	987	163.7994	135.8291	0	360
wind direction at location 572450	1,367	145.011	103.9244	0	360
wind direction at location 572590	1,074	131.6946	94.89149	0	360
wind direction at location 572790	1,102	164.5735	123.6801	0	360
wind direction at location 572900	1,062	145.5932	127.2984	0	360
wind direction at location 572970	1,374	221.4483	127.1344	0	360
wind direction at location 573060	999	185.3854	135.4086	0	360
wind direction at location 573280	1,152	80	85.87871	0	360
wind direction at location 573780	1,266	254.0916	118.827	0	360
wind direction at location 573990	1,270	211.9449	144.1633	0	360
wind direction at location 574110	1,426	178.345	130.4612	0	360
wind direction at location 574470	1,422	214.9015	97.79244	0	360
wind direction at location 574610	1,389	188.9777	100.2344	0	360
wind direction at location 574760	1,146	168.534	143.9448	0	360
wind direction at location 574940	1,460	133.4932	122.4963	0	360
wind direction at location 575030	419	162.8162	127.4302	0	360
wind direction at location 575160	1,463	179.3199	121.2042	0	360
wind direction at location 575540	1,099	118.1893	98.92453	0	360
wind direction at location 575840	1,259	177.784	145.2067	0	360
wind direction at location 576040	1,212	195.0248	112.4603	0	360
wind direction at location 576550	1,143	117.944	118.1604	0	360
wind direction at location 576620	1,374	166.4119	136.6395	0	360
wind direction at location 576870	1,419	254.3904	95.44029	0	360
wind direction at location 577070	979	167.334	123.5788	0	360
wind direction at location 577450	1,315	123.962	109.3201	0	360
wind direction at location 577660	1,165	142.3519	118.1056	0	360
wind direction at location 577760	1,220	201.8852	131.1346	0	360
wind direction at location 577930	1,263	164.4656	92.4984	0	360
wind direction at location 577990	1,378	274.9782	100.5607	0	360
wind direction at location 578160	1,455	111.6632	99.22386	0	360
wind direction at location 578320	1,234	147.3744	125.4148	0	360
wind direction at location 578660	1,388	119.5893	124.9936	0	360
wind direction at location 579020	1,430	157.1189	104.1011	0	360
wind direction at location 579220	1,085	216.7189	127.2028	0	360
wind direction at location 579570	1,462	106.9391	120.3553	0	360

wind direction at location 579720	1,159	187.7049	145.5402	0	360
wind direction at location 579930	1,409	203.1228	130.2272	0	360
wind direction at location 580270	1,313	146.0853	107.6172	0	360
wind direction at location 580400	1,089	130.9366	119.6166	0	360
wind direction at location 581020	1,425	206.1544	116.9195	0	360
wind direction at location 581410	1,421	150.2463	117.5196	0	360
wind direction at location 581500	1,433	171.6469	124.4426	0	360
wind direction at location 582030	1,422	162.4965	118.9339	0	360
wind direction at location 582210	1,387	133.1146	104.0006	0	360
wind direction at location 582380	1,464	136.2227	115.1922	0	360
wind direction at location 582390	1,397	212.5483	114.4778	0	360
wind direction at location 582510	1,434	174.9233	129.9934	0	360
wind direction at location 582650	1,462	148.4268	112.3795	0	360
wind direction at location 583140	1,283	160.3585	111.0573	0	360
wind direction at location 583210	1,464	135.4133	113.892	0	360
wind direction at location 583380	1,235	147.1984	114.8846	0	360
wind direction at location 583450	1,346	137.3626	119.6244	0	360
wind direction at location 583670	1,454	149.0165	123.0167	0	360
wind direction at location 584240	1,426	82.90323	88.61183	0	360
wind direction at location 584370	1,266	183.5387	105.4685	0	360
wind direction at location 584570	1,461	175.4004	124.9171	0	360
wind direction at location 584770	1,434	168.3124	131.391	0	360
wind direction at location 585060	1,161	127.5194	115.2511	0	360
wind direction at location 585270	1,370	153.3431	141.4583	0	360
wind direction at location 586060	1,426	97.03366	71.16451	0	360
wind direction at location 586330	1,418	90.6347	81.07616	0	360
wind direction at location 586460	1,275	115.8588	93.19185	0	360
wind direction at location 586660	1,453	173.1521	140.6385	0	360
wind direction at location 587150	1,270	272.9134	104.6764	0	360
wind direction at location 587300	1,218	189.2652	130.5999	0	360
wind direction at location 587520	1,416	199.0325	122.211	0	360
wind direction at location 588340	1,402	157.204	117.3781	0	360
wind direction at location 588470	1,463	135.0649	121.9051	0	360
wind direction at location 589210	1,442	174.9792	117.6182	0	360
wind direction at location 589260	1,397	202.6986	111.9523	0	360
wind direction at location 589440	1,460	99.20548	81.07772	0	360
wind direction at location 590230	1,414	172.0934	107.4428	0	360
wind direction at location 590460	1,256	200.422	136.0299	0	360
wind direction at location 590720	1,242	201.0386	146.0905	0	360
wind direction at location 590820	1,453	223.4136	108.2864	0	360
wind direction at location 591170	1,413	191.4084	113.0911	0	360
wind direction at location 591340	1,462	111.1457	93.4091	0	360
wind direction at location 592110	1,424	220.0492	115.5387	0	360
wind direction at location 592540	1,244	175.3135	136.0291	0	360

wind direction at location 592650	1,454	153.425	129.0538	0	360
wind direction at location 592780	1,434	165.5649	120.2179	0	360
wind direction at location 592870	1,459	137.7622	133.7745	0	360
wind direction at location 592871	1,327	238.4514	135.8963	0	360
wind direction at location 592930	1,441	142.4913	128.3527	0	360
wind direction at location 593160	1,457	125.3638	96.14373	0	360
wind direction at location 594170	1,364	155.1906	89.41175	0	360
wind direction at location 594310	1,450	162.369	127.6382	0	360
wind direction at location 594930	1,462	129.593	112.9555	0	360
wind direction at location 595010	1,433	143.2589	116.8681	0	360
wind direction at location 596320	1,447	213.3656	130.3578	0	360
wind direction at location 596440	1,451	190.5307	132.4332	0	360
wind direction at location 596580	1,457	165.3329	127.5834	0	360
wind direction at location 596630	1,461	134.0726	121.0464	20	360
wind direction at location 597580	1,454	143.0536	93.24553	0	360
wind direction at location 599480	1,458	149.1701	123.0043	0	360

Table 18b. Wind direction from elsewhere in September, October and November, 2014

Variable	Obs.	Mean	Std. Dev.	Min	Max
wind direction at location 450320	1,766	134.4337	103.8865	0	360
wind direction at location 450390	1,967	126.3142	107.9052	10	360
wind direction at location 450440	2,082	130.4995	92.07439	0	360
wind direction at location 503530	2,000	229.615	109.3832	0	360
wind direction at location 504680	2,079	262.7465	96.27174	0	360
wind direction at location 505270	2,168	208.8007	83.45582	0	360
wind direction at location 507450	2,060	209.6238	100.8052	0	360
wind direction at location 507740	1,958	204.4408	96.87243	0	360
wind direction at location 507880	2,123	219.8304	91.01102	0	360
wind direction at location 508440	1,806	211.9934	103.8927	0	360
wind direction at location 508540	1,799	209.0745	98.93843	0	360
wind direction at location 508880	1,757	220.0797	89.9968	0	360
wind direction at location 509490	2,101	206.6849	90.01147	0	360
wind direction at location 509530	2,096	214.3917	92.36071	0	360
wind direction at location 509780	2,164	242.3983	82.86438	0	360
wind direction at location 510760	2,059	174.1986	120.2876	0	360
wind direction at location 511330	1,899	193.6177	125.8	0	360
wind direction at location 512430	2,082	216.7723	111.7462	0	360
wind direction at location 513340	1,894	174.377	104.2585	0	360
wind direction at location 514310	1,822	140.719	102.6312	0	360
wind direction at location 514630	2,091	193.3142	118.4205	0	360
wind direction at location 514635	2,115	202.2317	107.8412	0	360
wind direction at location 515730	1,968	192.1748	105.8408	0	360
wind direction at location 517090	2,177	193.5347	105.9849	0	360
wind direction at location 517300	1,712	138.5631	107.6334	0	360

wind direction at location 518280	2,049	200.4124	99.04815	0	360
wind direction at location 522030	1,950	132.6615	106.098	0	360
wind direction at location 525330	2,150	194.1256	103.0081	0	360
wind direction at location 525331	2,091	188.8905	123.9697	0	360
wind direction at location 526520	2,157	204.8424	92.3657	0	360
wind direction at location 526810	2,116	191.6919	99.19485	0	360
wind direction at location 527370	1,745	148.5903	108.4718	0	360
wind direction at location 527540	2,131	220.5584	121.2715	0	360
wind direction at location 527870	1,906	239.937	106.5256	0	360
wind direction at location 528660	1,695	156.8053	111.596	0	360
wind direction at location 528890	22	170.4545	103.8074	0	290
wind direction at location 529550	1,947	208.0483	101.7048	0	360
wind direction at location 529960	1,889	182.8269	100.7443	0	360
wind direction at location 534630	2,180	183.5459	115.0238	0	360
wind direction at location 534800	1,814	212.1582	90.21998	0	360
wind direction at location 534870	1,757	210.9391	114.1542	0	360
wind direction at location 535020	1,900	186.9395	111.5361	0	360
wind direction at location 535130	2,131	166.1145	97.86987	0	360
wind direction at location 535430	2,085	206.4556	91.52973	0	360
wind direction at location 536140	2,087	188.5793	116.48	0	360
wind direction at location 536460	2,166	201.3089	95.25998	0	360
wind direction at location 536730	1,844	223.6117	114.8741	0	360
wind direction at location 536980	1,677	189.4991	116.1031	0	360
wind direction at location 537050	1,848	177.5595	100.7162	0	360
wind direction at location 537640	1,752	158.2306	127.2202	0	360
wind direction at location 537720	2,180	150.5482	100.0341	0	360
wind direction at location 537980	2,014	156.8669	114.4223	0	360
wind direction at location 538450	2,090	166.3852	102.7231	0	360
wind direction at location 538980	1,887	197.8696	105.498	0	360
wind direction at location 539150	2,132	203.2622	108.7289	0	360
wind direction at location 539230	1,874	198.4952	93.91968	0	360
wind direction at location 539590	2,077	160.3033	98.8233	0	360
wind direction at location 539750	1,822	190.2086	92.98492	0	360
wind direction at location 540940	2,125	203.4376	92.54869	0	360
wind direction at location 541020	2,138	205.3368	87.8496	0	360
wind direction at location 541350	2,151	204.0191	94.6727	0	360
wind direction at location 541570	1,856	202.0151	91.27153	0	360
wind direction at location 541610	2,176	200.455	87.49502	0	360
wind direction at location 542180	2,127	212.9525	98.54685	0	360
wind direction at location 542360	2,134	216.701	102.705	0	360
wind direction at location 542920	2,124	221.8832	101.2053	0	360
wind direction at location 543240	1,900	182.0737	87.13154	0	360
wind direction at location 543370	2,041	171.5679	112.0867	0	360
wind direction at location 543420	2,091	178.4672	96.03581	0	360

wind direction at location 543424	2,095	166.3795	104.2118	0	360
wind direction at location 543460	1,904	173.3508	102.6573	0	360
wind direction at location 543740	2,038	212.63	131.1355	0	360
wind direction at location 543770	1,864	242.6422	121.7391	0	360
wind direction at location 544010	2,072	213.7983	111.6346	0	360
wind direction at location 544230	1,880	181.484	122.4773	0	360
wind direction at location 544360	1,632	174.0962	115.9009	0	360
wind direction at location 544710	2,173	157.6898	104.1938	0	360
wind direction at location 544970	2,143	162.9818	123.0173	0	360
wind direction at location 545270	1,875	200.656	98.04028	0	360
wind direction at location 545340	1,624	180.4249	112.186	0	360
wind direction at location 546020	1,677	157.7102	103.6863	0	360
wind direction at location 546180	2,029	184.8472	101.5471	0	360
wind direction at location 546620	2,174	227.4425	107.0483	0	360
wind direction at location 547150	1,768	171.0633	106.498	0	360
wind direction at location 547250	1,753	172.607	107.8055	0	360
wind direction at location 547510	1,887	185.0556	113.9589	0	360
wind direction at location 547760	2,165	230.776	114.9791	0	360
wind direction at location 548080	1,680	167.9821	117.5835	0	360
wind direction at location 548230	2,147	163.095	96.24269	0	360
wind direction at location 548260	1,889	187.9354	83.81764	0	360
wind direction at location 548360	1,928	160.0726	105.3656	0	360
wind direction at location 548430	1,957	179.4635	107.6747	0	360
wind direction at location 548570	2,174	193.5488	118.4628	0	360
wind direction at location 549090	2,043	163.2942	111.9805	0	360
wind direction at location 549160	1,599	166.1976	121.1446	0	360
wind direction at location 549290	1,791	152.7806	103.7082	0	360
wind direction at location 549450	2,027	220.9645	117.2312	0	360
wind direction at location 552280	2,093	207.4988	90.15212	0	360
wind direction at location 552990	2,123	193.0758	106.7713	0	360
wind direction at location 555910	2,129	161.3551	93.18512	0	360
wind direction at location 560290	1,595	175.0721	114.3935	0	360
wind direction at location 560460	2,044	180.7559	103.7811	0	360
wind direction at location 560650	1,744	189.2661	106.4373	0	360
wind direction at location 560800	2,065	240.4455	113.6941	0	360
wind direction at location 560960	2,029	156.656	107.5666	0	360
wind direction at location 561370	2,072	217.4493	108.7889	0	360
wind direction at location 561720	1,751	165.1256	115.713	0	360
wind direction at location 561960	1,865	177.2922	119.7848	0	360
wind direction at location 562870	1,501	163.6642	105.8063	0	360
wind direction at location 562940	1,914	138.9159	131.8259	0	360
wind direction at location 563120	2,053	182.8982	87.01979	0	360
wind direction at location 563740	1,869	125.1204	79.46319	0	360
wind direction at location 563850	1,828	214.8523	100.7092	0	360

wind direction at location 564440	2,067	211.2313	100.7835	0	360
wind direction at location 564920	1,726	178.989	122.8796	0	360
wind direction at location 565710	1,911	195.7718	128.1888	0	360
wind direction at location 565860	1,683	184.3256	134.8441	0	360
wind direction at location 566510	2,114	181.807	88.42284	0	360
wind direction at location 566710	1,724	195.5336	94.71223	0	360
wind direction at location 566910	2,154	198.8951	97.12201	0	360
wind direction at location 567390	1,985	190.1259	87.64006	0	360
wind direction at location 567480	1,669	158.3883	83.22042	0	360
wind direction at location 567510	1,834	193.1843	102.572	0	360
wind direction at location 567680	1,684	171.155	82.21271	0	360
wind direction at location 567780	2,179	183.5108	87.03723	0	360
wind direction at location 567860	1,839	200.4377	90.10504	0	360
wind direction at location 569510	1,755	161.6467	106.5889	0	360
wind direction at location 569590	1,735	182.5908	98.97275	0	360
wind direction at location 569640	1,884	230.5016	102.6128	0	360
wind direction at location 569850	2,160	169.7292	61.82108	0	360
wind direction at location 570140	1,818	188.4571	92.02664	0	360
wind direction at location 570250	1,857	209.3753	104.2793	0	360
wind direction at location 570360	2,027	128.9171	107.8582	0	360
wind direction at location 570460	1,856	201.6272	82.66024	0	360
wind direction at location 570710	1,833	168.9253	108.1746	0	360
wind direction at location 570830	2,157	169.9073	110.3012	0	360
wind direction at location 571270	1,982	148.1155	92.71492	0	360
wind direction at location 571310	2,136	143.1578	113.24	0	360
wind direction at location 571780	2,166	145.2078	118.0145	0	360
wind direction at location 571930	1,817	167.6775	114.7766	0	360
wind direction at location 572450	2,034	152.4189	100.7124	0	360
wind direction at location 572590	1,819	143.1501	94.78088	0	360
wind direction at location 572790	1,777	176.2802	124.0852	0	360
wind direction at location 572900	1,852	235.6587	110.7201	0	360
wind direction at location 572970	2,139	221.0659	123.8182	0	360
wind direction at location 573060	1,840	210.212	130.9638	0	360
wind direction at location 573280	2,106	118.4734	103.1711	0	360
wind direction at location 573780	1,877	228.8918	129.4496	0	360
wind direction at location 573990	1,840	233.6957	138.0633	0	360
wind direction at location 574110	1,994	174.6841	138.2266	0	360
wind direction at location 574470	1,714	192.1324	109.8325	0	360
wind direction at location 574610	2,158	205.8179	105.49	0	360
wind direction at location 574760	1,827	163.1253	140.718	0	360
wind direction at location 574940	2,166	141.4428	122.848	0	360
wind direction at location 575030	768	192.3828	122.6763	0	360
wind direction at location 575160	2,162	186.2095	122.738	0	360
wind direction at location 575540	1,729	137.6778	101.818	0	360

wind direction at location 575840	1,879	212.7142	144.6997	0	360
wind direction at location 576040	1,845	206.4932	112.1318	0	360
wind direction at location 576550	1,749	135.7633	131.1974	0	360
wind direction at location 576620	2,124	231.4548	131.0216	0	360
wind direction at location 576870	2,096	246.4122	100.2727	0	360
wind direction at location 577070	1,707	163.8254	110.7544	0	360
wind direction at location 577450	1,879	114.1804	111.5958	0	360
wind direction at location 577660	1,785	120.6218	110.7602	0	360
wind direction at location 577760	1,903	187.7509	117.7099	0	360
wind direction at location 577930	1,894	168.6246	92.58951	0	360
wind direction at location 577990	2,049	222.2011	137.3639	0	360
wind direction at location 578160	2,170	124.9078	95.86971	0	360
wind direction at location 578320	1,759	143.6498	123.9715	0	360
wind direction at location 578660	2,062	121.7653	110.2641	0	360
wind direction at location 579020	2,068	139.1272	80.24168	0	360
wind direction at location 579220	1,784	186.3004	103.8647	0	360
wind direction at location 579570	2,171	133.1	128.2961	0	360
wind direction at location 579720	1,979	211.996	129.6765	0	360
wind direction at location 579930	2,138	165.3017	124.1598	0	360
wind direction at location 580270	1,885	141.9973	106.2508	0	360
wind direction at location 580400	1,908	169.5755	124.13	0	360
wind direction at location 581020	2,009	186.3514	117.6999	0	360
wind direction at location 581410	1,977	151.735	123.2176	0	360
wind direction at location 581500	2,057	156.1351	115.5678	0	360
wind direction at location 582030	2,106	163.7654	119.1331	0	360
wind direction at location 582210	2,154	139.8561	101.0549	0	360
wind direction at location 582380	2,178	150.5188	110.0973	0	360
wind direction at location 582390	2,105	210.7411	115.5293	0	360
wind direction at location 582510	2,134	162.4695	118.4916	0	360
wind direction at location 582650	2,116	167.1692	116.7571	0	360
wind direction at location 583140	2,032	162.5517	105.6116	0	360
wind direction at location 583210	2,179	154.8738	110.6845	0	360
wind direction at location 583380	1,851	146.6721	106.7857	0	360
wind direction at location 583450	1,933	139.8784	113.6454	0	360
wind direction at location 583670	2,166	168.0702	120.7079	0	360
wind direction at location 584240	2,116	128.9225	125.1362	0	360
wind direction at location 584370	1,907	221.678	96.83943	20	360
wind direction at location 584570	2,180	177.4358	126.2657	0	360
wind direction at location 584770	2,030	177.367	138.8956	0	360
wind direction at location 585060	1,855	150.8733	111.1754	0	360
wind direction at location 585270	2,033	140.578	133.5237	0	360
wind direction at location 586060	2,160	115.2546	112.5177	0	360
wind direction at location 586330	2,100	114.9024	95.44773	0	360
wind direction at location 586460	1,821	102.6057	87.71382	0	360

wind direction at location 586660	2,168	199.2758	147.9526	0	360
wind direction at location 587150	1,901	241.6991	123.8459	0	360
wind direction at location 587300	1,860	182.6774	130.8644	0	360
wind direction at location 587520	2,103	190.2235	120.2424	0	360
wind direction at location 588340	2,067	156.4248	116.2904	0	360
wind direction at location 588470	2,180	145.2317	127.718	0	360
wind direction at location 589210	2,122	164.7361	110.3449	0	360
wind direction at location 589260	2,132	202.5328	104.1191	0	360
wind direction at location 589440	2,172	142.7164	143.242	0	360
wind direction at location 590230	1,943	167.0844	106.8465	0	360
wind direction at location 590460	1,825	169.874	124.9422	0	360
wind direction at location 590720	1,819	190.022	141.7803	0	360
wind direction at location 590820	2,142	207.2502	96.90662	0	360
wind direction at location 591170	2,161	238.7853	103.5129	0	360
wind direction at location 591340	2,180	117.7569	101.8466	0	360
wind direction at location 592110	2,066	186.6796	120.3655	0	360
wind direction at location 592540	1,849	172.6636	136.9725	0	360
wind direction at location 592650	2,150	115.707	109.7845	0	360
wind direction at location 592780	2,142	156.5476	122.7337	0	360
wind direction at location 592870	2,180	165.0092	139.0183	0	360
wind direction at location 592871	2,092	216.0612	135.0169	0	360
wind direction at location 592930	2,126	153.6336	131.0191	0	360
wind direction at location 593160	2,177	128.4336	92.07064	0	360
wind direction at location 594170	1,973	174.6072	93.60381	0	360
wind direction at location 594310	2,147	164.2781	121.7315	0	360
wind direction at location 594930	2,180	131.6766	106.3874	0	360
wind direction at location 595010	2,150	108.3558	88.23251	0	360
wind direction at location 596320	2,158	203.209	123.2811	0	360
wind direction at location 596440	2,167	153.5095	116.2237	0	360
wind direction at location 596580	2,164	149.2768	111.5848	0	360
wind direction at location 596630	2,160	127.8472	117.857	0	360
wind direction at location 597580	2,043	107.7998	77.66687	0	360
wind direction at location 599480	2,150	87.81395	74.71654	0	360

Table 19a. Wind speed elsewhere in September and October, 2010

Variable	Obs.	Mean	Std. Dev.	Min	Max
wind speed at location 450320	0				
wind speed at location 450390	1,464	25.13661	11.64444	0	70
wind speed at location 450440	1,464	53.47678	24.60075	0	160
wind speed at location 503530	1,271	19.63808	13.16861	0	70
wind speed at location 504680	1,419	25.36293	17.26521	0	90

wind speed at location 505270	1,446	22.44813	12.91263	0	80
wind speed at location 507450	1,434	27.55927	15.024	0	90
wind speed at location 507740	1,274	17.54317	13.02635	0	70
wind speed at location 507880	1,444	34.01662	19.11963	0	100
wind speed at location 508440	1,140	34.37719	20.37096	0	100
wind speed at location 508540	1,176	25.78231	14.55964	0	110
wind speed at location 508880	1,104	27.37319	17.48934	0	100
wind speed at location 509490	1,381	24.72122	14.49682	0	80
wind speed at location 509530	1,360	21.33088	12.30861	0	70
wind speed at location 509780	1,442	33.89736	20.18816	0	120
wind speed at location 510760	1,436	19.33844	12.17387	0	80
wind speed at location 511330	1,436	20.18802	13.00896	0	80
wind speed at location 512430	1,420	22.16901	13.12163	0	110
wind speed at location 513340	1,102	14.31942	9.636423	0	90
wind speed at location 514310	1,374	15.69869	9.85249	0	60
wind speed at location 514630	1,438	24.08901	14.51025	0	100
wind speed at location 514635	1,464	26.15437	15.60577	0	110
wind speed at location 515730	1,232	12.54058	7.666271	0	50
wind speed at location 517090	1,464	27.27117	22.28985	0	180
wind speed at location 517300	989	16.18807	11.68622	0	70
wind speed at location 518280	1,450	21.16552	10.99376	0	100
wind speed at location 522030	1,415	14.55124	8.311902	0	60
wind speed at location 525330	1,437	19.42241	10.22792	0	70
wind speed at location 525331	1,462	20.42408	15.84678	0	110
wind speed at location 526520	1,414	16.52051	8.906247	0	60
wind speed at location 526810	1,446	22.21992	13.79971	0	90
wind speed at location 527370	1,095	17.47032	10.12232	0	60
wind speed at location 527540	1,427	29.31324	16.80945	0	90
wind speed at location 527870	1,204	49.95847	27.07856	0	150
wind speed at location 528660	1,111	11.34113	7.527829	0	60
wind speed at location 528890	9	10	0	10	10
wind speed at location 529550	1,301	16.63336	9.752874	0	70
wind speed at location 529960	1,202	47.07155	24.87089	0	130
wind speed at location 534630	1,464	22.24385	15.13561	0	100
wind speed at location 534800	1,009	20.37661	15.14667	0	80
wind speed at location 534870	1,202	24.78369	14.34654	0	90
wind speed at location 535020	1,178	26.04414	16.0703	0	90
wind speed at location 535130	1,310	22.08397	14.47874	0	80
wind speed at location 535430	1,448	23.80525	11.80155	0	80
wind speed at location 536140	1,391	17.33285	9.376416	0	60
wind speed at location 536460	1,440	25.73611	13.58114	0	90
wind speed at location 536730	1,086	17.4954	12.27892	0	80
wind speed at location 536980	1,147	13.53095	6.710132	0	40
wind speed at location 537050	1,100	19.18182	11.9927	0	70

wind speed at location 537640	1,160	19.94828	10.54989	0	60
wind speed at location 537720	1,464	19.62432	15.8921	0	120
wind speed at location 537980	1,404	15.24929	7.911338	0	50
wind speed at location 538450	1,406	13.41038	5.855448	0	40
wind speed at location 538980	1,088	18.93382	11.85481	0	80
wind speed at location 539150	1,436	20.50836	10.76609	0	80
wind speed at location 539230	1,194	21.23953	10.04456	0	50
wind speed at location 539590	1,377	21.83007	14.72589	0	90
wind speed at location 539750	1,066	18.82739	14.33451	0	80
wind speed at location 540940	1,318	18.48255	13.71045	0	80
wind speed at location 541020	1,453	33.66139	17.70047	0	90
wind speed at location 541350	1,437	29.19972	15.92504	0	80
wind speed at location 541570	1,081	20.43478	12.55712	0	70
wind speed at location 541610	1,464	29.80533	17.82173	0	100
wind speed at location 542180	1,331	18.3997	11.87312	0	70
wind speed at location 542360	1,422	32.78481	20.44151	0	100
wind speed at location 542920	1,370	24.05109	22.28077	0	140
wind speed at location 543240	1,206	23.78109	12.60831	0	70
wind speed at location 543370	1,396	23.72493	15.45558	0	100
wind speed at location 543420	1,410	21.51064	12.90579	0	60
wind speed at location 543424	1,464	30.38593	17.71377	0	100
wind speed at location 543460	1,152	17.94271	8.584644	0	50
wind speed at location 543740	1,232	14.46429	9.784287	0	60
wind speed at location 543770	945	12.55026	9.214595	0	70
wind speed at location 544010	1,442	20.44383	9.965797	0	70
wind speed at location 544230	1,376	14.73837	10.9911	0	80
wind speed at location 544360	1,178	22.26655	14.89266	0	70
wind speed at location 544710	1,439	37.92217	20.51302	0	100
wind speed at location 544970	1,407	26.14783	17.29423	0	130
wind speed at location 545270	1,196	26.07023	15.87425	0	100
wind speed at location 545340	1,164	22.99828	13.6419	0	70
wind speed at location 546020	1,109	14.8963	7.988771	0	50
wind speed at location 546180	1,438	19.20723	10.05539	0	70
wind speed at location 546620	1,464	30.26298	20.69328	0	120
wind speed at location 547150	1,102	20.00907	13.08464	0	80
wind speed at location 547250	1,190	20.52101	11.73283	0	80
wind speed at location 547510	1,176	40.4932	23.40238	0	110
wind speed at location 547760	1,448	56.40193	40.28882	0	210
wind speed at location 548080	1,133	18.06708	11.63593	0	60
wind speed at location 548230	1,443	23.80457	12.48613	0	90
wind speed at location 548260	1,196	47.75084	33.04175	0	200
wind speed at location 548360	1,192	17.13087	11.64791	0	70
wind speed at location 548430	1,246	18.61958	12.72589	0	70
wind speed at location 548570	1,464	30.25273	19.61012	0	120

wind speed at location 549090	1,303	18.33461	11.65578	0	80
wind speed at location 549160	1,040	15.68269	9.598047	0	60
wind speed at location 549290	1,239	15.29459	9.429077	0	60
wind speed at location 549450	1,321	19.50795	10.45844	0	80
wind speed at location 552280	1,240	29.3629	22.10469	0	120
wind speed at location 552990	1,268	20.5836	15.27357	0	70
wind speed at location 555910	1,256	17.30096	10.46147	0	60
wind speed at location 560290	1,107	12.96296	10.47176	0	60
wind speed at location 560460	1,338	19.79821	14.12217	0	100
wind speed at location 560650	1,055	20.05687	14.65597	0	80
wind speed at location 560800	1,422	19.49367	12.23266	0	80
wind speed at location 560960	1,428	19.20168	13.3281	0	90
wind speed at location 561370	1,220	12.77049	7.655189	0	40
wind speed at location 561720	998	13.26653	10.74698	0	50
wind speed at location 561960	1,211	16.89513	9.75424	0	80
wind speed at location 562870	948	14.89451	10.8503	0	60
wind speed at location 562940	1,463	14.23787	11.9985	0	110
wind speed at location 563120	1,044	15.41188	12.2268	0	70
wind speed at location 563740	1,159	31.44953	22.4986	0	100
wind speed at location 563850	1,236	25.39644	15.07084	0	90
wind speed at location 564440	1,248	16.93109	9.937498	0	60
wind speed at location 564920	1,199	11.41785	6.587643	0	50
wind speed at location 565710	1,228	14.60912	11.23623	0	90
wind speed at location 565860	1,144	17.44755	11.13611	0	60
wind speed at location 566510	1,383	19.43601	13.14948	0	70
wind speed at location 566710	1,100	15.22727	9.081733	0	50
wind speed at location 566910	1,439	24.43363	9.927183	0	60
wind speed at location 567390	1,428	16.67367	9.70121	0	70
wind speed at location 567480	1,167	16.88089	10.77791	0	60
wind speed at location 567510	1,182	16.61591	9.259804	0	60
wind speed at location 567680	1,179	20.33079	12.03317	0	70
wind speed at location 567780	1,464	27.29508	14.09102	0	90
wind speed at location 567860	1,223	26.3287	14.77645	0	80
wind speed at location 569510	1,270	13.25197	8.637219	0	60
wind speed at location 569590	1,055	11.97156	7.05758	0	40
wind speed at location 569640	1,171	12.89496	8.324923	0	50
wind speed at location 569850	1,434	16.83403	7.926146	0	50
wind speed at location 570140	1,179	19.79644	13.23521	0	90
wind speed at location 570250	1,193	22.38894	13.32642	0	80
wind speed at location 570360	1,461	27.47091	20.43248	0	90
wind speed at location 570460	1,157	36.81936	28.45344	0	150
wind speed at location 570710	1,182	22.1066	12.74562	0	80
wind speed at location 570830	1,464	21.60861	17.14074	0	120
wind speed at location 571270	1,357	12.92557	6.465559	0	40

wind speed at location 571310	1,435	25.18467	13.9841	0	70
wind speed at location 571780	1,355	16.74539	10.13014	0	60
wind speed at location 571930	987	14.29585	9.414159	0	50
wind speed at location 572450	1,367	13.77469	7.246073	0	60
wind speed at location 572590	1,074	17.25326	11.7839	0	50
wind speed at location 572790	1,102	16.39746	9.081222	0	50
wind speed at location 572900	1,062	14.23729	8.27953	0	50
wind speed at location 572970	1,374	18.29694	10.82923	0	70
wind speed at location 573060	999	12.6026	8.819797	0	50
wind speed at location 573280	1,152	10.88542	6.675869	0	40
wind speed at location 573780	1,266	23.60979	11.66744	0	70
wind speed at location 573990	1,270	20.56693	11.45078	0	70
wind speed at location 574110	1,426	15	7.698257	0	60
wind speed at location 574470	1,422	12.39803	5.635086	0	40
wind speed at location 574610	1,389	13.36933	6.598376	0	50
wind speed at location 574760	1,146	21.89354	13.88005	0	90
wind speed at location 574940	1,464	23.6373	12.93172	0	90
wind speed at location 575030	419	14.10501	9.476662	0	50
wind speed at location 575160	1,464	18.59631	11.01296	0	70
wind speed at location 575540	1,099	14.19472	10.29449	0	70
wind speed at location 575840	1,259	27.30739	13.86891	0	80
wind speed at location 576040	1,212	15.40429	7.875051	0	50
wind speed at location 576550	1,143	15.38933	9.724837	0	70
wind speed at location 576620	1,374	14.51965	7.67289	0	70
wind speed at location 576870	1,419	23.51656	12.9323	0	60
wind speed at location 577070	979	12.63534	8.423893	0	50
wind speed at location 577450	1,315	17.23954	10.43497	0	60
wind speed at location 577660	1,165	16.66953	10.13134	0	60
wind speed at location 577760	1,220	42.90164	24.59397	0	140
wind speed at location 577930	1,263	18.67775	8.689568	0	50
wind speed at location 577990	1,378	20.32656	12.03822	0	70
wind speed at location 578160	1,455	24.1512	10.66324	0	60
wind speed at location 578320	1,234	17.40681	9.354763	0	50
wind speed at location 578660	1,388	27.01729	15.28984	0	80
wind speed at location 579020	1,430	18.41958	10.06724	0	60
wind speed at location 579220	1,085	21.92627	12.78094	0	60
wind speed at location 579570	1,464	24.19057	16.06369	0	100
wind speed at location 579720	1,159	12.7006	7.744133	0	40
wind speed at location 579930	1,409	17.11852	10.17256	0	60
wind speed at location 580270	1,313	18.89566	10.43632	0	60
wind speed at location 580400	1,089	20.64279	15.68738	0	70
wind speed at location 581020	1,425	18.1614	8.891626	0	60
wind speed at location 581410	1,421	20.82336	11.5593	0	70
wind speed at location 581500	1,433	25.63154	13.23544	0	80

wind speed at location 582030	1,422	21.94796	12.65868	0	90
wind speed at location 582210	1,387	19.56741	11.3815	0	60
wind speed at location 582380	1,464	25.67281	15.11207	0	100
wind speed at location 582390	1,464	27.88251	17.2906	0	90
wind speed at location 582510	1,434	27.85914	14.90438	0	100
wind speed at location 582650	1,462	32.87278	15.76119	0	80
wind speed at location 583140	1,283	13.34373	8.254693	0	50
wind speed at location 583210	1,464	21.7418	12.31447	0	80
wind speed at location 583380	1,235	22.40486	12.17636	0	60
wind speed at location 583450	1,346	19.04903	11.72113	0	80
wind speed at location 583670	1,464	39.19399	21.18981	0	110
wind speed at location 584240	1,426	22.7209	11.80672	0	70
wind speed at location 584370	1,266	42.56714	27.63335	0	150
wind speed at location 584570	1,464	24.35792	14.93541	0	120
wind speed at location 584770	1,434	26.31102	15.58323	0	90
wind speed at location 585060	1,161	43.72093	32.31747	0	190
wind speed at location 585270	1,370	15.61314	9.146761	0	60
wind speed at location 586060	1,426	21.19215	10.39478	0	60
wind speed at location 586330	1,418	29.8378	14.66788	0	90
wind speed at location 586460	1,275	14.09412	8.71801	0	50
wind speed at location 586660	1,453	71.79628	37.40195	0	180
wind speed at location 587150	1,270	27.16535	12.90064	0	70
wind speed at location 587300	1,218	14.53612	7.311752	0	40
wind speed at location 587520	1,416	25.56497	14.0002	0	80
wind speed at location 588340	1,402	17.26819	9.363664	0	60
wind speed at location 588470	1,464	45.99727	30.86079	0	180
wind speed at location 589210	1,442	18.38419	10.04277	0	80
wind speed at location 589260	1,397	16.1131	10.02126	0	90
wind speed at location 589440	1,460	42.09589	21.86924	0	120
wind speed at location 590230	1,414	16.63366	9.553968	0	70
wind speed at location 590460	1,256	15.44586	6.700795	0	40
wind speed at location 590720	1,242	22.8744	13.40013	0	80
wind speed at location 590820	1,453	23.8128	14.03648	0	80
wind speed at location 591170	1,413	15.8811	8.649126	0	60
wind speed at location 591340	1,464	40.47814	25.19256	0	170
wind speed at location 592110	1,424	14.70506	8.182567	0	100
wind speed at location 592540	1,244	13.36013	5.973572	0	40
wind speed at location 592650	1,454	21.91197	11.3046	0	70
wind speed at location 592780	1,434	20.1325	11.76873	0	130
wind speed at location 592870	1,464	23.20014	19.63147	0	100
wind speed at location 592871	1,453	23.94357	16.5312	0	80
wind speed at location 592930	1,441	28.18876	20.14139	0	110
wind speed at location 593160	1,457	29.27934	18.75858	0	100
wind speed at location 594170	1,364	12.33871	6.308266	0	60

wind speed at location 594310	1,463	20.7177	13.13396	0	80
wind speed at location 594930	1,463	30.97403	17.21628	0	90
wind speed at location 595010	1,433	23.48221	12.67128	0	100
wind speed at location 596320	1,447	21.58258	10.70399	0	60
wind speed at location 596440	1,451	31.28187	15.79646	0	80
wind speed at location 596580	1,457	26.49966	12.26841	0	70
wind speed at location 596630	1,461	42.67625	19.99376	10	110
wind speed at location 597580	1,454	37.81981	21.82311	0	110
wind speed at location 599480	1,458	52.58573	31.19835	0	160

Table 19b. Wind speed elsewhere in September, October and November, 2014

Variable	Obs.	Mean	Std. Dev.	Min	Max
wind speed at location 450320	1,920	18.875	11.07015	10	80
wind speed at location 450390	2,165	18.32333	10.32766	10	70
wind speed at location 450440	2,090	50.87321	28.78696	10	230
wind speed at location 503530	1,911	32.77603	23.68641	10	150
wind speed at location 504680	2,030	24.7069	16.9007	10	100
wind speed at location 505270	2,162	48.58927	26.58443	10	140
wind speed at location 507450	2,001	24.34283	14.11667	10	80
wind speed at location 507740	1,850	25.28108	17.42951	10	100
wind speed at location 507880	2,095	35.46301	22.69352	10	150
wind speed at location 508440	1,755	30.5584	18.2572	10	100
wind speed at location 508540	1,745	25.11748	14.68712	10	90
wind speed at location 508880	1,682	29.29251	19.44284	10	130
wind speed at location 509490	2,063	24.22443	14.97183	10	90
wind speed at location 509530	2,058	27.94947	16.89492	10	110
wind speed at location 509780	2,159	39.7962	27.61496	10	160
wind speed at location 510760	1,999	19.08954	11.32805	10	80
wind speed at location 511330	1,760	17.02841	11.218	10	100
wind speed at location 512430	2,031	23.44658	17.2446	0	130
wind speed at location 513340	1,886	22.82344	13.18085	10	140
wind speed at location 514310	1,644	16.25912	10.3468	10	80
wind speed at location 514630	2,048	22.29736	14.87476	0	170
wind speed at location 514635	2,180	21.81881	12.84395	0	120
wind speed at location 515730	1,862	12.46509	5.405891	10	40
wind speed at location 517090	2,180	30.38073	19.98088	0	190
wind speed at location 517300	1,613	15.98264	8.662672	10	70
wind speed at location 518280	1,985	18.84887	9.310792	10	70
wind speed at location 522030	1,832	14.08843	8.518867	0	80
wind speed at location 525330	2,135	21.18033	11.26959	10	90
wind speed at location 525331	2,180	22.74083	13.74051	0	120
wind speed at location 526520	2,147	27.45925	16.43657	10	110
wind speed at location 526810	2,087	24.19262	13.67361	10	100

wind speed at location 527370	1,662	18.3574	10.20016	10	80
wind speed at location 527540	2,111	30.01184	17.83448	10	120
wind speed at location 527870	1,904	51.31565	28.90568	10	160
wind speed at location 528660	1,447	12.79889	5.217568	0	40
wind speed at location 528890	21	12.85714	4.6291	10	20
wind speed at location 529550	1,832	16.78766	7.691498	10	60
wind speed at location 529960	1,880	44.64362	21.96278	10	150
wind speed at location 534630	2,180	28.41055	17.37365	0	130
wind speed at location 534800	1,767	25.26316	16.97798	10	100
wind speed at location 534870	1,682	22.3038	14.55462	10	90
wind speed at location 535020	1,895	32.43799	21.15634	10	120
wind speed at location 535130	2,106	24.68661	14.30983	10	80
wind speed at location 535430	2,039	24.58558	12.06429	10	80
wind speed at location 536140	2,042	16.22674	8.436059	10	80
wind speed at location 536460	2,160	27.31944	14.3402	10	100
wind speed at location 536730	1,814	20.09647	15.48816	10	100
wind speed at location 536980	1,560	12.59615	5.114819	10	40
wind speed at location 537050	1,817	19.93671	11.95895	10	90
wind speed at location 537640	1,674	14.13978	7.253059	10	70
wind speed at location 537720	2,180	21.31193	16.84701	0	120
wind speed at location 537980	1,908	13.88889	6.579132	0	50
wind speed at location 538450	2,048	21.19873	11.75557	10	70
wind speed at location 538980	1,877	23.90517	13.08238	10	90
wind speed at location 539150	2,111	17.73093	9.564725	10	70
wind speed at location 539230	1,856	20.80011	10.11356	10	70
wind speed at location 539590	2,019	23.37048	18.98553	0	110
wind speed at location 539750	1,778	18.45332	13.39094	10	100
wind speed at location 540940	2,100	29.87857	24.14221	10	140
wind speed at location 541020	2,118	31.45184	18.70211	0	100
wind speed at location 541350	2,138	22.75725	12.8355	10	80
wind speed at location 541570	1,829	24.59267	16.10995	10	110
wind speed at location 541610	2,180	30.44266	20.11666	0	150
wind speed at location 542180	2,102	26.03949	17.24275	10	110
wind speed at location 542360	2,117	27.76334	17.18402	10	100
wind speed at location 542920	2,099	27.62982	23.48796	10	140
wind speed at location 543240	1,895	25.50923	13.35653	10	80
wind speed at location 543370	1,974	38.84498	20.78925	10	100
wind speed at location 543420	2,048	22.53906	14.13171	10	80
wind speed at location 543424	2,180	30.20183	19.04936	0	120
wind speed at location 543460	1,901	21.10994	10.69082	10	60
wind speed at location 543740	1,970	18.67259	11.00473	10	80
wind speed at location 543770	1,841	20.50788	11.36476	10	80
wind speed at location 544010	2,018	26.21655	18.56047	10	130
wind speed at location 544230	1,727	17.51592	12.95422	0	90

wind speed at location 544360	1,493	24.41058	15.75791	10	90
wind speed at location 544710	2,171	37.07508	21.59671	10	130
wind speed at location 544970	2,126	28.05738	17.11452	10	110
wind speed at location 545270	1,859	24.52932	15.13241	10	120
wind speed at location 545340	1,481	17.65361	12.95969	10	90
wind speed at location 546020	1,560	19.80769	12.18687	10	100
wind speed at location 546180	1,955	20.95908	10.4413	10	70
wind speed at location 546620	2,180	31.54358	21.58828	0	120
wind speed at location 547150	1,698	19.45524	11.54074	10	70
wind speed at location 547250	1,677	20.41741	12.10307	10	90
wind speed at location 547510	1,877	43.74267	26.18546	10	190
wind speed at location 547760	2,159	51.27374	27.94761	10	170
wind speed at location 548080	1,565	22.13099	11.89033	10	70
wind speed at location 548230	2,130	23.57277	12.66064	0	90
wind speed at location 548260	1,880	59.26064	35.40439	10	180
wind speed at location 548360	1,803	18.44703	11.1406	10	70
wind speed at location 548430	1,848	19.7592	12.00338	10	70
wind speed at location 548570	2,180	31.29587	20.23456	0	130
wind speed at location 549090	1,977	23.03237	11.55531	10	70
wind speed at location 549160	1,445	16.39792	8.41596	10	60
wind speed at location 549290	1,599	17.34209	9.785045	10	70
wind speed at location 549450	1,952	20.49436	12.71152	10	120
wind speed at location 552280	2,049	28.83358	20.83361	10	110
wind speed at location 552990	2,096	23.98855	18.39121	10	100
wind speed at location 555910	2,103	18.54018	9.567686	10	70
wind speed at location 560290	1,291	21.67312	16.83909	0	110
wind speed at location 560460	1,978	22.60111	18.34506	10	130
wind speed at location 560650	1,661	22.2637	14.94747	10	90
wind speed at location 560800	2,010	16.45771	9.876764	10	80
wind speed at location 560960	1,955	16.82864	10.62378	10	70
wind speed at location 561370	1,994	16.10331	9.424555	0	70
wind speed at location 561720	1,536	15.25391	8.815923	10	90
wind speed at location 561960	1,844	18.03688	8.472402	10	50
wind speed at location 562870	1,297	11.2953	3.624324	10	30
wind speed at location 562940	2,177	13.95269	11.16208	0	70
wind speed at location 563120	1,989	19.30618	11.30434	10	70
wind speed at location 563740	1,851	34.02485	23.69987	10	110
wind speed at location 563850	1,788	27.32103	17.70029	10	120
wind speed at location 564440	2,013	21.43815	9.013507	10	50
wind speed at location 564920	1,501	11.95869	4.415234	0	40
wind speed at location 565710	1,779	18.5385	11.75778	10	70
wind speed at location 565860	1,571	19.25525	10.8325	10	60
wind speed at location 566510	2,081	23.18597	14.40448	10	80
wind speed at location 566710	1,633	17.32701	9.080164	10	50

wind speed at location 566910	2,141	24.33209	10.17705	10	60
wind speed at location 567390	1,886	20.56999	12.06552	0	80
wind speed at location 567480	1,550	18.98065	11.2484	10	70
wind speed at location 567510	1,796	18.15145	10.5678	10	70
wind speed at location 567680	1,572	24.02672	13.18262	10	70
wind speed at location 567780	2,180	36.15596	20.83543	0	120
wind speed at location 567860	1,805	25.73407	13.99541	10	80
wind speed at location 569510	1,541	14.18559	8.005798	10	60
wind speed at location 569590	1,649	12.69254	5.82122	10	60
wind speed at location 569640	1,736	13.3871	5.991534	10	40
wind speed at location 569850	2,150	19.82326	8.89243	10	50
wind speed at location 570140	1,775	18.58592	11.4543	10	70
wind speed at location 570250	1,838	21.2568	11.45859	10	80
wind speed at location 570360	2,180	23.82339	18.57111	0	120
wind speed at location 570460	1,832	38.71725	25.84123	10	150
wind speed at location 570710	1,797	21.04062	12.52512	10	100
wind speed at location 570830	2,180	23.70183	15.71935	0	100
wind speed at location 571270	1,886	12.10764	4.728555	10	40
wind speed at location 571310	2,120	22.56604	12.57053	10	80
wind speed at location 571780	2,160	26.4838	13.93127	10	80
wind speed at location 571930	1,772	16.93002	8.255495	10	50
wind speed at location 572450	1,962	12.46687	4.991597	10	40
wind speed at location 572590	1,775	15.41127	9.218315	10	60
wind speed at location 572790	1,712	16.09229	7.275067	10	40
wind speed at location 572900	1,824	22.79057	12.42191	10	80
wind speed at location 572970	2,120	19.77358	9.939442	10	60
wind speed at location 573060	1,806	13.87597	6.457542	10	50
wind speed at location 573280	2,069	12.02997	4.432174	10	40
wind speed at location 573780	1,862	21.94952	10.97169	10	60
wind speed at location 573990	1,805	23.16343	13.36916	10	90
wind speed at location 574110	1,902	12.82334	5.549199	0	40
wind speed at location 574470	1,479	11.03448	3.302236	10	30
wind speed at location 574610	2,147	18.0531	8.641723	10	70
wind speed at location 574760	1,787	21.74314	11.91363	10	70
wind speed at location 574940	2,180	22.62844	11.05369	0	70
wind speed at location 575030	744	14.6371	6.774787	10	40
wind speed at location 575160	2,180	20.44037	11.34339	0	80
wind speed at location 575540	1,640	14.6311	8.381966	10	60
wind speed at location 575840	1,865	27.15818	13.0396	10	80
wind speed at location 576040	1,815	17.22865	7.813994	10	50
wind speed at location 576550	1,670	15.56287	7.286851	10	40
wind speed at location 576620	2,096	29.8187	14.35455	10	80
wind speed at location 576870	2,054	19.77605	9.464394	10	60
wind speed at location 577070	1,606	12.75218	5.447876	10	40

wind speed at location 577450	1,728	17.56076	8.684245	10	50
wind speed at location 577660	1,724	21.74884	11.70225	10	90
wind speed at location 577760	1,901	47.23304	27.20338	10	180
wind speed at location 577930	1,886	18.65323	10.10237	10	70
wind speed at location 577990	1,988	19.03421	9.994857	10	60
wind speed at location 578160	2,180	24.0711	14.34662	0	100
wind speed at location 578320	1,684	17.2209	8.301859	10	50
wind speed at location 578660	2,006	24.12263	13.03373	10	70
wind speed at location 579020	2,013	21.40089	11.52509	10	70
wind speed at location 579220	1,722	23.11847	11.24328	10	60
wind speed at location 579570	2,180	20.54128	14.3349	0	110
wind speed at location 579720	1,880	14.00532	6.013111	10	40
wind speed at location 579930	2,120	16.17925	7.66826	10	50
wind speed at location 580270	1,740	19.42816	9.539604	10	60
wind speed at location 580400	1,773	23.44332	14.07621	10	80
wind speed at location 581020	1,923	16.15705	7.996506	10	70
wind speed at location 581410	1,881	21.91122	11.74087	10	70
wind speed at location 581500	1,997	28.47021	17.14245	10	90
wind speed at location 582030	2,065	23.46489	12.46961	0	80
wind speed at location 582210	2,141	25.66558	14.98873	10	90
wind speed at location 582380	2,180	25.63073	13.77569	0	80
wind speed at location 582390	2,180	27.26606	16.68631	0	100
wind speed at location 582510	2,111	26.11559	14.41017	10	80
wind speed at location 582650	2,087	31.8735	16.64911	10	120
wind speed at location 583140	1,958	14.77017	7.708823	10	50
wind speed at location 583210	2,180	25.51835	12.80192	0	80
wind speed at location 583380	1,823	21.48656	10.78356	10	60
wind speed at location 583450	1,812	19.73234	9.539224	10	50
wind speed at location 583670	2,180	39.93578	18.82251	0	120
wind speed at location 584240	2,084	29.52495	17.79598	10	100
wind speed at location 584370	1,907	52.77137	30.83975	10	160
wind speed at location 584570	2,180	24.05505	14.51295	0	80
wind speed at location 584770	1,958	24.20838	14.33811	10	90
wind speed at location 585060	1,829	37.89502	26.29778	10	140
wind speed at location 585270	1,963	14.03719	6.536586	10	70
wind speed at location 586060	2,150	18.65581	8.708219	10	50
wind speed at location 586330	2,057	27.36753	14.35667	0	80
wind speed at location 586460	1,643	14.91175	7.552585	10	50
wind speed at location 586660	2,165	66.33718	37.77979	10	190
wind speed at location 587150	1,898	26.13277	11.75695	10	60
wind speed at location 587300	1,838	14.91839	7.679542	10	50
wind speed at location 587520	2,069	23.65394	12.30508	10	90
wind speed at location 588340	2,012	15.70577	7.331662	10	60
wind speed at location 588470	2,180	42.02523	27.17022	0	130

wind speed at location 589210	2,095	16.49642	8.688709	10	60
wind speed at location 589260	2,111	14.30128	6.97811	10	60
wind speed at location 589440	2,171	38.59281	16.82419	10	100
wind speed at location 590230	1,824	17.07511	9.499854	10	70
wind speed at location 590460	1,784	16.1407	7.347389	10	50
wind speed at location 590720	1,775	21.19155	13.1958	10	90
wind speed at location 590820	2,126	23.5254	12.03333	10	90
wind speed at location 591170	2,153	17.32002	9.212397	10	70
wind speed at location 591340	2,180	34.02294	19.19943	0	100
wind speed at location 592110	2,012	14.92545	8.153452	10	70
wind speed at location 592540	1,820	12.45879	4.846285	10	40
wind speed at location 592650	2,138	20.07016	9.614455	10	100
wind speed at location 592780	2,126	17.5635	9.299688	10	60
wind speed at location 592870	2,180	24.26376	17.22477	0	100
wind speed at location 592871	2,180	27.5344	15.28185	0	100
wind speed at location 592930	2,102	20.58278	11.17579	10	70
wind speed at location 593160	2,180	21.63073	13.1383	0	90
wind speed at location 594170	1,869	12.18834	5.443387	10	60
wind speed at location 594310	2,180	19.49541	14.53415	0	200
wind speed at location 594930	2,180	30.86009	15.83115	0	110
wind speed at location 595010	2,138	23.60384	12.42587	10	100
wind speed at location 596320	2,150	19.66047	10.38245	10	90
wind speed at location 596440	2,162	26.33904	14.75934	10	170
wind speed at location 596580	2,159	32.69569	19.12789	10	240
wind speed at location 596630	2,153	36.21458	17.774	10	140
wind speed at location 597580	1,985	32.32997	17.07504	10	150
wind speed at location 599480	2,138	56.99018	25.13843	10	150

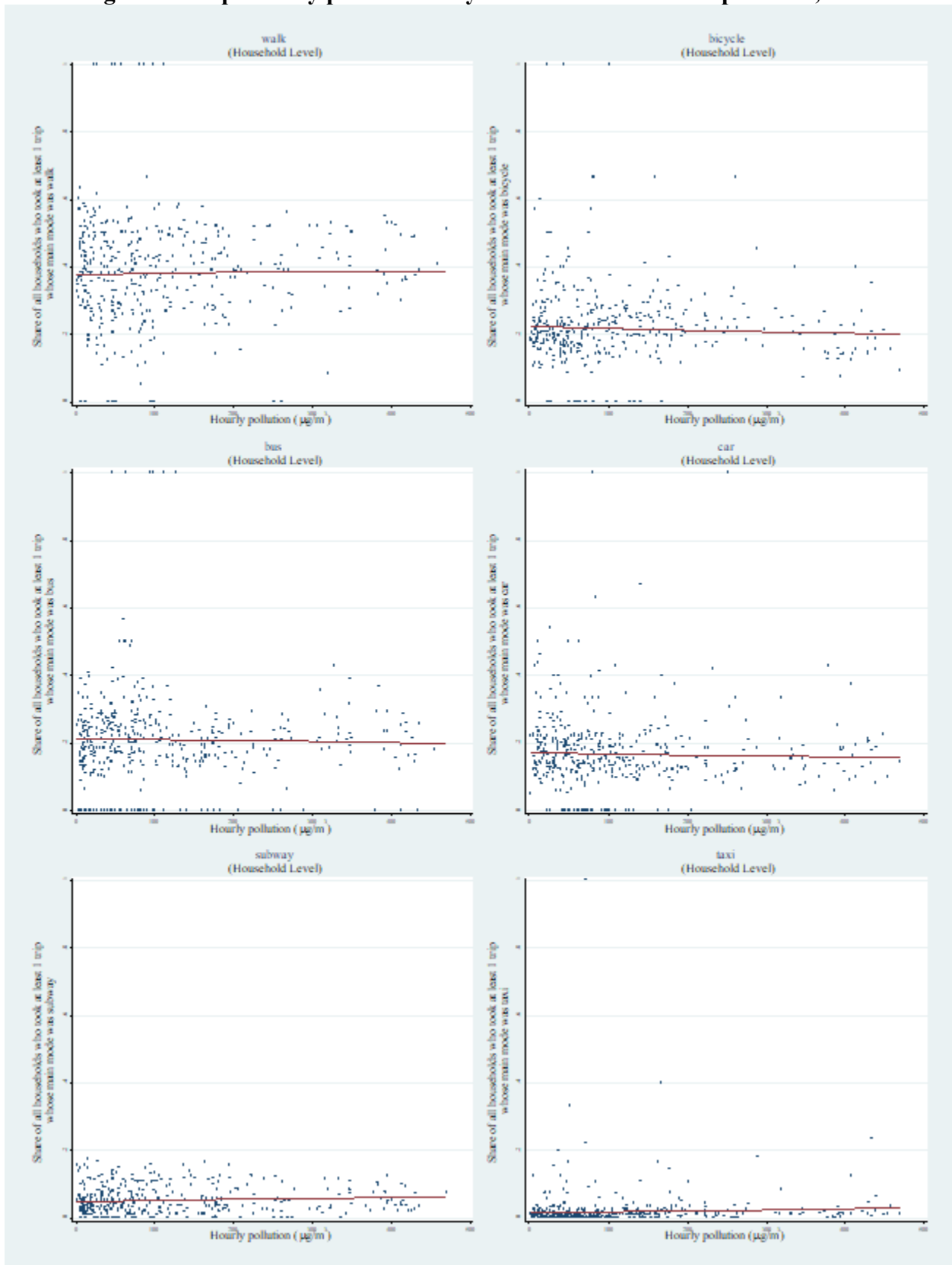
4. Exploratory Plots

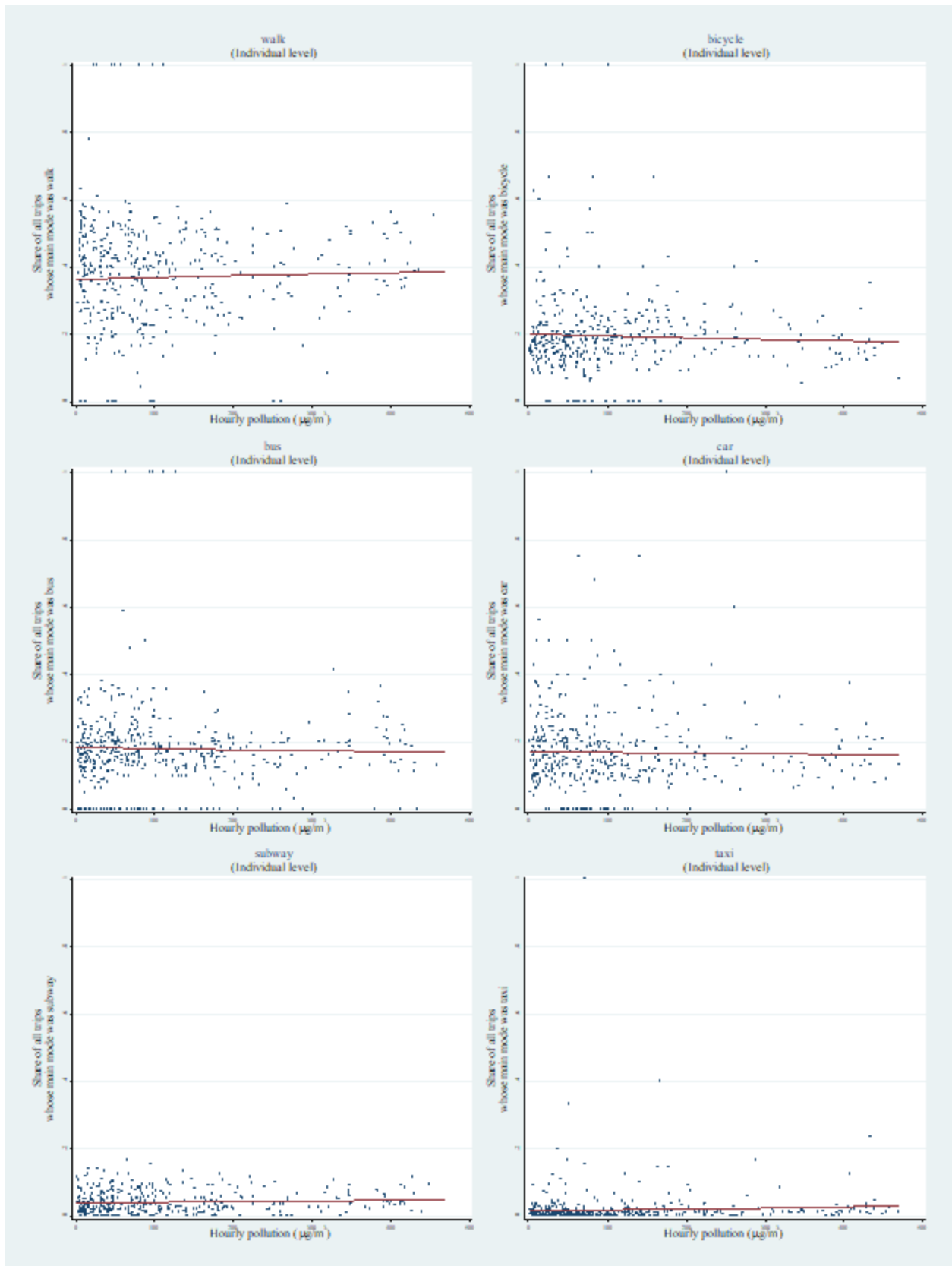
Exploratory plots of hourly travel mode share and pollution are presented in Figure 3a for 2010 and Figure 3b for 2014.

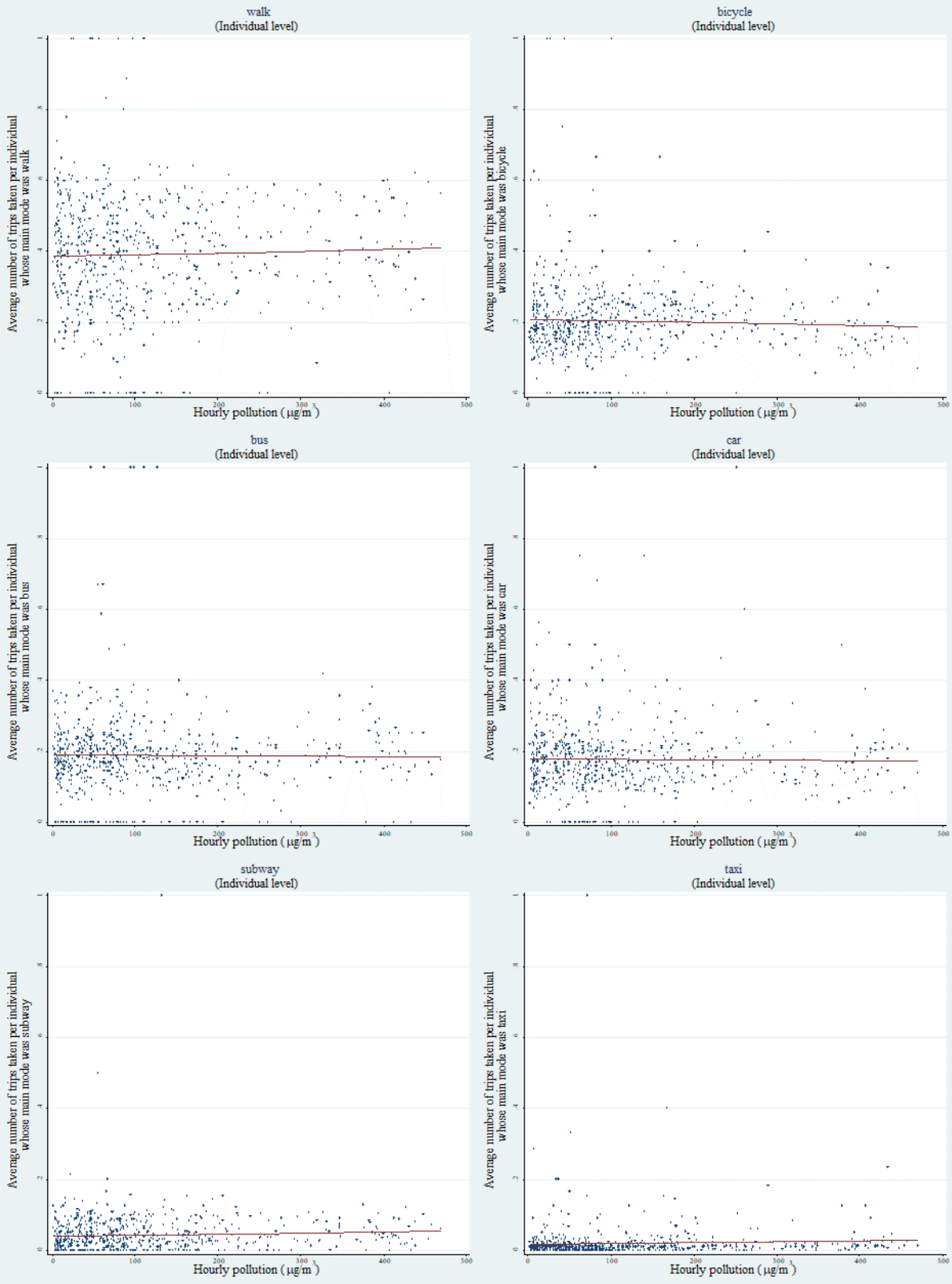
We also present histograms of each of the hourly travel mode share variables on all days, on low pollution days, and on high pollution days in Figure 4 for 2010 and Figure 5 for 2014. We

define high pollution days as days with daily max pollution above 75th percentile pollution, where 75th percentile is determined using the pooled 2010 and 2014 data (so is the same cutoff value in both 2010 and 2014). We define low pollution days as days with daily max pollution below 75th percentile pollution, where 75th percentile is determined using the pooled 2010 and 2014 data (so is the same cutoff value in both 2010 and 2014).

Figure 3a. Exploratory plots of hourly travel mode share and pollution, 2010







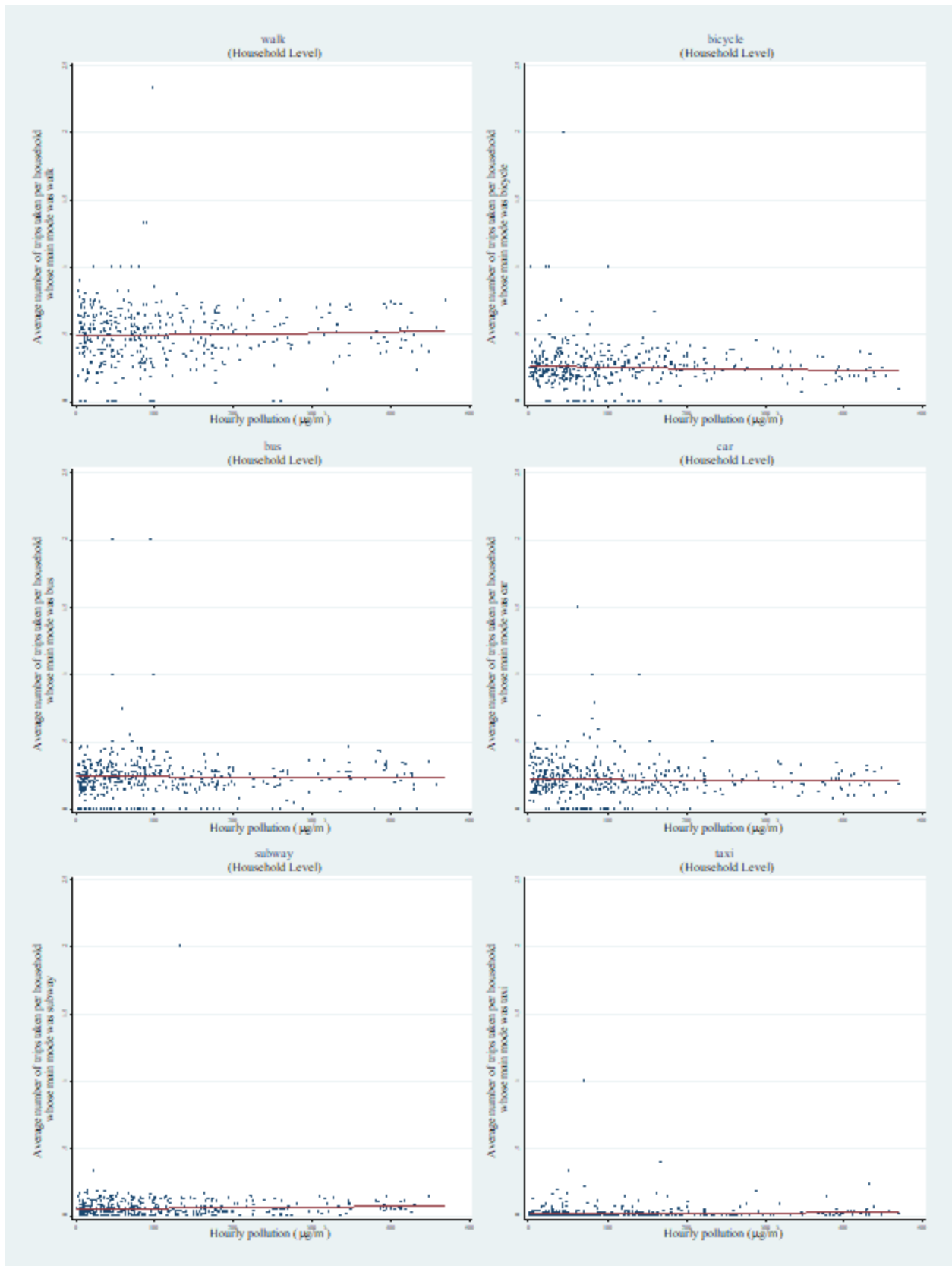
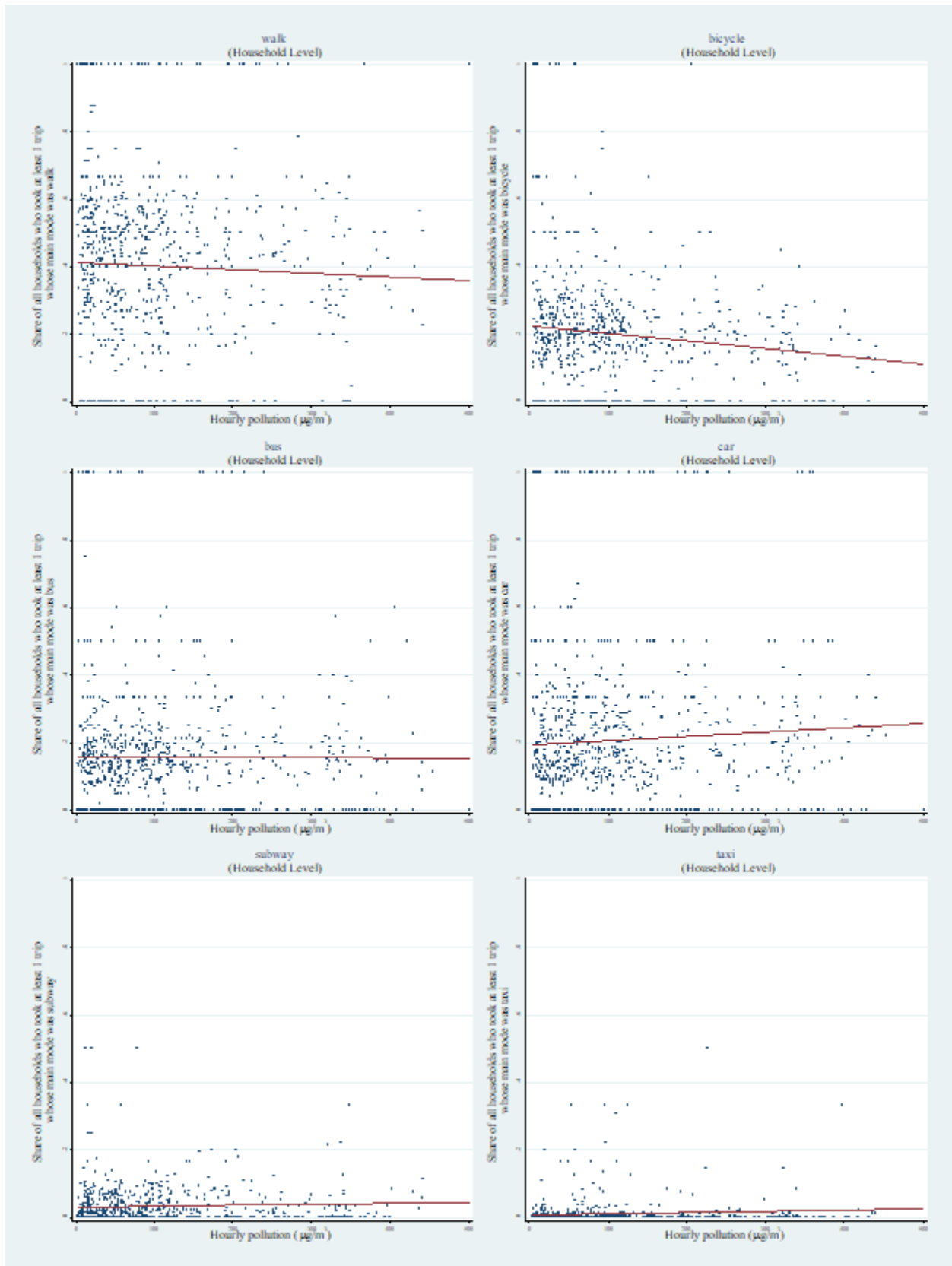
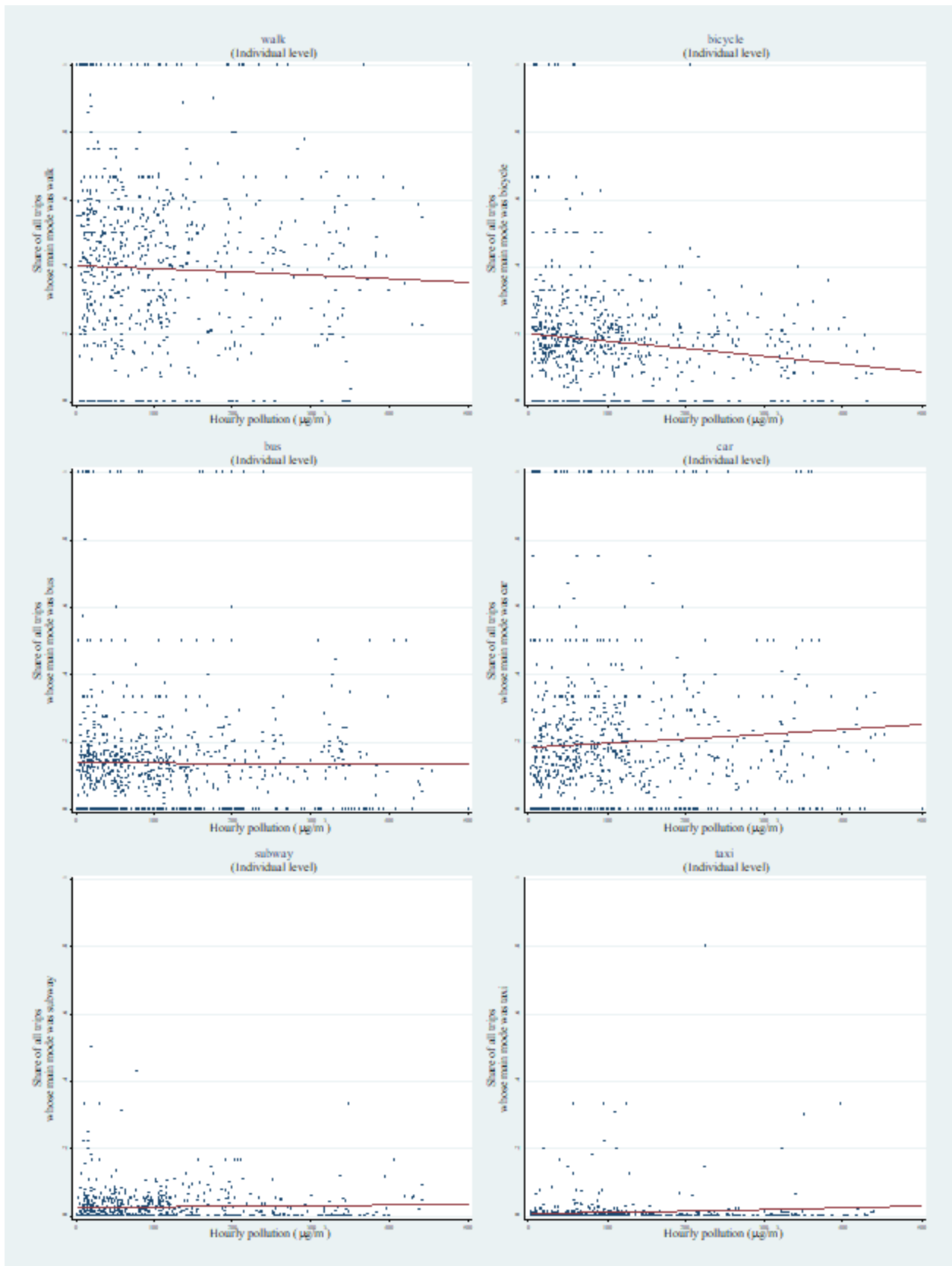
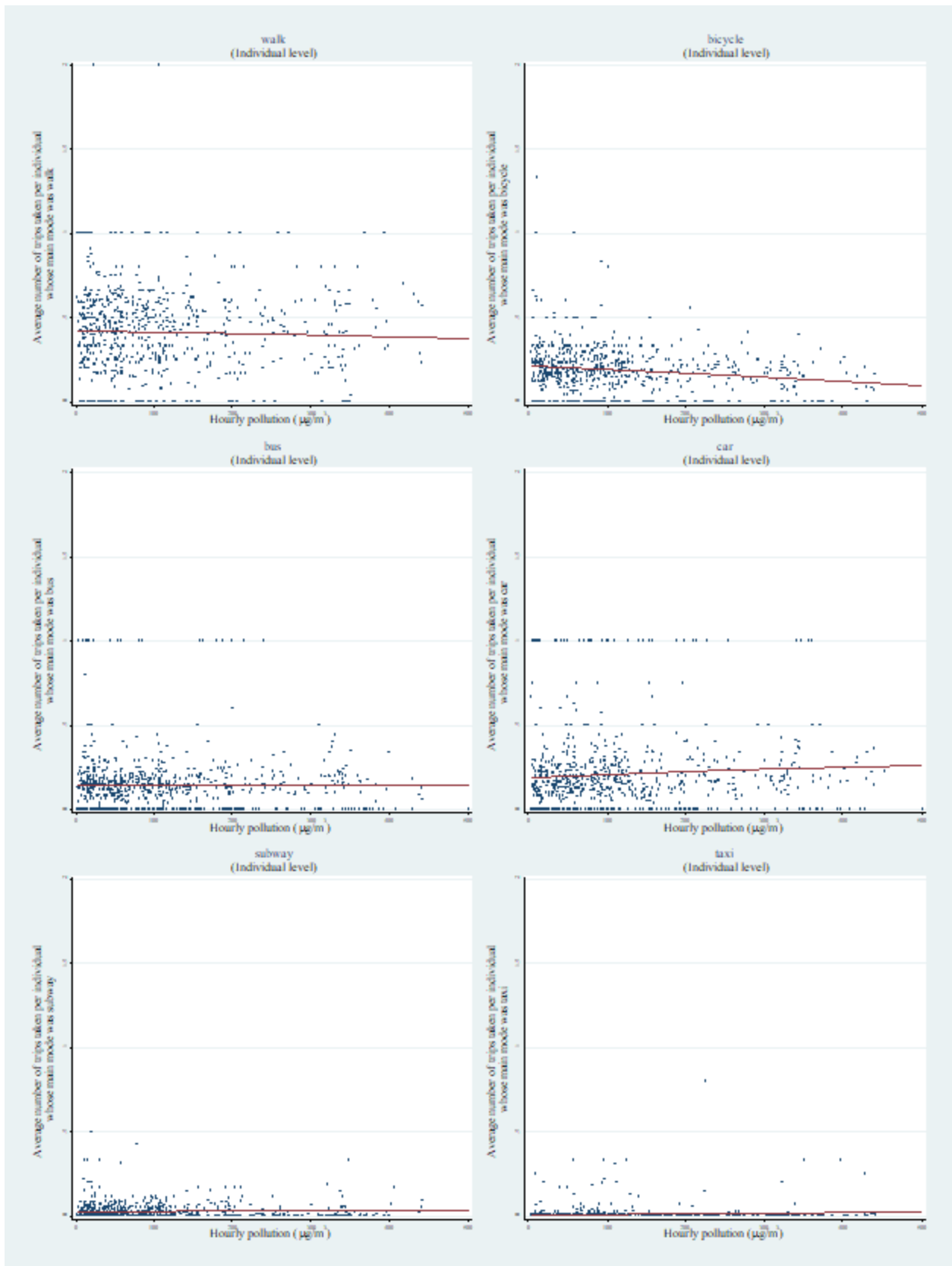


Figure 3b. Exploratory plots of hourly travel mode share and pollution, 2014







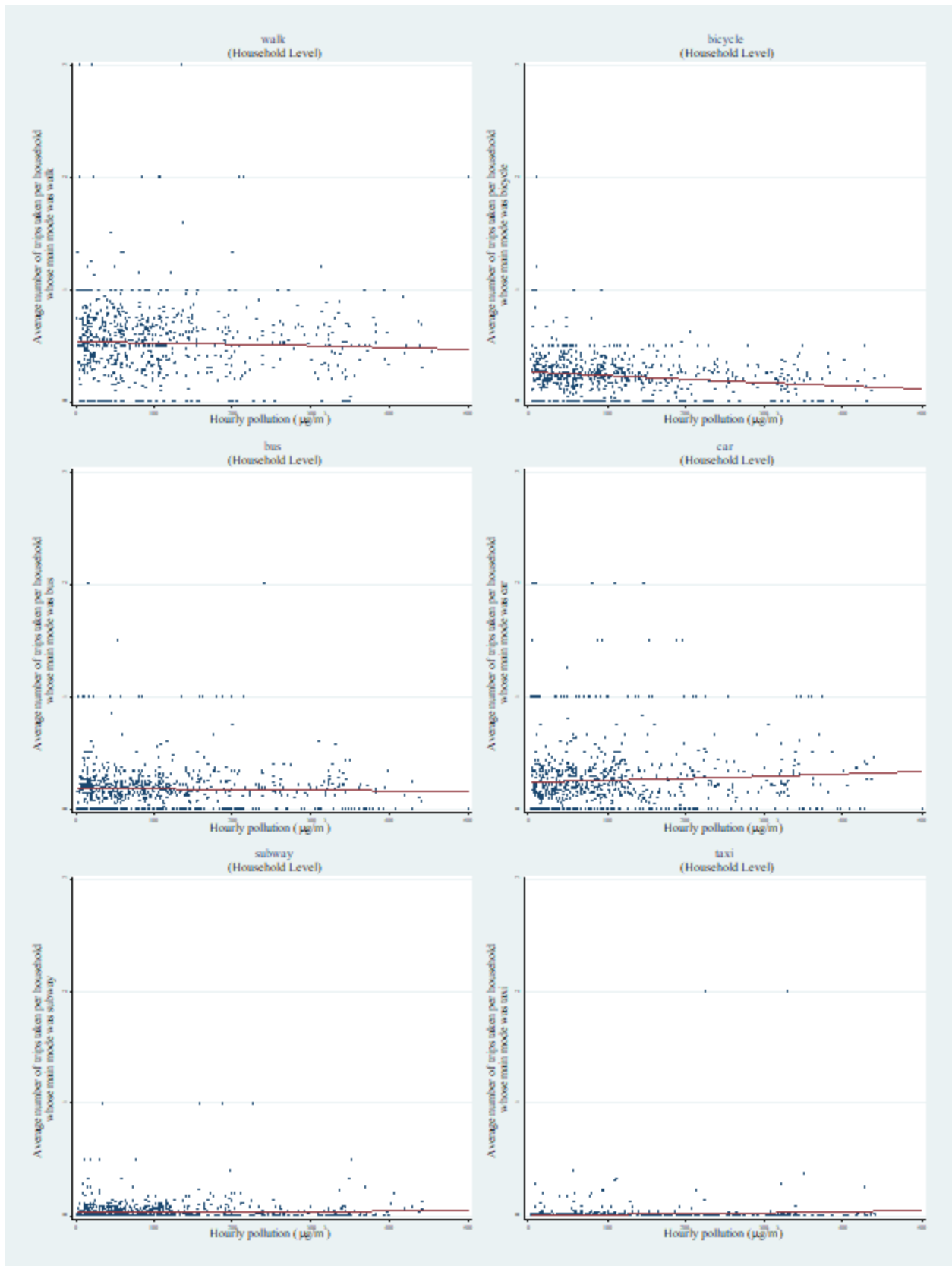
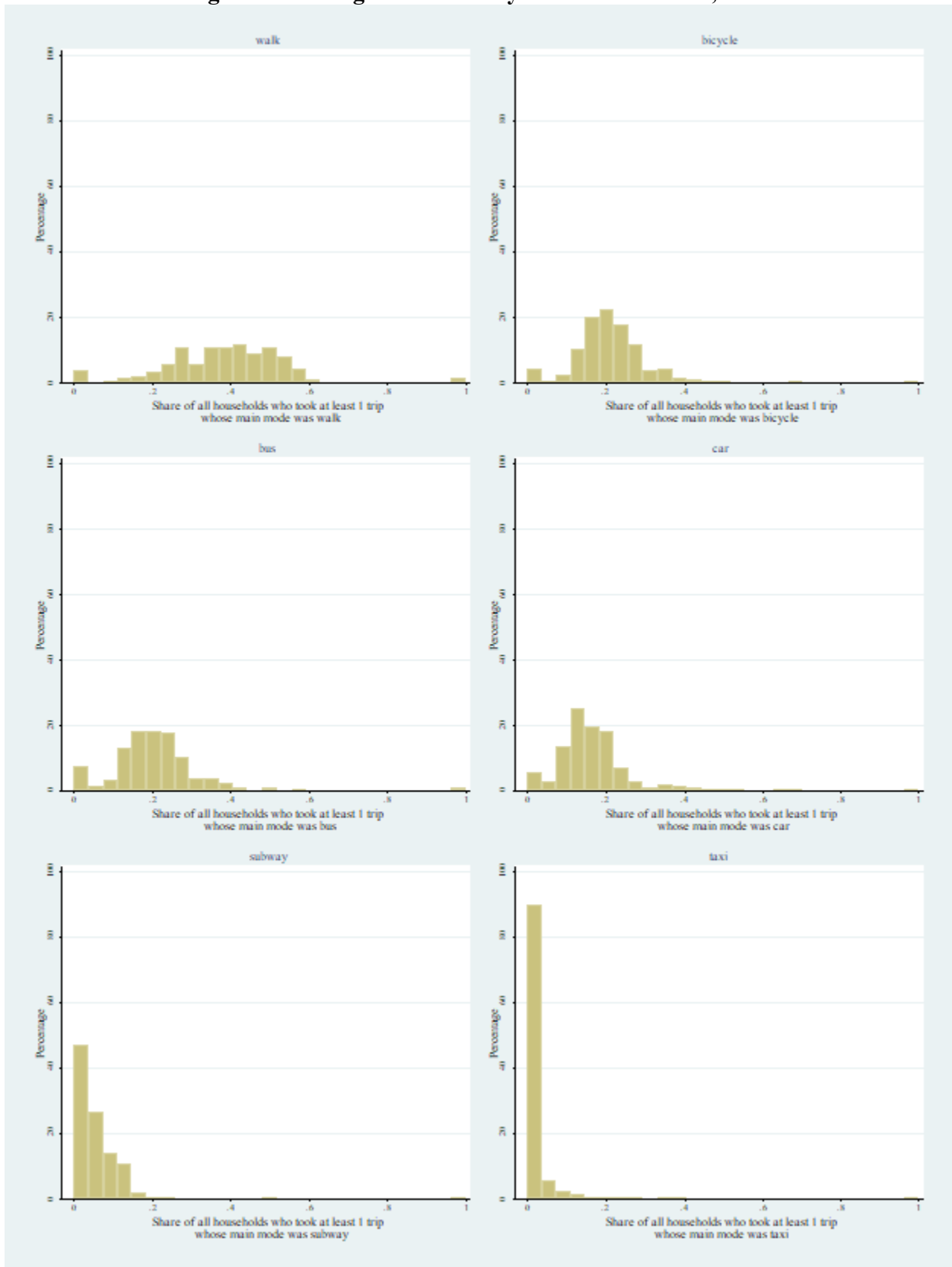
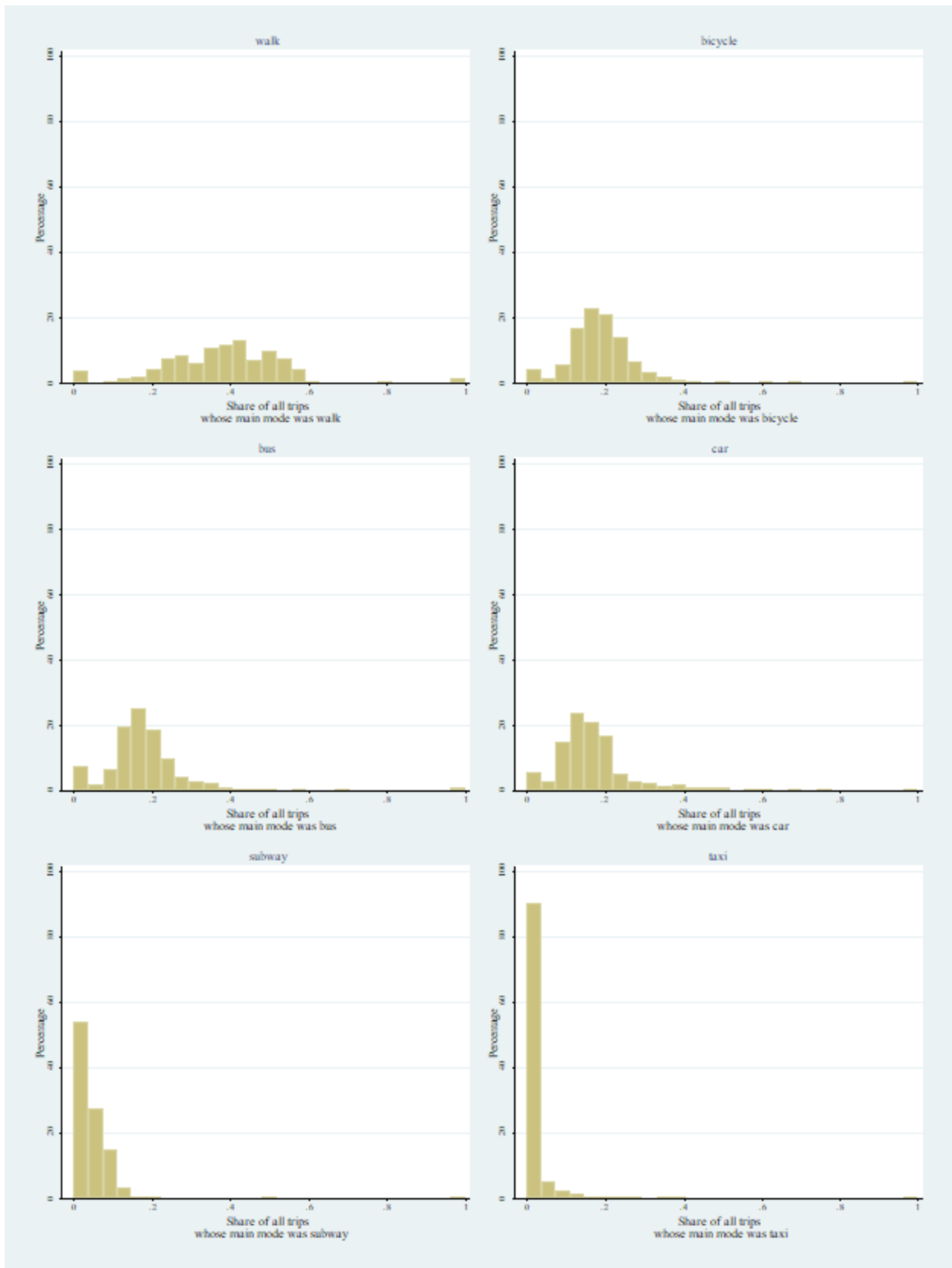
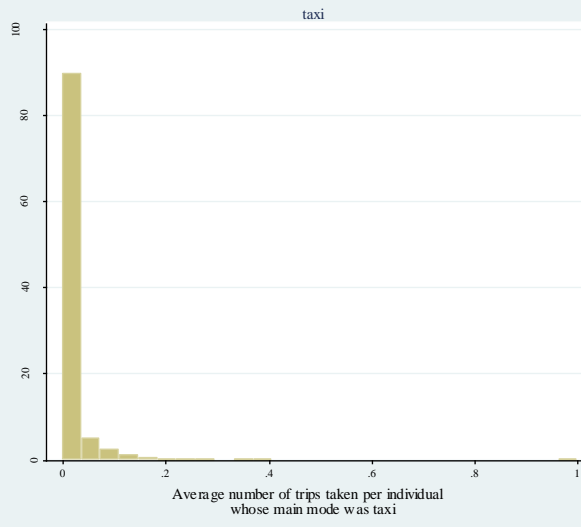
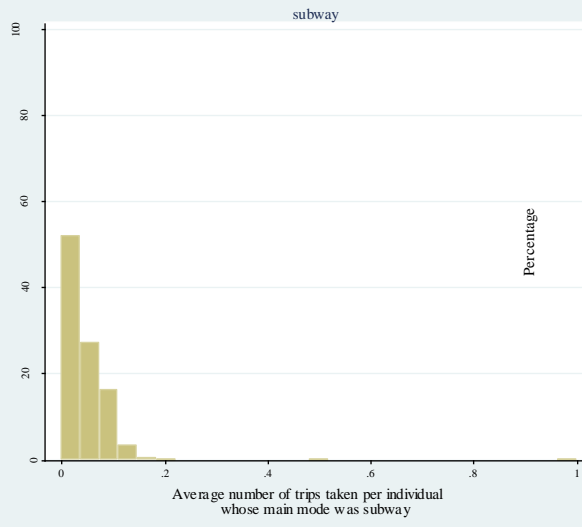
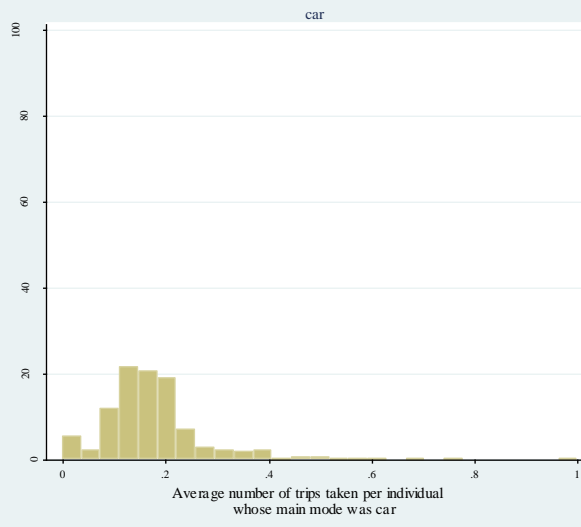
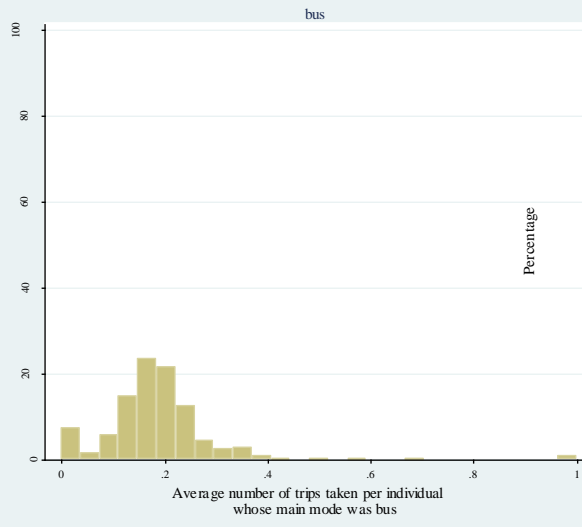
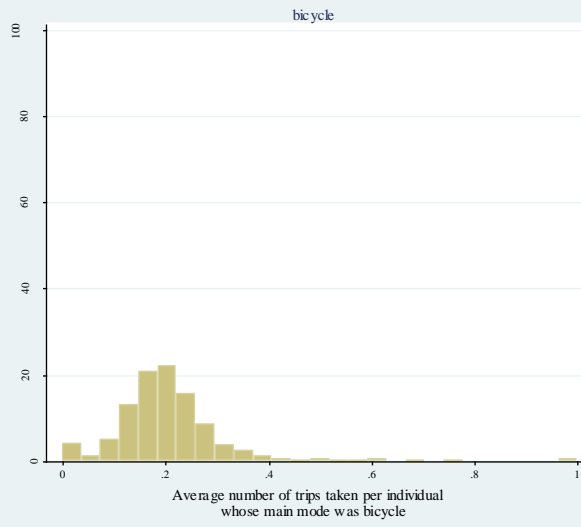
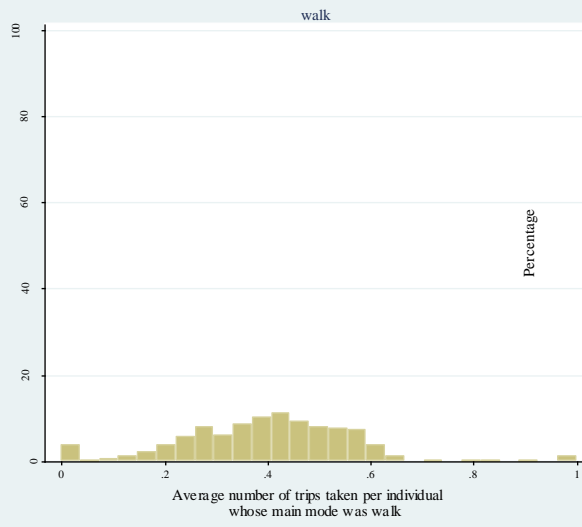


Figure 4a. Histograms of hourly travel mode share, 2010







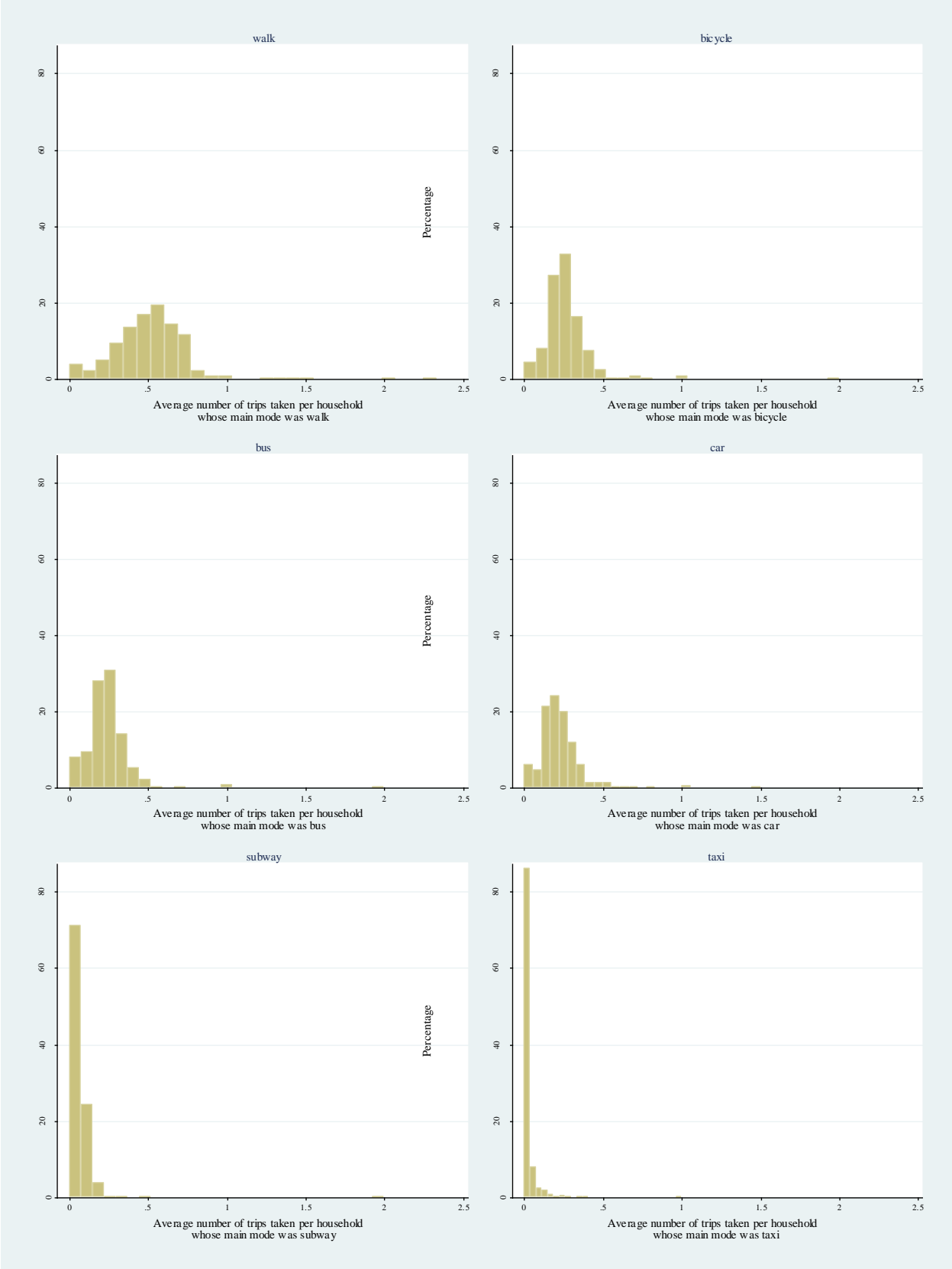
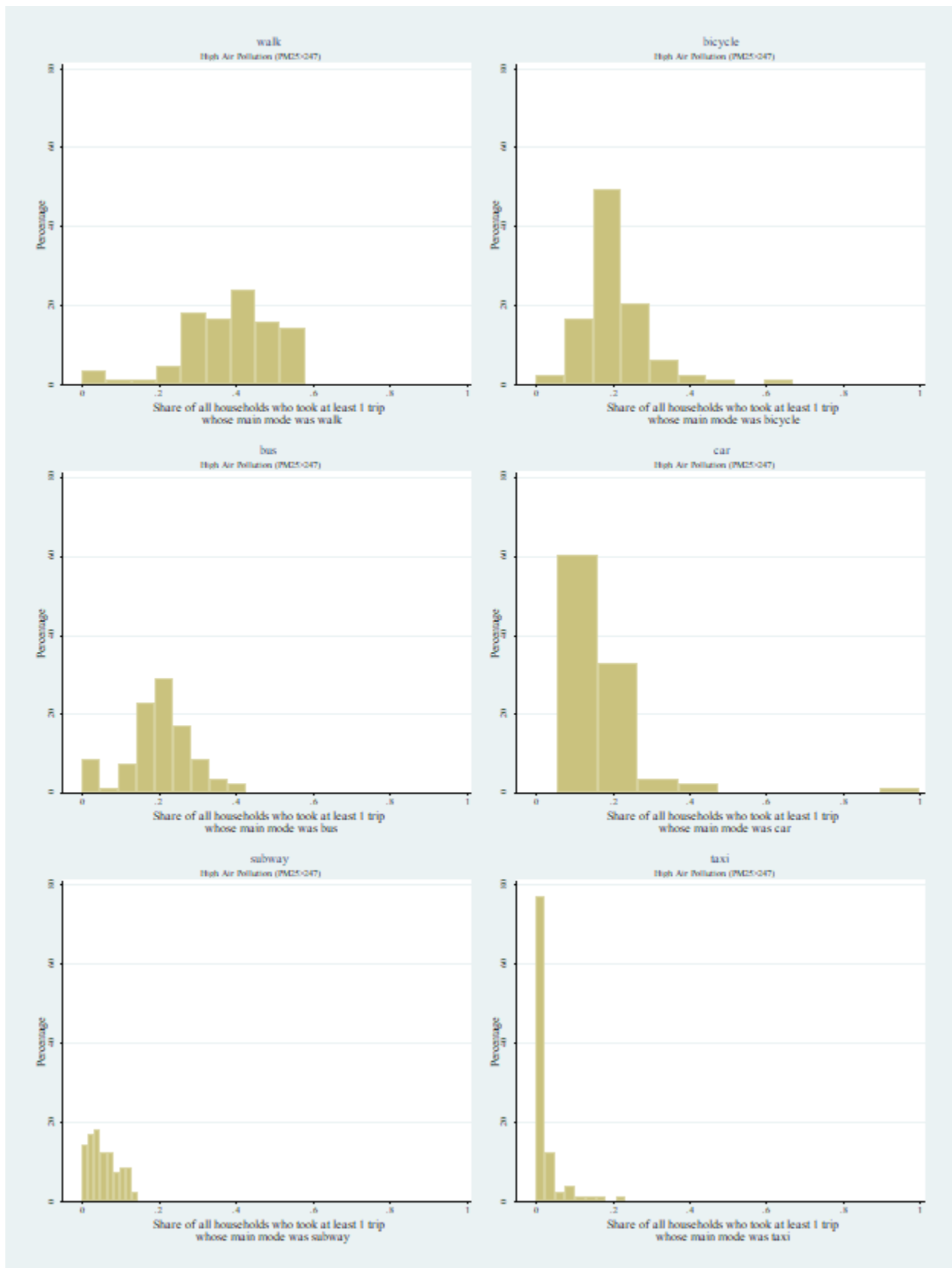
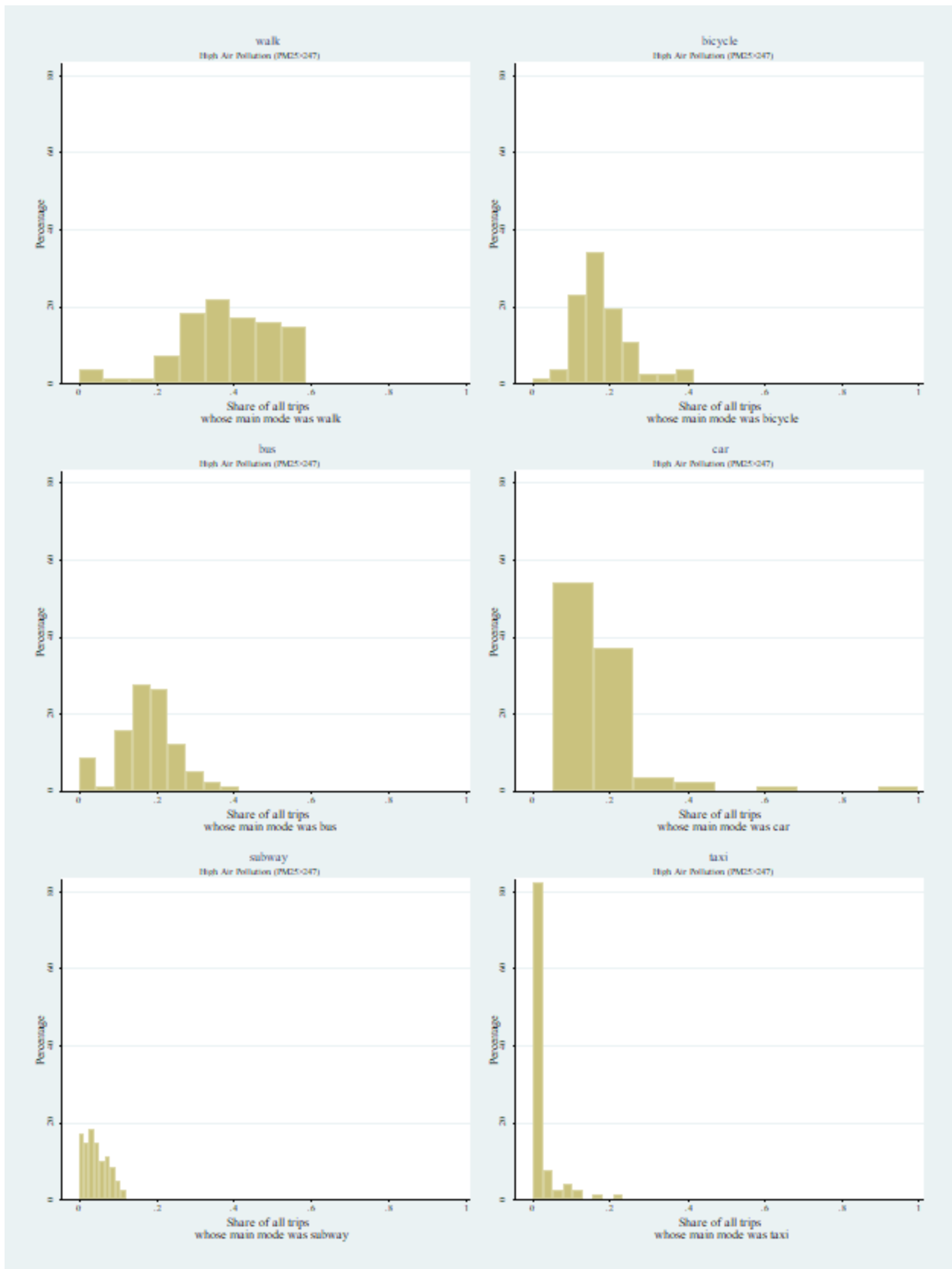
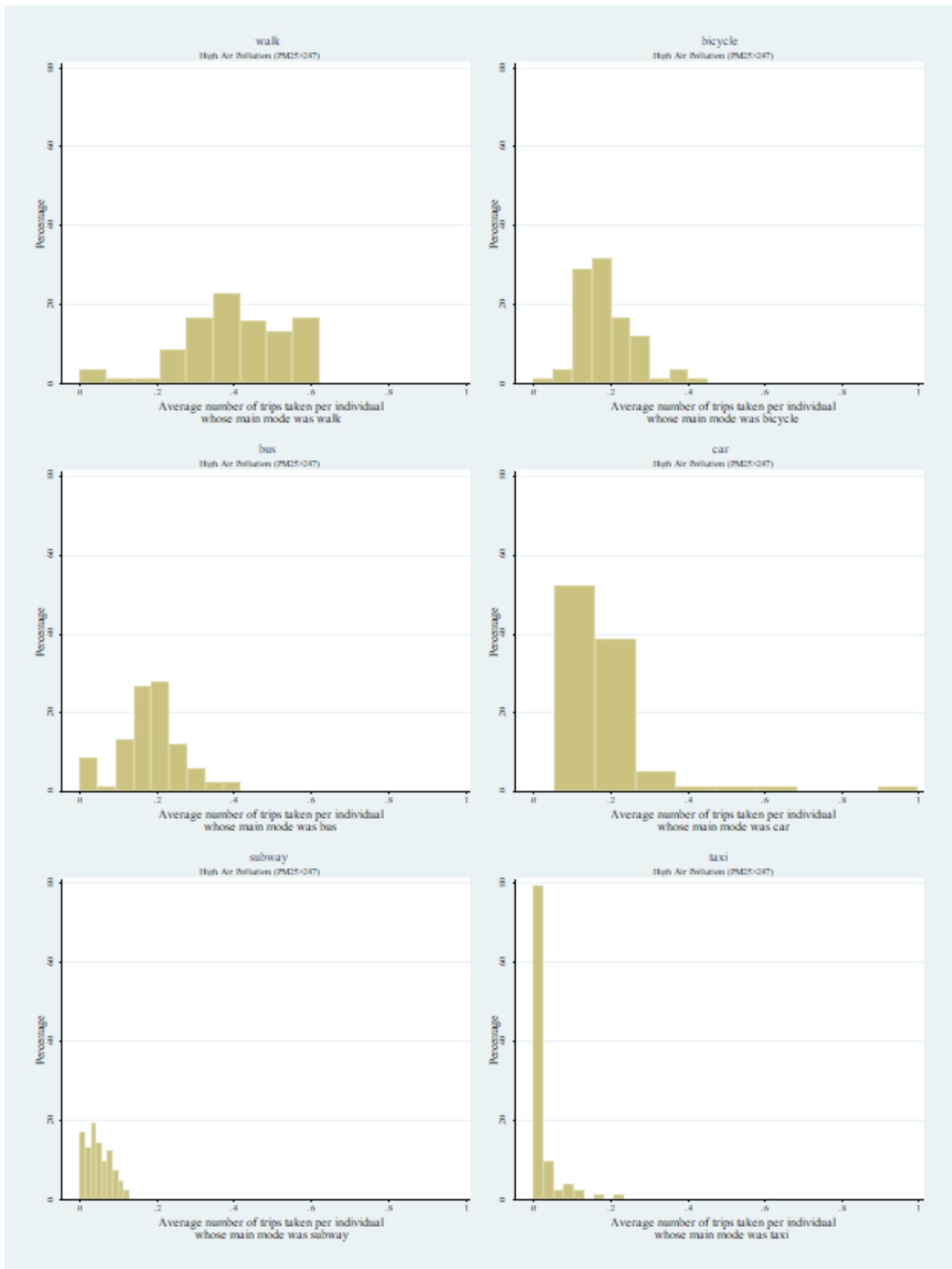
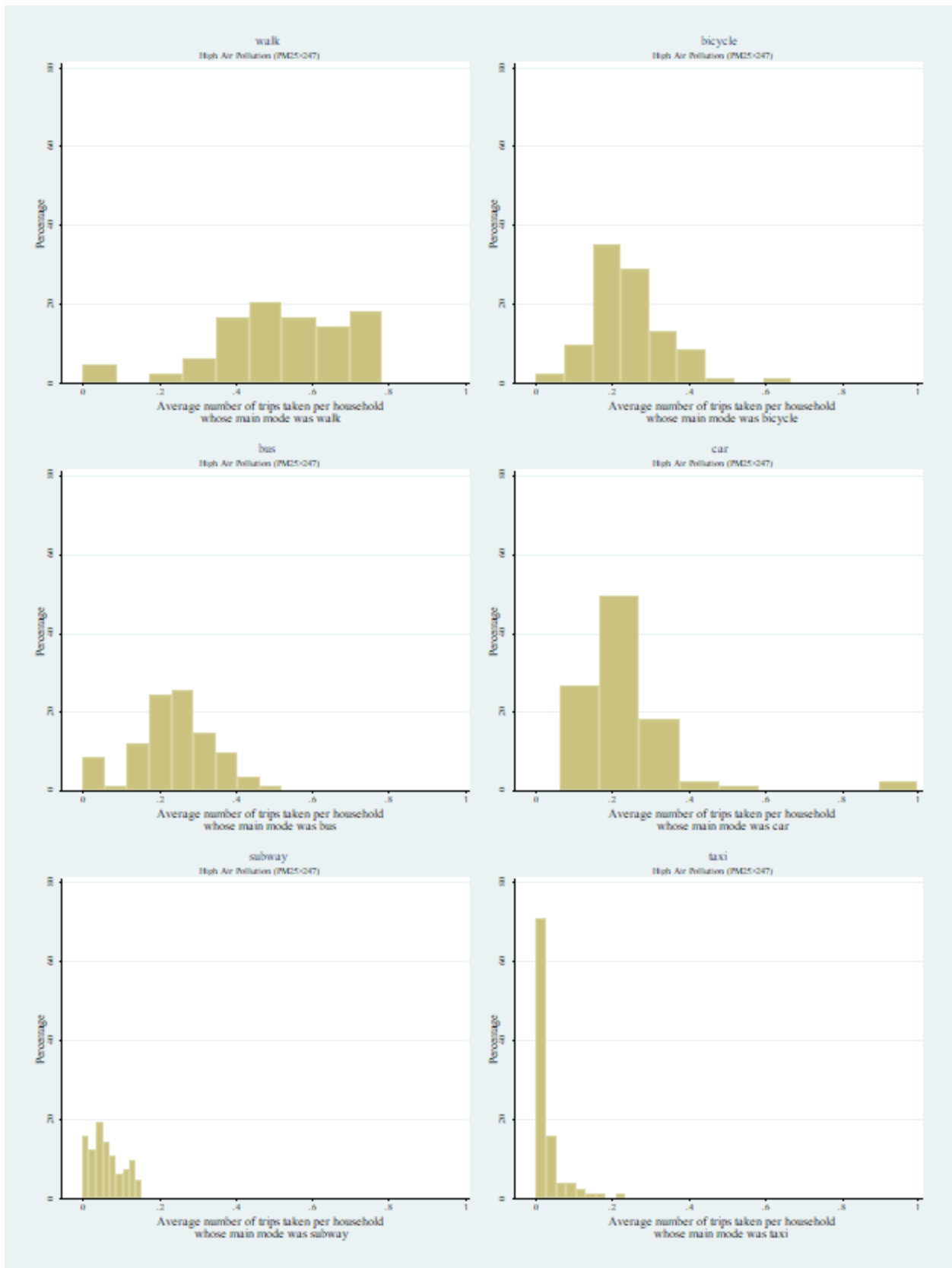


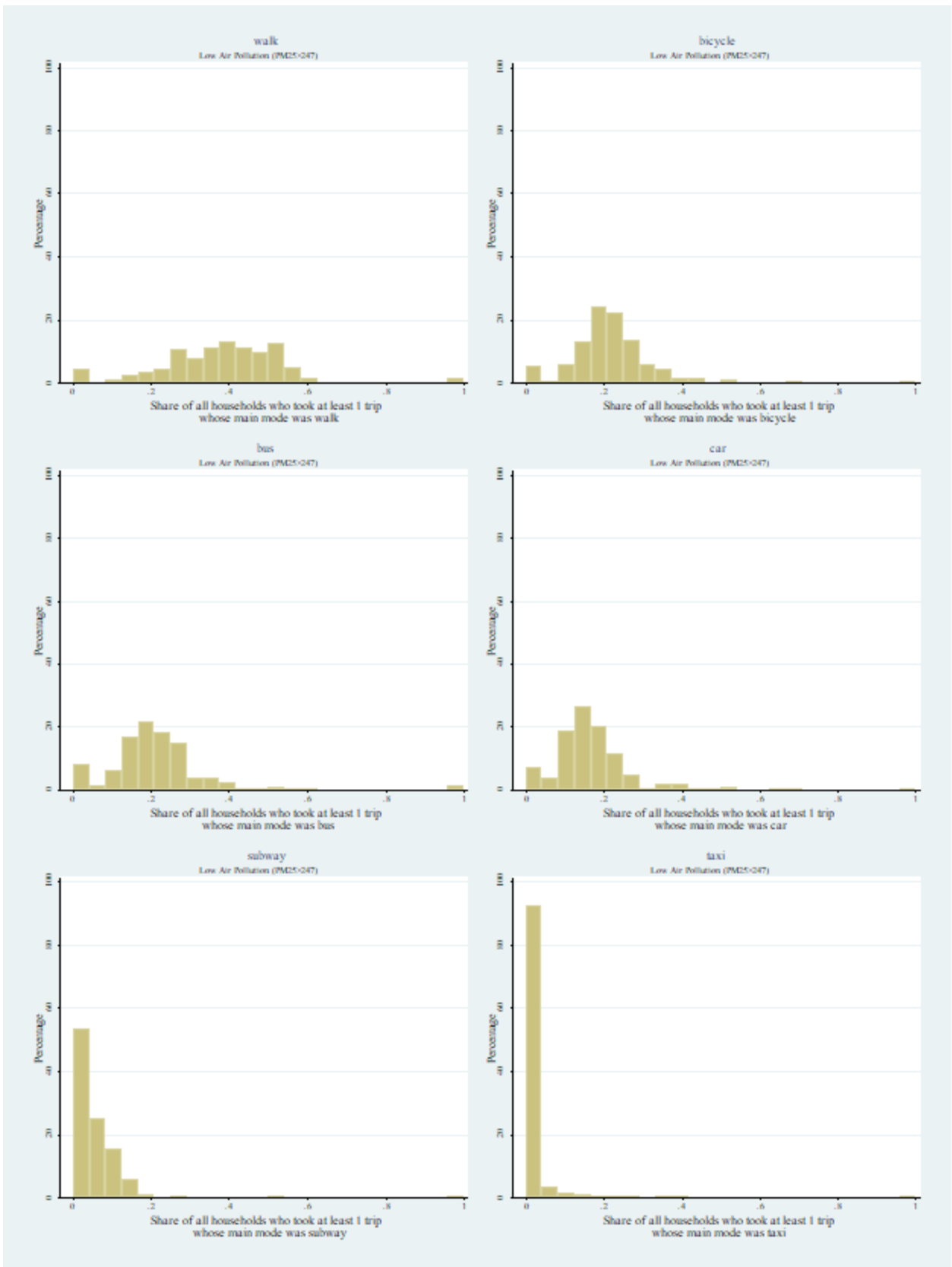
Figure 4b. Histograms of hourly travel mode share on high pollution days, 2010

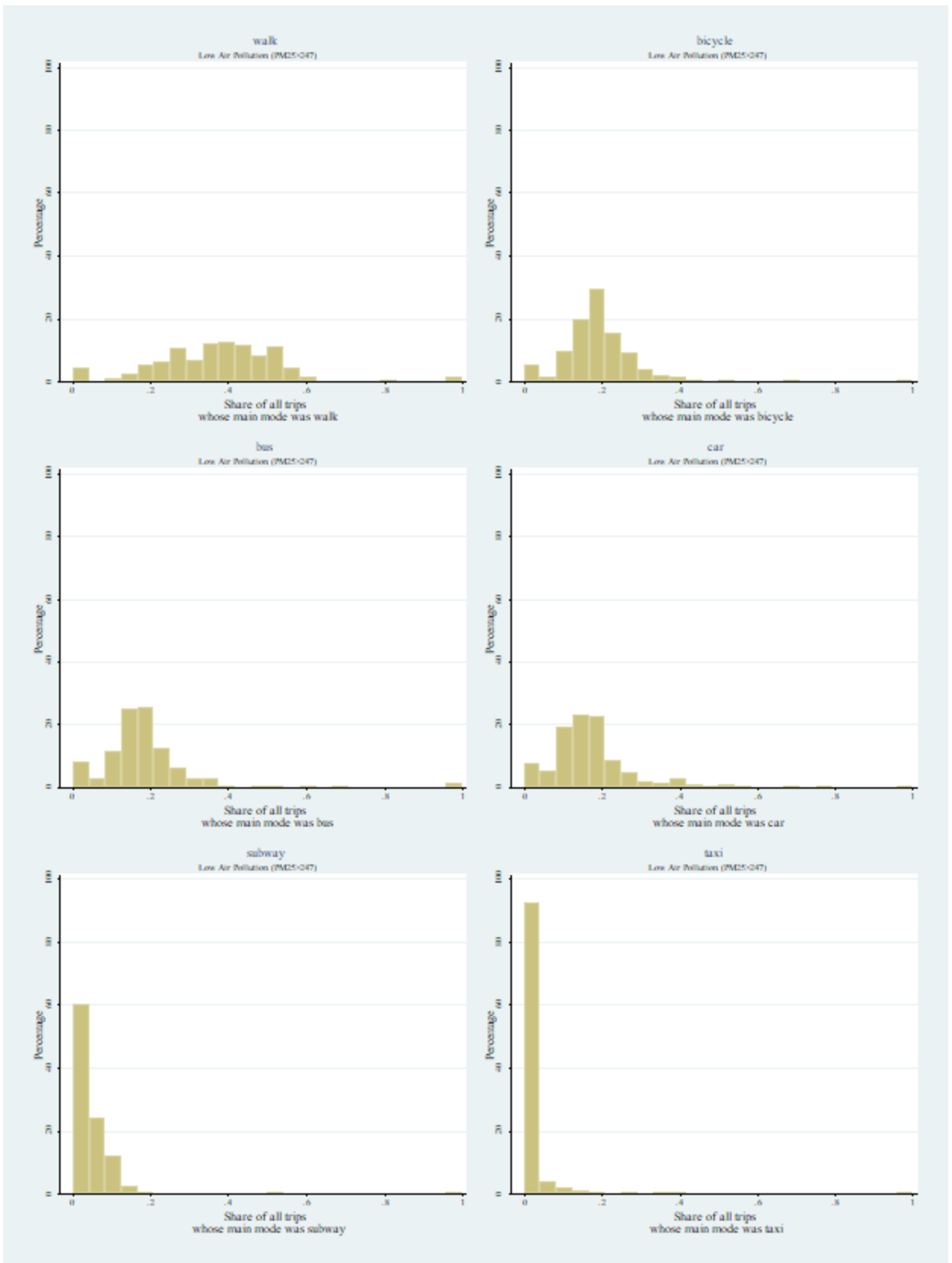












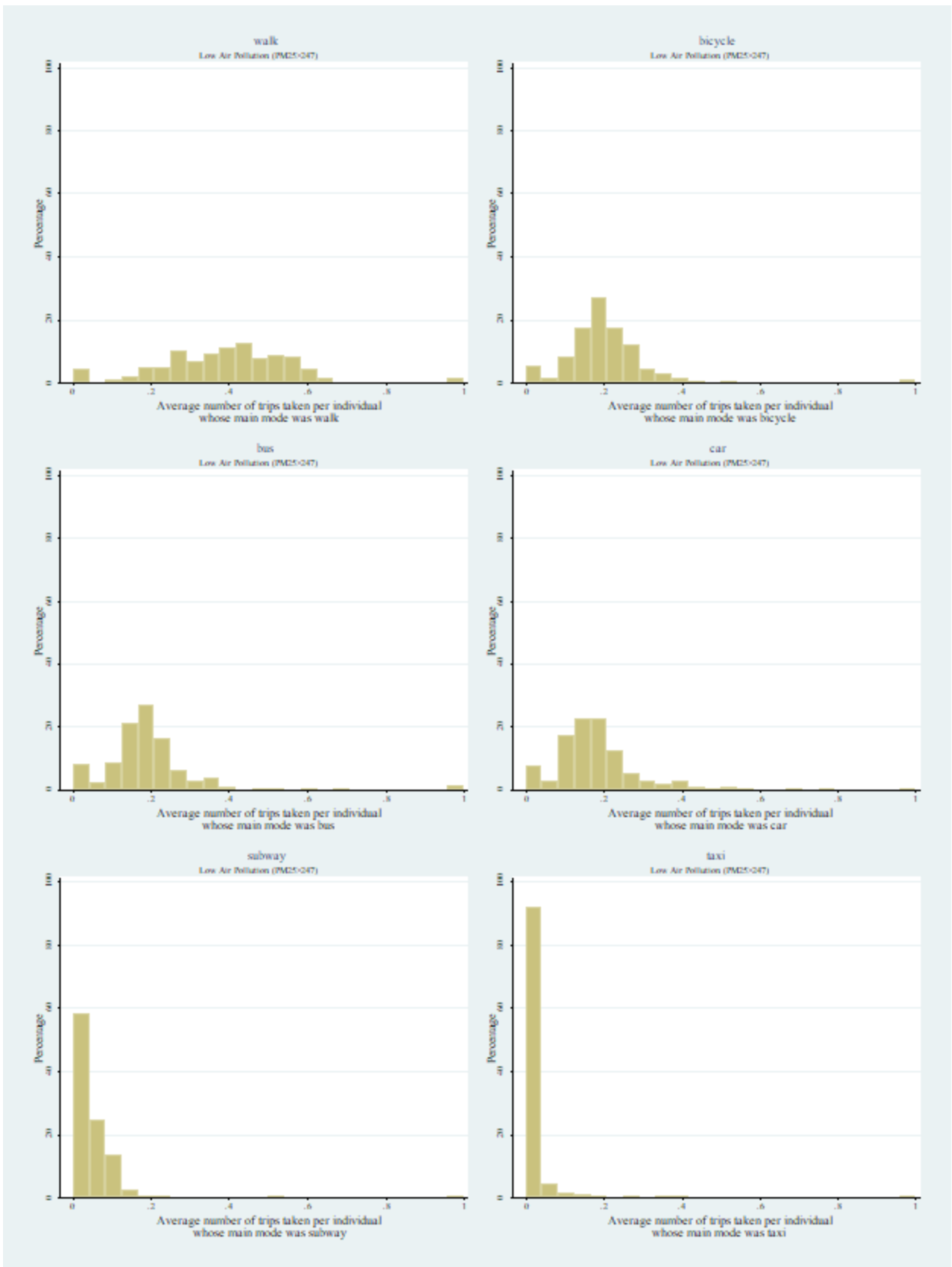
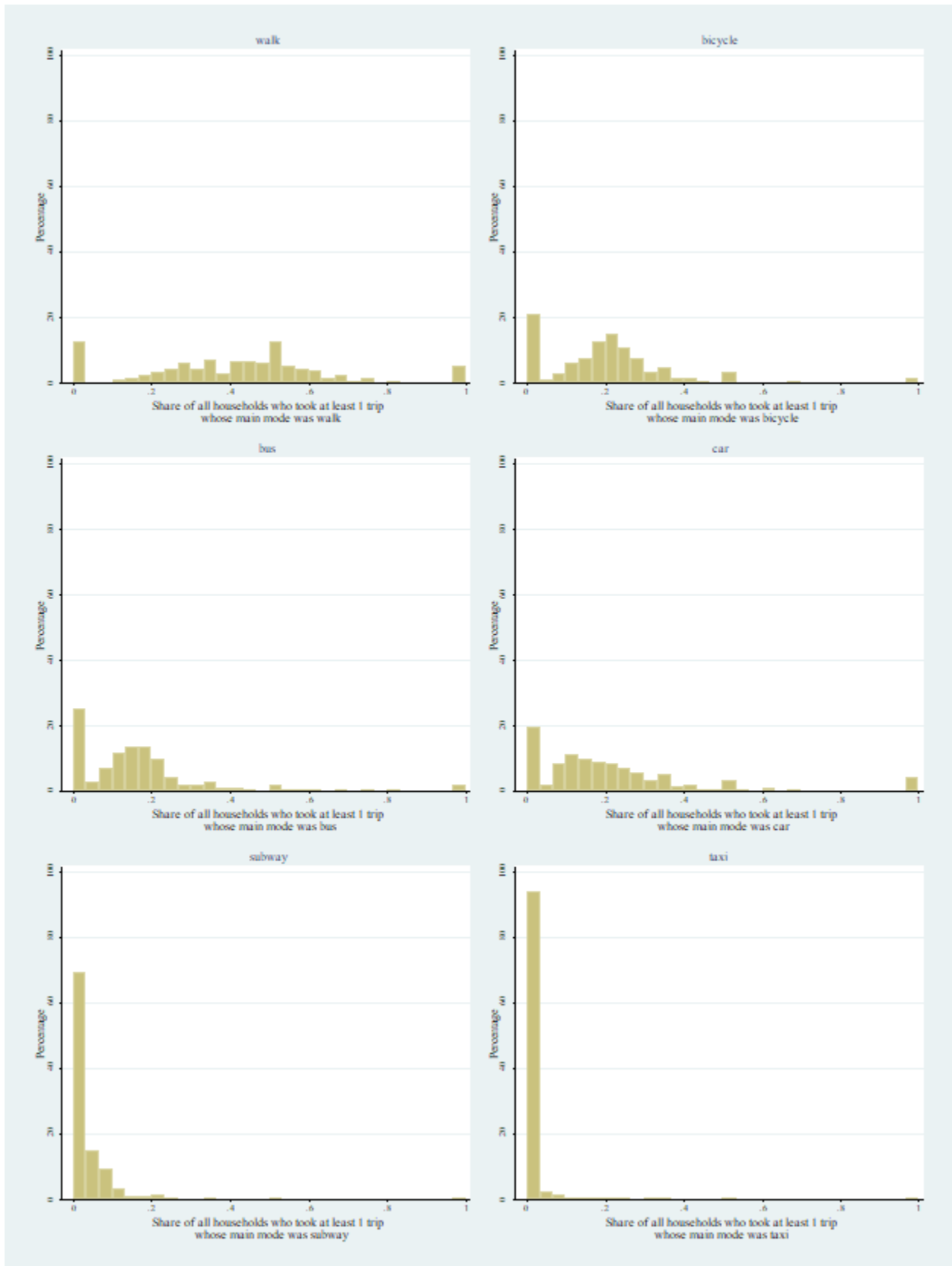
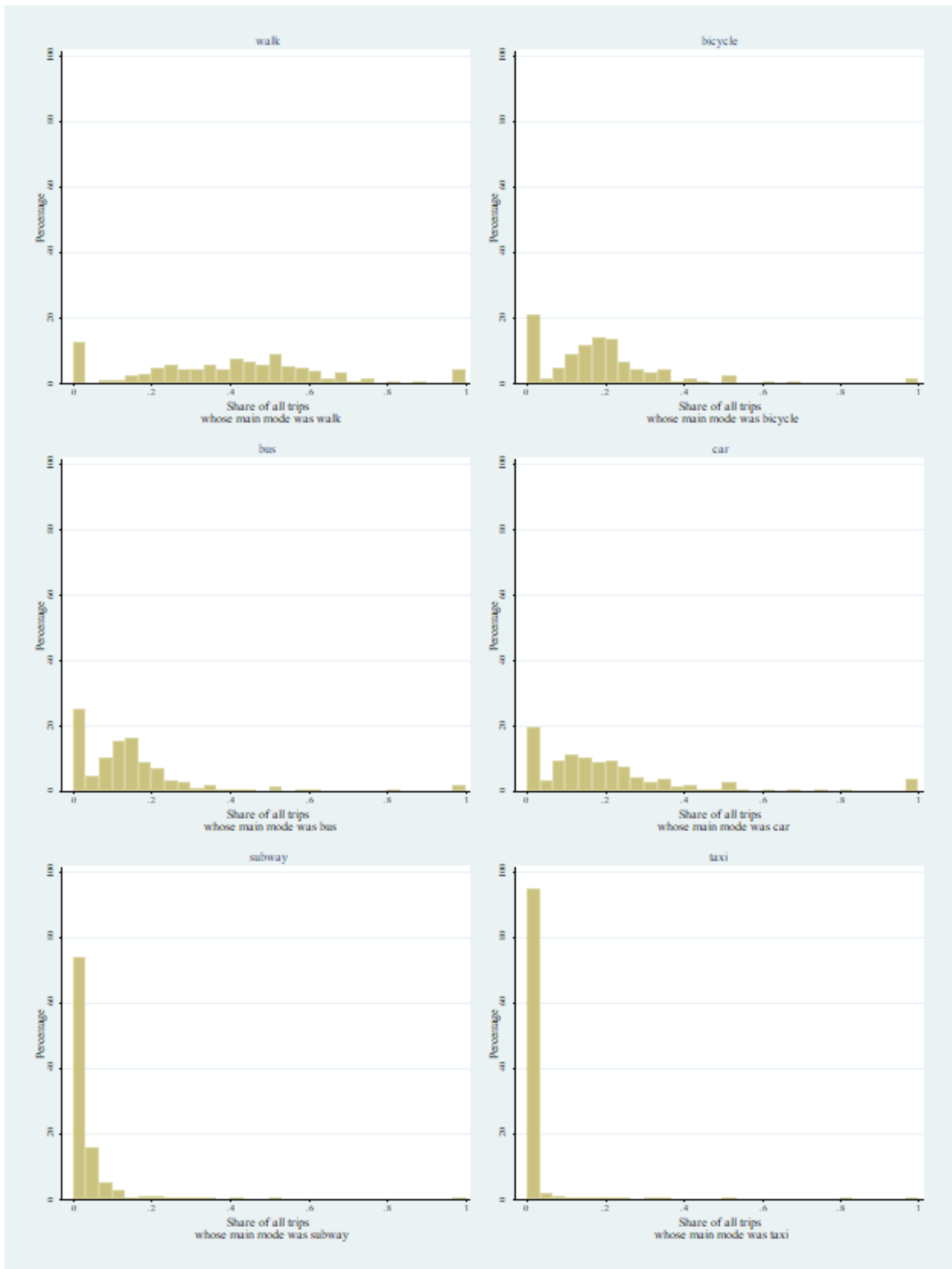
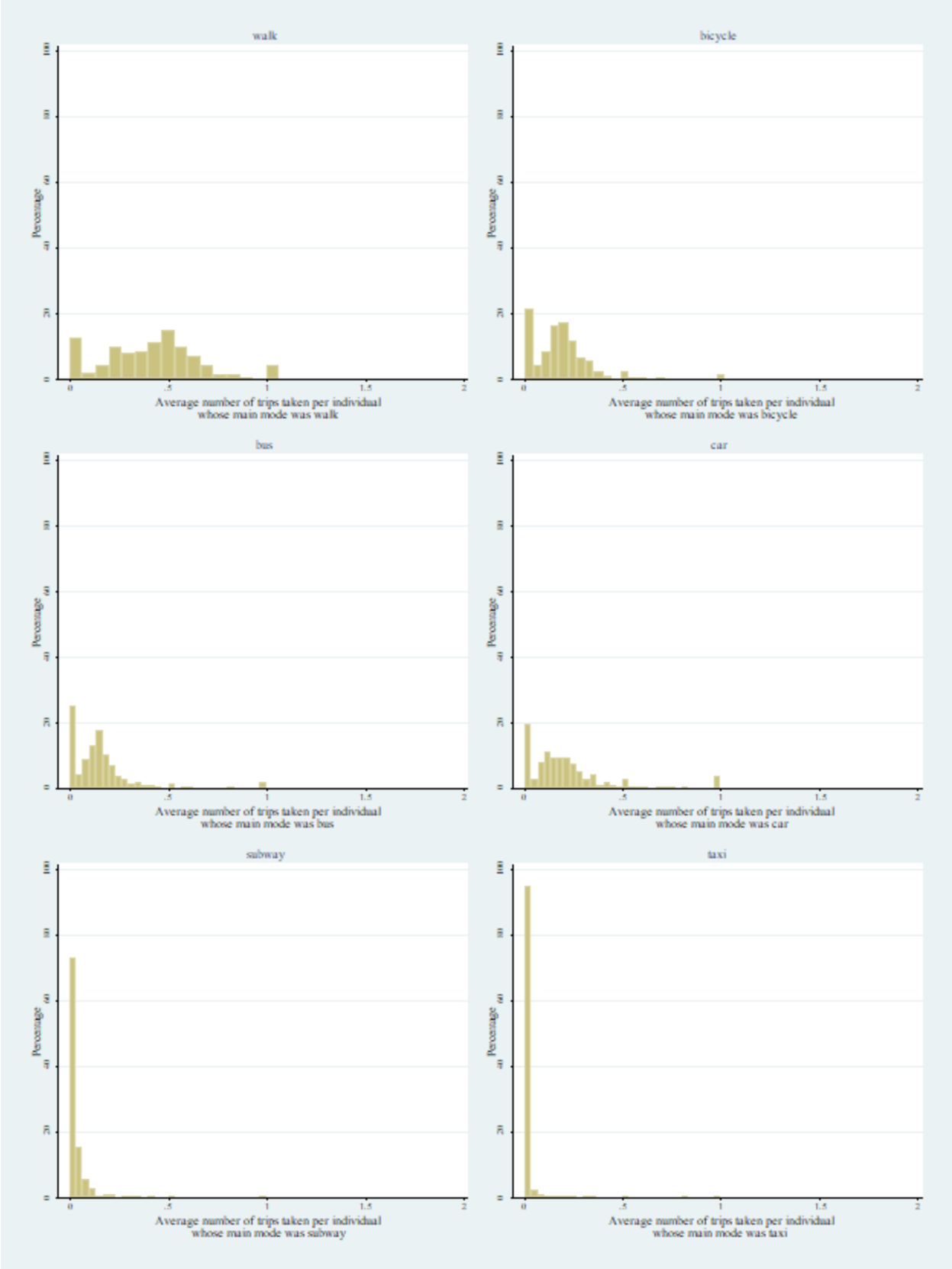


Figure 5a. Histograms of hourly travel mode share, 2014







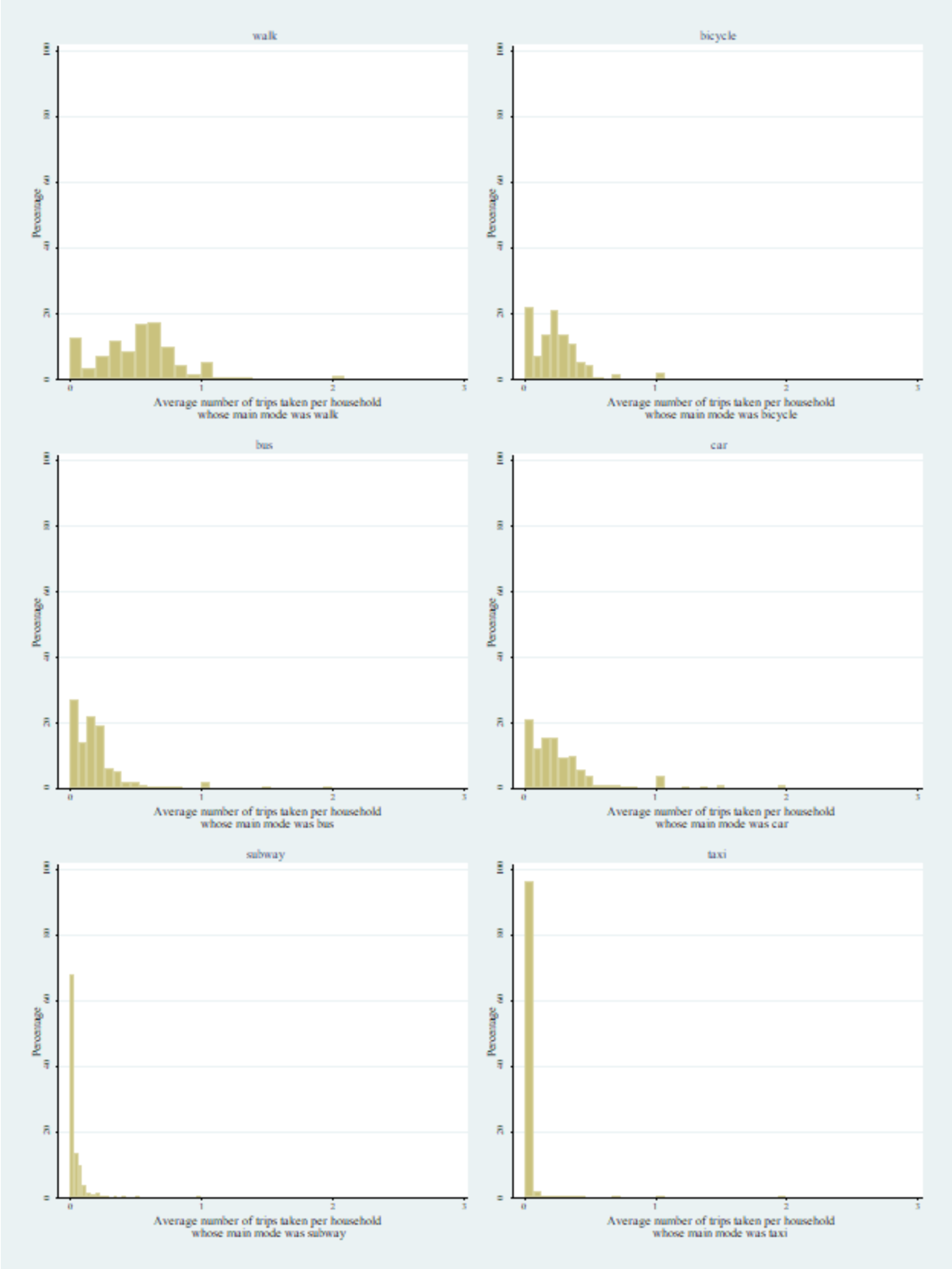
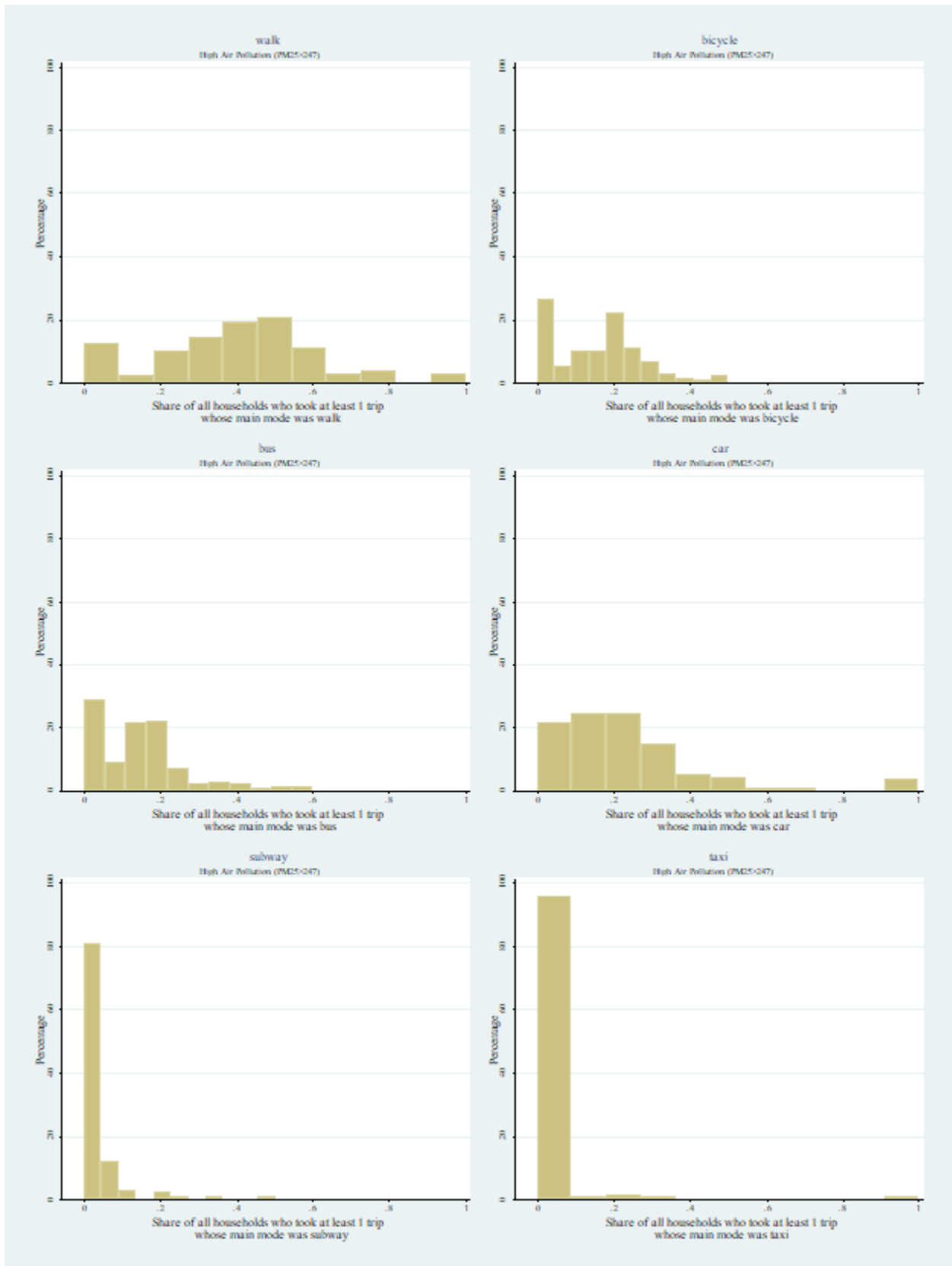
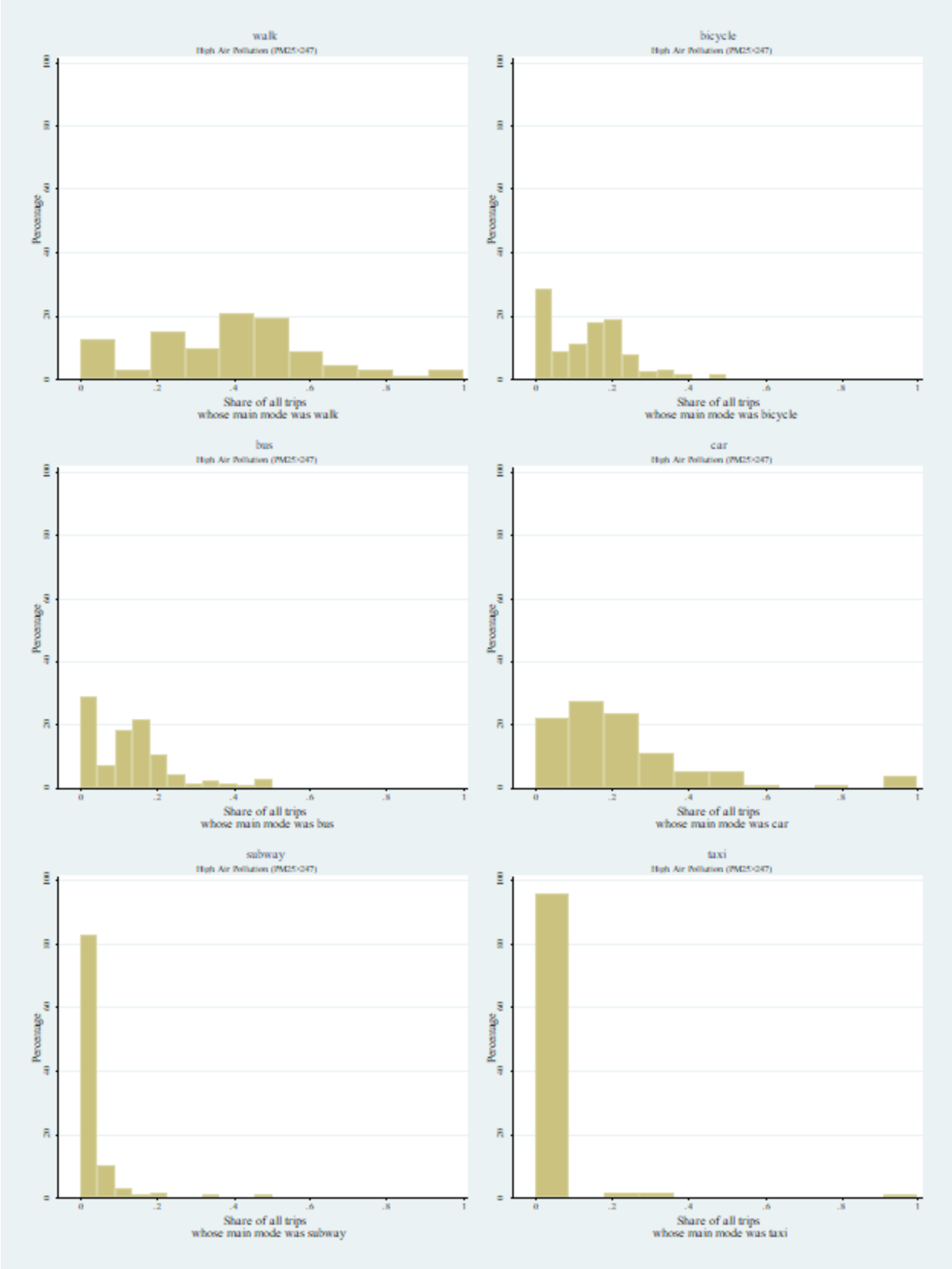
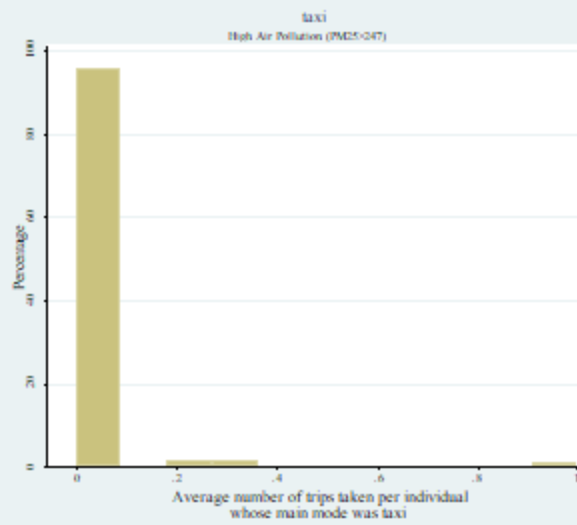
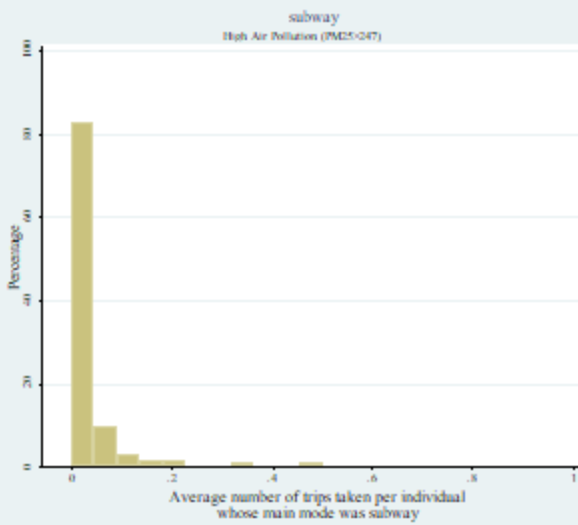
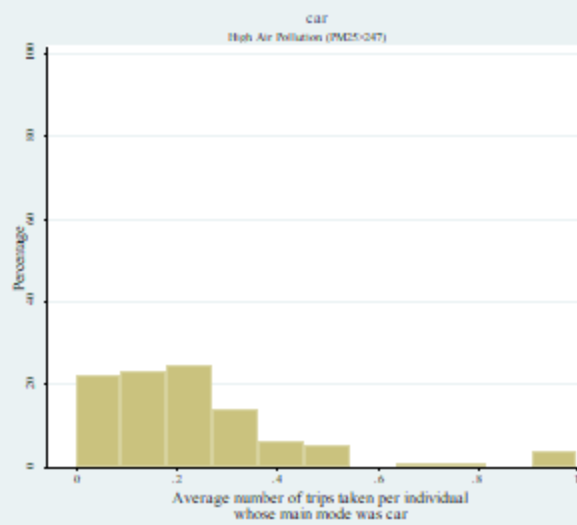
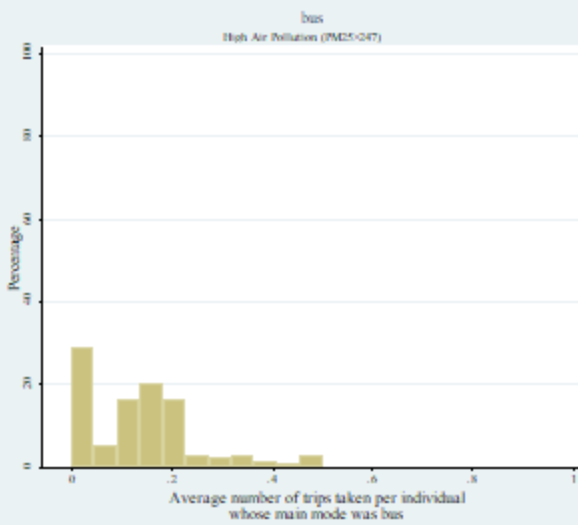
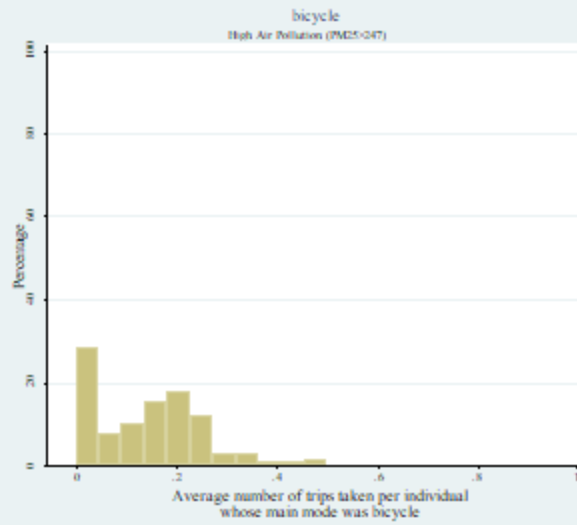
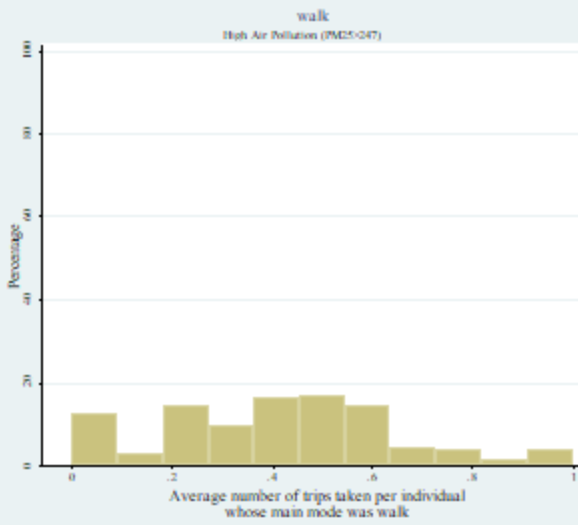


Figure 5b. Histograms of hourly travel mode share on high pollution days, 2014







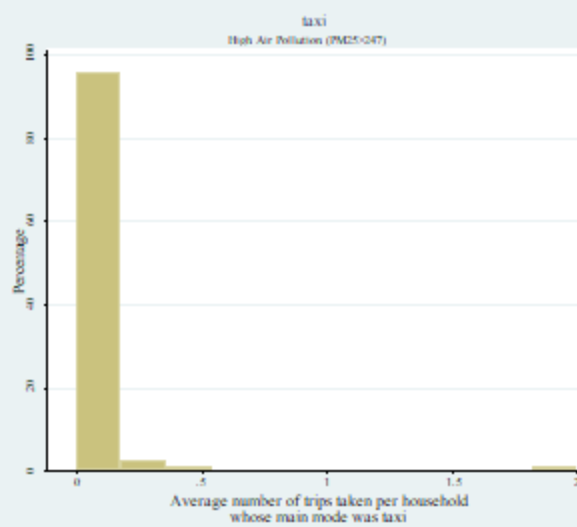
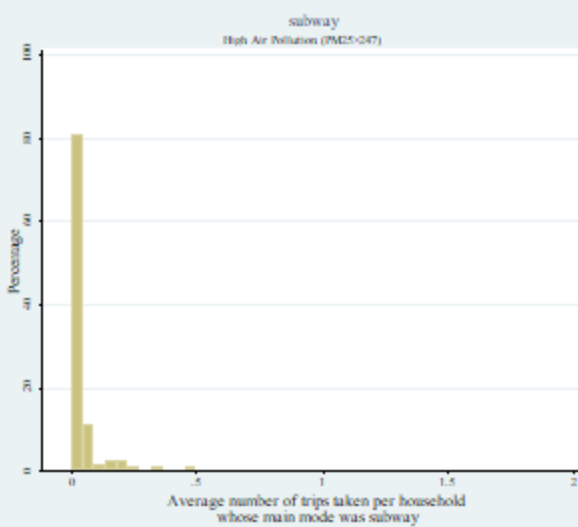
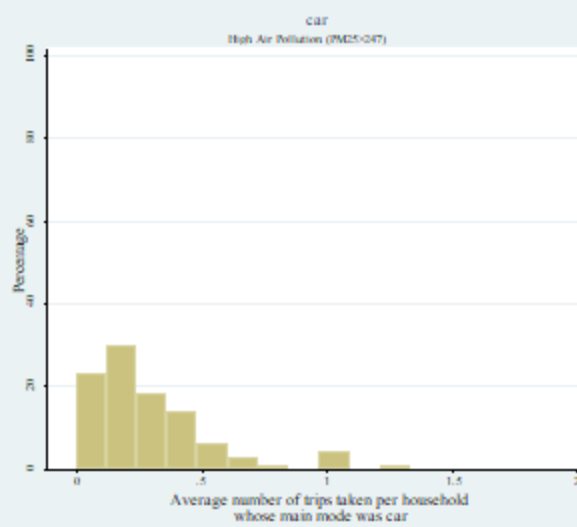
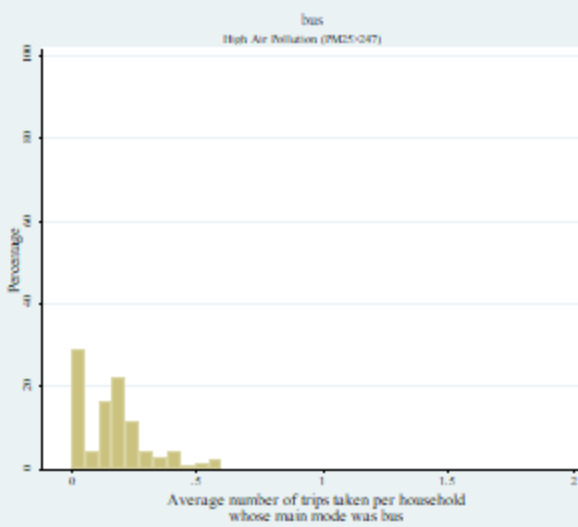
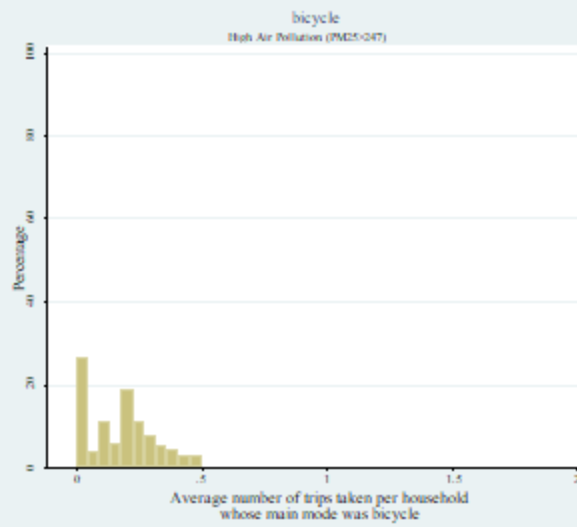
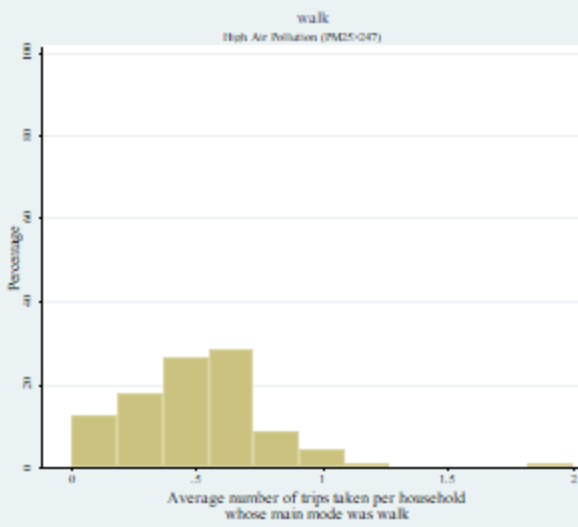
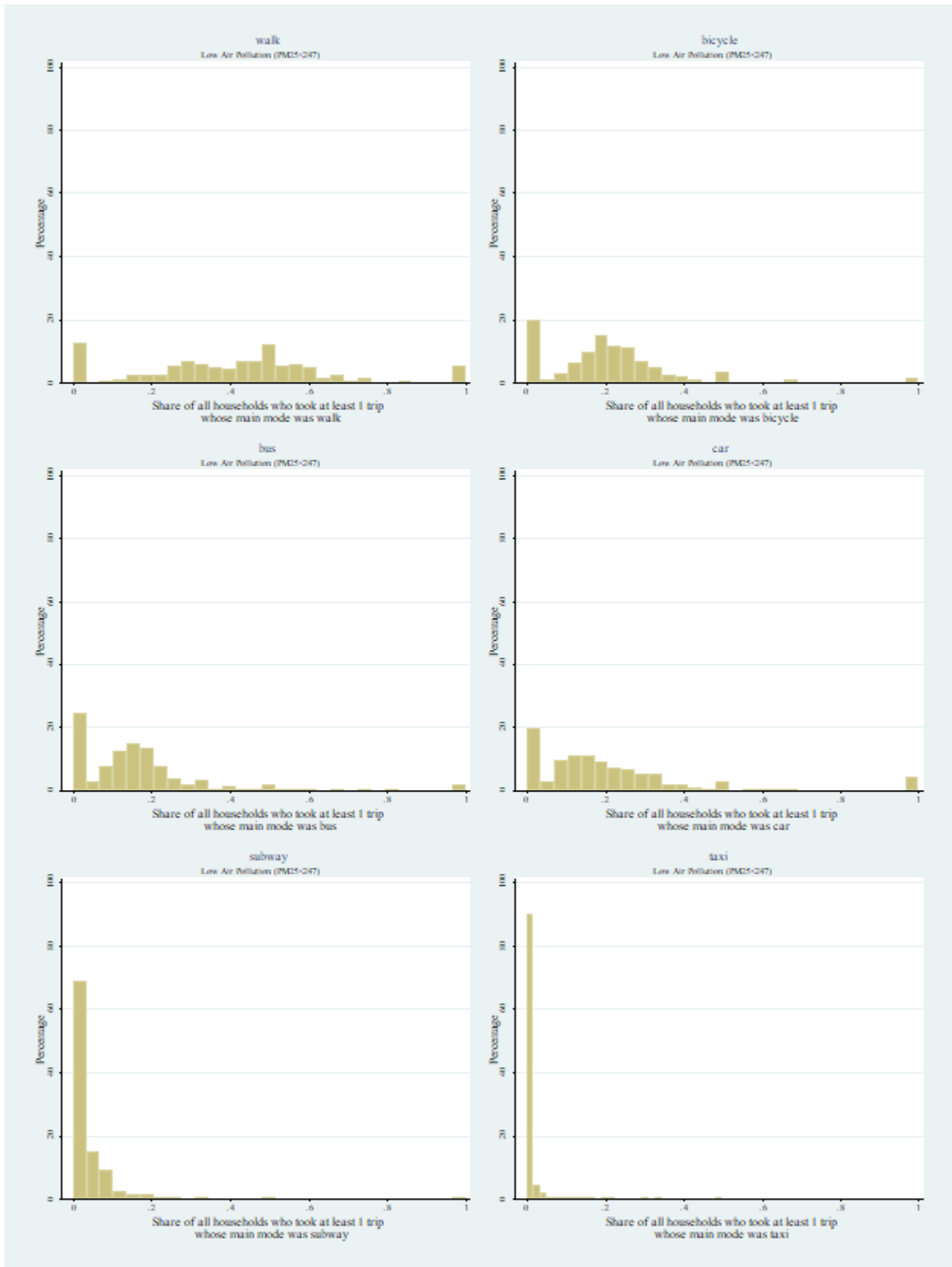
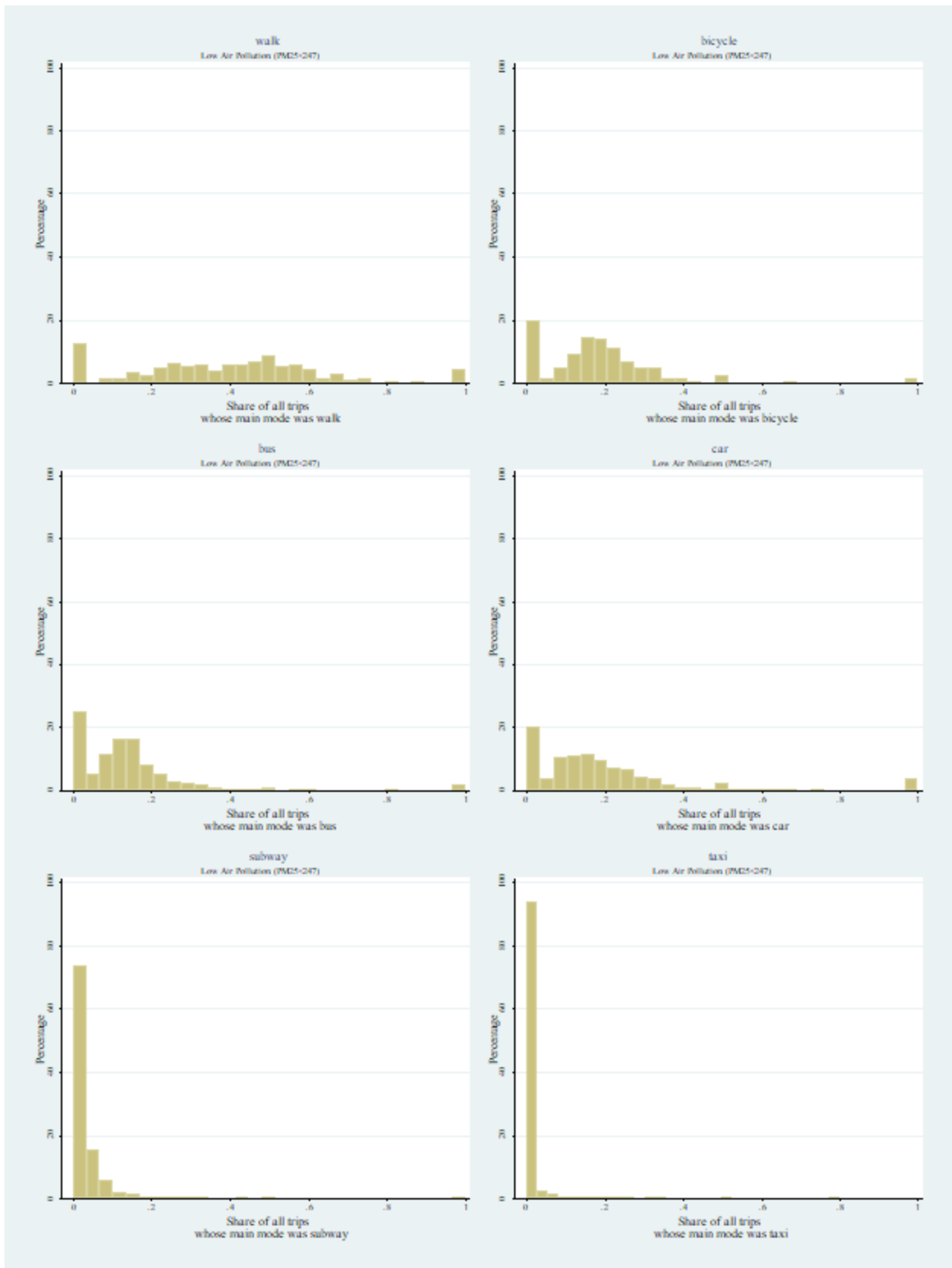
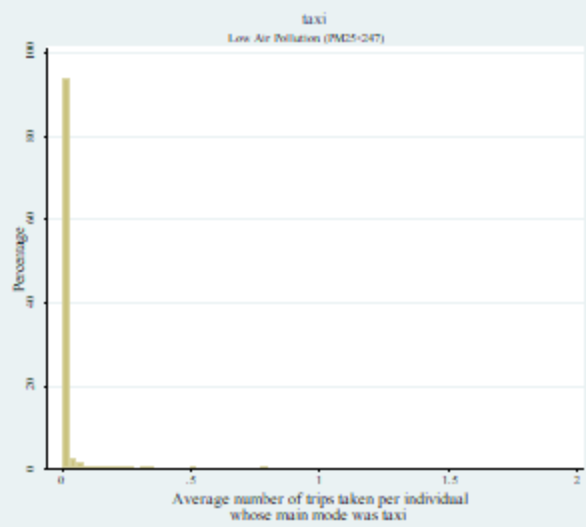
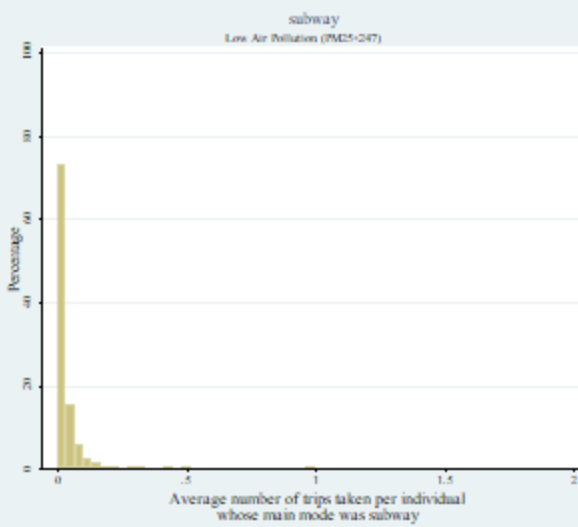
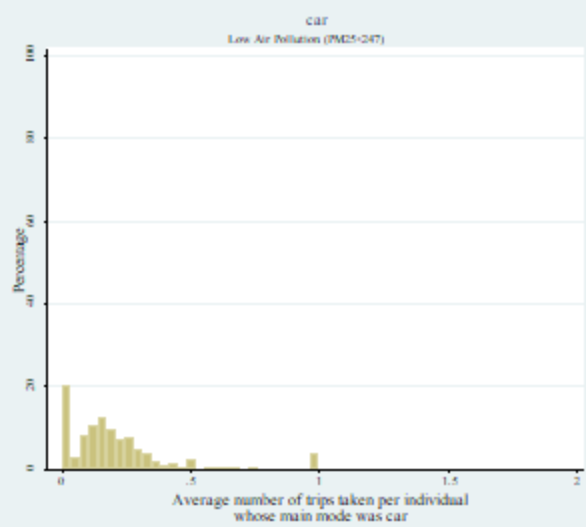
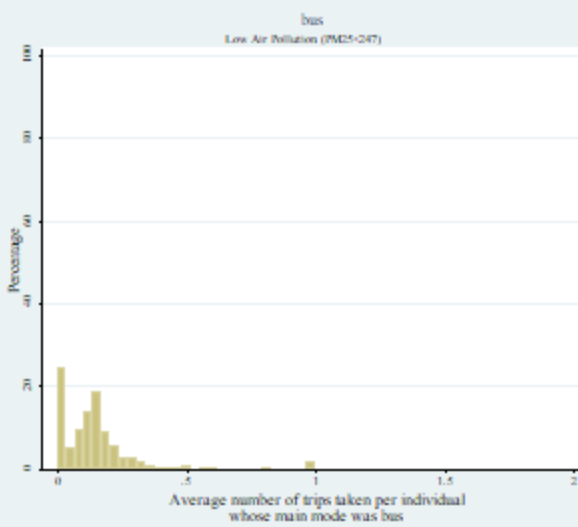
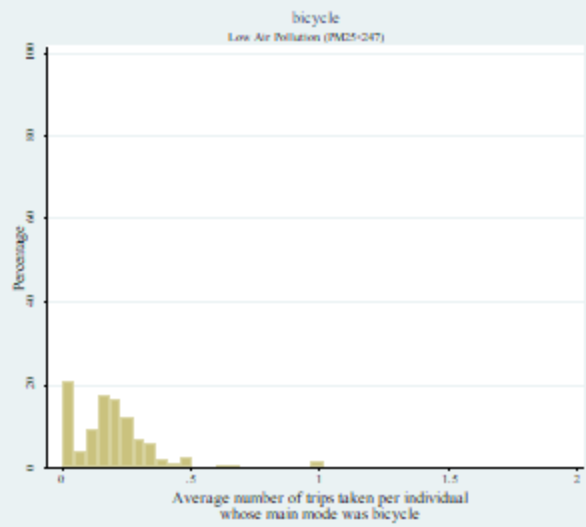
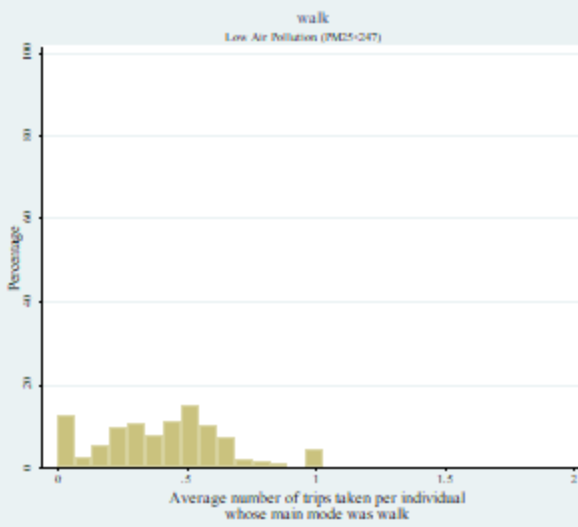
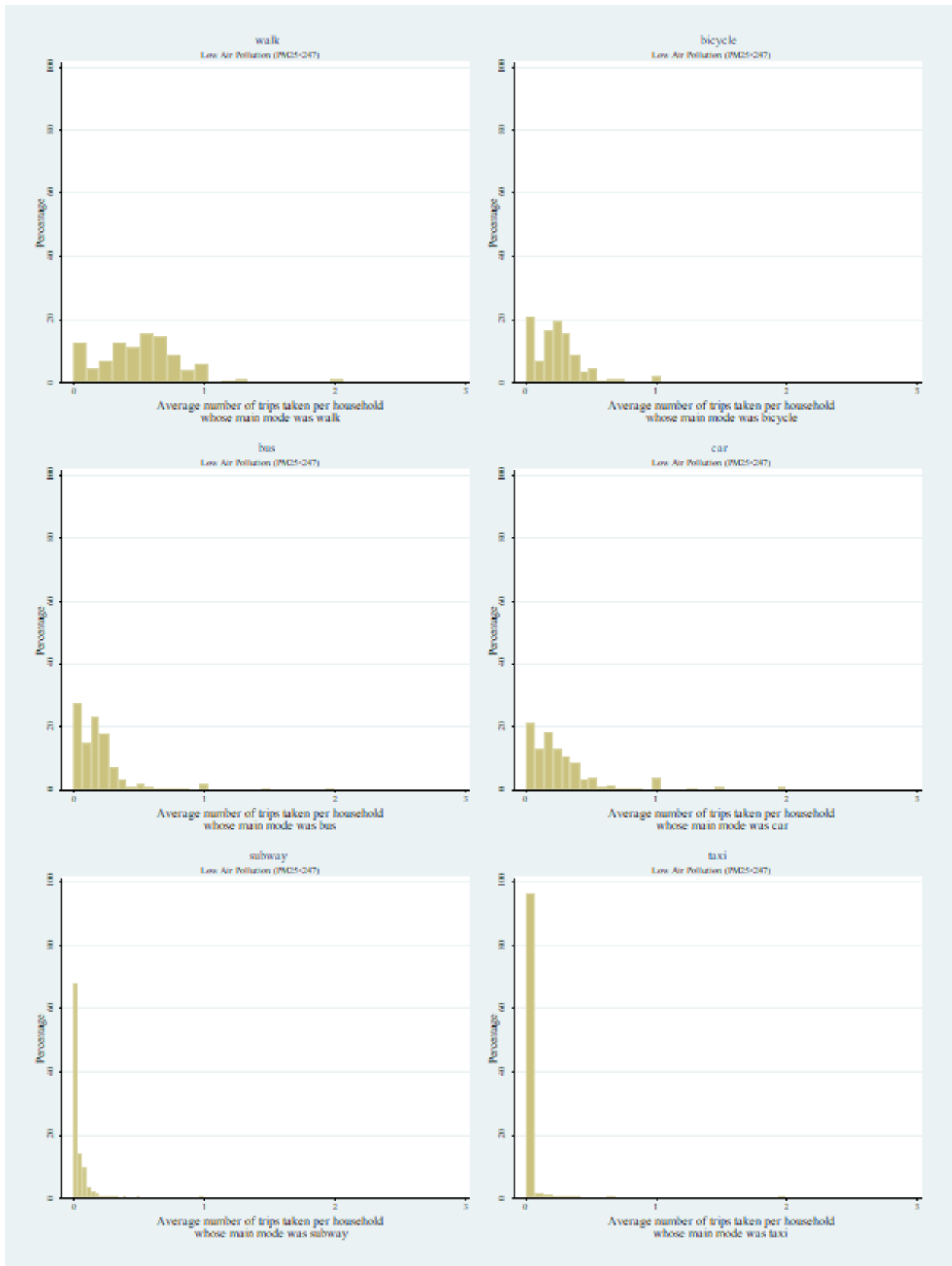


Figure 5c. Histograms of hourly travel mode share on low pollution days, 2014









5. Empirical Strategy

5.1. IV regressions

We run the following IV regressions separately for both 2010 and 2014, using instruments for air pollution.

In the first set of IV regressions, we regress our hourly travel mode share variables on hourly air pollution and controls, using instruments for air pollution. The IV regression model is given by:

$$s_{mt} = \beta_{m1} p_t + x_t' \beta_{m2} + \varepsilon_{mt} . \quad (1)$$

where the index m indicates the travel mode (walk, bicycle, bus, car, subway, taxi, or others); h is the hour, s is the share of the respective travel mode; p_t is the hourly PM_{2.5} concentration; x_t is a vector of controls, including precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day; and ε_{mt} is the error term.

In the second set of IV regressions, we run IV probit regressions of the individual travel mode variables, using instruments for air pollution. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver's license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and

dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010).

In the third set of IV regressions, we run IV fixed effects regressions of the individual travel mode variables including household fixed effects, using instruments for air pollution. We control for age; number of years of schooling; dummies for different types of residency, education, driver's license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects.

In the fourth set of IV regressions, we run IV regressions of the travel mode decision time series variables, using instruments for air pollution. We control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day.

In the fifth set of IV regressions, we run IV fixed effects regressions of the travel mode decision panel variables including household fixed effects, using instruments for air pollution. We control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects.

5.2. *IV Selection*

Air pollution is endogenous to travel decisions for two main reasons. The first reason air pollution is endogenous is due to unobserved variables. For example, the error term contains the number of days a person is staying in the home, which is influenced by the pollution. The second reason air pollution is endogeneous is due to simultaneity. Congestion is a crucial factor for pollution, yielding:

$$p_t = f_t(s_{mt}). \quad (2)$$

Thus, owing to unobserved variables and simultaneity, the error term ε in our regression equation (1) is correlated with air pollution. This can be only partially addressed by the day of a week and hour of a day fixed effects.

We therefore instrument for air pollution to address its endogeneity. The instruments should be uncorrelated with the errors, including unobserved economic activities. Therefore, instruments could be factors that contribute to (instead of merely be correlated with) PM_{2.5} in Beijing.

We use atmospheric chemistry form a set of potential instruments for air pollution to address its endogeneity. One common source of instruments that have been used for air pollution are temperature inversions. Under most circumstances, the temperature of the atmosphere decreases with height, meaning it gets colder the higher you go. A temperature inversion occurs when the atmosphere actually becomes warmer as altitude increases. This typically occurs within a defined layer of the atmosphere. Temperature inversions affect air pollution because they change the dynamics of air movement. Warm air rises in the atmosphere because it is less dense and, therefore, more buoyant than the cooler air above it. This tendency to rise is what creates the vertical development found in thunderstorms. A temperature inversion prevents this vertical movement, also known as convection. Stated differently, inversions function like an atmospheric

lid or blanket. This smothering effect traps air pollutants and allows their concentrations to increase (Bennett, 2018). We assume that temperature at high altitudes would not affect travel mode decisions except through their effect on air pollution.

A second source of instruments are wind speeds and wind blowing from locations other than Beijing that may have high pollution that might blow into Beijing. We control for wind directions and wind speeds in Beijing, since wind in Beijing may directly affect travel decisions in Beijing, but we assume that wind at and from other locations would not affect travel mode decisions except through their effect on air pollution.

A third source of instruments are wind speeds at high altitudes. There is some evidence for a correlation between wind speed and air quality. Enz, Hofman and Thostenson (2017) find that as the wind speed increases, inversions are weakened and only weak ones will form. We assume that, controlling for wind directions and wind speeds in Beijing, wind speeds at high altitudes would not affect travel mode decisions except through their effect on air pollution.

In their study of air pollution in China, Zeng and Zhang (2017) find that adverse atmospheric circulation, unfavorable meteorological conditions (lower air temperature and wind speed, higher air pressure and relative humidity), a frequently occurring inversion layer (with a strong intensity and lower bottom), and the low height of the mixing layer resulted in this haze. This study suggests that not only surface meteorological factors, but also the boundary layer structure, played an important role in the vertical diffusion of the pollutants.

Factory production near Beijing is also a common used instrument for air pollution in Beijing. As economic activity and factory production near Beijing may be correlated with travel decisions in and to and from Beijing, however, we do not use factory production near Beijing as an instrument.

Our set of potential instruments therefore includes temperature inversion variables; wind speeds and directions at high altitude; and wind speeds and wind blowing from locations other than Beijing that may have high pollution that might blow into Beijing.

Since we have only 1,030 observations of hourly pollution in 2010 but 2,060 possible candidate instruments (including temperature inversion variables at midnight and noon; wind speeds and directions at high altitude at midnight and noon; wind speeds and directions around Beijing every 3 hours), we run the risk overfitting the first stage. We use machine learning and LASSO regressions to select our instruments for air pollution to address its endogeneity. Belloni, Chernozhukov and Hansen (2011) prove the efficiency of the LASSO method for Gaussian IV model.

6. Results

6.1. IV selection results: 2010

After applying stepwise LASSO with controls to data for September and October 2010 to select our instruments for 2010, and after dropping IVs that are not significant at a 5% level in the first-stage regression, we have two remaining IVs for air pollution for 2010.

The first instrument is “wspd70000_hour0”, which is the high altitude wind speed at the 7000 pressure level at midnight. This has a negative coefficient in the first-stage regression. Wind speed at high altitude thus will decrease pollution, perhaps via dispersion. As wind speed increases, inversions steadily are weakened and only weak ones will form (Enz, Hofman and Thostenson, 2017). Wind speeds decrease air pollution (Zeng and Zhang, 2017).

The second instrument is “wind_S548080”, which is a dummy variable for wind blowing from Xin Xian, a major city in Shan Dong province, near Beijing. Xin Xian is an industrial city.

Shan Dong province is south of Beijing, and instrument is dummy for wind from the South. Thus, this IV is a dummy for wind blowing from Xin Xian, an industrial city. This instrument has a positive coefficient in the first-stage regression

To get a sense of how polluted Xin Xian was in 2010, we present the following. Since we do not have the data for Xin Xian, we use Liao Cheng that Xin Xian is located in. Also, we do not have air pollution data for 2010, but only have air pollution data from May 13, 2014 onwards. According to the 2019 January to June ranking, Liao Cheng is among the 20 most serve polluted cities in China. The ranking used the average of daily PM 2.5 as the measurement. The air pollution severity in Liao Cheng, based on daily air pollution data in Liao Cheng in 2014 from May 13, 2014 onwards, is presented in Table 20.

Table 20. Severity of daily air pollution in Liao Cheng

PM_{2.5} (µg/m³)	Freq.	Percent	Cum.
0 to 50	27	12.05	12.05
51 to 100	114	50.89	62.95
101 to 150	61	27.23	90.18
151 to 200	18	8.04	98.21
201 to 300	4	1.79	100

We present first-stage graphs of our instruments against pollution and residualized pollution in Figure 6. The pairwise correlations are presented in Table 21.

Figure 6. First stage graph: IVs vs. pollution, 2010

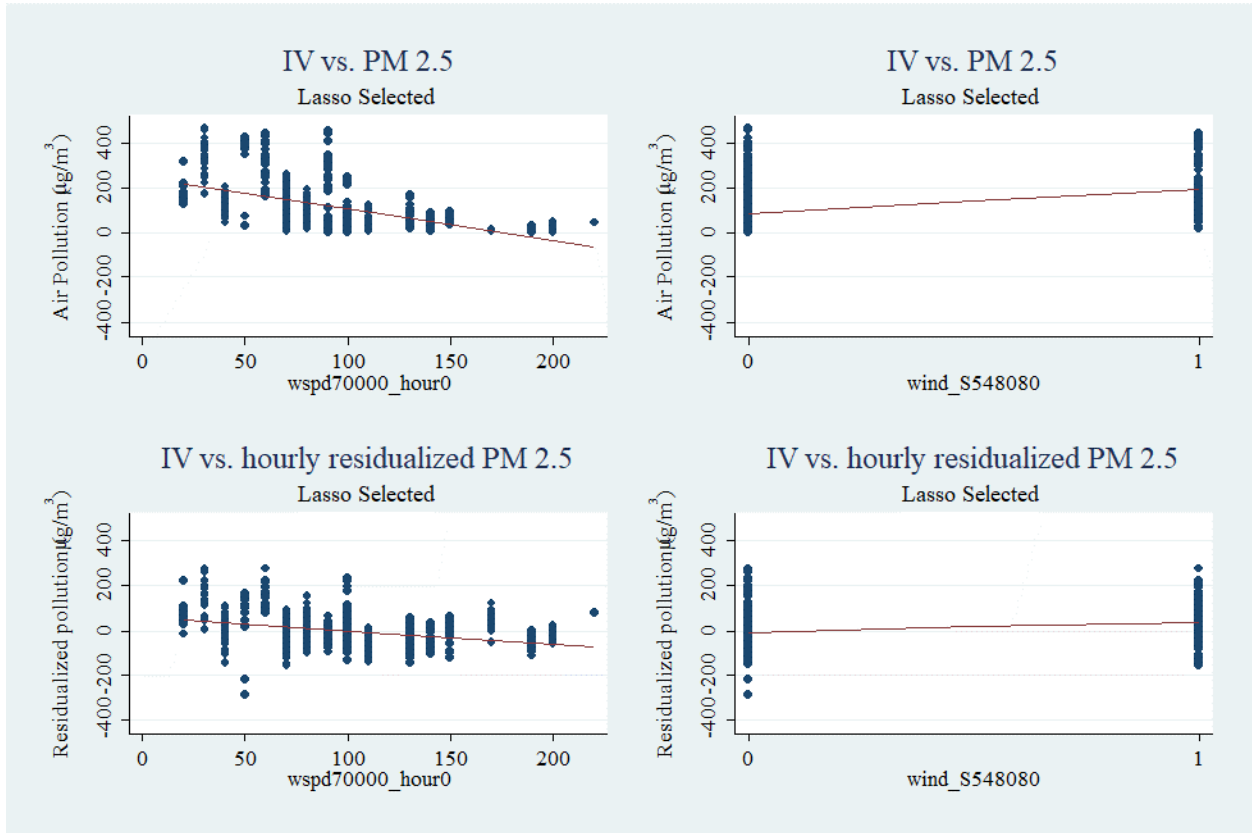


Table 21. Pairwise correlation between IVs and pollution, 2010

	pollution	residualized pollution
high altitude wind speed at the 7000 pressure level at midnight	-0.5571	-0.3383
wind blowing from Xin Xian (dummy)	0.4048	0.2220

Thus, using machine learning and LASSO regressions to select instruments, we find that, in 2010, wind speed at high altitude and wind blowing from polluted cities elsewhere are more related to the endogenous pollution than traditional instruments such as temperature inversion.

6.2. *IV selection results: 2014*

After applying stepwise LASSO with controls to data for September, October, and November 2014 to select our instruments for 2014, and after dropping IVs that are not significant at a 5% level in the first-stage regression, we have three remaining IVs for pollution for 2014.

The first instrument is “wind_S546620”, which is a dummy variable for a south wind at Zhoushuizi, which is 443.852 km to the east of Beijing. Zhoushuizi is in Dalian. The air pollution severity Zhoushuizi, based on the 2014 daily air pollution data for Zhoushuizi, is presented in Table 22.

Table 22. Severity of daily air pollution in Zhoushuizi

PM_{2.5} (µg/m³)	Freq.	Percent	Cum.
0 to 50	160	71.43	71.43
51 to 100	50	22.32	93.75
101 to 150	10	4.46	98.21
151 to 200	3	1.34	99.55
201 to 300	1	0.45	100.00

The second instrument is “wspd592780”, which is the wind speed in Gaoyao, which is 1927.601 km to the south of Beijing. The major industries in this city are automobile manufacture and automobile instruments.

The third instrument is “wind_S547760”, the dummy variable for wind blowing from Chengshantou in the Shandong Province, which is 607.887 km to the south of Beijing. A south wind from Shandong province will increase the air pollution in Beijing. This implies that the air pollution could be sent from the Shandong Province. Chengshantou is in Rongcheng. The air pollution severity in Rongcheng, based on the 2014 daily air pollution data for Rongcheng, is presented in Table 23.

Table 23. Severity of air pollution in Rongcheng

PM_{2.5} (µg/m³)	Freq.	Percent	Cum.
0 to 50	173	77.23	77.23
51 to 100	43	19.20	96.43
101 to 150	7	3.13	99.55
151 to 200	1	0.45	100.00

We present first-stage graphs of our instruments against pollution and residualized pollution for 2014 in Figure 7. The pairwise correlations are presented in Table 24.

Figure 7. First stage graph: IVs vs. pollution, 2014

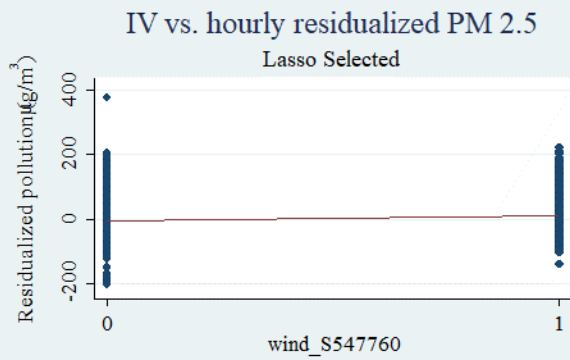
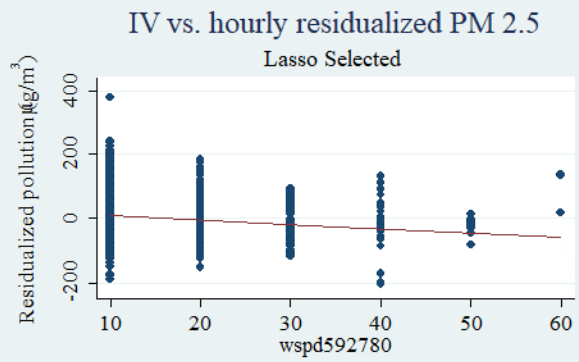
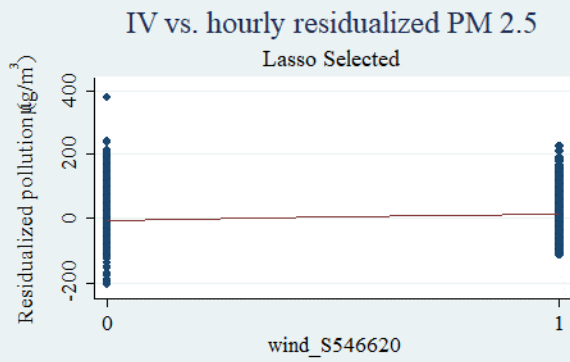
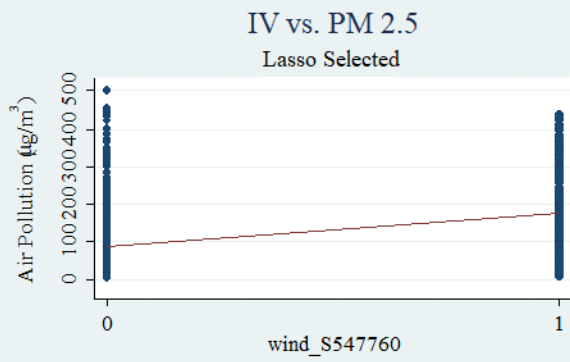
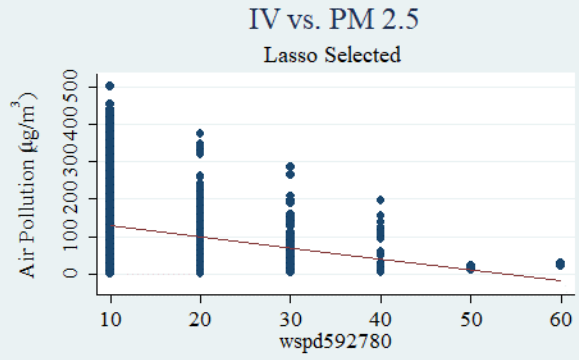
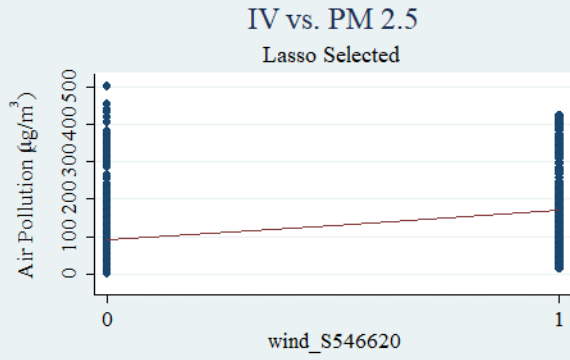


Table 24. Pairwise correlation between IVs and pollution, 2014

	pollution	residualized pollution
hourly south wind at Zhoushuizi (dummy)	0.3304	0.1237
wind speed in Gaoyao	-0.2508	-0.1747
wind blowing from Chengshantou (dummy)	0.3903	0.1164

Thus, using machine learning and LASSO regressions to select instruments, we find that, in 2014, wind speed and direction at other locations and wind blowing from polluted cities elsewhere are more related to the endogenous pollution than traditional instruments such as temperature inversion.

6.3. *IV Regression Results: 2010*

We present first-stage regressions for 2010 in Table 25.

Table 25. First-stage regression, 2010

	(0iv) hourly PM _{2.5}	(1iv) hourly PM _{2.5}	(2iv) hourly PM _{2.5}
high altitude wind speed at 7000 pressure level at midnight	-1.0745*** (0.1061)	-1.0025*** (0.0792)	
wind blowing from Xin Xian	37.7515*** (11.7582)		60.7543*** (12.5207)
wind speed	-6.5919** (3.1243)	-6.4273** (2.6839)	-14.7905*** (3.2575)
temperature	5.3933*** (0.8883)	7.0943*** (0.7946)	8.6685*** (0.9992)
dew point temperature	0.0453 (0.0579)	0.0602 (0.0676)	0.0464 (0.0727)
sea level pressure	-1.9381** (0.8921)	-2.3297*** (0.7791)	-2.1121** (0.9142)
cloud ceiling	-0.3373***	-0.2603***	0.0546

	(0.0980)	(0.0808)	(0.1059)
altitude	0.0187***	0.0125***	0.0205***
	(0.0029)	(0.0045)	(0.0032)
wind from N	-11.2149	-3.9318	-9.4372
	(12.7177)	(10.7771)	(13.5399)
wind from NE	2.2288	4.4671	23.1728
	(14.9413)	(14.1056)	(15.8211)
wind from E	21.3180	25.4594**	21.1756
	(14.0380)	(11.6573)	(15.7560)
wind from SE	-3.4606	-9.7071	-6.5898
	(16.6894)	(13.9415)	(18.2722)
wind from S	22.6887	1.2969	31.3042**
	(14.2096)	(12.4520)	(15.5175)
wind from SW	-12.0740	-27.7226*	-4.6332
	(15.8654)	(14.6215)	(17.0261)
wind from W	11.8999	-3.2847	-14.4813
	(16.4823)	(12.1133)	(18.2459)
precipitation	4.9123***	5.0849***	5.2874***
	(0.7379)	(0.7239)	(0.7727)
lagged precipitation	-1.0626*	-1.6018***	-3.1632***
	(0.6071)	(0.5650)	(0.4721)
October	116.6801***	128.1712***	142.6782***
	(13.4314)	(12.4276)	(15.6277)
Monday	-15.5052	-11.9746	-11.8115
	(12.0829)	(10.7312)	(13.6837)
Tuesday	-13.4777	-2.4773	-31.2720**
	(10.6315)	(9.0423)	(13.6839)
Wednesday	-16.3851	-8.2973	-27.7074*
	(11.7241)	(10.5688)	(14.3348)
Thursday	-27.1914**	-34.2867***	-57.2527***
	(12.4217)	(9.7468)	(14.8554)
Friday	2.4266	-3.9435	-6.8904
	(14.8416)	(12.3602)	(17.7525)
Saturday	31.0106**	32.4106**	-8.6812
	(15.4244)	(14.3044)	(14.9587)
5am	-14.4175	-20.5918	-18.5115
	(18.0596)	(18.8332)	(21.1366)
6am	-17,431.6415**	-	-
	(8,012.4241)	20,951.4266***	19,003.8344**
7am	-24.5143	-26.5719	-27.1172
	(19.1045)	(19.0712)	(21.3543)
8am	-21.7853	-31.9087*	-22.2732
	(17.8916)	(18.7329)	(19.6845)

9am	-17,438.8626** (8,011.5769)	- (6,996.8743)	- (8,209.8461)
10am	-10.1318 (17.4341)	-14.6724 (17.7924)	-9.5651 (19.5878)
11am	-0.3198 (18.3610)	-6.2927 (18.2653)	-6.9868 (21.7551)
12noon	-17,418.2191** (8,009.9646)	- (6,994.8318)	- (8,208.4856)
1pm	10.6174 (22.2107)	4.9874 (20.2880)	1.5049 (26.0520)
2pm		4.1005 (18.9050)	
3pm		- 20,937.6318*** (6,996.5702)	
4pm		5.1374 (18.8618)	
5pm	17.3850 (20.6983)	12.2899 (19.0034)	19.0876 (23.3439)
6pm	-17,406.1816** (8,010.4370)	- (6,995.4007)	- (8,208.4404)
7pm	27.6902 (23.0117)	32.5861 (20.3916)	28.9765 (26.2391)
8pm	30.4991 (25.9113)	41.4598* (21.9421)	45.4143 (29.8967)
9pm	-17,389.4845** (8,009.5234)	- (6,995.8949)	- (8,206.9975)
10pm	11.6951 (25.0135)	32.1711 (21.7748)	21.9643 (28.4828)
11pm	11.7764 (23.9265)	32.1059 (23.3974)	30.0716 (27.3636)
constant	19,440.4026** (8,928.5722)	23,319.5754*** (7,796.5201)	21,003.8204** (9,149.6409)
Observations	441	580	441
R-squared	0.6033	0.5757	0.5053

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Our results for 2010 for the travel mode share IV regressions are in Table 26. Using high altitude wind speed at the 7000 pressure level at midnight as the only IV (“1iv”), we find that people are less likely to walk but more likely to bike when there is bad air. Using wind blowing from Xin Xian as the only IV (in “2iv”), we find that people are less likely to walk when there is bad air. Using both of the 2 IVs (in “0iv”), we find that people are less likely to walk when there is bad air.

Our robust results for 2010 for the travel mode share IV regressions are therefore that people are less likely to walk and weakly more likely to bike when there is bad air.

Table 26a. Travel mode share IV regressions using both IVs, 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000292** (0.000124)	9.66e-05 (0.000139)	2.10e-05 (0.000108)	7.20e-05 (0.000135)	4.54e-05 (4.77e-05)	3.88e-05 (4.29e-05)	1.80e-05 (4.87e-05)
Wind speed	-0.00631 (0.00423)	-0.00233 (0.00466)	-0.000902 (0.00319)	0.00900 (0.00553)	-0.00187* (0.00106)	0.00259 (0.00219)	-0.000172 (0.00135)
Temperature	0.00844*** (0.00214)	-0.00413** (0.00203)	-3.96e-05 (0.00164)	-0.00362 (0.00222)	-0.000142 (0.000876)	-0.000673 (0.000680)	0.000165 (0.000695)
Dew point temperature	3.81e-05 (5.19e-05)	-2.32e-05 (4.03e-05)	-6.29e-05 (5.18e-05)	2.18e-05 (2.73e-05)	9.66e-06 (1.74e-05)	5.23e-06 (1.16e-05)	1.14e-05 (9.91e-06)
Sea level pressure	-0.000198 (0.00163)	-0.00165 (0.00140)	-0.000133 (0.00150)	0.00162 (0.00103)	-0.000101 (0.000508)	0.000346 (0.000532)	0.000116 (0.000385)
Cloud ceiling	0.000168 (0.000160)	-3.98e-05 (0.000159)	7.65e-05 (0.000115)	-0.000364* (0.000198)	3.67e-05 (4.79e-05)	0.000149*** (5.20e-05)	-2.73e-05 (5.53e-05)
Altitude	9.06e-06* (4.99e-06)	-1.04e-05** (5.24e-06)	-6.62e-06 (5.21e-06)	6.99e-06 (4.78e-06)	1.08e-06 (1.83e-06)	2.65e-07 (1.43e-06)	-3.38e-07 (1.10e-06)
Wind from the N (dummy)	-0.000401 (0.0204)	0.0424** (0.0173)	-0.0210 (0.0178)	-0.00299 (0.0190)	0.00327 (0.00637)	-0.0125 (0.0127)	-0.00872 (0.00550)
Wind from the NE (dummy)	0.0264 (0.0191)	-0.0112 (0.0178)	-0.00827 (0.0158)	-0.0132 (0.0182)	-0.00503 (0.00750)	0.0105* (0.00559)	0.000748 (0.00419)
Wind from the E (dummy)	0.0428** (0.0198)	-0.0516*** (0.0167)	0.0106 (0.0186)	-0.0191 (0.0189)	-0.00142 (0.00722)	0.0183** (0.00787)	0.000376 (0.00467)
Wind from the SE (dummy)	-0.0156 (0.0315)	-0.0236 (0.0336)	0.0258 (0.0256)	-0.00853 (0.0239)	0.00331 (0.00884)	0.0160** (0.00644)	0.00266 (0.00633)
Wind from the S (dummy)	-0.0169 (0.0281)	-0.0321 (0.0221)	0.0315 (0.0257)	0.0189 (0.0163)	-0.0105 (0.0130)	0.00497 (0.00597)	0.00409 (0.00587)
Wind from the SW (dummy)	-0.0420 (0.0285)	-0.0231 (0.0179)	0.0365 (0.0382)	0.00908 (0.0168)	0.00743 (0.0128)	0.00103 (0.00601)	0.0111** (0.00556)
Wind from the W (dummy)	-0.0576 (0.0433)	0.0196 (0.0450)	0.0143 (0.0332)	-0.00862 (0.0177)	0.0336 (0.0429)	-0.00317 (0.00685)	0.00182 (0.00897)
Precipitation	0.00149	-0.00151	0.000168	0.000190	4.20e-05	-0.000322	-6.26e-05

	(0.00117)	(0.00117)	(0.00112)	(0.00118)	(0.000474)	(0.000506)	(0.000333)
Lag Precipitation	-0.000614	-0.00127	-0.000331	0.00119	0.000222	0.000310	0.000491
	(0.000947)	(0.000922)	(0.000594)	(0.000858)	(0.000328)	(0.000398)	(0.000396)
o.holiday	-	-	-	-	-	-	-
10.month	0.0423	-0.0296	0.00577	0.00523	-0.0102	-0.0163	0.00287
	(0.0271)	(0.0290)	(0.0256)	(0.0303)	(0.0178)	(0.0147)	(0.00985)
1.weekday	0.0208	0.0450**	-0.0359*	-0.0669***	0.0188***	0.00586	0.0124**
	(0.0196)	(0.0182)	(0.0207)	(0.0226)	(0.00508)	(0.00569)	(0.00552)
2.weekday	0.0130	0.0401*	-0.0359	-0.0533**	0.0259***	0.00159	0.00858*
	(0.0235)	(0.0227)	(0.0241)	(0.0222)	(0.00640)	(0.00521)	(0.00481)
3.weekday	0.00715	0.00742	-0.00817	-0.0490**	0.0308*	0.0110**	0.000772
	(0.0301)	(0.0210)	(0.0370)	(0.0239)	(0.0186)	(0.00501)	(0.00487)
4.weekday	-0.00554	0.0115	-0.0330	-0.0301	0.0225***	0.00908	0.0255*
	(0.0282)	(0.0212)	(0.0265)	(0.0235)	(0.00780)	(0.00674)	(0.0134)
5.weekday	0.0460*	0.00513	-0.0376	-0.0546***	0.0190**	0.0136**	0.00857*
	(0.0249)	(0.0180)	(0.0249)	(0.0205)	(0.00802)	(0.00574)	(0.00469)
6.weekday	0.0298	0.0156	-0.0355*	-0.0457**	0.0156**	0.0204	-0.000178
	(0.0214)	(0.0222)	(0.0211)	(0.0207)	(0.00616)	(0.0150)	(0.00365)
5.hour	-0.0235	-0.150***	0.236***	-0.0567	0.0576***	-0.0154*	-0.0485***
	(0.0537)	(0.0466)	(0.0292)	(0.0406)	(0.0117)	(0.00801)	(0.0168)
6.hour	-1.866	-14.99	-0.986	14.53	-0.803	3.095	1.018
	(14.65)	(12.58)	(13.45)	(9.220)	(4.555)	(4.778)	(3.451)
7.hour	-0.0344	-0.0928**	0.149***	-0.0447	0.0712***	-0.0110	-0.0378**
	(0.0495)	(0.0460)	(0.0405)	(0.0363)	(0.0165)	(0.00802)	(0.0161)
8.hour	0.0934*	-0.129***	0.141***	-0.0800**	0.0444***	-0.0127	-0.0570***
	(0.0534)	(0.0473)	(0.0416)	(0.0368)	(0.0108)	(0.00789)	(0.0162)
9.hour	-1.577	-14.96	-1.137	14.47	-0.894	3.100	0.991
	(14.64)	(12.56)	(13.46)	(9.220)	(4.564)	(4.779)	(3.456)
10.hour	0.186***	-0.143***	0.117***	-0.114***	0.0114	-0.0101	-0.0469**
	(0.0511)	(0.0473)	(0.0354)	(0.0363)	(0.00914)	(0.00823)	(0.0182)
11.hour	0.174***	-0.115**	0.0988***	-0.0998***	0.00718	-0.0107	-0.0541***
	(0.0475)	(0.0458)	(0.0314)	(0.0365)	(0.00884)	(0.00800)	(0.0174)
12.hour	-1.599	-14.98	-1.132	14.51	-0.892	3.105	0.990
	(14.65)	(12.58)	(13.46)	(9.219)	(4.566)	(4.779)	(3.455)

13.hour	0.134** (0.0529)	-0.0941* (0.0494)	0.0690*** (0.0227)	-0.0640* (0.0373)	0.0213** (0.00997)	-0.0113 (0.00873)	-0.0549*** (0.0180)
17.hour	-0.0203 (0.0469)	-0.128*** (0.0468)	0.150*** (0.0212)	-0.0325 (0.0395)	0.0787*** (0.00860)	-0.0151* (0.00855)	-0.0333* (0.0181)
18.hour	-1.790 (14.64)	-15.01 (12.57)	-1.025 (13.45)	14.55 (9.219)	-0.821 (4.562)	3.101 (4.779)	0.989 (3.455)
19.hour	0.204*** (0.0481)	-0.211*** (0.0475)	0.0721*** (0.0216)	-0.0356 (0.0409)	0.0373*** (0.00894)	-0.0111 (0.00981)	-0.0565*** (0.0186)
20.hour	0.192*** (0.0521)	-0.207*** (0.0490)	0.0680*** (0.0235)	-0.0397 (0.0471)	0.0401*** (0.00963)	0.00336 (0.0108)	-0.0567*** (0.0188)
21.hour	-1.714 (14.65)	-15.01 (12.57)	-1.061 (13.44)	14.57 (9.223)	-0.872 (4.564)	3.112 (4.780)	0.983 (3.454)
22.hour	0.00301 (0.0542)	-0.184*** (0.0515)	0.112*** (0.0247)	0.0588 (0.0502)	0.0499*** (0.0108)	0.0172 (0.0128)	-0.0574*** (0.0190)
23.hour	-0.0931* (0.0547)	-0.0354 (0.0603)	-0.0382 (0.0241)	0.111* (0.0601)	0.00576 (0.00962)	0.0987** (0.0407)	-0.0484** (0.0221)
Constant	2.132 (16.32)	16.91 (14.01)	1.434 (14.99)	-15.93 (10.27)	0.999 (5.086)	-3.444 (5.315)	-1.098 (3.848)
Observations	441	441	441	441	441	441	441
R-squared	0.431	0.223	0.269	0.354	0.271	0.236	0.244
Sanderson-Windmeijer F-statistic	81.39	81.39	81.39	81.39	81.39	81.39	81.39
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0679	0.740	0.878	0.880	0.514	0.472	0.922
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0505	0.717	0.867	0.868	0.480	0.436	0.915
Stock-Wright weak instrument-robust inference p-value	0.0100	0.502	0.739	0.612	0.0188	0.00635	0.773
Hansen overidentification test p-value	0.383	0.632	0.616	0.866	0.284	0.229	0.959

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000277** (0.000123)	0.000125 (0.000140)	1.39e-05 (0.000106)	0.000121 (0.000130)	2.95e-05 (4.79e-05)	4.41e-05 (4.42e-05)	8.82e-06 (5.62e-05)
Wind speed	-0.00649 (0.00405)	-0.00361 (0.00460)	-0.000667 (0.00320)	0.0109* (0.00559)	-0.00235** (0.00114)	0.00294 (0.00222)	0.000415 (0.00160)
Temperature	0.00733*** (0.00202)	-0.00414** (0.00203)	-0.000261 (0.00168)	-0.00375* (0.00216)	0.000104 (0.000867)	-0.000728 (0.000703)	0.000610 (0.000820)
Dew point temperature	3.16e-05 (4.90e-05)	-2.12e-05 (4.10e-05)	-5.39e-05 (5.07e-05)	2.55e-05 (2.78e-05)	7.48e-06 (1.83e-05)	-5.57e-07 (1.21e-05)	2.75e-06 (1.33e-05)
Sea Level Pressure	-9.07e-06 (0.00155)	-0.00121 (0.00140)	-0.000606 (0.00146)	0.00158* (0.000949)	-0.000269 (0.000550)	0.000333 (0.000540)	-8.22e-05 (0.000669)
Cloud Ceiling	0.000186 (0.000148)	-8.52e-05 (0.000162)	6.38e-05 (0.000117)	-0.000361* (0.000195)	3.82e-05 (5.21e-05)	0.000168*** (5.44e-05)	-3.19e-05 (5.92e-05)
Altitude	9.15e-06* (4.78e-06)	-1.06e-05** (5.31e-06)	-7.00e-06 (5.26e-06)	2.82e-06 (4.27e-06)	2.68e-06* (1.48e-06)	9.55e-07 (1.49e-06)	-5.30e-07 (1.18e-06)
North wind	0.00538 (0.0190)	0.0476*** (0.0174)	-0.0184 (0.0181)	-0.00904 (0.0173)	0.00250 (0.00632)	-0.0141 (0.0128)	-0.0109 (0.00772)
Northeast wind	0.0227 (0.0184)	-0.00606 (0.0183)	-0.0123 (0.0161)	-0.00789 (0.0169)	-0.00361 (0.00726)	0.0108* (0.00583)	-0.000660 (0.00588)
East wind	0.0313 (0.0191)	-0.0574*** (0.0167)	0.0105 (0.0190)	-0.0114 (0.0171)	0.00328 (0.00724)	0.0212** (0.00827)	0.00119 (0.00585)
Southeast wind	-0.0140 (0.0287)	-0.0252 (0.0335)	0.0199 (0.0252)	-0.00285 (0.0207)	0.00559 (0.00846)	0.0186** (0.00740)	0.00105 (0.00780)
South wind	-0.00985 (0.0274)	-0.0340 (0.0224)	0.0292 (0.0256)	0.0195 (0.0147)	-0.00801 (0.0127)	0.00536 (0.00614)	-0.00146 (0.00934)
Southwest wind	-0.0426 (0.0266)	-0.0192 (0.0182)	0.0391 (0.0374)	0.0150 (0.0151)	0.00711 (0.0112)	0.00114 (0.00618)	0.00551 (0.00777)
West wind	-0.0354 (0.0487)	0.0118 (0.0446)	0.00260 (0.0303)	-0.00108 (0.0185)	0.0326 (0.0421)	-0.00352 (0.00714)	-0.00184 (0.0121)
Precipitation	0.00147	-0.00165	6.82e-05	-4.35e-05	0.000271	-0.000307	-0.000171

	(0.00117)	(0.00118)	(0.00111)	(0.00110)	(0.000478)	(0.000523)	(0.000366)
Lag Precipitation	-0.000939	-0.00108	-0.000498	0.00158**	0.000319	0.000375	0.000590
	(0.000847)	(0.000925)	(0.000592)	(0.000790)	(0.000352)	(0.000423)	(0.000484)
o.holiday	-	-	-	-	-	-	-
10.month	0.0337	-0.0310	0.00782	-0.00264	-0.00648	-0.0168	0.00379
	(0.0258)	(0.0291)	(0.0254)	(0.0291)	(0.0176)	(0.0148)	(0.0105)
1.weekday	0.0155	0.0439**	-0.0290	-0.0530**	0.0230***	0.00666	0.0135**
	(0.0189)	(0.0183)	(0.0202)	(0.0218)	(0.00579)	(0.00587)	(0.00616)
2.weekday	0.00560	0.0340	-0.0273	-0.0324	0.0302***	0.00202	0.0118**
	(0.0230)	(0.0222)	(0.0235)	(0.0228)	(0.00682)	(0.00543)	(0.00554)
3.weekday	0.00483	0.00249	-0.0103	-0.0391*	0.0340*	0.0130**	0.00315
	(0.0296)	(0.0223)	(0.0362)	(0.0227)	(0.0185)	(0.00537)	(0.00583)
4.weekday	-0.00693	0.0134	-0.0249	-0.0200	0.0275***	0.00882	0.0254*
	(0.0278)	(0.0224)	(0.0266)	(0.0222)	(0.00807)	(0.00690)	(0.0138)
5.weekday	0.0427*	-3.69e-05	-0.0357	-0.0404**	0.0237***	0.0135**	0.0146*
	(0.0250)	(0.0185)	(0.0239)	(0.0200)	(0.00825)	(0.00589)	(0.00782)
6.weekday	0.0224	0.0175	-0.0278	-0.0423**	0.0147***	0.0211	0.000271
	(0.0203)	(0.0222)	(0.0211)	(0.0185)	(0.00546)	(0.0151)	(0.00433)
5.hour	-0.00560	-0.147***	0.256***	-0.0789**	0.0630***	-0.0189**	-0.0545***
	(0.0522)	(0.0465)	(0.0299)	(0.0391)	(0.0129)	(0.00933)	(0.0183)
6.hour	-0.138	-11.00	-5.187	14.11*	-2.294	2.980	-0.753
	(13.96)	(12.61)	(13.10)	(8.535)	(4.934)	(4.855)	(5.995)
7.hour	0.0215	-0.0750	0.206***	-0.0268	0.0966***	-0.0131	-0.0317*
	(0.0501)	(0.0463)	(0.0391)	(0.0368)	(0.0169)	(0.00934)	(0.0178)
8.hour	0.146***	-0.116**	0.163***	-0.0774**	0.0501***	-0.0152	-0.0623***
	(0.0527)	(0.0473)	(0.0383)	(0.0373)	(0.0115)	(0.00927)	(0.0178)
9.hour	0.145	-10.97	-5.377	14.06*	-2.399	2.985	-0.796
	(13.95)	(12.59)	(13.11)	(8.535)	(4.942)	(4.856)	(6.008)
10.hour	0.213***	-0.139***	0.135***	-0.118***	0.0114	-0.0128	-0.0466**
	(0.0513)	(0.0469)	(0.0358)	(0.0372)	(0.0102)	(0.00945)	(0.0223)
11.hour	0.223***	-0.110**	0.110***	-0.103***	0.00724	-0.0138	-0.0582***
	(0.0458)	(0.0458)	(0.0259)	(0.0373)	(0.00997)	(0.00932)	(0.0190)
12.hour	0.104	-10.99	-5.365	14.10*	-2.399	2.990	-0.794
	(13.96)	(12.61)	(13.11)	(8.535)	(4.943)	(4.857)	(6.006)

13.hour	0.175*** (0.0523)	-0.0912* (0.0492)	0.0826*** (0.0231)	-0.0661* (0.0376)	0.0231** (0.0108)	-0.0131 (0.00986)	-0.0569*** (0.0196)
17.hour	0.0273 (0.0467)	-0.107** (0.0464)	0.201*** (0.0220)	-0.0199 (0.0412)	0.106*** (0.00978)	-0.0177* (0.00977)	-0.0269 (0.0196)
18.hour	-0.0817 (13.95)	-11.02 (12.61)	-5.254 (13.10)	14.14* (8.535)	-2.307 (4.940)	2.986 (4.856)	-0.794 (6.006)
19.hour	0.206*** (0.0477)	-0.208*** (0.0474)	0.0920*** (0.0217)	-0.0461 (0.0419)	0.0459*** (0.0101)	-0.0133 (0.0109)	-0.0597*** (0.0201)
20.hour	0.186*** (0.0505)	-0.208*** (0.0489)	0.0876*** (0.0247)	-0.0395 (0.0481)	0.0458*** (0.0101)	-0.000181 (0.0117)	-0.0587*** (0.0203)
21.hour	-0.0168 (13.95)	-11.04 (12.61)	-5.296 (13.09)	14.14* (8.537)	-2.379 (4.942)	2.999 (4.857)	-0.800 (6.005)
22.hour	-0.00162 (0.0517)	-0.190*** (0.0509)	0.141*** (0.0281)	0.0418 (0.0479)	0.0569*** (0.0122)	0.0169 (0.0143)	-0.0616*** (0.0205)
23.hour	-0.0889 (0.0541)	-0.0464 (0.0599)	-0.0426* (0.0248)	0.110* (0.0602)	0.00539 (0.0104)	0.0978** (0.0410)	-0.0526** (0.0235)
Constant	0.249 (15.55)	12.50 (14.05)	6.175 (14.60)	-15.48 (9.511)	2.670 (5.509)	-3.318 (5.401)	0.886 (6.689)
Observations	441	441	441	441	441	441	441
R-squared	0.452	0.206	0.340	0.359	0.366	0.241	0.225
Sanderson-Windmeijer F- statistic	81.39	81.39	81.39	81.39	81.39	81.39	81.39
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0996	0.653	0.957	0.657	0.752	0.496	0.921
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0775	0.624	0.952	0.629	0.731	0.461	0.913
Stock-Wright weak instrument- robust inference p-value	0.0108	0.396	0.917	0.235	0.245	0.0234	0.721
Hansen overidentification test p- value	0.544	0.672	0.786	0.931	0.496	0.288	0.709

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000362* (0.000186)	0.000200 (0.000163)	7.85e-05 (0.000153)	0.000132 (0.000159)	7.88e-05 (7.58e-05)	3.56e-05 (4.50e-05)	1.45e-05 (5.70e-05)
Wind speed	-0.00828 (0.00585)	0.000304 (0.00570)	-0.00136 (0.00416)	0.0112* (0.00590)	-0.00305** (0.00154)	0.00275 (0.00223)	0.000532 (0.00163)
Temperature	0.0126*** (0.00366)	-0.00539** (0.00243)	-0.000108 (0.00230)	-0.00556* (0.00284)	-0.000757 (0.00134)	-0.000570 (0.000714)	0.000410 (0.000833)
Dew point temperature	2.69e-05 (6.57e-05)	-6.16e-05 (6.11e-05)	-7.76e-05 (5.92e-05)	2.27e-05 (3.40e-05)	-2.67e-07 (3.01e-05)	4.05e-06 (1.27e-05)	5.64e-06 (1.36e-05)
Sea Level Pressure	8.19e-05 (0.00256)	-0.00273 (0.00232)	0.000603 (0.00188)	0.00216 (0.00136)	-0.000445 (0.000784)	0.000344 (0.000547)	2.36e-05 (0.000677)
Cloud Ceiling	0.000182 (0.000208)	-7.84e-05 (0.000188)	0.000131 (0.000154)	-0.000342 (0.000214)	7.84e-05 (7.71e-05)	0.000163*** (5.54e-05)	-1.97e-05 (5.99e-05)
Altitude	8.34e-06 (7.42e-06)	-1.50e-05** (6.48e-06)	-8.49e-06 (6.95e-06)	7.04e-06 (6.78e-06)	1.11e-06 (2.41e-06)	8.21e-07 (1.53e-06)	-4.39e-07 (1.21e-06)
North wind	0.00265 (0.0311)	0.0499** (0.0210)	-0.0341 (0.0223)	0.000784 (0.0271)	0.00581 (0.00854)	-0.0138 (0.0129)	-0.0110 (0.00779)
Northeast wind	0.0365 (0.0279)	-0.0115 (0.0224)	-0.0111 (0.0196)	-0.0141 (0.0245)	-0.00724 (0.0102)	0.0132** (0.00596)	-0.000784 (0.00599)
East wind	0.0458 (0.0290)	-0.0638*** (0.0205)	0.00896 (0.0245)	-0.0228 (0.0257)	-0.000776 (0.00940)	0.0214** (0.00835)	8.87e-05 (0.00595)
Southeast wind	-0.0461 (0.0453)	-0.0386 (0.0358)	0.0215 (0.0323)	-0.0217 (0.0334)	0.00430 (0.0104)	0.0194*** (0.00742)	0.00289 (0.00799)
South wind	-0.0489 (0.0385)	-0.0497 (0.0325)	0.0376 (0.0353)	0.0198 (0.0218)	-0.0163 (0.0197)	0.00644 (0.00632)	-0.000416 (0.00944)
Southwest wind	-0.0679* (0.0397)	-0.0398 (0.0259)	0.0263 (0.0393)	0.0135 (0.0223)	0.0155 (0.0179)	0.000382 (0.00637)	0.00931 (0.00827)
West wind	-0.0713 (0.0680)	0.0693 (0.0811)	0.0167 (0.0475)	-0.00598 (0.0233)	0.0808 (0.0857)	-0.00472 (0.00725)	-0.00227 (0.0123)
Precipitation	0.000614	-0.00303*	-0.000354	-0.000193	-0.000177	-0.000215	-0.000116

	(0.00174)	(0.00164)	(0.00163)	(0.00156)	(0.000855)	(0.000532)	(0.000378)
Lag Precipitation	-0.00144	-0.00165	-0.000625	0.00106	0.000171	0.000368	0.000601
	(0.00140)	(0.00106)	(0.000803)	(0.00103)	(0.000518)	(0.000427)	(0.000489)
o.holiday	-	-	-	-	-	-	-
10.month	0.0416	-0.0623*	-0.00281	-0.0102	-0.0256	-0.0154	0.00239
	(0.0369)	(0.0364)	(0.0329)	(0.0376)	(0.0347)	(0.0150)	(0.0107)
1.weekday	-0.0102	0.0474**	-0.0591**	-0.0822***	0.0270***	0.00482	0.0144**
	(0.0327)	(0.0205)	(0.0300)	(0.0253)	(0.00756)	(0.00606)	(0.00628)
2.weekday	-0.0229	0.0524*	-0.0637*	-0.0624**	0.0357***	0.000543	0.0127**
	(0.0389)	(0.0281)	(0.0368)	(0.0266)	(0.0103)	(0.00561)	(0.00576)
3.weekday	-0.0519	0.00534	-0.0250	-0.0659**	0.0526	0.0109*	0.00246
	(0.0422)	(0.0262)	(0.0566)	(0.0286)	(0.0369)	(0.00558)	(0.00600)
4.weekday	-0.0547	0.00740	-0.0594	-0.0394	0.0254**	0.00874	0.0291**
	(0.0460)	(0.0269)	(0.0383)	(0.0269)	(0.0110)	(0.00724)	(0.0142)
5.weekday	0.0299	0.00970	-0.0595	-0.0751***	0.0191*	0.0130**	0.0145*
	(0.0408)	(0.0255)	(0.0377)	(0.0235)	(0.0111)	(0.00602)	(0.00788)
6.weekday	0.0309	0.0176	-0.0494	-0.0396	0.0228**	0.0209	0.000112
	(0.0365)	(0.0241)	(0.0328)	(0.0288)	(0.00921)	(0.0151)	(0.00448)
5.hour	-0.0710	-0.157***	0.294***	-0.0685	0.0756***	-0.0193**	-0.0532***
	(0.0958)	(0.0543)	(0.0355)	(0.0481)	(0.0189)	(0.00933)	(0.0183)
6.hour	0.623	-24.63	5.725	19.36	-3.835	3.079	0.203
	(22.97)	(20.81)	(16.88)	(12.22)	(7.014)	(4.914)	(6.068)
7.hour	0.0147	-0.00451	0.312***	0.0153	0.112***	-0.0110	-0.0248
	(0.0917)	(0.0550)	(0.0771)	(0.0444)	(0.0198)	(0.00933)	(0.0178)
8.hour	0.126	-0.102*	0.214***	-0.0708	0.0674***	-0.0146	-0.0597***
	(0.0928)	(0.0565)	(0.0484)	(0.0440)	(0.0185)	(0.00925)	(0.0178)
9.hour	1.000	-24.56	5.522	19.27	-3.981	3.086	0.161
	(22.96)	(20.77)	(16.89)	(12.22)	(7.036)	(4.914)	(6.081)
10.hour	0.250***	-0.119**	0.206***	-0.126***	0.0203	-0.0108	-0.0420*
	(0.0886)	(0.0577)	(0.0663)	(0.0431)	(0.0158)	(0.00949)	(0.0223)
11.hour	0.242***	-0.0827	0.161***	-0.103**	0.0150	-0.0112	-0.0553***
	(0.0853)	(0.0554)	(0.0434)	(0.0434)	(0.0153)	(0.00925)	(0.0190)
12.hour	0.988	-24.60	5.526	19.32	-3.980	3.093	0.161
	(22.97)	(20.81)	(16.89)	(12.22)	(7.040)	(4.915)	(6.079)

13.hour	0.155*	-0.0580	0.113***	-0.0604	0.0319**	-0.0120	-0.0561***
	(0.0838)	(0.0587)	(0.0282)	(0.0453)	(0.0154)	(0.00983)	(0.0196)
17.hour	-0.00616	-0.0837	0.245***	-0.000248	0.118***	-0.0159	-0.0237
	(0.0816)	(0.0562)	(0.0268)	(0.0466)	(0.0136)	(0.00979)	(0.0196)
18.hour	0.715	-24.65	5.633	19.37	-3.885	3.088	0.158
	(22.96)	(20.80)	(16.88)	(12.22)	(7.033)	(4.915)	(6.079)
19.hour	0.271***	-0.215***	0.114***	-0.0274	0.0516***	-0.0115	-0.0587***
	(0.0819)	(0.0568)	(0.0269)	(0.0482)	(0.0137)	(0.0109)	(0.0201)
20.hour	0.256***	-0.218***	0.105***	-0.0412	0.0528***	0.00718	-0.0595***
	(0.0881)	(0.0586)	(0.0303)	(0.0547)	(0.0140)	(0.0122)	(0.0203)
21.hour	0.786	-24.67	5.583	19.37	-3.960	3.101	0.150
	(22.97)	(20.81)	(16.88)	(12.22)	(7.036)	(4.915)	(6.077)
22.hour	-0.0423	-0.204***	0.145***	0.0816	0.0599***	0.0198	-0.0609***
	(0.0864)	(0.0607)	(0.0326)	(0.0712)	(0.0143)	(0.0144)	(0.0207)
23.hour	-0.183**	-0.0729	-0.0463	0.0837	0.00659	0.0999**	-0.0533**
	(0.0876)	(0.0675)	(0.0297)	(0.0702)	(0.0133)	(0.0409)	(0.0234)
Constant	-0.569	27.73	-5.890	-21.20	4.450	-3.430	-0.171
	(25.60)	(23.19)	(18.82)	(13.61)	(7.844)	(5.466)	(6.770)
Observations	441	441	441	441	441	441	441
R-squared	0.422	0.170	0.252	0.287	0.228	0.239	0.228
Sanderson-Windmeijer F- statistic	81.39	81.39	81.39	81.39	81.39	81.39	81.39
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.155	0.480	0.801	0.733	0.500	0.520	0.932
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.127	0.444	0.783	0.710	0.465	0.486	0.925
Stock-Wright weak instrument- robust inference p-value	0.0164	0.188	0.489	0.297	0.00155	0.0285	0.802
Hansen overidentification test p- value	0.318	0.579	0.574	0.705	0.238	0.258	0.787

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000308** (0.000129)	8.69e-05 (0.000143)	1.76e-05 (0.000107)	6.98e-05 (0.000136)	4.61e-05 (4.81e-05)	3.89e-05 (4.31e-05)	1.86e-05 (4.89e-05)
Wind speed	-0.00779* (0.00448)	-0.00342 (0.00490)	-0.00112 (0.00321)	0.00908 (0.00557)	-0.00198* (0.00108)	0.00254 (0.00219)	-0.000163 (0.00136)
Temperature	0.00856*** (0.00222)	-0.00419** (0.00205)	-3.45e-05 (0.00164)	-0.00369 (0.00225)	-0.000159 (0.000881)	-0.000680 (0.000686)	0.000156 (0.000700)
Dew point temperature	4.53e-05 (5.41e-05)	-2.13e-05 (4.08e-05)	-6.14e-05 (5.13e-05)	2.25e-05 (2.77e-05)	1.00e-05 (1.75e-05)	5.23e-06 (1.18e-05)	1.14e-05 (1.00e-05)
Sea Level Pressure	-0.000792 (0.00174)	-0.00221 (0.00164)	-0.000151 (0.00150)	0.00166 (0.00105)	-0.000130 (0.000512)	0.000346 (0.000533)	0.000144 (0.000389)
Cloud Ceiling	0.000177 (0.000164)	-3.71e-05 (0.000160)	8.03e-05 (0.000115)	-0.000360* (0.000200)	3.98e-05 (4.85e-05)	0.000154*** (5.28e-05)	-2.60e-05 (5.56e-05)
Altitude	9.05e-06* (5.23e-06)	-1.06e-05** (5.29e-06)	-6.45e-06 (5.20e-06)	7.56e-06 (4.84e-06)	1.14e-06 (1.84e-06)	3.32e-07 (1.44e-06)	-2.95e-07 (1.11e-06)
North wind	0.00454 (0.0213)	0.0463*** (0.0179)	-0.0204 (0.0177)	-0.00287 (0.0191)	0.00358 (0.00641)	-0.0121 (0.0127)	-0.00858 (0.00557)
Northeast wind	0.0280 (0.0199)	-0.0109 (0.0181)	-0.00800 (0.0157)	-0.0104 (0.0189)	-0.00484 (0.00756)	0.0108* (0.00564)	0.000823 (0.00424)
East wind	0.0461** (0.0210)	-0.0520*** (0.0168)	0.0121 (0.0186)	-0.0164 (0.0195)	-0.00101 (0.00731)	0.0188** (0.00803)	0.000501 (0.00473)
Southeast wind	-0.0185 (0.0327)	-0.0268 (0.0340)	0.0265 (0.0255)	-0.00836 (0.0243)	0.00328 (0.00890)	0.0162** (0.00655)	0.00282 (0.00644)
South wind	-0.0186 (0.0290)	-0.0342 (0.0228)	0.0336 (0.0256)	0.0206 (0.0167)	-0.00997 (0.0130)	0.00507 (0.00603)	0.00423 (0.00594)
Southwest wind	-0.0428 (0.0302)	-0.0253 (0.0186)	0.0377 (0.0381)	0.0109 (0.0171)	0.00856 (0.0131)	0.000771 (0.00608)	0.0115** (0.00573)
West wind	-0.0461 (0.0471)	0.0374 (0.0519)	0.0133 (0.0333)	-0.00829 (0.0183)	0.0335 (0.0428)	-0.00372 (0.00690)	0.00167 (0.00909)
Precipitation	0.00146	-0.00170	0.000280	0.000309	6.84e-05	-0.000300	-5.80e-05

	(0.00124)	(0.00119)	(0.00112)	(0.00121)	(0.000478)	(0.000512)	(0.000335)
Lag Precipitation	-0.000822	-0.00154	-0.000347	0.00116	0.000231	0.000306	0.000495
	(0.000984)	(0.000985)	(0.000595)	(0.000871)	(0.000333)	(0.000399)	(0.000397)
o.holiday	-	-	-	-	-	-	-
10.month	0.0427	-0.0321	0.00714	0.00658	-0.00981	-0.0162	0.00284
	(0.0282)	(0.0293)	(0.0255)	(0.0306)	(0.0178)	(0.0147)	(0.00991)
1.weekday	0.0231	0.0473**	-0.0354*	-0.0673***	0.0196***	0.00581	0.0128**
	(0.0204)	(0.0184)	(0.0205)	(0.0228)	(0.00514)	(0.00573)	(0.00555)
2.weekday	0.0126	0.0405*	-0.0358	-0.0539**	0.0268***	0.00155	0.00909*
	(0.0243)	(0.0229)	(0.0239)	(0.0225)	(0.00650)	(0.00527)	(0.00487)
3.weekday	0.00241	0.00586	-0.00877	-0.0499**	0.0312*	0.0110**	0.00105
	(0.0307)	(0.0217)	(0.0367)	(0.0242)	(0.0186)	(0.00514)	(0.00500)
4.weekday	-0.00814	0.00902	-0.0325	-0.0310	0.0233***	0.00916	0.0262*
	(0.0294)	(0.0221)	(0.0262)	(0.0236)	(0.00791)	(0.00681)	(0.0134)
5.weekday	0.0486*	0.00897	-0.0384	-0.0556***	0.0195**	0.0139**	0.00875*
	(0.0258)	(0.0191)	(0.0247)	(0.0207)	(0.00802)	(0.00579)	(0.00472)
6.weekday	0.0303	0.0152	-0.0351*	-0.0461**	0.0162**	0.0202	-0.000160
	(0.0224)	(0.0225)	(0.0210)	(0.0209)	(0.00635)	(0.0150)	(0.00370)
5.hour	-0.0153	-0.144***	0.244***	-0.0552	0.0595***	-0.0160*	-0.0483***
	(0.0539)	(0.0468)	(0.0292)	(0.0414)	(0.0118)	(0.00821)	(0.0169)
6.hour	-7.194	-19.99	-1.144	14.88	-1.063	3.092	1.274
	(15.66)	(14.72)	(13.46)	(9.425)	(4.589)	(4.789)	(3.488)
7.hour	-0.0114	-0.0738	0.164***	-0.0329	0.0769***	-0.0109	-0.0351**
	(0.0496)	(0.0465)	(0.0400)	(0.0372)	(0.0165)	(0.00825)	(0.0162)
8.hour	0.113**	-0.119**	0.149***	-0.0765**	0.0466***	-0.0130	-0.0568***
	(0.0537)	(0.0478)	(0.0413)	(0.0374)	(0.0109)	(0.00810)	(0.0163)
9.hour	-6.873	-19.95	-1.294	14.82	-1.154	3.098	1.247
	(15.65)	(14.71)	(13.46)	(9.425)	(4.598)	(4.790)	(3.494)
10.hour	0.218***	-0.132***	0.127***	-0.111***	0.0122	-0.00995	-0.0461**
	(0.0520)	(0.0474)	(0.0351)	(0.0369)	(0.00918)	(0.00846)	(0.0183)
11.hour	0.200***	-0.103**	0.107***	-0.0966***	0.00774	-0.0107	-0.0535***
	(0.0477)	(0.0462)	(0.0312)	(0.0371)	(0.00886)	(0.00821)	(0.0175)
12.hour	-6.871	-19.95	-1.285	14.86	-1.151	3.103	1.247
	(15.66)	(14.71)	(13.46)	(9.424)	(4.600)	(4.790)	(3.493)

13.hour	0.152*** (0.0525)	-0.0827* (0.0497)	0.0755*** (0.0229)	-0.0603 (0.0379)	0.0223** (0.0101)	-0.0115 (0.00892)	-0.0546*** (0.0181)
17.hour	-0.00965 (0.0469)	-0.118** (0.0470)	0.160*** (0.0213)	-0.0277 (0.0400)	0.0824*** (0.00866)	-0.0155* (0.00877)	-0.0321* (0.0181)
18.hour	-7.116 (15.65)	-20.00 (14.72)	-1.186 (13.45)	14.90 (9.424)	-1.079 (4.597)	3.098 (4.790)	1.244 (3.493)
19.hour	0.226*** (0.0485)	-0.205*** (0.0476)	0.0780*** (0.0216)	-0.0301 (0.0415)	0.0391*** (0.00903)	-0.0114 (0.0100)	-0.0563*** (0.0187)
20.hour	0.210*** (0.0536)	-0.202*** (0.0492)	0.0723*** (0.0236)	-0.0379 (0.0474)	0.0412*** (0.00972)	0.00360 (0.0111)	-0.0568*** (0.0189)
21.hour	-7.045 (15.66)	-20.02 (14.72)	-1.226 (13.44)	14.91 (9.428)	-1.133 (4.599)	3.109 (4.791)	1.237 (3.492)
22.hour	0.00602 (0.0550)	-0.182*** (0.0516)	0.113*** (0.0246)	0.0567 (0.0505)	0.0508*** (0.0110)	0.0173 (0.0131)	-0.0577*** (0.0191)
23.hour	-0.0933* (0.0546)	-0.0340 (0.0604)	-0.0385 (0.0241)	0.110* (0.0605)	0.00566 (0.00966)	0.0990** (0.0408)	-0.0486** (0.0222)
Constant	8.071 (17.45)	22.49 (16.40)	1.618 (14.99)	-16.31 (10.50)	1.290 (5.125)	-3.442 (5.327)	-1.382 (3.890)
Observations	441	441	441	441	441	441	441
R-squared	0.466	0.211	0.282	0.341	0.281	0.236	0.245
Sanderson-Windmeijer F-statistic	81.39	81.39	81.39	81.39	81.39	81.39	81.39
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0529	0.839	0.882	0.889	0.509	0.478	0.921
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0382	0.824	0.870	0.878	0.475	0.443	0.913
Stock-Wright weak instrument-robust inference p-value	0.00693	0.680	0.748	0.651	0.0189	0.00962	0.769
Hansen overidentification test p-value	0.281	0.862	0.615	0.888	0.281	0.237	0.968

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 26b. Travel mode share IV regressions using high altitude wind speed at the 7000 pressure level at midnight as the only IV, 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000266** (0.000123)	0.000215* (0.000126)	-2.71e-05 (0.000104)	6.34e-05 (0.000127)	3.48e-05 (4.94e-05)	-2.62e-05 (4.06e-05)	5.66e-06 (4.48e-05)
Wind speed	-0.00702* (0.00365)	0.000548 (0.00409)	-0.00196 (0.00282)	0.00812* (0.00471)	-0.000904 (0.000950)	0.00119 (0.00155)	3.44e-05 (0.00115)
Temperature	0.00714*** (0.00215)	-0.00530*** (0.00187)	0.000435 (0.00157)	-0.00308 (0.00204)	0.000250 (0.000831)	0.000569 (0.000675)	-7.76e-06 (0.000697)
Dew point temperature	3.40e-05 (4.91e-05)	-3.01e-05 (4.78e-05)	-5.95e-05 (4.95e-05)	3.43e-05 (2.37e-05)	4.41e-06 (1.65e-05)	1.05e-05 (1.66e-05)	6.38e-06 (8.89e-06)
Sea Level Pressure	-0.000481 (0.00141)	-0.000796 (0.00124)	-0.000483 (0.00122)	0.00169* (0.000881)	-0.000137 (0.000416)	0.000307 (0.000402)	-9.63e-05 (0.000327)
Cloud Ceiling	0.000179 (0.000135)	-7.77e-05 (0.000129)	9.99e-05 (9.00e-05)	-0.000298* (0.000154)	-1.27e-05 (3.28e-05)	9.40e-05** (4.08e-05)	1.57e-05 (4.57e-05)
Altitude	2.62e-06 (3.03e-06)	-3.19e-06 (3.50e-06)	-3.65e-07 (2.68e-06)	1.73e-06 (3.15e-06)	-1.48e-07 (1.04e-06)	-3.79e-07 (9.42e-07)	-2.71e-07 (8.38e-07)
North wind	0.0203 (0.0179)	0.0294** (0.0149)	-0.0228 (0.0143)	-0.0125 (0.0150)	1.95e-05 (0.00474)	-0.00921 (0.0104)	-0.00524 (0.00480)
Northeast wind	0.000570 (0.0170)	-0.0181 (0.0152)	0.00690 (0.0129)	-0.000816 (0.0143)	-0.00156 (0.00606)	0.0103** (0.00492)	0.00272 (0.00336)
East wind	0.0217 (0.0172)	-0.0435*** (0.0143)	0.0170 (0.0154)	-0.00950 (0.0153)	-0.00154 (0.00632)	0.0133** (0.00622)	0.00254 (0.00379)
Southeast wind	-0.0192 (0.0237)	-0.0268 (0.0268)	0.0284 (0.0193)	-0.00255 (0.0180)	0.00632 (0.00664)	0.0106* (0.00564)	0.00330 (0.00526)
South wind	-0.0312 (0.0239)	-0.0195 (0.0188)	0.0288 (0.0210)	0.0228* (0.0129)	-0.00599 (0.0105)	0.00265 (0.00558)	0.00238 (0.00512)

Southwest wind	-0.0625** (0.0267)	-0.00377 (0.0176)	0.0389 (0.0317)	0.0113 (0.0136)	0.00947 (0.0105)	-0.00169 (0.00512)	0.00831 (0.00520)
West wind	-0.0551* (0.0327)	0.0192 (0.0320)	0.00884 (0.0241)	0.00931 (0.0141)	0.0236 (0.0306)	-0.00280 (0.00547)	-0.00294 (0.00692)
Precipitation	0.00117 (0.00105)	-0.00252** (0.000981)	0.000919 (0.00102)	0.000125 (0.00108)	0.000300 (0.000442)	6.64e-05 (0.000367)	-5.94e-05 (0.000308)
Lag Precipitation	-0.000430 (0.000819)	-0.000853 (0.000802)	-0.000250 (0.000519)	0.000623 (0.000744)	0.000494** (0.000237)	5.30e-05 (0.000388)	0.000362 (0.000331)
o.holiday	-	-	-	-	-	-	-
10.month	0.0260 (0.0261)	-0.0542** (0.0255)	0.0236 (0.0225)	0.00429 (0.0271)	-0.00181 (0.0168)	-0.000337 (0.0100)	0.00245 (0.00912)
1.weekday	0.0207 (0.0169)	0.0432*** (0.0153)	-0.0311* (0.0174)	-0.0620*** (0.0187)	0.0143*** (0.00405)	0.00354 (0.00471)	0.0115*** (0.00444)
2.weekday	0.0139 (0.0186)	0.0252 (0.0190)	-0.0284 (0.0195)	-0.0440** (0.0178)	0.0197*** (0.00471)	0.00292 (0.00569)	0.0108** (0.00445)
3.weekday	0.0128 (0.0246)	0.00653 (0.0178)	-0.00220 (0.0309)	-0.0528*** (0.0197)	0.0260* (0.0144)	0.00416 (0.00449)	0.00546 (0.00539)
4.weekday	0.0187 (0.0273)	0.0243 (0.0200)	-0.0301 (0.0205)	-0.0469** (0.0211)	0.0165*** (0.00526)	0.000933 (0.00566)	0.0165* (0.00909)
5.weekday	0.0526** (0.0220)	0.0109 (0.0162)	-0.0400* (0.0207)	-0.0563*** (0.0169)	0.0163** (0.00642)	0.00909* (0.00473)	0.00744* (0.00386)
6.weekday	0.0246 (0.0184)	0.0144 (0.0191)	-0.0283 (0.0184)	-0.0383** (0.0175)	0.0127** (0.00497)	0.0174 (0.0124)	-0.00254 (0.00327)
5.hour	-0.0207 (0.0542)	-0.145*** (0.0468)	0.233*** (0.0289)	-0.0551 (0.0411)	0.0551*** (0.0107)	-0.0171** (0.00816)	-0.0500*** (0.0172)
6.hour	-4.402 (12.69)	-7.294 (11.11)	-4.133 (10.98)	15.11* (7.920)	-1.130 (3.726)	2.742 (3.609)	-0.891 (2.936)
7.hour	-0.0300 (0.0495)	-0.0911* (0.0465)	0.148*** (0.0402)	-0.0445 (0.0370)	0.0692*** (0.0165)	-0.0132 (0.00820)	-0.0387** (0.0167)
8.hour	0.0960* (0.0529)	-0.124*** (0.0472)	0.135*** (0.0395)	-0.0755** (0.0371)	0.0403*** (0.00930)	-0.0140* (0.00817)	-0.0582*** (0.0166)

9.hour	-4.111 (12.68)	-7.261 (11.09)	-4.285 (10.98)	15.05* (7.920)	-1.219 (3.733)	2.747 (3.610)	-0.918 (2.942)
10.hour	0.189*** (0.0508)	-0.140*** (0.0470)	0.113*** (0.0342)	-0.113*** (0.0369)	0.0101 (0.00820)	-0.00970 (0.00835)	-0.0491*** (0.0183)
11.hour	0.163*** (0.0480)	-0.0970** (0.0464)	0.0924*** (0.0281)	-0.0984*** (0.0372)	0.00523 (0.00809)	-0.00961 (0.00802)	-0.0557*** (0.0179)
12.hour	-4.140 (12.69)	-7.285 (11.11)	-4.278 (10.98)	15.08* (7.919)	-1.215 (3.734)	2.754 (3.610)	-0.918 (2.941)
13.hour	0.127** (0.0508)	-0.0722 (0.0487)	0.0536** (0.0216)	-0.0623 (0.0383)	0.0175** (0.00829)	-0.00689 (0.00848)	-0.0569*** (0.0185)
14.hour	0.0783 (0.0479)	-0.113** (0.0517)	0.123*** (0.0228)	-0.0471 (0.0390)	0.0182** (0.00727)	-0.00418 (0.00903)	-0.0551*** (0.0187)
15.hour	-4.206 (12.69)	-7.289 (11.11)	-4.218 (10.98)	15.08* (7.919)	-1.208 (3.733)	2.753 (3.610)	-0.915 (2.941)
16.hour	0.0968** (0.0471)	-0.111** (0.0484)	0.100*** (0.0211)	-0.0711* (0.0389)	0.0279*** (0.00694)	-0.00439 (0.00883)	-0.0383** (0.0186)
17.hour	-0.00712 (0.0528)	-0.128*** (0.0474)	0.143*** (0.0213)	-0.0362 (0.0399)	0.0760*** (0.00785)	-0.0101 (0.00840)	-0.0371** (0.0188)
18.hour	-4.334 (12.68)	-7.313 (11.10)	-4.171 (10.97)	15.13* (7.918)	-1.143 (3.731)	2.753 (3.610)	-0.921 (2.941)
19.hour	0.216*** (0.0511)	-0.221*** (0.0477)	0.0724*** (0.0216)	-0.0338 (0.0418)	0.0338*** (0.00762)	-0.00509 (0.00954)	-0.0615*** (0.0195)
20.hour	0.181*** (0.0511)	-0.215*** (0.0481)	0.0735*** (0.0225)	-0.0302 (0.0447)	0.0382*** (0.00840)	0.0101 (0.0102)	-0.0581*** (0.0199)
21.hour	-4.252 (12.69)	-7.327 (11.11)	-4.211 (10.96)	15.14* (7.922)	-1.194 (3.734)	2.767 (3.611)	-0.927 (2.940)
22.hour	-0.000556 (0.0521)	-0.182*** (0.0499)	0.112*** (0.0249)	0.0677 (0.0469)	0.0411*** (0.00960)	0.0268** (0.0114)	-0.0648*** (0.0202)
23.hour	-0.0660 (0.0579)	-0.0665 (0.0600)	-0.0408* (0.0233)	0.0984* (0.0582)	0.00698 (0.00861)	0.106*** (0.0390)	-0.0375 (0.0238)
Constant	4.986 (14.14)	8.362 (12.37)	4.911 (12.22)	-16.57* (8.817)	1.357 (4.159)	-3.069 (4.016)	1.027 (3.274)

Observations	580	580	580	580	580	580	580
R-squared	0.392	0.181	0.275	0.332	0.273	0.227	0.213
Sanderson-Windmeijer F-statistic	160.4	160.4	160.4	160.4	160.4	160.4	160.4
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0364	0.0944	0.803	0.632	0.499	0.532	0.903
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0293	0.0817	0.795	0.618	0.482	0.516	0.899
Stock-Wright weak instrument-robust inference p-value	0.00517	0.0176	0.676	0.370	0.214	0.378	0.816

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000257** (0.000119)	0.000271** (0.000129)	-3.91e-05 (0.000106)	0.000110 (0.000120)	9.58e-06 (4.92e-05)	-2.36e-05 (4.23e-05)	-9.70e-06 (5.04e-05)
Wind speed	-0.00635* (0.00352)	0.000175 (0.00407)	-0.00204 (0.00281)	0.00915* (0.00476)	-0.00149 (0.00101)	0.00139 (0.00160)	0.000362 (0.00131)
Temperature	0.00613*** (0.00205)	-0.00598*** (0.00189)	0.000337 (0.00162)	-0.00334* (0.00197)	0.000615 (0.000823)	0.000578 (0.000699)	0.000435 (0.000808)
Dew point temperature	2.69e-05 (4.72e-05)	-2.87e-05 (5.06e-05)	-4.90e-05 (4.84e-05)	3.92e-05 (2.40e-05)	2.41e-06 (1.73e-05)	5.46e-06 (1.69e-05)	-4.99e-07 (1.16e-05)
Sea Level Pressure	-0.000351 (0.00135)	-0.000528 (0.00125)	-0.000835 (0.00121)	0.00166** (0.000797)	-0.000336 (0.000450)	0.000322 (0.000411)	-0.000294 (0.000556)
Cloud Ceiling	0.000212* (0.000128)	-0.000110 (0.000132)	0.000103 (9.08e-05)	-0.000294* (0.000150)	-1.09e-05 (3.66e-05)	0.000107** (4.36e-05)	1.40e-05 (4.83e-05)

Altitude	3.35e-06 (2.95e-06)	-3.95e-06 (3.58e-06)	-8.00e-07 (2.59e-06)	6.01e-07 (2.48e-06)	4.51e-07 (1.24e-06)	-2.48e-07 (1.10e-06)	-3.05e-07 (8.79e-07)
North wind	0.0212 (0.0170)	0.0323** (0.0148)	-0.0211 (0.0145)	-0.0135 (0.0139)	-0.000813 (0.00484)	-0.0106 (0.0105)	-0.00737 (0.00626)
Northeast wind	-0.000851 (0.0167)	-0.0163 (0.0157)	0.00602 (0.0134)	0.00170 (0.0134)	0.000288 (0.00602)	0.0117** (0.00571)	0.00217 (0.00463)
East wind	0.0163 (0.0166)	-0.0485*** (0.0145)	0.0192 (0.0159)	-0.00663 (0.0137)	0.00368 (0.00639)	0.0152** (0.00661)	0.00397 (0.00471)
Southeast wind	-0.0122 (0.0218)	-0.0264 (0.0263)	0.0258 (0.0191)	-0.000522 (0.0158)	0.00894 (0.00647)	0.0133** (0.00626)	0.00311 (0.00651)
South wind	-0.0257 (0.0233)	-0.0172 (0.0189)	0.0283 (0.0209)	0.0239** (0.0116)	-0.00334 (0.0103)	0.00269 (0.00568)	-0.00183 (0.00790)
Southwest wind	-0.0656** (0.0260)	0.00120 (0.0178)	0.0416 (0.0311)	0.0187 (0.0124)	0.00999 (0.00931)	-0.00152 (0.00525)	0.00421 (0.00727)
West wind	-0.0409 (0.0363)	0.0175 (0.0318)	0.00234 (0.0224)	0.0111 (0.0140)	0.0231 (0.0301)	-0.00228 (0.00574)	-0.00565 (0.00936)
Precipitation	0.00127 (0.00106)	-0.00284*** (0.00101)	0.000924 (0.00102)	-7.90e-05 (0.00102)	0.000598 (0.000444)	6.74e-05 (0.000390)	-0.000102 (0.000324)
Lag Precipitation	-0.000650 (0.000732)	-0.000641 (0.000804)	-0.000394 (0.000514)	0.00102 (0.000690)	0.000554** (0.000268)	8.69e-05 (0.000410)	0.000414 (0.000407)
o.holiday	-	-	-	-	-	-	-
10.month	0.0163 (0.0252)	-0.0613** (0.0259)	0.0263 (0.0227)	-0.00266 (0.0258)	0.00368 (0.0166)	-0.000298 (0.0103)	0.00486 (0.00946)
1.weekday	0.0161 (0.0164)	0.0398** (0.0156)	-0.0240 (0.0171)	-0.0481*** (0.0180)	0.0182*** (0.00465)	0.00417 (0.00485)	0.0132*** (0.00496)
2.weekday	0.0114 (0.0184)	0.0167 (0.0188)	-0.0207 (0.0190)	-0.0272 (0.0179)	0.0236*** (0.00512)	0.00343 (0.00579)	0.0142*** (0.00495)
3.weekday	0.0138 (0.0242)	-7.23e-06 (0.0189)	-0.00303 (0.0301)	-0.0434** (0.0188)	0.0292** (0.0144)	0.00555 (0.00475)	0.00780 (0.00602)
4.weekday	0.0221 (0.0271)	0.0266 (0.0208)	-0.0234 (0.0203)	-0.0351* (0.0204)	0.0200*** (0.00563)	0.00151 (0.00589)	0.0169* (0.00937)

5.weekday	0.0517** (0.0221)	0.00277 (0.0166)	-0.0384* (0.0199)	-0.0420** (0.0166)	0.0203*** (0.00667)	0.00899* (0.00488)	0.0130** (0.00617)
6.weekday	0.0177 (0.0180)	0.0160 (0.0194)	-0.0233 (0.0184)	-0.0356** (0.0157)	0.0121*** (0.00458)	0.0190 (0.0125)	-0.00221 (0.00382)
5.hour	-0.00398 (0.0529)	-0.140*** (0.0468)	0.253*** (0.0297)	-0.0781** (0.0395)	0.0603*** (0.0121)	-0.0208** (0.00950)	-0.0561*** (0.0187)
6.hour	-3.204 (12.09)	-4.878 (11.27)	-7.239 (10.87)	14.90** (7.164)	-2.899 (4.031)	2.878 (3.692)	-2.655 (4.979)
7.hour	0.0263 (0.0501)	-0.0722 (0.0466)	0.204*** (0.0388)	-0.0273 (0.0374)	0.0942*** (0.0169)	-0.0153 (0.00954)	-0.0330* (0.0183)
8.hour	0.147*** (0.0526)	-0.108** (0.0471)	0.158*** (0.0368)	-0.0740** (0.0372)	0.0457*** (0.0102)	-0.0163* (0.00955)	-0.0640*** (0.0181)
9.hour	-2.919 (12.08)	-4.847 (11.25)	-7.430 (10.87)	14.85** (7.164)	-3.004 (4.038)	2.883 (3.692)	-2.698 (4.992)
10.hour	0.215*** (0.0511)	-0.136*** (0.0467)	0.130*** (0.0347)	-0.117*** (0.0373)	0.0101 (0.00941)	-0.0123 (0.00962)	-0.0497** (0.0220)
11.hour	0.210*** (0.0477)	-0.0883* (0.0464)	0.102*** (0.0245)	-0.100*** (0.0379)	0.00492 (0.00934)	-0.0123 (0.00933)	-0.0599*** (0.0194)
12.hour	-2.964 (12.09)	-4.871 (11.27)	-7.416 (10.87)	14.89** (7.163)	-3.000 (4.038)	2.890 (3.693)	-2.695 (4.990)
13.hour	0.165*** (0.0508)	-0.0650 (0.0488)	0.0661*** (0.0224)	-0.0656* (0.0386)	0.0194** (0.00944)	-0.00947 (0.00963)	-0.0592*** (0.0200)
14.hour	0.108** (0.0474)	-0.114** (0.0500)	0.135*** (0.0231)	-0.0557 (0.0394)	0.0197** (0.00857)	-0.00734 (0.0102)	-0.0595*** (0.0201)
15.hour	-3.014 (12.09)	-4.885 (11.27)	-7.352 (10.87)	14.88** (7.163)	-2.988 (4.038)	2.889 (3.693)	-2.689 (4.990)
16.hour	0.127*** (0.0471)	-0.117** (0.0479)	0.139*** (0.0222)	-0.0763* (0.0397)	0.0369*** (0.00829)	-0.00656 (0.00993)	-0.0361* (0.0201)
17.hour	0.0380 (0.0522)	-0.103** (0.0474)	0.193*** (0.0228)	-0.0272 (0.0412)	0.102*** (0.00959)	-0.0121 (0.00959)	-0.0312 (0.0203)
18.hour	-3.155 (12.09)	-4.901 (11.26)	-7.305 (10.86)	14.93** (7.163)	-2.907 (4.035)	2.890 (3.693)	-2.696 (4.990)

19.hour	0.217*** (0.0511)	-0.220*** (0.0476)	0.0889*** (0.0220)	-0.0405 (0.0426)	0.0420*** (0.00901)	-0.00683 (0.0106)	-0.0651*** (0.0209)
20.hour	0.178*** (0.0504)	-0.217*** (0.0479)	0.0930*** (0.0236)	-0.0338 (0.0457)	0.0444*** (0.00916)	0.00760 (0.0111)	-0.0614*** (0.0213)
21.hour	-3.082 (12.09)	-4.924 (11.26)	-7.353 (10.85)	14.93** (7.165)	-2.978 (4.038)	2.905 (3.694)	-2.703 (4.989)
22.hour	0.000775 (0.0512)	-0.188*** (0.0493)	0.137*** (0.0266)	0.0336 (0.0461)	0.0482*** (0.0112)	0.0300** (0.0135)	-0.0694*** (0.0216)
23.hour	-0.0613 (0.0578)	-0.0811 (0.0598)	-0.0441* (0.0241)	0.0946 (0.0584)	0.00740 (0.00962)	0.105*** (0.0392)	-0.0414* (0.0250)
Constant	3.690 (13.47)	5.715 (12.55)	8.430 (12.10)	-16.36** (7.979)	3.336 (4.500)	-3.222 (4.108)	3.001 (5.557)
Observations	580	580	580	580	580	580	580
R-squared	0.406	0.157	0.345	0.329	0.368	0.230	0.209
Sanderson-Windmeijer F- statistic	160.4	160.4	160.4	160.4	160.4	160.4	160.4
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0369	0.0367	0.723	0.386	0.852	0.590	0.853
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0297	0.0295	0.713	0.367	0.846	0.575	0.848
Stock-Wright weak instrument- robust inference p-value	0.00393	0.00365	0.560	0.0990	0.755	0.454	0.724

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:							
	walk	bicycle	bus	car	subway	taxi	others

Hourly PM 2.5 pollution	-0.000351** (0.000175)	0.000331** (0.000146)	3.79e-06 (0.000139)	0.000118 (0.000156)	7.61e-05 (8.60e-05)	-3.00e-05 (4.30e-05)	-2.28e-06 (5.12e-05)
Wind speed	-0.00877* (0.00506)	0.00302 (0.00497)	-0.00282 (0.00380)	0.0105** (0.00506)	-0.00132 (0.00129)	0.00132 (0.00161)	0.000608 (0.00134)
Temperature	0.0112*** (0.00333)	-0.00702*** (0.00229)	0.000432 (0.00227)	-0.00466* (0.00259)	-0.000325 (0.00139)	0.000726 (0.000708)	0.000218 (0.000818)
Dew point temperature	1.21e-05 (6.53e-05)	-6.69e-05 (6.97e-05)	-7.34e-05 (5.40e-05)	3.52e-05 (3.07e-05)	-7.08e-06 (2.86e-05)	1.00e-05 (1.77e-05)	1.86e-06 (1.17e-05)
Sea Level Pressure	0.000306 (0.00224)	-0.00156 (0.00206)	5.19e-06 (0.00149)	0.00239** (0.00116)	-0.000405 (0.000618)	0.000354 (0.000421)	-0.000200 (0.000564)
Cloud Ceiling	0.000227 (0.000175)	-9.93e-05 (0.000152)	0.000173 (0.000121)	-0.000285* (0.000165)	2.56e-08 (4.69e-05)	0.000104** (4.41e-05)	2.75e-05 (4.91e-05)
Altitude	2.56e-06 (4.05e-06)	-4.20e-06 (4.83e-06)	-7.81e-07 (3.54e-06)	1.14e-06 (4.17e-06)	-2.81e-08 (1.44e-06)	-5.03e-07 (1.16e-06)	-1.70e-07 (9.79e-07)
North wind	0.0382 (0.0280)	0.0378** (0.0188)	-0.0343* (0.0181)	-0.0138 (0.0213)	0.000525 (0.00588)	-0.0105 (0.0105)	-0.00778 (0.00633)
Northeast wind	-0.00829 (0.0282)	-0.0214 (0.0197)	0.00944 (0.0162)	0.00359 (0.0199)	-0.00252 (0.00812)	0.0135** (0.00576)	0.00292 (0.00477)
East wind	0.0139 (0.0273)	-0.0563*** (0.0182)	0.0188 (0.0200)	-0.0101 (0.0210)	-0.00249 (0.00893)	0.0162** (0.00668)	0.00368 (0.00483)
Southeast wind	-0.0519 (0.0354)	-0.0457 (0.0297)	0.0286 (0.0242)	-0.00944 (0.0247)	0.00847 (0.00783)	0.0137** (0.00631)	0.00443 (0.00660)
South wind	-0.0749** (0.0362)	-0.0341 (0.0279)	0.0352 (0.0284)	0.0291* (0.0172)	-0.00970 (0.0158)	0.00414 (0.00586)	-0.000332 (0.00800)
Southwest wind	-0.115*** (0.0408)	-0.0194 (0.0259)	0.0297 (0.0333)	0.0146 (0.0183)	0.0177 (0.0142)	-0.00210 (0.00548)	0.00710 (0.00769)
West wind	-0.0796 (0.0525)	0.0527 (0.0563)	0.0116 (0.0340)	0.0173 (0.0190)	0.0566 (0.0609)	-0.00299 (0.00593)	-0.00616 (0.00953)
Precipitation	0.000236 (0.00160)	-0.00417*** (0.00129)	0.000781 (0.00142)	-0.000119 (0.00141)	0.000159 (0.000799)	0.000156 (0.000400)	-9.24e-05 (0.000336)
Lag Precipitation	-0.00119 (0.00121)	-0.00117 (0.000926)	-0.000530 (0.000670)	0.000499 (0.000877)	0.000665* (0.000352)	8.31e-05 (0.000413)	0.000440 (0.000410)

o.holiday	-	-	-	-	-	-	-
10.month	0.0152 (0.0361)	-0.0907*** (0.0304)	0.0225 (0.0301)	-0.00808 (0.0337)	-0.0147 (0.0329)	0.000444 (0.0104)	0.00256 (0.00966)
1.weekday	-0.0141 (0.0280)	0.0429** (0.0178)	-0.0538** (0.0255)	-0.0809*** (0.0210)	0.0195*** (0.00574)	0.00239 (0.00508)	0.0133*** (0.00510)
2.weekday	-0.0198 (0.0309)	0.0309 (0.0225)	-0.0531* (0.0303)	-0.0571*** (0.0213)	0.0267*** (0.00707)	0.00147 (0.00598)	0.0139*** (0.00510)
3.weekday	-0.0342 (0.0341)	0.00336 (0.0221)	-0.0157 (0.0474)	-0.0717*** (0.0235)	0.0432 (0.0284)	0.00328 (0.00497)	0.00708 (0.00615)
4.weekday	-0.0243 (0.0382)	0.0225 (0.0244)	-0.0552* (0.0310)	-0.0622** (0.0242)	0.0190** (0.00740)	8.68e-05 (0.00613)	0.0191** (0.00973)
5.weekday	0.0527 (0.0384)	0.0162 (0.0227)	-0.0630** (0.0315)	-0.0791*** (0.0196)	0.0167* (0.00866)	0.00809 (0.00504)	0.0121* (0.00626)
6.weekday	0.0275 (0.0312)	0.0177 (0.0212)	-0.0379 (0.0286)	-0.0338 (0.0238)	0.0188** (0.00734)	0.0182 (0.0126)	-0.00303 (0.00400)
5.hour	-0.0692 (0.0959)	-0.154*** (0.0540)	0.289*** (0.0346)	-0.0671 (0.0487)	0.0709*** (0.0161)	-0.0210** (0.00949)	-0.0549*** (0.0188)
6.hour	2.642 (20.11)	-14.10 (18.53)	0.350 (13.41)	21.42** (10.40)	-3.473 (5.532)	3.166 (3.780)	-1.808 (5.056)
7.hour	0.0199 (0.0912)	-0.00344 (0.0552)	0.310*** (0.0766)	0.0145 (0.0452)	0.109*** (0.0190)	-0.0132 (0.00952)	-0.0262 (0.0184)
8.hour	0.129 (0.0923)	-0.0965* (0.0552)	0.205*** (0.0454)	-0.0659 (0.0445)	0.0606*** (0.0147)	-0.0158* (0.00953)	-0.0614*** (0.0180)
9.hour	3.024 (20.11)	-14.03 (18.49)	0.145 (13.41)	21.34** (10.40)	-3.617 (5.548)	3.173 (3.780)	-1.850 (5.068)
10.hour	0.252*** (0.0888)	-0.118** (0.0565)	0.197*** (0.0634)	-0.125*** (0.0436)	0.0176 (0.0133)	-0.0104 (0.00963)	-0.0454** (0.0220)
11.hour	0.226*** (0.0864)	-0.0620 (0.0551)	0.152*** (0.0375)	-0.102** (0.0436)	0.0113 (0.0131)	-0.01000 (0.00929)	-0.0574*** (0.0194)
12.hour	3.004 (20.12)	-14.08 (18.53)	0.152 (13.41)	21.39** (10.40)	-3.612 (5.552)	3.182 (3.781)	-1.849 (5.067)

13.hour	0.146*	-0.0390	0.0914***	-0.0608	0.0250**	-0.00700	-0.0590***
	(0.0852)	(0.0571)	(0.0259)	(0.0453)	(0.0118)	(0.00973)	(0.0200)
14.hour	0.0770	-0.0962	0.172***	-0.0479	0.0251**	-0.00419	-0.0578***
	(0.0834)	(0.0627)	(0.0276)	(0.0460)	(0.0107)	(0.0102)	(0.0201)
15.hour	2.898	-14.10	0.227	21.39**	-3.605	3.180	-1.845
	(20.12)	(18.53)	(13.41)	(10.40)	(5.549)	(3.781)	(5.066)
16.hour	0.160*	-0.0655	0.169***	-0.0581	0.0414***	-0.00271	-0.0310
	(0.0825)	(0.0568)	(0.0257)	(0.0458)	(0.00994)	(0.00997)	(0.0201)
17.hour	0.0382	-0.0837	0.237***	-0.00433	0.113***	-0.0103	-0.0283
	(0.0984)	(0.0569)	(0.0267)	(0.0472)	(0.0112)	(0.00959)	(0.0203)
18.hour	2.725	-14.13	0.259	21.44**	-3.517	3.181	-1.853
	(20.11)	(18.53)	(13.41)	(10.40)	(5.546)	(3.781)	(5.067)
19.hour	0.303***	-0.237***	0.112***	-0.0287	0.0443***	-0.00481	-0.0649***
	(0.0940)	(0.0570)	(0.0269)	(0.0491)	(0.0105)	(0.0106)	(0.0209)
20.hour	0.232***	-0.235***	0.110***	-0.0308	0.0471***	0.0142	-0.0610***
	(0.0870)	(0.0576)	(0.0283)	(0.0519)	(0.0112)	(0.0114)	(0.0213)
21.hour	2.802	-14.17	0.204	21.44**	-3.592	3.196	-1.862
	(20.11)	(18.53)	(13.40)	(10.41)	(5.549)	(3.781)	(5.066)
22.hour	-0.0434	-0.212***	0.140***	0.0909	0.0471***	0.0326**	-0.0696***
	(0.0873)	(0.0593)	(0.0312)	(0.0612)	(0.0119)	(0.0135)	(0.0217)
23.hour	-0.154*	-0.113*	-0.0472*	0.0703	0.00492	0.107***	-0.0425*
	(0.0902)	(0.0678)	(0.0281)	(0.0670)	(0.0105)	(0.0392)	(0.0250)
Constant	-2.788	16.04	0.0566	-23.51**	4.041	-3.544	2.066
	(22.41)	(20.64)	(14.94)	(11.58)	(6.184)	(4.206)	(5.642)
Observations	580	580	580	580	580	580	580
R-squared	0.377	0.147	0.262	0.272	0.226	0.226	0.212
Sanderson-Windmeijer F- statistic	160.4	160.4	160.4	160.4	160.4	160.4	160.4
underidentification test p-value	0	0	0	0	0	0	0

Anderson-Rubin weak instrument-robust inference F test p-value	0.0541	0.0237	0.979	0.469	0.396	0.500	0.966
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0449	0.0184	0.978	0.452	0.378	0.483	0.964
Stock-Wright weak instrument-robust inference p-value	0.00724	0.00270	0.964	0.189	0.0603	0.358	0.938

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000275** (0.000127)	0.000219* (0.000131)	-2.96e-05 (0.000104)	6.29e-05 (0.000128)	3.53e-05 (4.99e-05)	-2.53e-05 (4.08e-05)	5.80e-06 (4.50e-05)
Wind speed	-0.00854** (0.00382)	-0.000428 (0.00425)	-0.00228 (0.00283)	0.00813* (0.00475)	-0.000999 (0.000967)	0.00117 (0.00156)	2.87e-05 (0.00116)
Temperature	0.00725*** (0.00222)	-0.00544*** (0.00193)	0.000445 (0.00158)	-0.00314 (0.00206)	0.000257 (0.000837)	0.000567 (0.000682)	-1.65e-05 (0.000701)
Dew point temperature	3.97e-05 (5.08e-05)	-3.09e-05 (4.89e-05)	-5.80e-05 (4.91e-05)	3.57e-05 (2.43e-05)	4.49e-06 (1.66e-05)	1.05e-05 (1.67e-05)	6.57e-06 (8.99e-06)
Sea Level Pressure	-0.000934 (0.00150)	-0.00113 (0.00144)	-0.000506 (0.00122)	0.00174* (0.000902)	-0.000167 (0.000420)	0.000315 (0.000404)	-7.70e-05 (0.000331)
Cloud Ceiling	0.000181 (0.000138)	-7.49e-05 (0.000130)	0.000106 (9.05e-05)	-0.000298* (0.000155)	-1.19e-05 (3.35e-05)	9.60e-05** (4.15e-05)	1.78e-05 (4.60e-05)
Altitude	2.71e-06 (3.14e-06)	-3.08e-06 (3.76e-06)	-3.13e-07 (2.69e-06)	1.95e-06 (3.25e-06)	-2.02e-07 (1.08e-06)	-4.34e-07 (9.75e-07)	-2.62e-07 (8.63e-07)
North wind	0.0260 (0.0184)	0.0360** (0.0164)	-0.0225 (0.0143)	-0.0130 (0.0151)	0.000191 (0.00479)	-0.00909 (0.0104)	-0.00530 (0.00485)
Northeast wind	0.000531 (0.0175)	-0.0213 (0.0166)	0.00813 (0.0130)	0.00177 (0.0148)	-0.00127 (0.00612)	0.0105** (0.00495)	0.00307 (0.00343)

East wind	0.0231 (0.0181)	-0.0468*** (0.0152)	0.0193 (0.0155)	-0.00709 (0.0158)	-0.00116 (0.00640)	0.0138** (0.00636)	0.00288 (0.00385)
Southeast wind	-0.0228 (0.0244)	-0.0341 (0.0283)	0.0295 (0.0194)	-0.00163 (0.0184)	0.00655 (0.00671)	0.0110* (0.00570)	0.00366 (0.00535)
South wind	-0.0343 (0.0244)	-0.0255 (0.0209)	0.0311 (0.0209)	0.0250* (0.0132)	-0.00547 (0.0105)	0.00288 (0.00561)	0.00268 (0.00517)
Southwest wind	-0.0668** (0.0280)	-0.00963 (0.0194)	0.0402 (0.0318)	0.0129 (0.0140)	0.0105 (0.0107)	-0.00181 (0.00518)	0.00883* (0.00533)
West wind	-0.0472 (0.0350)	0.0287 (0.0371)	0.00898 (0.0242)	0.0109 (0.0148)	0.0236 (0.0306)	-0.00297 (0.00553)	-0.00298 (0.00702)
Precipitation	0.00109 (0.00112)	-0.00286*** (0.00101)	0.00103 (0.00102)	0.000215 (0.00111)	0.000332 (0.000445)	8.39e-05 (0.000374)	-5.66e-05 (0.000309)
Lag Precipitation	-0.000562 (0.000845)	-0.00107 (0.000845)	-0.000261 (0.000523)	0.000587 (0.000755)	0.000513** (0.000243)	5.47e-05 (0.000388)	0.000362 (0.000332)
o.holiday	-	-	-	-	-	-	-
10.month	0.0248 (0.0269)	-0.0608** (0.0260)	0.0251 (0.0226)	0.00505 (0.0274)	-0.00124 (0.0168)	-0.000317 (0.0101)	0.00244 (0.00917)
1.weekday	0.0229 (0.0175)	0.0451*** (0.0155)	-0.0301* (0.0173)	-0.0624*** (0.0188)	0.0151*** (0.00411)	0.00352 (0.00475)	0.0120*** (0.00448)
2.weekday	0.0145 (0.0193)	0.0263 (0.0192)	-0.0277 (0.0194)	-0.0443** (0.0180)	0.0207*** (0.00481)	0.00285 (0.00572)	0.0113** (0.00449)
3.weekday	0.00954 (0.0251)	0.00578 (0.0184)	-0.00159 (0.0308)	-0.0538*** (0.0200)	0.0265* (0.0144)	0.00407 (0.00460)	0.00577 (0.00547)
4.weekday	0.0165 (0.0280)	0.0230 (0.0208)	-0.0295 (0.0203)	-0.0475** (0.0212)	0.0172*** (0.00537)	0.000998 (0.00573)	0.0169* (0.00912)
5.weekday	0.0565** (0.0226)	0.0175 (0.0181)	-0.0406** (0.0205)	-0.0573*** (0.0172)	0.0168*** (0.00644)	0.00930* (0.00479)	0.00764* (0.00390)
6.weekday	0.0257 (0.0194)	0.0147 (0.0195)	-0.0275 (0.0184)	-0.0388** (0.0177)	0.0133*** (0.00514)	0.0172 (0.0124)	-0.00265 (0.00332)
5.hour	-0.0126 (0.0544)	-0.140*** (0.0471)	0.241*** (0.0289)	-0.0533 (0.0420)	0.0569*** (0.0108)	-0.0176** (0.00836)	-0.0498*** (0.0173)

6.hour	-8.464 (13.46)	-10.27 (12.90)	-4.338 (11.00)	15.56* (8.105)	-1.401 (3.765)	2.817 (3.627)	-0.716 (2.973)
7.hour	-0.00654 (0.0497)	-0.0717 (0.0470)	0.163*** (0.0397)	-0.0325 (0.0379)	0.0749*** (0.0165)	-0.0131 (0.00841)	-0.0361** (0.0168)
8.hour	0.115** (0.0531)	-0.113** (0.0476)	0.143*** (0.0393)	-0.0715* (0.0378)	0.0426*** (0.00938)	-0.0142* (0.00838)	-0.0580*** (0.0167)
9.hour	-8.142 (13.45)	-10.23 (12.89)	-4.488 (11.00)	15.50* (8.104)	-1.492 (3.771)	2.823 (3.627)	-0.743 (2.978)
10.hour	0.221*** (0.0515)	-0.128*** (0.0472)	0.122*** (0.0340)	-0.110*** (0.0375)	0.0110 (0.00824)	-0.00952 (0.00857)	-0.0484*** (0.0184)
11.hour	0.187*** (0.0482)	-0.0848* (0.0468)	0.0998*** (0.0281)	-0.0955** (0.0377)	0.00568 (0.00812)	-0.00965 (0.00822)	-0.0553*** (0.0180)
12.hour	-8.147 (13.46)	-10.23 (12.89)	-4.477 (11.00)	15.54* (8.103)	-1.486 (3.773)	2.830 (3.628)	-0.743 (2.977)
13.hour	0.143*** (0.0504)	-0.0617 (0.0490)	0.0592*** (0.0218)	-0.0590 (0.0388)	0.0184** (0.00837)	-0.00692 (0.00867)	-0.0566*** (0.0186)
14.hour	0.0966** (0.0474)	-0.0944* (0.0566)	0.130*** (0.0231)	-0.0436 (0.0396)	0.0191*** (0.00731)	-0.00431 (0.00921)	-0.0549*** (0.0188)
15.hour	-8.247 (13.46)	-10.26 (12.90)	-4.417 (11.00)	15.54* (8.103)	-1.479 (3.771)	2.828 (3.628)	-0.740 (2.977)
16.hour	0.134*** (0.0471)	-0.0892* (0.0489)	0.117*** (0.0214)	-0.0598 (0.0395)	0.0311*** (0.00701)	-0.00383 (0.00901)	-0.0354* (0.0187)
17.hour	0.00253 (0.0524)	-0.120** (0.0477)	0.153*** (0.0215)	-0.0311 (0.0404)	0.0797*** (0.00796)	-0.0104 (0.00858)	-0.0360* (0.0189)
18.hour	-8.396 (13.46)	-10.29 (12.90)	-4.379 (10.99)	15.58* (8.103)	-1.413 (3.770)	2.829 (3.628)	-0.747 (2.977)
19.hour	0.236*** (0.0510)	-0.218*** (0.0480)	0.0786*** (0.0217)	-0.0280 (0.0424)	0.0355*** (0.00772)	-0.00522 (0.00972)	-0.0614*** (0.0196)
20.hour	0.196*** (0.0517)	-0.213*** (0.0483)	0.0777*** (0.0227)	-0.0281 (0.0451)	0.0395*** (0.00850)	0.0104 (0.0104)	-0.0582*** (0.0200)
21.hour	-8.318 (13.46)	-10.31 (12.90)	-4.423 (10.98)	15.59* (8.106)	-1.467 (3.772)	2.842 (3.629)	-0.754 (2.976)

22.hour	0.00239 (0.0525)	-0.181*** (0.0503)	0.113*** (0.0250)	0.0679 (0.0473)	0.0422*** (0.00978)	0.0273** (0.0116)	-0.0652*** (0.0203)
23.hour	-0.0672 (0.0578)	-0.0676 (0.0602)	-0.0411* (0.0234)	0.0975* (0.0585)	0.00703 (0.00866)	0.106*** (0.0391)	-0.0378 (0.0238)
Constant	9.518 (15.00)	11.69 (14.37)	5.146 (12.25)	-17.07* (9.023)	1.660 (4.202)	-3.153 (4.035)	0.833 (3.314)
Observations	580	580	580	580	580	580	580
R-squared	0.432	0.168	0.288	0.317	0.283	0.226	0.217
Sanderson-Windmeijer F- statistic	160.4	160.4	160.4	160.4	160.4	160.4	160.4
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0362	0.100	0.785	0.638	0.498	0.549	0.901
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0291	0.0869	0.777	0.624	0.481	0.533	0.897
Stock-Wright weak instrument- robust inference p-value	0.00516	0.0204	0.648	0.392	0.220	0.399	0.816

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 26c. Travel mode share IV regressions using wind blowing from Xin Xian as the only IV, 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000524* (0.000313)	0.000201 (0.000271)	0.000140 (0.000267)	3.72e-05 (0.000214)	-8.90e-05 (0.000120)	0.000214 (0.000170)	2.15e-05 (6.70e-05)
Wind speed	-0.0101 (0.00674)	-0.000645 (0.00589)	0.00102 (0.00497)	0.00844 (0.00545)	-0.00404 (0.00256)	0.00541 (0.00428)	-0.000116 (0.00169)
Temperature	0.0108*** (0.00343)	-0.00517* (0.00307)	-0.00123 (0.00267)	-0.00327 (0.00254)	0.00120 (0.00124)	-0.00242 (0.00167)	0.000130 (0.000690)
Dew point temperature	5.90e-05 (6.99e-05)	-3.26e-05 (5.13e-05)	-7.36e-05 (5.38e-05)	2.49e-05 (2.83e-05)	2.18e-05 (1.71e-05)	-1.05e-05 (1.40e-05)	1.11e-05 (1.31e-05)
Sea Level Pressure	-0.000766 (0.00176)	-0.00140 (0.00137)	0.000158 (0.00170)	0.00154 (0.00119)	-0.000430 (0.000642)	0.000773 (0.000846)	0.000125 (0.000458)
Cloud Ceiling	0.000189 (0.000169)	-4.93e-05 (0.000162)	6.56e-05 (0.000122)	-0.000360* (0.000196)	4.89e-05 (5.68e-05)	0.000133** (5.23e-05)	-2.76e-05 (5.36e-05)
Altitude	1.44e-05* (8.17e-06)	-1.28e-05 (7.83e-06)	-9.33e-06 (6.94e-06)	7.78e-06 (5.65e-06)	4.14e-06 (3.04e-06)	-3.71e-06 (4.34e-06)	-4.18e-07 (1.58e-06)
North wind	-0.00120 (0.0212)	0.0427** (0.0176)	-0.0206 (0.0179)	-0.00311 (0.0189)	0.00280 (0.00641)	-0.0119 (0.0127)	-0.00871 (0.00562)
Northeast wind	0.0319 (0.0210)	-0.0136 (0.0187)	-0.0110 (0.0161)	-0.0124 (0.0177)	-0.00189 (0.00662)	0.00647 (0.00592)	0.000666 (0.00460)
East wind	0.0481** (0.0212)	-0.0539*** (0.0176)	0.00791 (0.0188)	-0.0183 (0.0179)	0.00164 (0.00726)	0.0143** (0.00691)	0.000297 (0.00461)
Southeast wind	-0.0200 (0.0338)	-0.0216 (0.0347)	0.0280 (0.0269)	-0.00918 (0.0250)	0.000798 (0.00956)	0.0193** (0.00808)	0.00273 (0.00614)
South wind	-0.0129 (0.0289)	-0.0338 (0.0233)	0.0295 (0.0259)	0.0195 (0.0158)	-0.00818 (0.0119)	0.00197 (0.00667)	0.00403 (0.00636)
Southwest wind	-0.0445 (0.0296)	-0.0220 (0.0180)	0.0377 (0.0380)	0.00872 (0.0171)	0.00603 (0.0130)	0.00285 (0.00747)	0.0111** (0.00539)
West wind	-0.0614 (0.0454)	0.0213 (0.0471)	0.0163 (0.0346)	-0.00919 (0.0186)	0.0314 (0.0421)	-0.000310 (0.00860)	0.00188 (0.00915)
Precipitation	0.00275	-0.00207	-0.000475	0.000377	0.000769	-0.00127	-8.15e-05

	(0.00192)	(0.00189)	(0.00157)	(0.00127)	(0.000528)	(0.00120)	(0.000420)
Lag Precipitation	-0.00153	-0.000856	0.000136	0.00105	-0.000305	0.000996**	0.000505
	(0.00152)	(0.00118)	(0.00121)	(0.00113)	(0.000720)	(0.000466)	(0.000398)
o.holiday	-	-	-	-	-	-	-
10.month	0.0794	-0.0463	-0.0132	0.0108	0.0113	-0.0442	0.00231
	(0.0520)	(0.0484)	(0.0430)	(0.0373)	(0.0140)	(0.0362)	(0.0119)
1.weekday	0.0180	0.0462**	-0.0345	-0.0673***	0.0172***	0.00793	0.0124**
	(0.0214)	(0.0190)	(0.0219)	(0.0235)	(0.00516)	(0.00661)	(0.00569)
2.weekday	0.00587	0.0433*	-0.0322	-0.0544**	0.0218***	0.00697	0.00869
	(0.0270)	(0.0243)	(0.0269)	(0.0239)	(0.00621)	(0.00816)	(0.00547)
3.weekday	0.00154	0.00994	-0.00530	-0.0498**	0.0276*	0.0152**	0.000857
	(0.0320)	(0.0216)	(0.0378)	(0.0250)	(0.0167)	(0.00740)	(0.00522)
4.weekday	-0.0195	0.0178	-0.0259	-0.0322	0.0144	0.0196	0.0258**
	(0.0330)	(0.0233)	(0.0326)	(0.0279)	(0.0121)	(0.0129)	(0.0114)
5.weekday	0.0451*	0.00553	-0.0372	-0.0548***	0.0185**	0.0143**	0.00858*
	(0.0261)	(0.0185)	(0.0254)	(0.0208)	(0.00829)	(0.00645)	(0.00474)
6.weekday	0.0312	0.0149	-0.0362*	-0.0455**	0.0164**	0.0194	-0.000199
	(0.0224)	(0.0224)	(0.0212)	(0.0206)	(0.00655)	(0.0146)	(0.00363)
5.hour	-0.0291	-0.147***	0.239***	-0.0576	0.0544***	-0.0112	-0.0484***
	(0.0538)	(0.0472)	(0.0296)	(0.0419)	(0.0116)	(0.00977)	(0.0176)
6.hour	-6.982	-12.70	1.632	13.77	-3.761	6.941	1.095
	(15.81)	(12.34)	(15.29)	(10.71)	(5.747)	(7.607)	(4.115)
7.hour	-0.0415	-0.0896*	0.153***	-0.0458	0.0671***	-0.00563	-0.0377**
	(0.0509)	(0.0467)	(0.0434)	(0.0382)	(0.0159)	(0.00995)	(0.0172)
8.hour	0.0870	-0.127***	0.145***	-0.0810**	0.0406***	-0.00787	-0.0569***
	(0.0537)	(0.0479)	(0.0416)	(0.0384)	(0.0101)	(0.00932)	(0.0173)
9.hour	-6.695	-12.66	1.482	13.71	-3.853	6.948	1.068
	(15.81)	(12.34)	(15.30)	(10.71)	(5.767)	(7.609)	(4.120)
10.hour	0.183***	-0.142***	0.119***	-0.115***	0.00965	-0.00782	-0.0468**
	(0.0511)	(0.0477)	(0.0352)	(0.0372)	(0.00902)	(0.00891)	(0.0188)
11.hour	0.172***	-0.114**	0.0997***	-0.100***	0.00612	-0.00930	-0.0541***
	(0.0473)	(0.0462)	(0.0316)	(0.0371)	(0.00927)	(0.00867)	(0.0177)
12.hour	-6.710	-12.69	1.484	13.74	-3.846	6.947	1.067
	(15.81)	(12.34)	(15.29)	(10.70)	(5.767)	(7.605)	(4.118)

13.hour	0.135** (0.0525)	-0.0944* (0.0497)	0.0686*** (0.0228)	-0.0639* (0.0374)	0.0217** (0.0105)	-0.0118 (0.00920)	-0.0549*** (0.0179)
17.hour	-0.0147 (0.0467)	-0.130*** (0.0479)	0.147*** (0.0216)	-0.0316 (0.0387)	0.0819*** (0.0109)	-0.0193** (0.00942)	-0.0334* (0.0172)
18.hour	-6.896 (15.80)	-12.72 (12.34)	1.588 (15.28)	13.79 (10.70)	-3.772 (5.762)	6.939 (7.602)	1.066 (4.118)
19.hour	0.212*** (0.0490)	-0.214*** (0.0490)	0.0681*** (0.0227)	-0.0345 (0.0399)	0.0419*** (0.0114)	-0.0171 (0.0106)	-0.0566*** (0.0174)
20.hour	0.204*** (0.0548)	-0.212*** (0.0517)	0.0619** (0.0250)	-0.0379 (0.0463)	0.0470*** (0.0133)	-0.00564 (0.0133)	-0.0569*** (0.0171)
21.hour	-6.816 (15.81)	-12.72 (12.34)	1.550 (15.27)	13.80 (10.71)	-3.821 (5.763)	6.947 (7.600)	1.060 (4.116)
22.hour	0.00950 (0.0560)	-0.187*** (0.0530)	0.109*** (0.0250)	0.0598 (0.0510)	0.0536*** (0.0130)	0.0123 (0.0138)	-0.0575*** (0.0181)
23.hour	-0.0841 (0.0543)	-0.0394 (0.0609)	-0.0428* (0.0252)	0.112* (0.0585)	0.0109 (0.0128)	0.0920** (0.0362)	-0.0485** (0.0208)
Constant	7.785 (17.60)	14.37 (13.75)	-1.459 (17.02)	-15.09 (11.91)	4.267 (6.416)	-7.694 (8.439)	-1.183 (4.582)
Observations	441	441	441	441	441	441	441
R-squared	0.395	0.208	0.256	0.355	0.239	0.181	0.243
Sanderson-Windmeijer F- statistic	23.54	23.54	23.54	23.54	23.54	23.54	23.54
underidentification test p-value	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.0951	0.475	0.611	0.868	0.465	0.224	0.760
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0793	0.454	0.594	0.862	0.443	0.202	0.749
Stock-Wright weak instrument- robust inference p-value	0.0232	0.278	0.445	0.826	0.173	0.00151	0.630

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000436 (0.000316)	0.000219 (0.000274)	7.71e-05 (0.000249)	0.000137 (0.000203)	-5.33e-05 (0.000118)	0.000200 (0.000170)	4.26e-05 (0.000100)
Wind speed	-0.00906 (0.00650)	-0.00209 (0.00589)	0.000353 (0.00479)	0.0112** (0.00533)	-0.00369 (0.00247)	0.00545 (0.00428)	0.000960 (0.00233)
Temperature	0.00892*** (0.00342)	-0.00508* (0.00309)	-0.000891 (0.00249)	-0.00392 (0.00250)	0.000930 (0.00124)	-0.00228 (0.00167)	0.000274 (0.000947)
Dew point temperature	4.59e-05 (6.32e-05)	-2.97e-05 (5.13e-05)	-5.96e-05 (5.11e-05)	2.40e-05 (2.87e-05)	1.49e-05 (1.71e-05)	-1.45e-05 (1.38e-05)	-2.88e-07 (1.87e-05)
Sea Level Pressure	-0.000398 (0.00166)	-0.000981 (0.00138)	-0.000452 (0.00164)	0.00162 (0.00110)	-0.000471 (0.000676)	0.000713 (0.000849)	3.01e-07 (0.000789)
Cloud Ceiling	0.000200 (0.000155)	-9.37e-05 (0.000165)	5.80e-05 (0.000122)	-0.000362* (0.000192)	4.57e-05 (5.92e-05)	0.000154*** (5.41e-05)	-3.49e-05 (5.93e-05)
Altitude	1.28e-05 (8.15e-06)	-1.28e-05 (7.86e-06)	-8.44e-06 (6.47e-06)	2.45e-06 (5.41e-06)	4.56e-06 (3.01e-06)	-2.58e-06 (4.32e-06)	-1.30e-06 (2.26e-06)
North wind	0.00483 (0.0196)	0.0479*** (0.0176)	-0.0181 (0.0180)	-0.00898 (0.0173)	0.00221 (0.00633)	-0.0135 (0.0128)	-0.0108 (0.00791)
Northeast wind	0.0264 (0.0195)	-0.00825 (0.0191)	-0.0137 (0.0157)	-0.00826 (0.0167)	-0.00168 (0.00658)	0.00718 (0.00594)	-0.00145 (0.00699)
East wind	0.0350* (0.0201)	-0.0596*** (0.0175)	0.00906 (0.0186)	-0.0117 (0.0166)	0.00516 (0.00744)	0.0176** (0.00717)	0.000422 (0.00651)
Southeast wind	-0.0169 (0.0307)	-0.0235 (0.0347)	0.0211 (0.0268)	-0.00255 (0.0214)	0.00404 (0.00907)	0.0215** (0.00874)	0.00168 (0.00722)
South wind	-0.00713 (0.0280)	-0.0356 (0.0235)	0.0281 (0.0254)	0.0193 (0.0143)	-0.00659 (0.0116)	0.00270 (0.00672)	-0.00204 (0.0101)
Southwest wind	-0.0442 (0.0273)	-0.0182 (0.0185)	0.0397 (0.0374)	0.0152 (0.0156)	0.00624 (0.0115)	0.00277 (0.00749)	0.00586 (0.00741)
West wind	-0.0380 (0.0509)	0.0134 (0.0468)	0.00363 (0.0310)	-0.000815 (0.0193)	0.0312 (0.0411)	-0.000973 (0.00878)	-0.00128 (0.0120)
Precipitation	0.00233 (0.00197)	-0.00216 (0.00190)	-0.000273 (0.00141)	-0.000131 (0.00125)	0.000719 (0.000534)	-0.00115 (0.00119)	-0.000353 (0.000611)
Lag Precipitation	-0.00156	-0.000708	-0.000250	0.00165	-6.75e-06	0.000985**	0.000722

	(0.00145)	(0.00121)	(0.00120)	(0.00101)	(0.000710)	(0.000489)	(0.000543)
o.holiday	-	-	-	-	-	-	-
10.month	0.0591 (0.0512)	-0.0459 (0.0485)	-0.00225 (0.0393)	-0.00522 (0.0364)	0.00674 (0.0139)	-0.0416 (0.0361)	-0.00160 (0.0170)
1.weekday	0.0136 (0.0203)	0.0450** (0.0192)	-0.0282 (0.0212)	-0.0528** (0.0225)	0.0220*** (0.00577)	0.00849 (0.00666)	0.0139** (0.00637)
2.weekday	0.000707 (0.0263)	0.0369 (0.0240)	-0.0253 (0.0261)	-0.0319 (0.0241)	0.0276*** (0.00645)	0.00680 (0.00819)	0.0128* (0.00668)
3.weekday	0.001000 (0.0311)	0.00475 (0.0229)	-0.00874 (0.0369)	-0.0387 (0.0237)	0.0320* (0.0166)	0.0168** (0.00753)	0.00396 (0.00649)
4.weekday	-0.0165 (0.0322)	0.0190 (0.0246)	-0.0210 (0.0325)	-0.0191 (0.0265)	0.0225* (0.0119)	0.0182 (0.0129)	0.0275** (0.0124)
5.weekday	0.0421 (0.0259)	0.000326 (0.0190)	-0.0354 (0.0243)	-0.0404** (0.0203)	0.0234*** (0.00844)	0.0141** (0.00645)	0.0148* (0.00796)
6.weekday	0.0233 (0.0208)	0.0169 (0.0224)	-0.0282 (0.0211)	-0.0424** (0.0183)	0.0152*** (0.00581)	0.0202 (0.0146)	7.21e-05 (0.00426)
5.hour	-0.00941 (0.0520)	-0.145*** (0.0473)	0.257*** (0.0299)	-0.0786* (0.0402)	0.0611*** (0.0126)	-0.0152 (0.0108)	-0.0536*** (0.0193)
6.hour	-3.636 (14.93)	-8.939 (12.37)	-3.798 (14.77)	14.46 (9.920)	-4.116 (6.057)	6.399 (7.631)	-0.0107 (7.081)
7.hour	0.0167 (0.0511)	-0.0722 (0.0470)	0.208*** (0.0413)	-0.0263 (0.0383)	0.0941*** (0.0164)	-0.00833 (0.0109)	-0.0306 (0.0190)
8.hour	0.141*** (0.0525)	-0.114** (0.0481)	0.165*** (0.0374)	-0.0769** (0.0385)	0.0478*** (0.0110)	-0.0109 (0.0104)	-0.0614*** (0.0190)
9.hour	-3.355 (14.93)	-8.906 (12.36)	-3.987 (14.77)	14.42 (9.921)	-4.223 (6.076)	6.406 (7.633)	-0.0530 (7.094)
10.hour	0.211*** (0.0511)	-0.138*** (0.0474)	0.136*** (0.0354)	-0.118*** (0.0376)	0.0104 (0.00994)	-0.0108 (0.00997)	-0.0462** (0.0231)
11.hour	0.222*** (0.0455)	-0.109** (0.0463)	0.110*** (0.0260)	-0.103*** (0.0376)	0.00659 (0.0101)	-0.0125 (0.00981)	-0.0579*** (0.0193)
12.hour	-3.390 (14.93)	-8.930 (12.37)	-3.977 (14.77)	14.45 (9.918)	-4.220 (6.075)	6.406 (7.629)	-0.0517 (7.091)
13.hour	0.176*** (0.0520)	-0.0915* (0.0496)	0.0824*** (0.0231)	-0.0662* (0.0374)	0.0234** (0.0111)	-0.0136 (0.0101)	-0.0570*** (0.0195)

17.hour	0.0311 (0.0470)	-0.109** (0.0473)	0.200*** (0.0223)	-0.0203 (0.0402)	0.108*** (0.0116)	-0.0214** (0.0104)	-0.0278 (0.0187)
18.hour	-3.572 (14.92)	-8.960 (12.36)	-3.868 (14.76)	14.50 (9.916)	-4.126 (6.070)	6.399 (7.626)	-0.0527 (7.089)
19.hour	0.211*** (0.0488)	-0.211*** (0.0488)	0.0898*** (0.0225)	-0.0467 (0.0408)	0.0488*** (0.0120)	-0.0186 (0.0115)	-0.0608*** (0.0189)
20.hour	0.194*** (0.0531)	-0.212*** (0.0515)	0.0844*** (0.0263)	-0.0403 (0.0474)	0.0501*** (0.0134)	-0.00818 (0.0139)	-0.0605*** (0.0188)
21.hour	-3.505 (14.92)	-8.979 (12.36)	-3.911 (14.75)	14.49 (9.917)	-4.196 (6.071)	6.408 (7.624)	-0.0598 (7.087)
22.hour	0.00282 (0.0531)	-0.193*** (0.0523)	0.139*** (0.0289)	0.0413 (0.0478)	0.0592*** (0.0140)	0.0125 (0.0151)	-0.0625*** (0.0195)
23.hour	-0.0828 (0.0546)	-0.0500 (0.0604)	-0.0450* (0.0254)	0.109* (0.0585)	0.00858 (0.0129)	0.0918** (0.0366)	-0.0539** (0.0221)
Constant	4.114 (16.62)	10.22 (13.78)	4.640 (16.44)	-15.87 (11.04)	4.684 (6.760)	-7.096 (8.466)	0.0652 (7.889)
Observations	441	441	441	441	441	441	441
R-squared	0.430	0.191	0.335	0.358	0.348	0.199	0.220
Sanderson-Windmeijer F- statistic	23.54	23.54	23.54	23.54	23.54	23.54	23.54
underidentification test p-value	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.176	0.440	0.766	0.517	0.660	0.258	0.686
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.155	0.418	0.755	0.497	0.645	0.235	0.672
Stock-Wright weak instrument- robust inference p-value	0.0480	0.252	0.679	0.391	0.449	0.00616	0.443

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(1) (2) (3) (4) (5) (6) (7)

Average number of trips taken per household whose main mode was:

	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000775 (0.000499)	0.000400 (0.000436)	0.000296 (0.000451)	1.22e-05 (0.000295)	-0.000191 (0.000201)	0.000202 (0.000171)	3.91e-05 (0.000102)
Wind speed	-0.0149 (0.0104)	0.00353 (0.00889)	0.00215 (0.00762)	0.00926 (0.00709)	-0.00740 (0.00470)	0.00543 (0.00429)	0.000929 (0.00236)
Temperature	0.0167*** (0.00596)	-0.00738* (0.00443)	-0.00227 (0.00414)	-0.00437 (0.00308)	0.00193 (0.00178)	-0.00223 (0.00169)	0.000165 (0.000970)
Dew point temperature	6.41e-05 (9.62e-05)	-7.96e-05 (8.62e-05)	-9.71e-05 (7.55e-05)	3.35e-05 (4.05e-05)	2.40e-05 (2.88e-05)	-1.09e-05 (1.39e-05)	3.43e-06 (1.87e-05)
Sea Level Pressure	-0.000928 (0.00271)	-0.00224 (0.00218)	0.00113 (0.00228)	0.00187 (0.00167)	-0.00111 (0.00113)	0.000751 (0.000853)	8.37e-05 (0.000794)
Cloud Ceiling	0.000219 (0.000225)	-9.66e-05 (0.000203)	0.000111 (0.000168)	-0.000331 (0.000216)	0.000103 (9.64e-05)	0.000148*** (5.52e-05)	-2.20e-05 (5.99e-05)
Altitude	1.77e-05 (1.27e-05)	-1.95e-05 (1.23e-05)	-1.34e-05 (1.18e-05)	9.76e-06 (6.95e-06)	7.25e-06 (5.24e-06)	-2.96e-06 (4.35e-06)	-9.98e-07 (2.30e-06)
North wind	0.00123 (0.0324)	0.0506** (0.0218)	-0.0333 (0.0228)	0.000373 (0.0267)	0.00488 (0.00875)	-0.0132 (0.0128)	-0.0109 (0.00797)
Northeast wind	0.0461 (0.0308)	-0.0161 (0.0261)	-0.0162 (0.0218)	-0.0113 (0.0229)	-0.000942 (0.00905)	0.00929 (0.00616)	-0.00136 (0.00706)
East wind	0.0552* (0.0312)	-0.0683*** (0.0241)	0.00402 (0.0272)	-0.0201 (0.0234)	0.00536 (0.0105)	0.0176** (0.00729)	-0.000470 (0.00657)
Southeast wind	-0.0538 (0.0495)	-0.0349 (0.0372)	0.0256 (0.0335)	-0.0239 (0.0363)	-0.000734 (0.0117)	0.0225** (0.00881)	0.00335 (0.00746)
South wind	-0.0418 (0.0390)	-0.0531 (0.0361)	0.0339 (0.0373)	0.0218 (0.0204)	-0.0117 (0.0174)	0.00359 (0.00690)	-0.000837 (0.0102)
Southwest wind	-0.0722* (0.0424)	-0.0377 (0.0255)	0.0286 (0.0390)	0.0122 (0.0225)	0.0127 (0.0180)	0.00212 (0.00766)	0.00957 (0.00791)
West wind	-0.0780 (0.0713)	0.0726 (0.0855)	0.0203 (0.0493)	-0.00794 (0.0245)	0.0764 (0.0837)	-0.00199 (0.00881)	-0.00186 (0.0123)
Precipitation	0.00285 (0.00290)	-0.00411 (0.00314)	-0.00153 (0.00276)	0.000452 (0.00157)	0.00128 (0.000850)	-0.00111 (0.00120)	-0.000249 (0.000625)
Lag Precipitation	-0.00306 (0.00241)	-0.000867 (0.00170)	0.000228 (0.00191)	0.000590 (0.00172)	-0.000889 (0.00127)	0.00102** (0.000496)	0.000697 (0.000549)
o.holiday	-	-	-	-	-	-	-

10.month	0.108 (0.0797)	-0.0942 (0.0775)	-0.0375 (0.0663)	0.00884 (0.0474)	0.0175 (0.0207)	-0.0420 (0.0362)	-0.00153 (0.0172)
1.weekday	-0.0151 (0.0356)	0.0497** (0.0222)	-0.0565* (0.0310)	-0.0836*** (0.0263)	0.0238*** (0.00756)	0.00679 (0.00686)	0.0147** (0.00646)
2.weekday	-0.0356 (0.0452)	0.0585* (0.0325)	-0.0571 (0.0393)	-0.0661** (0.0289)	0.0274*** (0.00885)	0.00566 (0.00837)	0.0135** (0.00682)
3.weekday	-0.0618 (0.0467)	0.0102 (0.0280)	-0.0198 (0.0566)	-0.0687** (0.0306)	0.0461 (0.0328)	0.0149* (0.00770)	0.00305 (0.00663)
4.weekday	-0.0796 (0.0563)	0.0194 (0.0308)	-0.0463 (0.0441)	-0.0466 (0.0334)	0.00917 (0.0205)	0.0187 (0.0131)	0.0306** (0.0127)
5.weekday	0.0283 (0.0426)	0.0105 (0.0267)	-0.0586 (0.0384)	-0.0756*** (0.0240)	0.0181 (0.0122)	0.0137** (0.00662)	0.0146* (0.00800)
6.weekday	0.0334 (0.0372)	0.0165 (0.0248)	-0.0507 (0.0337)	-0.0389 (0.0294)	0.0244** (0.0100)	0.0199 (0.0146)	-3.26e-05 (0.00442)
5.hour	-0.0809 (0.0962)	-0.152*** (0.0573)	0.299*** (0.0371)	-0.0714 (0.0496)	0.0692*** (0.0175)	-0.0153 (0.0108)	-0.0527*** (0.0192)
6.hour	-8.464 (24.28)	-20.24 (19.56)	10.51 (20.49)	16.73 (15.02)	-9.774 (10.06)	6.736 (7.666)	0.743 (7.125)
7.hour	0.00213 (0.0943)	0.00159 (0.0580)	0.319*** (0.0835)	0.0117 (0.0465)	0.103*** (0.0192)	-0.00593 (0.0109)	-0.0240 (0.0190)
8.hour	0.114 (0.0938)	-0.0961 (0.0597)	0.220*** (0.0513)	-0.0741 (0.0455)	0.0599*** (0.0164)	-0.0100 (0.0104)	-0.0590*** (0.0189)
9.hour	-8.091 (24.28)	-20.16 (19.53)	10.30 (20.49)	16.65 (15.02)	-9.924 (10.11)	6.744 (7.668)	0.702 (7.137)
10.hour	0.244*** (0.0882)	-0.116* (0.0597)	0.209*** (0.0657)	-0.127*** (0.0443)	0.0168 (0.0153)	-0.00862 (0.0100)	-0.0417* (0.0231)
11.hour	0.238*** (0.0847)	-0.0812 (0.0568)	0.163*** (0.0442)	-0.104** (0.0443)	0.0129 (0.0160)	-0.00991 (0.00972)	-0.0551*** (0.0193)
12.hour	-8.090 (24.28)	-20.21 (19.55)	10.30 (20.49)	16.70 (15.02)	-9.913 (10.11)	6.746 (7.665)	0.701 (7.134)
13.hour	0.157* (0.0827)	-0.0585 (0.0593)	0.112*** (0.0288)	-0.0600 (0.0456)	0.0327* (0.0168)	-0.0124 (0.0101)	-0.0561*** (0.0195)
17.hour	0.00376 (0.0799)	-0.0884 (0.0569)	0.239*** (0.0281)	0.00262 (0.0463)	0.124*** (0.0187)	-0.0198* (0.0105)	-0.0243 (0.0186)

18.hour	-8.353 (24.27)	-20.26 (19.55)	10.40 (20.48)	16.75 (15.02)	-9.812 (10.10)	6.737 (7.661)	0.698 (7.133)
19.hour	0.285*** (0.0816)	-0.221*** (0.0580)	0.107*** (0.0297)	-0.0233 (0.0473)	0.0608*** (0.0197)	-0.0171 (0.0115)	-0.0595*** (0.0190)
20.hour	0.277*** (0.0912)	-0.228*** (0.0618)	0.0939*** (0.0348)	-0.0350 (0.0542)	0.0667*** (0.0228)	-0.00137 (0.0144)	-0.0608*** (0.0187)
21.hour	-8.276 (24.27)	-20.30 (19.56)	10.35 (20.47)	16.75 (15.02)	-9.883 (10.10)	6.748 (7.659)	0.689 (7.130)
22.hour	-0.0308 (0.0875)	-0.210*** (0.0622)	0.139*** (0.0345)	0.0850 (0.0755)	0.0674*** (0.0196)	0.0152 (0.0152)	-0.0616*** (0.0198)
23.hour	-0.167** (0.0851)	-0.0805 (0.0683)	-0.0547* (0.0328)	0.0883 (0.0689)	0.0170 (0.0204)	0.0935** (0.0366)	-0.0542** (0.0221)
Constant	9.472 (27.04)	22.88 (21.80)	-11.17 (22.79)	-18.30 (16.71)	11.01 (11.24)	-7.470 (8.505)	-0.769 (7.937)
Observations	441	441	441	441	441	441	441
R-squared	0.385	0.138	0.230	0.289	0.184	0.196	0.225
Sanderson-Windmeijer F-statistic	23.54	23.54	23.54	23.54	23.54	23.54	23.54
underidentification test p-value	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.124	0.373	0.522	0.968	0.342	0.255	0.714
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.106	0.349	0.501	0.967	0.318	0.232	0.701
Stock-Wright weak instrument-robust inference p-value	0.0222	0.112	0.250	0.956	0.0499	0.00787	0.507

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:							
	walk	bicycle	bus	car	subway	taxi	others

Hourly PM 2.5 pollution	-0.000617* (0.000338)	0.000126 (0.000281)	0.000136 (0.000265)	4.05e-05 (0.000218)	-9.00e-05 (0.000121)	0.000212 (0.000171)	2.13e-05 (6.77e-05)
Wind speed	-0.0128* (0.00738)	-0.00278 (0.00631)	0.000794 (0.00495)	0.00860 (0.00551)	-0.00418 (0.00258)	0.00533 (0.00428)	-0.000118 (0.00170)
Temperature	0.0116*** (0.00363)	-0.00458 (0.00313)	-0.00122 (0.00265)	-0.00340 (0.00258)	0.00120 (0.00124)	-0.00240 (0.00167)	0.000128 (0.000703)
Dew point temperature	7.31e-05 (7.76e-05)	-2.49e-05 (4.90e-05)	-7.20e-05 (5.31e-05)	2.52e-05 (2.89e-05)	2.23e-05 (1.75e-05)	-1.03e-05 (1.39e-05)	1.12e-05 (1.32e-05)
Sea Level Pressure	-0.00155 (0.00191)	-0.00211 (0.00169)	0.000139 (0.00170)	0.00159 (0.00122)	-0.000463 (0.000646)	0.000768 (0.000847)	0.000151 (0.000462)
Cloud Ceiling	0.000205 (0.000177)	-4.07e-05 (0.000161)	6.95e-05 (0.000121)	-0.000358* (0.000197)	5.21e-05 (5.75e-05)	0.000138*** (5.30e-05)	-2.63e-05 (5.39e-05)
Altitude	1.61e-05* (8.73e-06)	-1.15e-05 (7.80e-06)	-9.15e-06 (6.88e-06)	8.23e-06 (5.74e-06)	4.23e-06 (3.06e-06)	-3.60e-06 (4.34e-06)	-3.58e-07 (1.60e-06)
North wind	0.00348 (0.0225)	0.0465*** (0.0180)	-0.0200 (0.0178)	-0.00297 (0.0190)	0.00311 (0.00646)	-0.0115 (0.0127)	-0.00858 (0.00569)
Northeast wind	0.0352 (0.0226)	-0.0118 (0.0186)	-0.0108 (0.0161)	-0.00974 (0.0183)	-0.00167 (0.00669)	0.00680 (0.00593)	0.000759 (0.00465)
East wind	0.0531** (0.0229)	-0.0528*** (0.0175)	0.00936 (0.0187)	-0.0157 (0.0185)	0.00208 (0.00737)	0.0149** (0.00704)	0.000438 (0.00466)
Southeast wind	-0.0242 (0.0356)	-0.0261 (0.0350)	0.0287 (0.0268)	-0.00891 (0.0254)	0.000743 (0.00963)	0.0195** (0.00816)	0.00287 (0.00626)
South wind	-0.0133 (0.0301)	-0.0349 (0.0236)	0.0316 (0.0257)	0.0211 (0.0162)	-0.00765 (0.0119)	0.00211 (0.00670)	0.00419 (0.00641)
Southwest wind	-0.0461 (0.0318)	-0.0249 (0.0186)	0.0389 (0.0380)	0.0106 (0.0175)	0.00714 (0.0132)	0.00258 (0.00751)	0.0116** (0.00557)
West wind	-0.0511 (0.0489)	0.0381 (0.0530)	0.0153 (0.0347)	-0.00877 (0.0191)	0.0313 (0.0420)	-0.000894 (0.00862)	0.00171 (0.00928)
Precipitation	0.00313 (0.00207)	-0.00191 (0.00187)	-0.000361 (0.00156)	0.000467 (0.00129)	0.000804 (0.000535)	-0.00123 (0.00120)	-7.29e-05 (0.000424)
Lag Precipitation	-0.00203 (0.00163)	-0.00138 (0.00130)	0.000118 (0.00121)	0.00104 (0.00115)	-0.000304 (0.000725)	0.000984** (0.000467)	0.000506 (0.000401)
o.holiday	-	-	-	-	-	-	-
10.month	0.0919	-0.0383	-0.0118	0.0113	0.0119	-0.0438	0.00240

	(0.0561)	(0.0485)	(0.0426)	(0.0377)	(0.0142)	(0.0362)	(0.0121)
1.weekday	0.0194	0.0478**	-0.0340	-0.0676***	0.0180***	0.00785	0.0128**
	(0.0228)	(0.0189)	(0.0217)	(0.0236)	(0.00523)	(0.00663)	(0.00572)
2.weekday	0.00315	0.0417*	-0.0321	-0.0548**	0.0226***	0.00686	0.00917*
	(0.0285)	(0.0243)	(0.0267)	(0.0241)	(0.00634)	(0.00818)	(0.00552)
3.weekday	-0.00504	0.00681	-0.00591	-0.0506**	0.0279*	0.0152**	0.00111
	(0.0332)	(0.0222)	(0.0375)	(0.0252)	(0.0168)	(0.00746)	(0.00532)
4.weekday	-0.0267	0.0114	-0.0254	-0.0327	0.0151	0.0196	0.0263**
	(0.0351)	(0.0249)	(0.0324)	(0.0281)	(0.0122)	(0.0129)	(0.0114)
5.weekday	0.0475*	0.00912	-0.0379	-0.0557***	0.0190**	0.0145**	0.00876*
	(0.0275)	(0.0194)	(0.0252)	(0.0210)	(0.00830)	(0.00648)	(0.00477)
6.weekday	0.0321	0.0149	-0.0358*	-0.0459**	0.0170**	0.0192	-0.000177
	(0.0239)	(0.0226)	(0.0210)	(0.0209)	(0.00676)	(0.0146)	(0.00368)
5.hour	-0.0227	-0.143***	0.247***	-0.0559	0.0562***	-0.0118	-0.0483***
	(0.0543)	(0.0470)	(0.0296)	(0.0427)	(0.0117)	(0.00990)	(0.0177)
6.hour	-13.99	-19.13	1.463	14.23	-4.055	6.893	1.334
	(17.12)	(15.19)	(15.25)	(10.93)	(5.788)	(7.613)	(4.147)
7.hour	-0.0208	-0.0726	0.167***	-0.0338	0.0727***	-0.00567	-0.0350**
	(0.0515)	(0.0468)	(0.0428)	(0.0390)	(0.0159)	(0.0101)	(0.0174)
8.hour	0.104*	-0.118**	0.153***	-0.0773**	0.0428***	-0.00817	-0.0567***
	(0.0542)	(0.0481)	(0.0413)	(0.0389)	(0.0102)	(0.00944)	(0.0174)
9.hour	-13.67	-19.09	1.316	14.18	-4.148	6.901	1.307
	(17.12)	(15.18)	(15.25)	(10.93)	(5.808)	(7.615)	(4.152)
10.hour	0.214***	-0.131***	0.128***	-0.111***	0.0105	-0.00773	-0.0461**
	(0.0521)	(0.0475)	(0.0349)	(0.0377)	(0.00908)	(0.00909)	(0.0189)
11.hour	0.198***	-0.103**	0.107***	-0.0969**	0.00667	-0.00939	-0.0535***
	(0.0478)	(0.0463)	(0.0314)	(0.0376)	(0.00932)	(0.00882)	(0.0178)
12.hour	-13.66	-19.09	1.320	14.22	-4.141	6.900	1.307
	(17.11)	(15.17)	(15.25)	(10.93)	(5.808)	(7.611)	(4.151)
13.hour	0.153***	-0.0828*	0.0752***	-0.0603	0.0227**	-0.0120	-0.0546***
	(0.0521)	(0.0499)	(0.0230)	(0.0380)	(0.0106)	(0.00936)	(0.0180)
17.hour	-0.00223	-0.119**	0.157***	-0.0270	0.0857***	-0.0197**	-0.0321*
	(0.0469)	(0.0478)	(0.0217)	(0.0393)	(0.0109)	(0.00963)	(0.0173)
18.hour	-13.90	-19.14	1.417	14.26	-4.066	6.891	1.304
	(17.11)	(15.18)	(15.24)	(10.93)	(5.803)	(7.608)	(4.150)

19.hour	0.237*** (0.0499)	-0.206*** (0.0489)	0.0740*** (0.0227)	-0.0291 (0.0407)	0.0437*** (0.0115)	-0.0173 (0.0108)	-0.0564*** (0.0175)
20.hour	0.226*** (0.0570)	-0.204*** (0.0518)	0.0662*** (0.0252)	-0.0364 (0.0468)	0.0482*** (0.0133)	-0.00530 (0.0136)	-0.0569*** (0.0172)
21.hour	-13.82 (17.11)	-19.16 (15.18)	1.375 (15.22)	14.26 (10.93)	-4.118 (5.803)	6.900 (7.606)	1.297 (4.149)
22.hour	0.0146 (0.0574)	-0.183*** (0.0528)	0.110*** (0.0249)	0.0575 (0.0512)	0.0546*** (0.0132)	0.0125 (0.0140)	-0.0578*** (0.0182)
23.hour	-0.0814 (0.0542)	-0.0355 (0.0609)	-0.0431* (0.0252)	0.111* (0.0588)	0.0109 (0.0128)	0.0923** (0.0363)	-0.0487** (0.0208)
Constant	15.58 (19.06)	21.53 (16.91)	-1.264 (16.96)	-15.60 (12.17)	4.596 (6.461)	-7.642 (8.445)	-1.449 (4.618)
Observations	441	441	441	441	441	441	441
R-squared	0.418	0.207	0.271	0.341	0.249	0.184	0.245
Sanderson-Windmeijer F- statistic	23.54	23.54	23.54	23.54	23.54	23.54	23.54
underidentification test p-value	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07	7.68e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.0643	0.668	0.619	0.859	0.463	0.229	0.764
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0517	0.652	0.601	0.852	0.441	0.207	0.753
Stock-Wright weak instrument- robust inference p-value	0.0134	0.524	0.460	0.814	0.178	0.00235	0.643

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Results for the IV probit regressions of individual travel mode decisions for year 2010 different IVs are presented in Table 27.

Using both of the 2 IVs (“0iv”), we find that air pollution makes people more likely to bicycle, no significant effect on bus, less likely to take car, more likely to choose mode “others”, more likely to choose subway, no significant effect on taxi, less likely to walk.

Using high altitude wind speed at the 7000 pressure level at midnight as the 1 IV (in “1iv”), we find that air pollution makes people more likely to bicycle, less likely to take bus, less likely to take car, no significant effect on “others”, no significant effect on subway, no significant effect on taxi, no significant effect on walk.

Using wind blowing from Xin Xian as the 1 IV (in “2iv”), we find that when there is bad air, no significant effect on bicycle, more likely to take bus, more likely to take car, more likely to take “others”, more likely to take subway, no significant effect on taxi, less likely to walk.

Thus, our robust results using across the different specifications using the two different IVs are that air pollution makes people weakly more likely to bicycle, weakly more likely to take other modes of transport, weakly more likely to take subway, and weakly less likely to walk.

Table 27a. IV probit individual travel mode regressions using both IVs, 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	walk	bicycle	bus	car	subway	taxi	others
hourly PM _{2.5}	-0.000177*** (3.88E-05)	0.000227*** (4.43E-05)	-6.27E-06 (4.43E-05)	-0.000159*** (4.66E-05)	0.000286*** (6.26E-05)	5.78E-05 (0.00011)	0.000174** (8.26e-05)
Observations	154,092	154,092	154,092	154,092	154,092	154,092	154,092

Notes: Robust standard errors in parentheses. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver's license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010). Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 27b. IV probit individual travel mode regressions using high altitude wind speed at the 7000 pressure level at midnight as the only IV, 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	walk	bicycle	bus	car	subway	taxi	others
hourly PM _{2.5}	-4.55E-05 (3.94e-05)	0.000414*** (4.50e-05)	-0.000143*** (4.44e-05)	-0.000301*** (4.66e-05)	3.60E-05 (6.29e-05)	1.06E-04 (0.000114)	0.000126 (8.21e-05)
Observations	193,610	193,610	193,610	193,610	193,610	193,610	193,610

Notes: Robust standard errors in parentheses. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver's license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010). Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 27c. IV probit individual travel mode regressions using wind blowing from Xin Xian as the only IV, 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	walk	bicycle	bus	car	subway	taxi	others
hourly PM _{2.5}	-0.000575*** (5.74e-05)	-1.19E-05 (6.55e-05)	0.000205*** (6.49e-05)	0.000270*** (6.79e-05)	0.000705*** (8.79e-05)	-8.66E-05 (0.000168)	0.000331*** (0.000118)
Observations	154,092	154,092	154,092	154,092	154,092	154,092	154,092

Notes: Robust standard errors in parentheses. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver’s license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010). Significance stars: *** p<0.01, ** p<0.05, * p<0.1

First-stage and second-stage results for the IV regressions of individual travel mode with household fixed effects are presented in Tables 28a and 28b, respectively. Using wind blowing from Xin Xian as the only IV, we find that air pollution makes people less likely to walk, no significant effect on bicycle, more likely to take bus, more likely to take car, more likely to take subway, no significant effect on taxi, more likely to take others. Using high altitude wind speed at the 7000 pressure level at midnight and wind blowing from Xin Xian as the 2 IVs, we do not pass the overidentification test. Using high altitude wind speed at the 7000 pressure level at midnight as the only IV, the first-stage F-test is too low.

Our IV regressions of individual travel mode with household fixed effects therefore show that air pollution makes people less likely to walk, more likely to take bus, more likely to take car, more likely to take subway, and more likely to take other modes of transport.

Table 28a. First-stage regression for IV fixed effects individual travel mode regressions using wind blowing from Xin Xian as the only IV, 2010

	(1) hourly PM2.5
wind blowing from Xin Xian	8.0797*** (0.3130)
Controls	Y
Household fixed effects	Y
Observations	154,092
Number of households	33,793
R-squared	0.0055

Notes: Robust standard errors in parentheses. We control for age; number of years of schooling; dummies for different types of residency, education, driver's license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, travel mode of the first trip that day, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, hour of day. Household-level controls and daily controls are absorbed by the household fixed effects. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 28b. IV fixed effects individual travel mode regressions using wind blowing from Xin Xian as the only IV, 2010

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	-0.00438*** (0.000492)	-0.000650* (0.000355)	0.00258*** (0.000393)	0.000801** (0.000319)	0.00111*** (0.000234)	-4.81e-05 (9.81e-05)	0.000590*** (0.000161)
Controls	Y	Y	Y	Y	Y	Y	Y
Household fixed effects	Y	Y	Y	Y	Y	Y	Y
Observations	151,949	151,949	151,949	151,949	151,949	151,949	151,949
R-squared	-0.153	-0.004	-0.073	-0.011	-0.039	-0.001	-0.022
Number of Household	31,650	31,650	31,650	31,650	31,650	31,650	31,650
Sanderson-Windmeijer F-statistic	666.4	666.4	666.4	666.4	666.4	666.4	666.4
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0	0.0667	0	0.0116	1.28e-06	0.624	0.000214
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0	0.0667	0	0.0116	1.28e-06	0.624	0.000214
Stock-Wright weak instrument-robust inference p-value	0	0.0667	0	0.0116	1.28e-06	0.624	0.000214

Notes: Robust standard errors in parentheses. We control for age; number of years of schooling; dummies for different types of residency, education, driver's license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, travel mode of the first trip that day, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Results for the IV travel mode decision time series results for year 2010 are presented in Tables 29. Using “high altitude wind speed at the 7000 pressure level at midnight as the only IV (in “1_iv”), we find that the share of all households members surveyed during that 24-hour period who took at least 1 trip that hour decreases when there is bad air. Using wind blowing from Xin Xian as the only IV (in “2_iv”), we find no significant effect on travel mode decision time series variables when there is bad air.

Our robust results for the IV travel mode decision time series results for year 2010 are therefore that the share of all households members surveyed during that 24-hour period who took at least 1 trip that hour weakly decreases when there is bad air.

Table 29a. IV travel mode decision time series regressions using high altitude wind speed at the 7000 pressure level at midnight as the only IV, 2010

	(1) s_hh_d Share of all households surveyed that 24-hour period who took at least 1 trip	(2) s_all_d Share of all members of all households surveyed that 24-hour period who took at least 1 trip	(3) avg_hh_d Average number of members surveyed that 24-hour period who took at least 1 trip
Hourly PM 2.5 pollution	-8.86e-05 (5.58e-05)	-7.12e-05** (3.51e-05)	-8.98e-05 (8.27e-05)
Wind speed	-0.000325 (0.00170)	-0.000774 (0.00104)	-6.79e-05 (0.00247)
Temperature	0.000735 (0.000884)	0.000972* (0.000577)	0.000878 (0.00137)
Dew point temperature	2.13e-05 (2.40e-05)	1.33e-05 (1.51e-05)	1.39e-05 (2.98e-05)
Sea Level Pressure	-0.00214*** (0.000743)	-0.00118*** (0.000404)	-0.00251*** (0.000942)
Cloud Ceiling	3.64e-05 (5.01e-05)	1.34e-05 (3.02e-05)	6.33e-05 (7.16e-05)
Altitude	3.28e-06* (1.76e-06)	1.86e-06** (9.18e-07)	4.08e-06* (2.28e-06)
North wind	-0.00352 (0.00710)	-0.00203 (0.00446)	-0.00544 (0.0103)
Northeast wind	0.0110 (0.00785)	0.00485 (0.00509)	0.0127 (0.0119)
East wind	0.00226 (0.0105)	0.00152 (0.00645)	-0.000789 (0.0151)
Southeast wind	-0.0182 (0.0168)	-0.0108 (0.0103)	-0.0288 (0.0244)
South wind	0.0215* (0.0111)	0.00832 (0.00701)	0.0201 (0.0165)
Southwest wind	0.0219 (0.0170)	0.00554 (0.00850)	0.0175 (0.0199)
West wind	-0.00576 (0.0151)	-5.04e-05 (0.0108)	0.00407 (0.0264)
Precipitation	0.000456 (0.000526)	0.000437 (0.000335)	0.000256 (0.000803)
Lag Precipitation	-0.000108 (0.000325)	-0.000183 (0.000192)	-0.000222 (0.000443)
o.holiday	-	-	-

10.month	-0.00597 (0.0133)	-0.000217 (0.00817)	-0.0175 (0.0197)
1.weekday	0.0417*** (0.00779)	0.0187*** (0.00476)	0.0467*** (0.0111)
2.weekday	0.0438*** (0.00928)	0.0210*** (0.00558)	0.0525*** (0.0132)
3.weekday	0.0328** (0.0164)	0.0140 (0.00887)	0.0378* (0.0216)
4.weekday	0.0390*** (0.00930)	0.0187*** (0.00567)	0.0444*** (0.0133)
5.weekday	0.0227** (0.00949)	0.0130** (0.00609)	0.0281** (0.0141)
6.weekday	0.0210** (0.00909)	0.0131** (0.00572)	0.0275** (0.0134)
5.hour	0.0359*** (0.00868)	0.0190*** (0.00540)	0.0466*** (0.0123)
6.hour	-18.97*** (6.672)	-10.48*** (3.633)	-22.24*** (8.460)
7.hour	0.445*** (0.0168)	0.284*** (0.0125)	0.680*** (0.0299)
8.hour	0.370*** (0.0109)	0.203*** (0.00693)	0.485*** (0.0154)
9.hour	-18.94*** (6.666)	-10.48*** (3.633)	-22.23*** (8.458)
10.hour	0.203*** (0.0125)	0.115*** (0.00985)	0.272*** (0.0229)
11.hour	0.209*** (0.0125)	0.117*** (0.00702)	0.275*** (0.0165)
12.hour	-19.08*** (6.672)	-10.55*** (3.633)	-22.41*** (8.461)
13.hour	0.146*** (0.0108)	0.0794*** (0.00617)	0.185*** (0.0146)
14.hour	0.124*** (0.0107)	0.0665*** (0.00609)	0.153*** (0.0143)
15.hour	-19.07*** (6.670)	-10.54*** (3.632)	-22.40*** (8.459)
16.hour	0.207*** (0.0141)	0.116*** (0.00802)	0.270*** (0.0189)
17.hour	0.388*** (0.0214)	0.235*** (0.0129)	0.552*** (0.0305)
18.hour	-18.95*** (6.669)	-10.48*** (3.631)	-22.24*** (8.457)
19.hour	0.105*** (0.00996)	0.0616*** (0.00617)	0.138*** (0.0141)
20.hour	0.0736*** (0.00998)	0.0437*** (0.00602)	0.0939*** (0.0140)

21.hour	-19.14*** (6.665)	-10.58*** (3.631)	-22.48*** (8.456)
22.hour	0.0204** (0.00812)	0.0143*** (0.00503)	0.0246** (0.0117)
23.hour	0.00386 (0.00793)	0.00532 (0.00484)	0.00344 (0.0111)
Constant	21.36*** (7.432)	11.80*** (4.048)	25.10*** (9.428)
Observations	618	618	618
R-squared	0.795	0.805	0.807
Sanderson-Windmeijer F-statistic	155	155	155
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.118	0.0455	0.291
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.105	0.0378	0.273
Stock-Wright weak instrument-robust inference p-value	0.0404	0.00781	0.147

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 29b. IV travel mode decision time series regressions using wind blowing from Xin Xian as the only IV, 2010

	(1) s_hh_d Share of all households surveyed that 24-hour period who took at least 1 trip	(2) s_all_d Share of all members of all households surveyed that 24-hour period who took at least 1 trip	(3) avg_hh_d Average number of members surveyed that 24-hour period who took at least 1 trip
Hourly PM 2.5 pollution	3.63e-05 (0.000147)	3.10e-05 (9.66e-05)	0.000116 (0.000226)
Wind speed	0.000771 (0.00270)	0.000196 (0.00181)	0.00176 (0.00426)
Temperature	-0.000731 (0.00142)	-0.000161 (0.000911)	-0.00133 (0.00215)
Dew point temperature	6.69e-06 (2.47e-05)	3.08e-06 (1.46e-05)	-8.35e-06 (3.37e-05)
Sea Level Pressure	-0.00227** (0.000939)	-0.00123** (0.000554)	-0.00267** (0.00129)
Cloud Ceiling	4.38e-05	9.16e-06	6.01e-05

	(6.73e-05)	(4.14e-05)	(9.93e-05)
Altitude	-2.12e-06	-1.58e-06	-4.12e-06
	(3.96e-06)	(2.48e-06)	(5.79e-06)
North wind	-0.000826	-0.00119	-0.00309
	(0.00812)	(0.00522)	(0.0122)
Northeast wind	0.00410	0.00148	0.00510
	(0.00958)	(0.00655)	(0.0154)
East wind	-0.00179	-0.00120	-0.00615
	(0.0115)	(0.00732)	(0.0171)
Southeast wind	-0.0267	-0.0147	-0.0396
	(0.0211)	(0.0128)	(0.0307)
South wind	0.0204	0.00711	0.0167
	(0.0132)	(0.00831)	(0.0196)
Southwest wind	0.0231	0.00912	0.0226
	(0.0202)	(0.00978)	(0.0233)
West wind	0.000382	0.00829	0.0212
	(0.0195)	(0.0134)	(0.0336)
Precipitation	-0.000308	-0.000178	-0.000996
	(0.000858)	(0.000551)	(0.00127)
Lag Precipitation	0.000288	0.000149	0.000421
	(0.000682)	(0.000445)	(0.00105)
o.holiday	-	-	-
10.month	-0.0299	-0.0176	-0.0534
	(0.0225)	(0.0142)	(0.0331)
1.weekday	0.0444***	0.0218***	0.0534***
	(0.00871)	(0.00542)	(0.0129)
2.weekday	0.0471***	0.0247***	0.0610***
	(0.0120)	(0.00732)	(0.0175)
3.weekday	0.0429**	0.0197*	0.0517**
	(0.0191)	(0.0103)	(0.0250)
4.weekday	0.0450***	0.0238***	0.0534***
	(0.0132)	(0.00863)	(0.0204)
5.weekday	0.0272***	0.0161**	0.0331**
	(0.0104)	(0.00671)	(0.0157)
6.weekday	0.0225**	0.0138**	0.0291**
	(0.00979)	(0.00616)	(0.0146)
5.hour	0.0398***	0.0222***	0.0533***
	(0.00928)	(0.00564)	(0.0134)
6.hour	-20.12**	-10.87**	-23.63**
	(8.439)	(4.975)	(11.63)
7.hour	0.449***	0.286***	0.685***
	(0.0166)	(0.0122)	(0.0291)
8.hour	0.376***	0.208***	0.496***
	(0.0124)	(0.00739)	(0.0173)
9.hour	-20.09**	-10.87**	-23.62**

	(8.434)	(4.977)	(11.63)
10.hour	0.208*** (0.0133)	0.119*** (0.0107)	0.281*** (0.0251)
11.hour	0.199*** (0.0139)	0.113*** (0.00786)	0.264*** (0.0187)
12.hour	-20.23** (8.437)	-10.95** (4.976)	-23.80** (11.63)
13.hour	0.137*** (0.0134)	0.0756*** (0.00773)	0.176*** (0.0188)
17.hour	0.374*** (0.0286)	0.223*** (0.0171)	0.522*** (0.0409)
18.hour	-20.11** (8.434)	-10.88** (4.973)	-23.64** (11.62)
19.hour	0.0985*** (0.0131)	0.0563*** (0.00800)	0.128*** (0.0193)
20.hour	0.0624*** (0.0135)	0.0365*** (0.00839)	0.0798*** (0.0202)
21.hour	-20.29** (8.428)	-10.98** (4.972)	-23.88** (11.62)
22.hour	0.0144 (0.0108)	0.00988 (0.00668)	0.0175 (0.0164)
23.hour	-0.00547 (0.0103)	-0.00169 (0.00645)	-0.00956 (0.0157)
Constant	22.67** (9.392)	12.26** (5.537)	26.69** (12.94)
Observations	470	470	470
R-squared	0.810	0.820	0.817
Sanderson-Windmeijer F-statistic	17.80	17.80	17.80
underidentification test p-value	1.56e-05	1.56e-05	1.56e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.815	0.760	0.624
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.806	0.749	0.608
Stock-Wright weak instrument-robust inference p-value	0.785	0.718	0.567

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

The results for our IV regressions of each of the travel mode decision panel data variables with household fixed effects for 2010 are in Table 30. Using wind blowing from Xin Xian as the only IV, we find that when there is bad air, the share of household members in each household who took at least 1 trip that hour decreases, the number of members in that household who took at least 1 trip that hour decreases, and the number of members in that household who did not take any trip that hour increases. We did not use high altitude wind speed at the 7000 pressure level at midnight as an IV due to collinearity.

Our IV regressions of each of the travel mode decision panel data variables with household fixed effects for 2010 therefore show that when there is bad air, the share of household members in each household who took at least 1 trip that hour decreases, the number of members in that household who took at least 1 trip that hour decreases, and the number of members in that household who did not take any trip that hour increases.

Table 30. IV fixed effects travel mode decision panel regressions using wind blowing from Xin Xian as the only IV, 2010

	(1) s_mb_travel_hh Share of household members in household who took at least 1 trip that hour	(2) n_mb_travel_hh Number of members in household who took at least 1 trip that hour	(3) n_mb_stay_hh Number of members in household who did not take any trip that hour
Hourly PM 2.5 pollution	-9.14e-05*** (3.46e-05)	-0.000243*** (7.76e-05)	0.000243*** (7.76e-05)
Wind speed	-0.000175 (0.000329)	-0.000277 (0.000738)	0.000277 (0.000738)
Temperature	-0.000690*** (0.000199)	-0.00134*** (0.000446)	0.00134*** (0.000446)
Dew point temperature	1.14e-05* (6.88e-06)	2.97e-05* (1.54e-05)	-2.97e-05* (1.54e-05)
Sea Level Pressure	-0.000164 (0.000110)	-0.000465* (0.000247)	0.000465* (0.000247)
Cloud Ceiling	4.73e-05*** (1.80e-05)	0.000128*** (4.03e-05)	-0.000128*** (4.03e-05)
Altitude	7.06e-07 (7.09e-07)	1.16e-06 (1.59e-06)	-1.16e-06 (1.59e-06)
North wind	0.00147 (0.00120)	0.00599** (0.00270)	-0.00599** (0.00270)
Northeast wind	7.61e-05 (0.00141)	0.000324 (0.00317)	-0.000324 (0.00317)
East wind	-0.00154 (0.00154)	-0.00684** (0.00345)	0.00684** (0.00345)
Southeast wind	-0.00349* (0.00198)	-0.0119*** (0.00443)	0.0119*** (0.00443)
South wind	0.00442*** (0.00159)	0.00877** (0.00357)	-0.00877** (0.00357)
Southwest wind	-0.000319 (0.00204)	-0.00516 (0.00456)	0.00516 (0.00456)
West wind	0.00791*** (0.00193)	0.0136*** (0.00433)	-0.0136*** (0.00433)
Precipitation	-0.00587 (0.0142)	-0.0137 (0.0317)	0.0137 (0.0317)
Lag Precipitation	-0.00323 (0.0147)	-0.00856 (0.0329)	0.00856 (0.0329)
o.holiday	-	-	-
o.d_weekday1	-	-	-

o.d_weekday2	-	-	-
o.d_weekday3	-	-	-
o.d_weekday4	-	-	-
o.d_weekday5	-	-	-
o.d_weekday6	-	-	-
o.d_month1	-	-	-
d_hour1	0.00493* (0.00266)	0.0118** (0.00596)	-0.0118** (0.00596)
d_hour2	0.0216*** (0.00257)	0.0507*** (0.00575)	-0.0507*** (0.00575)
d_hour3	-1.336 (0.991)	-3.847* (2.221)	3.847* (2.221)
d_hour4	0.305*** (0.00266)	0.734*** (0.00595)	-0.734*** (0.00595)
d_hour5	0.237*** (0.00260)	0.529*** (0.00583)	-0.529*** (0.00583)
d_hour6	-1.313 (0.991)	-3.834* (2.221)	3.834* (2.221)
d_hour7	0.124*** (0.00243)	0.276*** (0.00546)	-0.276*** (0.00546)
d_hour8	0.130*** (0.00237)	0.299*** (0.00532)	-0.299*** (0.00532)
d_hour9	-1.391 (0.991)	-3.997* (2.221)	3.997* (2.221)
d_hour10	0.0898*** (0.00231)	0.211*** (0.00519)	-0.211*** (0.00519)
o.d_hour11	-	-	-
o.d_hour12	-	-	-
o.d_hour13	-	-	-
d_hour14	0.253*** (0.00211)	0.596*** (0.00473)	-0.596*** (0.00473)
d_hour15	-1.335 (0.991)	-3.864* (2.221)	3.864* (2.221)
d_hour16	0.0665*** (0.00227)	0.153*** (0.00509)	-0.153*** (0.00509)
d_hour17	0.0474*** (0.00248)	0.113*** (0.00555)	-0.113*** (0.00555)

d_hour18	-1.440 (0.991)	-4.107* (2.220)	4.107* (2.220)
d_hour19	0.0111*** (0.00218)	0.0265*** (0.00489)	-0.0265*** (0.00489)
o.d_hour20	-	-	-
Household fixed effects	Y	Y	Y
Observations	487,878	487,878	487,878
R-squared	0.131	0.143	0.143
Number of households	32,193	32,193	32,193
Sanderson-Windmeijer F-statistic	28822	28822	28822
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.00827	0.00173	0.00173
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.00827	0.00173	0.00173
Stock-Wright weak instrument-robust inference p-value	0.00827	0.00173	0.00173

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

6.4. IV Regression results: 2014

We present first-stage regressions for 2014 in Table 31.

Table 31. First-stage regression, 2014

	(1iv) hourly PM2.5	(2iv) hourly PM2.5	(4iv) hourly PM2.5	(7iv) hourly PM2.5	(8iv) hourly PM2.5	(9iv) hourly PM2.5
south wind at Zhoushuizi	26.8423*** (6.7782)	24.3666*** (6.7425)		28.3994*** (6.8650)		
wind speed in Gaoyao	-1.6021*** (0.2500)		-1.6093*** (0.2497)		-1.6340*** (0.2561)	
wind blowing from Chengshantou		24.2283*** (6.9387)	26.7897*** (7.0603)			26.5965*** (7.0569)
Wind speed	6.9236*** (2.3839)	7.3906*** (2.4340)	6.5635*** (2.4525)	7.6079*** (2.3777)	6.7180*** (2.4025)	7.2127*** (2.4539)
Temperature	-0.7928 (0.9881)	-0.8828 (0.9864)	-0.9989 (0.9863)	-0.8350 (1.0029)	-1.0133 (1.0100)	-1.0266 (0.9991)
Dew point temperature	11.2294*** (0.6043)	11.4493*** (0.6178)	11.5766*** (0.6249)	11.5189*** (0.6061)	11.7713*** (0.6131)	11.8988*** (0.6244)
Sea Level Pressure	-0.0478 (0.6943)	0.6364 (0.7086)	0.4474 (0.6876)	0.0152 (0.7253)	-0.2748 (0.7065)	0.5035 (0.7166)
Cloud Ceiling	0.0757 (0.0965)	0.0497 (0.0940)	0.0221 (0.0937)	0.0576 (0.0942)	0.0329 (0.0943)	0.0007 (0.0912)
Altitude	0.0073* (0.0038)	0.0071** (0.0032)	0.0069* (0.0036)	0.0075** (0.0032)	0.0074** (0.0036)	0.0068** (0.0031)
North wind	-3.9371 (10.8176)	-3.8399 (10.6078)	-4.2274 (10.6206)	-3.1101 (10.8411)	-3.0656 (11.0005)	-3.3915 (10.7308)
Northeast wind	19.0632	21.7095	19.6068	20.4437	18.2008	20.9604

	(16.0954)	(16.2863)	(16.0764)	(16.2280)	(16.0919)	(16.2355)
East wind	-8.7946	-6.3914	-11.5791	-6.8772	-12.7637	-9.5643
	(11.1325)	(10.8965)	(10.8374)	(11.1678)	(11.2254)	(10.9411)
Southeast wind	2.1424	7.0522	2.6746	4.1713	-0.5323	4.7472
	(11.3226)	(11.2493)	(11.1887)	(11.3850)	(11.4050)	(11.2994)
South wind	-6.1170	1.1144	-5.1490	-1.7726	-8.4962	-0.7785
	(10.4928)	(10.2010)	(10.1434)	(10.5662)	(10.5749)	(10.2924)
Southwest wind	1.7191	8.9537	4.1847	4.0314	-1.4000	6.4089
	(14.1849)	(13.3031)	(13.6194)	(14.1289)	(14.4817)	(13.5593)
West wind	2.7990	0.7372	4.3704	-2.9155	0.7131	-1.3919
	(20.1018)	(16.9694)	(19.2560)	(18.0274)	(20.4420)	(17.2014)
Precipitation	0.1761	0.3749	0.2538	0.2140	0.0559	0.2895
	(0.4704)	(0.4839)	(0.4850)	(0.4732)	(0.4745)	(0.4956)
Lag Precipitation	-3.8023***	-3.9737***	-4.2537***	-3.8804***	-4.2014***	-4.3381***
	(0.4654)	(0.4755)	(0.4991)	(0.4638)	(0.4858)	(0.4966)
holiday	-16.7623**	-10.9270	-16.6689**	-11.7289*	-18.0063***	-12.6743*
	(6.7908)	(6.9828)	(6.7992)	(7.0009)	(6.8484)	(7.0093)
10.month	151.3820***	150.8765***	148.3092***	157.5079***	156.4209***	155.0534***
	(9.0854)	(10.2811)	(10.1045)	(9.3845)	(9.0817)	(10.2764)
11.month	246.1992***	249.2466***	242.7624***	258.9307***	254.1247***	255.9961***
	(16.7748)	(17.9160)	(17.6248)	(17.1773)	(16.8768)	(17.9752)
1.weekday	10.8440	2.9190	14.7498*	-0.1911	11.9965	4.0376
	(8.7199)	(8.4981)	(8.7162)	(8.6649)	(9.0094)	(8.7294)
2.weekday	-13.1814*	-21.8524***	-13.1068*	-22.0808***	-13.0506	-21.6796***
	(7.7541)	(7.6157)	(7.8550)	(7.7317)	(8.0609)	(7.8756)
3.weekday	20.4678**	18.7402**	21.6057**	21.9114**	25.9579***	23.7878**
	(9.0116)	(8.9651)	(8.9693)	(9.2931)	(9.4366)	(9.2978)
4.weekday	24.9071***	22.7294**	27.4363***	27.0026***	32.5961***	29.6502***
	(8.6855)	(9.0494)	(9.0089)	(8.8736)	(8.7859)	(9.1935)
5.weekday	8.5462	-1.3858	4.2126	5.9656	12.4456	1.9500
	(8.9297)	(9.0424)	(8.7938)	(9.1656)	(8.8797)	(9.0279)
6.weekday	16.5590	3.0187	13.8138	12.1401	24.8420**	9.9027

	(12.4494)	(12.3266)	(11.5459)	(12.6546)	(11.7451)	(11.8432)
5.hour	8.4344	11.1004	7.4456	13.3489	10.1944	12.4787
	(13.4978)	(13.1487)	(14.2155)	(13.0336)	(14.1892)	(13.6334)
6.hour	-424.8199	5,723.9356	4,024.2776	145.0117	-2,460.8359	4,531.9079
	(6,235.5311)	(6,364.1463)	(6,175.4955)	(6,514.3069)	(6,344.9660)	(6,435.5593)
7.hour	3.9552	6.8780	4.4822	8.2657	6.4095	8.9524
	(12.4251)	(12.1343)	(13.0857)	(12.0804)	(13.1045)	(12.6048)
8.hour	8.3924	5.5541	6.2138	12.0879	13.6021	10.1364
	(13.0898)	(12.1366)	(13.0823)	(12.6606)	(13.5495)	(12.5988)
9.hour	-425.4437	5,721.8943	4,023.8476	143.4342	-2,460.5825	4,530.5558
	(6,235.5356)	(6,364.5232)	(6,175.6761)	(6,514.6349)	(6,345.0854)	(6,435.9281)
10.hour	1.0131	3.5550	-2.5540	6.1985	0.0637	2.6579
	(12.4678)	(12.2456)	(12.9230)	(12.1147)	(12.8243)	(12.4908)
11.hour	-16.7688	-9.9260	-20.9115	-6.3915	-17.3607	-10.5886
	(12.6844)	(12.5319)	(13.4676)	(12.2745)	(13.2687)	(12.9882)
12.hour	-445.4942	5,706.0985	3,999.9084	129.4309	-2,483.1471	4,512.8999
	(6,235.4146)	(6,364.2360)	(6,175.3782)	(6,514.5316)	(6,344.9230)	(6,435.7164)
13.hour	-11.8026	-4.3072	-16.8524	-1.0073	-13.7467	-5.0700
	(12.6878)	(12.3348)	(13.5127)	(12.0571)	(13.3910)	(12.9308)
14.hour	-27.9029**	-16.7296	-28.4179*	-14.2400	-26.9030*	-15.5232
	(14.0469)	(13.8773)	(14.8320)	(13.9090)	(14.8734)	(14.5507)
15.hour	-464.1631	5,692.2528	3,987.2696	114.7642	-2,497.8411	4,503.3391
	(6,237.0713)	(6,365.3279)	(6,176.9264)	(6,515.6506)	(6,346.5082)	(6,436.6970)
16.hour	-23.8537	-11.7566	-24.1035	-9.5898	-22.9882	-10.0701
	(14.5837)	(14.4415)	(15.6544)	(14.3483)	(15.6255)	(15.3221)
17.hour	-15.0808	-7.3941	-19.3524	-4.5738	-16.9077	-8.5428
	(15.3856)	(15.2981)	(15.7215)	(15.1899)	(15.7537)	(15.5085)
18.hour	-444.4870	5,710.2295	4,003.1273	131.1936	-2,483.6911	4,516.7714
	(6,238.1680)	(6,365.9550)	(6,177.8405)	(6,516.5853)	(6,347.8669)	(6,437.5212)
19.hour	-4.3812	6.7309	-9.1155	6.9580	-10.3631	2.2637
	(16.4338)	(16.5266)	(16.9174)	(16.3530)	(16.9206)	(16.8160)
20.hour	11.2975	11.6865	4.1389	14.8647	5.7497	7.1804

	(16.3260)	(16.2360)	(16.6683)	(16.3159)	(16.8508)	(16.6407)
21.hour	-404.7406	5,742.6786	4,041.2128	164.5109	-2,444.8440	4,548.2419
	(6,239.4270)	(6,367.6858)	(6,179.3364)	(6,518.0976)	(6,349.2249)	(6,439.3161)
22.hour	23.6674	23.0723	13.0300	29.1134	17.4578	17.8064
	(18.3434)	(18.1726)	(18.4935)	(18.3271)	(18.7930)	(18.4649)
23.hour	1.9636	8.0196	-5.7556	11.2498	-3.3429	3.5097
	(16.1899)	(16.1350)	(16.5668)	(15.9961)	(16.4772)	(16.1982)
Constant	410.2690	-6,466.4836	-4,532.1102	-259.4471	2,685.4289	-5,132.6888
	(6,947.1188)	(7,090.2048)	(6,879.5901)	(7,257.8760)	(7,069.1410)	(7,169.7420)
Observations	942	958	935	968	945	961
R-squared	0.5974	0.5970	0.6063	0.5837	0.5919	0.5919

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Our results for the IV travel mode share regressions for 2014 are in Table 32. Using wind speed in Gaoyao as the only IV (in “8iv”), we find that people are more likely to bicycle but less likely to take car when there is bad air. Using wind blowing from Chengshantou as the only IV (in “9iv”), we find that people are less likely to take car when there is bad air. Using south wind at Zhoushuizi as the only IV (in “7iv”), we find that people are more likely to taxi when there is bad air. Using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), we find that people are less likely to take car but more likely to take a taxi when there is bad air. Using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), we find that people are less likely to take car but more likely to take mode “others” when there is bad air. Using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), we don’t find any statistically significant coefficients on hourly PM 2.5 in the second stage.

When using south wind at Zhoushuizi and “wind_S544710” as the 2 IVs (in “3iv”), we do not pass the overidentification test (the Hansen overidentification test p-value is sometimes ≤ 0.05). When using wind speed in Gaoyao and “wind_S544710” as the 2 IVs (in “5iv”), we do not pass the overidentification test (the Hansen overidentification test p-value is sometimes ≤ 0.05). When using wind blowing from Chengshantou and “wind_S544710” as the 2 IVs (in “6iv”), we do not pass the overidentification test (the Hansen overidentification test p-value is sometimes ≤ 0.05).

Thus, our robust results for the IV travel mode share regressions for 2014 are that air pollution makes people weakly less likely to take car, and weakly more likely to take taxi.

Table 32a. Travel mode share IV regressions using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Share of all trips whose main mode was:						
	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000209 (0.000442)	-0.000121 (0.000287)	-3.79e-05 (0.000295)	-0.000548 (0.000401)	-7.81e-05 (9.28e-05)	0.000264* (0.000157)	0.000312 (0.000289)
Wind speed	-0.00269 (0.00780)	-0.00953** (0.00483)	-0.00805* (0.00473)	0.0211*** (0.00727)	0.00271 (0.00233)	-0.00439* (0.00227)	0.000885 (0.00365)
Temperature	0.00649** (0.00272)	0.00880*** (0.00233)	-0.00231 (0.00206)	-0.00866*** (0.00243)	-0.00293*** (0.000870)	-0.000328 (0.000539)	-0.00106 (0.00133)
Dew point temperature	-0.00285 (0.00529)	-0.000349 (0.00369)	-0.00201 (0.00362)	0.00914* (0.00512)	0.00147 (0.00138)	-0.00311* (0.00183)	-0.00230 (0.00348)
Sea Level Pressure	0.000712 (0.00245)	-0.00247 (0.00173)	0.00551*** (0.00208)	-3.56e-05 (0.00209)	-0.000832* (0.000493)	-0.000968 (0.000760)	-0.00191* (0.00115)
Cloud Ceiling	0.000158 (0.000253)	0.000207 (0.000158)	-0.000305 (0.000255)	-0.000209 (0.000202)	5.55e-05 (7.15e-05)	4.15e-05 (5.37e-05)	5.25e-05 (0.000105)
Altitude	-4.64e-06 (8.90e-06)	2.26e-05 (2.93e-05)	-5.75e-06 (8.56e-06)	-2.51e-06 (1.47e-05)	-1.76e-06 (1.88e-06)	-1.21e-06 (1.54e-06)	-6.72e-06* (3.45e-06)
North wind	-0.0453 (0.0275)	0.0154 (0.0186)	0.0565** (0.0223)	-0.0314 (0.0247)	0.0106 (0.00963)	0.0109 (0.00941)	-0.0169 (0.0158)
Northeast wind	0.0532 (0.0369)	-0.0248 (0.0261)	-0.0144 (0.0327)	0.0187 (0.0365)	-0.0151 (0.0127)	-0.0147 (0.0108)	-0.00291 (0.0180)
East wind	0.0718** (0.0307)	-0.00968 (0.0205)	-0.0387* (0.0231)	-0.0109 (0.0270)	-0.0157 (0.0105)	-0.00561 (0.00775)	0.00882 (0.0165)
Southeast wind	-0.00624 (0.0280)	0.000854 (0.0196)	-0.0348* (0.0207)	0.0293 (0.0253)	-0.0179* (0.00980)	2.00e-05 (0.0108)	0.0288 (0.0178)
South wind	0.0295 (0.0273)	0.00745 (0.0217)	-0.0454** (0.0210)	-0.00260 (0.0249)	-0.0136 (0.00982)	-0.00665 (0.00837)	0.0313** (0.0156)
Southwest wind	0.00108 (0.0432)	-0.0928*** (0.0321)	0.0372 (0.0434)	0.0426 (0.0371)	0.00209 (0.0105)	-0.0114 (0.00882)	0.0212 (0.0158)
West wind	0.0867 (0.0605)	-0.00727 (0.0397)	-0.0749*** (0.0262)	-0.0512 (0.0350)	-0.00428 (0.00864)	-0.00994 (0.00739)	0.0609 (0.0421)

Precipitation	0.00747*** (0.00278)	0.000348 (0.00222)	-0.00384*** (0.00116)	-0.00280* (0.00154)	-0.000293 (0.000678)	0.000290 (0.000588)	-0.00118 (0.000747)
Lag Precipitation	0.00308 (0.00255)	0.000711 (0.00215)	-0.000981 (0.00147)	-0.00325 (0.00207)	-0.000179 (0.000468)	0.000967 (0.000748)	-0.000341 (0.00139)
10.month	-0.0130 (0.0725)	0.0172 (0.0514)	-0.0236 (0.0462)	0.110* (0.0665)	-0.00209 (0.0171)	-0.0396 (0.0244)	-0.0492 (0.0514)
11.month	0.0127 (0.121)	0.0245 (0.0891)	-0.0318 (0.0816)	0.146 (0.112)	-0.0263 (0.0299)	-0.0713* (0.0429)	-0.0542 (0.0792)
1.weekday	0.0678* (0.0375)	0.0525* (0.0278)	0.0154 (0.0289)	-0.115*** (0.0395)	-0.00796 (0.0139)	0.00218 (0.00451)	-0.0149 (0.0165)
2.weekday	0.0700* (0.0385)	0.0165 (0.0284)	0.0450* (0.0271)	-0.151*** (0.0385)	-0.00179 (0.0140)	0.0107* (0.00566)	0.0100 (0.0199)
3.weekday	0.0607 (0.0375)	0.0397 (0.0272)	0.0271 (0.0247)	-0.136*** (0.0395)	0.000312 (0.0144)	-0.00136 (0.00670)	0.00926 (0.0180)
4.weekday	0.0584 (0.0373)	0.0460* (0.0265)	0.0449* (0.0254)	-0.121*** (0.0400)	-0.00782 (0.0138)	-0.00194 (0.00677)	-0.0186 (0.0189)
5.weekday	0.0602 (0.0373)	0.00681 (0.0266)	0.0595** (0.0246)	-0.0996*** (0.0384)	-0.000310 (0.0132)	-0.00445 (0.00583)	-0.0221 (0.0177)
6.weekday	0.0419 (0.0485)	-0.0255 (0.0321)	0.0171 (0.0304)	-0.0543 (0.0470)	-0.0227* (0.0136)	0.0171 (0.0146)	0.0263 (0.0280)
5.hour	0.0532 (0.0584)	-0.00352 (0.0371)	0.101*** (0.0237)	-0.223*** (0.0580)	0.0277** (0.0138)	-0.0112 (0.00952)	0.0564* (0.0312)
6.hour	6.389 (22.06)	-22.23 (15.51)	49.56*** (18.66)	-0.482 (18.73)	-7.431* (4.426)	-8.704 (6.827)	-17.10* (10.32)
7.hour	0.0836 (0.0511)	0.00538 (0.0342)	0.0736*** (0.0255)	-0.197*** (0.0559)	0.0388*** (0.0102)	-0.0120 (0.00946)	0.00769 (0.0190)
8.hour	0.170*** (0.0527)	-0.00415 (0.0348)	0.0781*** (0.0217)	-0.235*** (0.0584)	0.0371*** (0.0109)	0.000874 (0.0113)	-0.0463*** (0.0164)
9.hour	6.721 (22.05)	-22.23 (15.51)	49.49*** (18.66)	-0.630 (18.73)	-7.458* (4.428)	-8.686 (6.813)	-17.21* (10.32)
10.hour	0.349*** (0.0528)	0.0147 (0.0381)	0.0502** (0.0214)	-0.347*** (0.0554)	0.00486 (0.0118)	-0.0131 (0.00919)	-0.0586*** (0.0155)
11.hour	0.279*** (0.0554)	0.0636 (0.0388)	0.0614** (0.0269)	-0.333*** (0.0593)	-0.00756 (0.00774)	-0.0130 (0.00933)	-0.0503*** (0.0162)
12.hour	6.709	-22.20	49.52***	-0.672	-7.477*	-8.706	-17.18*

	(22.05)	(15.51)	(18.67)	(18.73)	(4.430)	(6.827)	(10.31)
13.hour	0.242***	0.0894**	0.0427	-0.312***	-0.0148**	-0.00246	-0.0450**
	(0.0550)	(0.0361)	(0.0319)	(0.0592)	(0.00753)	(0.0118)	(0.0181)
14.hour	0.179***	0.0922**	0.0353	-0.275***	-0.0144	0.00573	-0.0228
	(0.0551)	(0.0436)	(0.0259)	(0.0629)	(0.00881)	(0.0145)	(0.0276)
15.hour	6.659	-22.19	49.51***	-0.636	-7.480*	-8.706	-17.16*
	(22.05)	(15.50)	(18.67)	(18.73)	(4.432)	(6.826)	(10.31)
16.hour	0.241***	0.0673*	0.0584**	-0.340***	0.00294	-0.0148	-0.0142
	(0.0521)	(0.0358)	(0.0264)	(0.0583)	(0.0119)	(0.0105)	(0.0200)
17.hour	0.0591	0.0653*	0.0669***	-0.225***	0.0263***	-0.0162	0.0237
	(0.0528)	(0.0344)	(0.0246)	(0.0584)	(0.00956)	(0.0103)	(0.0220)
18.hour	6.415	-22.14	49.53***	-0.555	-7.439*	-8.710	-17.10*
	(22.05)	(15.51)	(18.67)	(18.74)	(4.430)	(6.826)	(10.31)
19.hour	0.303***	-0.00935	0.0136	-0.261***	-0.00633	-0.0174	-0.0221
	(0.0583)	(0.0363)	(0.0304)	(0.0625)	(0.0109)	(0.0111)	(0.0303)
20.hour	0.274***	-0.00731	-0.00783	-0.191***	-0.0142	-0.0168	-0.0371*
	(0.0567)	(0.0365)	(0.0282)	(0.0655)	(0.0116)	(0.0111)	(0.0195)
21.hour	6.648	-22.20	49.48***	-0.571	-7.458*	-8.713	-17.18*
	(22.05)	(15.50)	(18.66)	(18.74)	(4.432)	(6.827)	(10.31)
22.hour	0.0829	0.0537	0.0253	-0.146**	0.00747	0.00639	-0.0301
	(0.0603)	(0.0374)	(0.0317)	(0.0669)	(0.0140)	(0.0153)	(0.0232)
23.hour	-0.0524	0.107**	-0.0429	-0.000605	-0.0316***	0.0659**	-0.0457**
	(0.0583)	(0.0522)	(0.0276)	(0.0746)	(0.00874)	(0.0277)	(0.0204)
Constant	-7.051	24.70	-54.91***	0.959	8.378*	9.726	19.19*
	(24.55)	(17.27)	(20.77)	(20.85)	(4.933)	(7.606)	(11.49)
Observations	958	958	958	958	958	958	958
R-squared	0.293	0.190	0.128	0.235	0.104	0.039	0.134
Sanderson-Windmeijer F- statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.580	0.665	0.874	0.181	0.582	0.102	0.245

Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.564	0.652	0.868	0.166	0.567	0.0908	0.228
Stock-Wright weak instrument-robust inference p-value	0.452	0.532	0.764	0.106	0.149	2.47e-05	0.0142
Hansen overidentification test p-value	0.348	0.413	0.596	0.269	0.439	0.142	0.189

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000181 (0.000454)	-0.000163 (0.000313)	-9.74e-06 (0.000346)	-0.000690* (0.000407)	-0.000144 (0.000143)	0.000212* (0.000123)	0.000236 (0.000305)
Wind speed	-0.00305 (0.00813)	-0.00732 (0.00509)	-0.00766 (0.00514)	0.0213*** (0.00733)	0.00531 (0.00408)	-0.00356* (0.00197)	0.00295 (0.00387)
Temperature	0.00630** (0.00283)	0.00861*** (0.00239)	-0.00256 (0.00222)	-0.00952*** (0.00247)	-0.00402*** (0.00130)	-0.000302 (0.000480)	-0.00140 (0.00145)
Dew point temperature	-0.00264 (0.00555)	0.000561 (0.00393)	-0.00195 (0.00417)	0.0111** (0.00522)	0.00288 (0.00234)	-0.00249* (0.00147)	-0.00103 (0.00375)
Sea Level Pressure	0.000454 (0.00244)	-0.00331* (0.00177)	0.00529** (0.00214)	-0.000128 (0.00210)	-0.000952 (0.000659)	-0.000917 (0.000745)	-0.00204* (0.00121)
Cloud Ceiling	9.11e-05 (0.000250)	0.000234 (0.000165)	-0.000274 (0.000257)	-0.000187 (0.000202)	5.75e-05 (9.47e-05)	2.19e-05 (4.64e-05)	8.52e-05 (0.000115)
Altitude	-3.81e-06 (9.13e-06)	2.21e-05 (2.91e-05)	-6.88e-06 (8.48e-06)	-3.72e-06 (1.54e-05)	-1.49e-06 (2.30e-06)	-9.49e-07 (1.24e-06)	-6.00e-06* (3.63e-06)
North wind	-0.0399 (0.0278)	0.0124 (0.0195)	0.0583** (0.0227)	-0.0171 (0.0254)	0.00964 (0.0116)	0.00688 (0.00672)	-0.0178 (0.0159)
Northeast wind	0.0483 (0.0375)	-0.0276 (0.0269)	-0.0194 (0.0327)	0.00161 (0.0362)	-0.0161 (0.0144)	-0.0110 (0.00809)	-0.00280 (0.0183)
East wind	0.0609** (0.0309)	-0.0123 (0.0215)	-0.0398* (0.0236)	-0.0268 (0.0276)	-0.0181 (0.0121)	-0.00295 (0.00596)	0.00536 (0.0165)

Southeast wind	-0.00379 (0.0284)	-0.000833 (0.0206)	-0.0371* (0.0214)	0.0116 (0.0256)	-0.0201* (0.0113)	0.00211 (0.00923)	0.0289 (0.0181)
South wind	0.0273 (0.0279)	0.0131 (0.0231)	-0.0439** (0.0222)	-0.00481 (0.0262)	-0.0120 (0.0124)	-0.00494 (0.00623)	0.0334** (0.0167)
Southwest wind	-0.0166 (0.0408)	-0.0911*** (0.0343)	0.0356 (0.0435)	0.0364 (0.0376)	0.00646 (0.0132)	-0.00776 (0.00640)	0.0204 (0.0180)
West wind	0.0751 (0.0562)	0.00616 (0.0436)	-0.0767*** (0.0284)	-0.0594* (0.0357)	-0.00537 (0.0110)	-0.00760 (0.00570)	0.0582 (0.0429)
Precipitation	0.00694** (0.00269)	5.23e-05 (0.00223)	-0.00404*** (0.00123)	-0.00286* (0.00158)	-0.000655 (0.000809)	0.000133 (0.000502)	-0.00130 (0.000840)
Lag Precipitation	0.00367 (0.00256)	-0.000296 (0.00226)	-0.00146 (0.00168)	-0.00394* (0.00212)	-0.000457 (0.000655)	0.000780 (0.000614)	-0.000773 (0.00147)
10.month	-0.0104 (0.0733)	0.0231 (0.0555)	-0.0307 (0.0527)	0.127* (0.0671)	0.00549 (0.0248)	-0.0312 (0.0193)	-0.0355 (0.0539)
11.month	0.0162 (0.124)	0.0326 (0.0962)	-0.0372 (0.0895)	0.171 (0.114)	-0.0109 (0.0460)	-0.0586* (0.0331)	-0.0328 (0.0839)
1.weekday	0.0584 (0.0389)	0.0523* (0.0291)	0.0235 (0.0295)	-0.130*** (0.0411)	-0.00668 (0.0151)	0.00346 (0.00394)	-0.00752 (0.0169)
2.weekday	0.0616 (0.0402)	0.0198 (0.0301)	0.0590** (0.0295)	-0.173*** (0.0404)	-9.32e-05 (0.0156)	0.00896* (0.00459)	0.0157 (0.0200)
3.weekday	0.0484 (0.0390)	0.0506* (0.0295)	0.0354 (0.0260)	-0.144*** (0.0412)	0.00427 (0.0162)	0.000723 (0.00564)	0.0179 (0.0184)
4.weekday	0.0451 (0.0384)	0.0480* (0.0284)	0.0554** (0.0269)	-0.132*** (0.0414)	-0.00604 (0.0150)	-0.00113 (0.00612)	-0.00854 (0.0194)
5.weekday	0.0498 (0.0383)	0.00245 (0.0282)	0.0689*** (0.0255)	-0.111*** (0.0397)	0.00213 (0.0145)	-0.00242 (0.00519)	-0.0143 (0.0181)
6.weekday	0.0268 (0.0496)	-0.00719 (0.0360)	0.0288 (0.0336)	-0.0781* (0.0466)	-0.0255* (0.0147)	0.0177 (0.0142)	0.0346 (0.0287)
5.hour	0.0704 (0.0573)	-0.00996 (0.0391)	0.0965*** (0.0266)	-0.229*** (0.0578)	0.0315** (0.0140)	-0.00463 (0.00671)	0.0611* (0.0339)
6.hour	4.097 (21.90)	-29.74* (15.85)	47.62** (19.21)	-1.325 (18.90)	-8.494 (5.913)	-8.240 (6.690)	-18.27* (10.88)
7.hour	0.147*** (0.0514)	0.0352 (0.0370)	0.108*** (0.0288)	-0.172*** (0.0561)	0.0599*** (0.0118)	-0.00481 (0.00682)	0.0335 (0.0239)
8.hour	0.225***	0.0188	0.0927***	-0.219***	0.0563***	0.00602	-0.0488**

	(0.0526)	(0.0371)	(0.0262)	(0.0586)	(0.0179)	(0.00865)	(0.0195)
9.hour	4.428	-29.74*	47.52**	-1.456	-8.533	-8.221	-18.40*
	(21.90)	(15.85)	(19.21)	(18.90)	(5.923)	(6.675)	(10.88)
10.hour	0.374***	0.0137	0.0419*	-0.337***	0.00542	-0.00714	-0.0657***
	(0.0524)	(0.0390)	(0.0246)	(0.0573)	(0.0123)	(0.00636)	(0.0183)
11.hour	0.326***	0.0677*	0.0493*	-0.342***	-0.00913	-0.00737	-0.0587***
	(0.0544)	(0.0405)	(0.0287)	(0.0590)	(0.00932)	(0.00655)	(0.0189)
12.hour	4.377	-29.71*	47.56**	-1.497	-8.559	-8.241	-18.37*
	(21.90)	(15.85)	(19.21)	(18.90)	(5.925)	(6.690)	(10.87)
13.hour	0.281***	0.0947**	0.0361	-0.320***	-0.0169*	0.000339	-0.0501**
	(0.0538)	(0.0387)	(0.0336)	(0.0588)	(0.00884)	(0.00873)	(0.0217)
14.hour	0.202***	0.0975**	0.0345	-0.296***	-0.0190*	0.00715	-0.0344
	(0.0549)	(0.0456)	(0.0295)	(0.0621)	(0.0108)	(0.0109)	(0.0291)
15.hour	4.362	-29.71*	47.54**	-1.479	-8.563	-8.242	-18.35*
	(21.90)	(15.85)	(19.22)	(18.90)	(5.927)	(6.689)	(10.87)
16.hour	0.269***	0.0846**	0.0773***	-0.352***	0.00648	-0.00804	-0.0133
	(0.0533)	(0.0426)	(0.0298)	(0.0584)	(0.0150)	(0.00800)	(0.0227)
17.hour	0.120**	0.100***	0.110***	-0.193***	0.0368***	-0.00961	0.0401
	(0.0520)	(0.0371)	(0.0294)	(0.0588)	(0.0123)	(0.00761)	(0.0251)
18.hour	4.121	-29.65*	47.57**	-1.379	-8.514	-8.244	-18.29*
	(21.90)	(15.85)	(19.21)	(18.90)	(5.927)	(6.689)	(10.87)
19.hour	0.296***	0.00205	0.0133	-0.271***	-0.00426	-0.00934	-0.0269
	(0.0567)	(0.0393)	(0.0332)	(0.0620)	(0.0140)	(0.00829)	(0.0316)
20.hour	0.273***	0.00401	-0.0132	-0.184***	-0.0163	-0.00926	-0.0416*
	(0.0566)	(0.0397)	(0.0303)	(0.0659)	(0.0133)	(0.00818)	(0.0223)
21.hour	4.333	-29.72*	47.51**	-1.417	-8.540	-8.245	-18.37*
	(21.90)	(15.85)	(19.21)	(18.91)	(5.926)	(6.690)	(10.87)
22.hour	0.0893	0.0531	0.0168	-0.162**	0.00687	0.0151	-0.0372
	(0.0596)	(0.0396)	(0.0345)	(0.0668)	(0.0161)	(0.0128)	(0.0252)
23.hour	-0.0488	0.0998*	-0.0555*	0.00248	-0.0372***	0.0586***	-0.0567**
	(0.0560)	(0.0550)	(0.0300)	(0.0739)	(0.0102)	(0.0210)	(0.0228)
Constant	-4.467	33.07*	-52.71**	1.905	9.585	9.205	20.51*
	(24.38)	(17.65)	(21.38)	(21.04)	(6.598)	(7.454)	(12.11)
Observations	958	958	958	958	958	958	958

R-squared	0.284	0.181	0.142	0.228	0.089	0.051	0.166
Sanderson-Windmeijer F-statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.557	0.681	0.742	0.0586	0.454	0.0449	0.216
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.541	0.668	0.731	0.0505	0.436	0.0381	0.200
Stock-Wright weak instrument-robust inference p-value	0.427	0.584	0.579	0.0235	0.0280	5.10e-05	0.0182
Hansen overidentification test p-value	0.312	0.463	0.431	0.139	0.336	0.0722	0.106

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	9.70e-05 (0.000762)	-0.000267 (0.000360)	0.000206 (0.000390)	-0.000810 (0.000516)	-0.000165 (0.000146)	0.000487 (0.000322)	0.000292 (0.000337)
Wind speed	0.0104 (0.0131)	-0.00818 (0.00595)	-0.0116* (0.00622)	0.0277*** (0.00933)	0.00527 (0.00410)	-0.00781* (0.00442)	0.00281 (0.00462)
Temperature	0.00958** (0.00437)	0.0111*** (0.00272)	-0.00240 (0.00277)	-0.0123*** (0.00339)	-0.00420*** (0.00131)	-0.000666 (0.000801)	-0.00275 (0.00173)
Dew point temperature	-8.25e-05 (0.00888)	0.00102 (0.00449)	-0.00580 (0.00543)	0.0147** (0.00672)	0.00306 (0.00236)	-0.00567 (0.00370)	-0.00114 (0.00426)
Sea Level Pressure	0.00387 (0.00435)	-0.00404 (0.00267)	0.00747** (0.00292)	0.000332 (0.00288)	-0.00125* (0.000712)	-0.00167 (0.00148)	-0.00260 (0.00173)
Cloud Ceiling	0.000103 (0.000424)	0.000238 (0.000204)	-0.000310 (0.000290)	-0.000228 (0.000289)	6.46e-05 (9.54e-05)	6.87e-05 (8.81e-05)	9.10e-05 (0.000140)

Altitude	-1.12e-05 (9.24e-06)	1.80e-05 (2.99e-05)	-1.19e-05 (1.16e-05)	-4.61e-06 (1.69e-05)	-1.37e-06 (2.51e-06)	-1.98e-06 (2.80e-06)	-6.35e-06 (4.14e-06)
North wind	-0.0894** (0.0422)	0.00946 (0.0211)	0.0634** (0.0254)	-0.0525 (0.0344)	0.0101 (0.0117)	0.0257 (0.0212)	-0.0197 (0.0180)
Northeast wind	0.0874 (0.0615)	-0.0354 (0.0289)	0.00555 (0.0534)	0.0336 (0.0474)	-0.0170 (0.0146)	-0.0309 (0.0235)	-0.00356 (0.0197)
East wind	0.0984** (0.0440)	-0.00928 (0.0250)	-0.0323 (0.0304)	-0.00223 (0.0356)	-0.0176 (0.0123)	-0.0148 (0.0162)	0.00815 (0.0182)
Southeast wind	-0.00389 (0.0399)	0.00328 (0.0232)	-0.0327 (0.0247)	0.0572 (0.0352)	-0.0202* (0.0114)	-0.00300 (0.0229)	0.0405 (0.0253)
South wind	0.0723 (0.0466)	0.0128 (0.0258)	-0.0469* (0.0252)	0.0124 (0.0327)	-0.0120 (0.0125)	-0.0181 (0.0172)	0.0413** (0.0196)
Southwest wind	0.00151 (0.0613)	-0.126*** (0.0397)	0.0252 (0.0454)	0.0603 (0.0439)	0.00611 (0.0133)	-0.0224 (0.0185)	0.0314 (0.0216)
West wind	0.202 (0.139)	-0.00242 (0.0480)	-0.0882*** (0.0329)	-0.0361 (0.0479)	-0.00503 (0.0113)	-0.0169 (0.0136)	0.0687 (0.0438)
Precipitation	0.00713** (0.00316)	0.00143 (0.00364)	-0.00428*** (0.00142)	-0.00350* (0.00205)	-0.000464 (0.000883)	0.000561 (0.000741)	-0.00158* (0.000946)
Lag Precipitation	0.000526 (0.00408)	0.000630 (0.00256)	-0.000448 (0.00203)	-0.00505* (0.00264)	-0.000539 (0.000679)	0.00196 (0.00148)	-0.000768 (0.00170)
10.month	0.0219 (0.120)	0.0423 (0.0636)	-0.0692 (0.0600)	0.165* (0.0882)	0.00871 (0.0252)	-0.0724 (0.0498)	-0.0474 (0.0583)
11.month	0.130 (0.205)	0.0519 (0.107)	-0.111 (0.104)	0.232 (0.151)	-0.0105 (0.0465)	-0.133 (0.0893)	-0.0527 (0.0925)
1.weekday	0.104* (0.0558)	0.0707** (0.0351)	0.0157 (0.0447)	-0.134** (0.0528)	-0.00549 (0.0151)	0.00352 (0.00632)	-0.00728 (0.0173)
2.weekday	0.111* (0.0575)	0.0247 (0.0379)	0.0626 (0.0397)	-0.185*** (0.0533)	0.000173 (0.0157)	0.0179* (0.0105)	0.0204 (0.0213)
3.weekday	0.124** (0.0591)	0.0595* (0.0353)	0.0293 (0.0384)	-0.158*** (0.0518)	0.00755 (0.0163)	-0.00762 (0.0112)	0.0262 (0.0206)
4.weekday	0.0943* (0.0552)	0.0654* (0.0347)	0.0436 (0.0368)	-0.141*** (0.0511)	-0.00416 (0.0151)	-0.00205 (0.00970)	-0.00954 (0.0204)
5.weekday	0.0988* (0.0549)	0.0183 (0.0357)	0.0651* (0.0351)	-0.126** (0.0502)	0.00457 (0.0146)	-0.00728 (0.00854)	-0.0146 (0.0187)
6.weekday	0.0575	-0.0275	0.0110	-0.0438	-0.0259*	0.0293	0.0573

	(0.0687)	(0.0425)	(0.0408)	(0.0647)	(0.0148)	(0.0265)	(0.0380)
5.hour	0.0266	0.00676	0.109***	-0.267***	0.0311**	-0.0146	0.0729*
	(0.0781)	(0.0414)	(0.0279)	(0.0754)	(0.0147)	(0.0121)	(0.0406)
6.hour	34.80	-36.25	67.24**	2.862	-11.15*	-14.98	-23.27
	(39.08)	(23.96)	(26.18)	(25.86)	(6.390)	(13.26)	(15.52)
7.hour	0.259***	0.115***	0.150***	-0.129*	0.0637***	-0.0144	0.0489*
	(0.0853)	(0.0413)	(0.0395)	(0.0761)	(0.0126)	(0.0116)	(0.0287)
8.hour	0.277***	0.0409	0.127***	-0.255***	0.0577***	0.000151	-0.0479**
	(0.0765)	(0.0387)	(0.0289)	(0.0770)	(0.0183)	(0.0135)	(0.0208)
9.hour	35.24	-36.26	67.14**	2.635	-11.19*	-14.94	-23.41
	(39.06)	(23.97)	(26.19)	(25.86)	(6.399)	(13.24)	(15.52)
10.hour	0.494***	0.0470	0.0701***	-0.394***	0.00339	-0.0160	-0.0716***
	(0.0820)	(0.0425)	(0.0263)	(0.0760)	(0.0131)	(0.0116)	(0.0195)
11.hour	0.374***	0.113***	0.101***	-0.384***	-0.0111	-0.0153	-0.0631***
	(0.0783)	(0.0423)	(0.0392)	(0.0804)	(0.0104)	(0.0120)	(0.0207)
12.hour	35.30	-36.23	67.18**	2.576	-11.22*	-14.98	-23.36
	(39.08)	(23.97)	(26.19)	(25.86)	(6.401)	(13.27)	(15.49)
13.hour	0.295***	0.150***	0.0477	-0.368***	-0.0198**	-0.00418	-0.0590**
	(0.0754)	(0.0424)	(0.0351)	(0.0805)	(0.0100)	(0.0155)	(0.0234)
14.hour	0.234***	0.129***	0.0549*	-0.312***	-0.0210*	0.00711	-0.0380
	(0.0833)	(0.0469)	(0.0329)	(0.0894)	(0.0121)	(0.0186)	(0.0315)
15.hour	35.17	-36.18	67.17**	2.627	-11.22*	-14.98	-23.36
	(39.06)	(23.95)	(26.20)	(25.86)	(6.403)	(13.26)	(15.51)
16.hour	0.423***	0.166***	0.0940***	-0.388***	0.00400	-0.0192	-0.0198
	(0.0928)	(0.0465)	(0.0325)	(0.0809)	(0.0157)	(0.0143)	(0.0250)
17.hour	0.153*	0.155***	0.129***	-0.209***	0.0418***	-0.0207	0.0394
	(0.0822)	(0.0396)	(0.0324)	(0.0806)	(0.0135)	(0.0138)	(0.0280)
18.hour	34.85	-36.16	67.21**	2.709	-11.17*	-14.99	-23.29
	(39.06)	(23.97)	(26.21)	(25.86)	(6.402)	(13.26)	(15.51)
19.hour	0.433***	0.0216	0.0398	-0.283***	-0.00726	-0.0251	-0.0369
	(0.0852)	(0.0409)	(0.0438)	(0.0866)	(0.0148)	(0.0157)	(0.0330)
20.hour	0.393***	0.0368	-0.0139	-0.221**	-0.0196	-0.0256	-0.0473*
	(0.0841)	(0.0454)	(0.0335)	(0.0883)	(0.0142)	(0.0161)	(0.0245)
21.hour	35.13	-36.24	67.10**	2.694	-11.20*	-15.00	-23.39
	(39.07)	(23.96)	(26.19)	(25.88)	(6.402)	(13.26)	(15.51)

22.hour	0.0842 (0.0844)	0.0676 (0.0413)	0.0151 (0.0373)	-0.209** (0.0870)	0.00389 (0.0168)	-0.00617 (0.0218)	-0.0501* (0.0264)
23.hour	-0.0606 (0.0842)	0.113** (0.0556)	-0.0576* (0.0329)	0.00422 (0.111)	-0.0411*** (0.0113)	0.0972* (0.0561)	-0.0679*** (0.0239)
Constant	-38.74 (43.47)	40.32 (26.68)	-74.48** (29.14)	-2.606 (28.78)	12.54* (7.128)	16.74 (14.78)	26.10 (17.28)
Observations	958	958	958	958	958	958	958
R-squared	0.262	0.215	0.136	0.193	0.101	0.004	0.157
Sanderson-Windmeijer F- statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.241	0.659	0.498	0.181	0.405	0.261	0.251
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.224	0.645	0.481	0.166	0.387	0.244	0.234
Stock-Wright weak instrument- robust inference p-value	0.111	0.527	0.220	0.0889	0.0234	2.51e-08	0.0247
Hansen overidentification test p- value	0.0867	0.536	0.295	0.420	0.336	0.256	0.162

Robust standard errors in
parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000240 (0.000498)	-0.000120 (0.000298)	-6.29e-05 (0.000298)	-0.000550 (0.000405)	-8.00e-05 (9.42e-05)	0.000269* (0.000159)	0.000335 (0.000296)
Wind speed	0.00333 (0.0103)	-0.00865* (0.00496)	-0.00726 (0.00478)	0.0214*** (0.00750)	0.00310 (0.00240)	-0.00437* (0.00228)	0.00112 (0.00371)

Temperature	0.00659** (0.00298)	0.00909*** (0.00237)	-0.00259 (0.00207)	-0.00844*** (0.00259)	-0.00302*** (0.000879)	-0.000330 (0.000546)	-0.00114 (0.00136)
Dew point temperature	-0.00205 (0.00600)	-0.000311 (0.00379)	-0.00147 (0.00367)	0.00939* (0.00521)	0.00155 (0.00140)	-0.00315* (0.00185)	-0.00247 (0.00357)
Sea Level Pressure	0.00123 (0.00282)	-0.00281 (0.00197)	0.00573*** (0.00208)	0.000415 (0.00214)	-0.000888* (0.000525)	-0.000974 (0.000761)	-0.00188 (0.00116)
Cloud Ceiling	0.000276 (0.000308)	0.000225 (0.000166)	-0.000289 (0.000256)	-0.000231 (0.000212)	6.86e-05 (7.85e-05)	4.37e-05 (5.46e-05)	5.64e-05 (0.000108)
Altitude	-5.07e-06 (8.41e-06)	2.17e-05 (2.99e-05)	-5.77e-06 (8.58e-06)	-3.18e-06 (1.48e-05)	-1.74e-06 (1.90e-06)	-1.26e-06 (1.57e-06)	-6.89e-06* (3.58e-06)
North wind	-0.0629** (0.0312)	0.0141 (0.0189)	0.0563** (0.0222)	-0.0348 (0.0250)	0.0101 (0.00966)	0.0109 (0.00944)	-0.0181 (0.0159)
Northeast wind	0.0726 (0.0475)	-0.0261 (0.0265)	-0.0144 (0.0326)	0.0196 (0.0367)	-0.0151 (0.0127)	-0.0149 (0.0108)	-0.00292 (0.0182)
East wind	0.0796** (0.0325)	-0.00810 (0.0211)	-0.0390* (0.0230)	-0.00796 (0.0275)	-0.0154 (0.0105)	-0.00559 (0.00780)	0.0100 (0.0166)
Southeast wind	-0.000424 (0.0305)	0.00183 (0.0199)	-0.0351* (0.0207)	0.0303 (0.0256)	-0.0178* (0.00982)	0.000163 (0.0109)	0.0295* (0.0179)
South wind	0.0384 (0.0300)	0.00987 (0.0224)	-0.0462** (0.0210)	-0.000396 (0.0253)	-0.0135 (0.00984)	-0.00667 (0.00842)	0.0332** (0.0159)
Southwest wind	0.000145 (0.0449)	-0.100*** (0.0330)	0.0369 (0.0433)	0.0430 (0.0379)	0.00389 (0.0114)	-0.0116 (0.00888)	0.0214 (0.0162)
West wind	0.0952 (0.0756)	-0.0107 (0.0401)	-0.0747*** (0.0266)	-0.0506 (0.0361)	-0.00437 (0.00885)	-0.0102 (0.00745)	0.0607 (0.0421)
Precipitation	0.00788*** (0.00288)	0.000891 (0.00259)	-0.00397*** (0.00117)	-0.00291* (0.00155)	-0.000182 (0.000761)	0.000316 (0.000601)	-0.00121 (0.000765)
Lag Precipitation	0.00310 (0.00272)	0.000933 (0.00220)	-0.00115 (0.00149)	-0.00339 (0.00210)	-0.000163 (0.000479)	0.000974 (0.000757)	-0.000329 (0.00141)
10.month	-0.0128 (0.0817)	0.0184 (0.0535)	-0.0194 (0.0467)	0.116* (0.0673)	-0.00188 (0.0174)	-0.0402 (0.0246)	-0.0528 (0.0525)
11.month	0.0305 (0.138)	0.0220 (0.0918)	-0.0275 (0.0825)	0.153 (0.113)	-0.0270 (0.0303)	-0.0726* (0.0432)	-0.0600 (0.0809)
1.weekday	0.0921** (0.0424)	0.0589** (0.0283)	0.0211 (0.0289)	-0.111*** (0.0400)	-0.00683 (0.0139)	0.00227 (0.00473)	-0.0136 (0.0166)
2.weekday	0.0806**	0.0217	0.0522*	-0.148***	-0.000948	0.0108*	0.0122

	(0.0402)	(0.0293)	(0.0272)	(0.0390)	(0.0140)	(0.00576)	(0.0200)
3.weekday	0.0706*	0.0453	0.0328	-0.135***	0.00128	-0.00165	0.0113
	(0.0411)	(0.0278)	(0.0247)	(0.0399)	(0.0144)	(0.00708)	(0.0182)
4.weekday	0.0664	0.0513*	0.0517**	-0.119***	-0.00698	-0.00218	-0.0182
	(0.0413)	(0.0271)	(0.0255)	(0.0404)	(0.0139)	(0.00717)	(0.0191)
5.weekday	0.0712*	0.0113	0.0659***	-0.0992**	0.000707	-0.00461	-0.0215
	(0.0413)	(0.0273)	(0.0246)	(0.0389)	(0.0132)	(0.00616)	(0.0178)
6.weekday	0.0407	-0.0235	0.0194	-0.0558	-0.0227*	0.0170	0.0260
	(0.0519)	(0.0335)	(0.0307)	(0.0475)	(0.0136)	(0.0148)	(0.0281)
5.hour	0.0254	0.000176	0.104***	-0.222***	0.0282**	-0.0113	0.0580*
	(0.0732)	(0.0376)	(0.0236)	(0.0580)	(0.0138)	(0.00964)	(0.0315)
6.hour	11.07	-25.23	51.61***	3.578	-7.933*	-8.754	-16.86
	(25.38)	(17.69)	(18.72)	(19.20)	(4.715)	(6.839)	(10.46)
7.hour	0.0896	0.0263	0.0856***	-0.178***	0.0425***	-0.0120	0.0147
	(0.0696)	(0.0354)	(0.0256)	(0.0561)	(0.0103)	(0.00957)	(0.0197)
8.hour	0.149**	0.000123	0.0835***	-0.231***	0.0381***	0.00135	-0.0462***
	(0.0691)	(0.0349)	(0.0217)	(0.0584)	(0.0109)	(0.0115)	(0.0166)
9.hour	11.42	-25.23	51.53***	3.419	-7.958*	-8.735	-16.97
	(25.37)	(17.69)	(18.72)	(19.19)	(4.716)	(6.825)	(10.46)
10.hour	0.343***	0.0214	0.0579***	-0.343***	0.00515	-0.0130	-0.0590***
	(0.0692)	(0.0381)	(0.0217)	(0.0554)	(0.0118)	(0.00932)	(0.0157)
11.hour	0.265***	0.0719*	0.0651**	-0.330***	-0.00752	-0.0131	-0.0504***
	(0.0714)	(0.0390)	(0.0269)	(0.0593)	(0.00782)	(0.00947)	(0.0163)
12.hour	11.46	-25.19	51.57***	3.385	-7.979*	-8.754	-16.94
	(25.38)	(17.69)	(18.73)	(19.20)	(4.718)	(6.839)	(10.45)
13.hour	0.227***	0.0990***	0.0446	-0.308***	-0.0148*	-0.00255	-0.0451**
	(0.0704)	(0.0363)	(0.0319)	(0.0592)	(0.00762)	(0.0119)	(0.0182)
14.hour	0.162**	0.0999**	0.0380	-0.271***	-0.0143	0.00571	-0.0228
	(0.0701)	(0.0438)	(0.0261)	(0.0629)	(0.00893)	(0.0146)	(0.0278)
15.hour	11.35	-25.17	51.55***	3.420	-7.983*	-8.755	-16.92
	(25.37)	(17.68)	(18.74)	(19.20)	(4.720)	(6.838)	(10.46)
16.hour	0.261***	0.0922**	0.0704***	-0.326***	0.00456	-0.0145	-0.0102
	(0.0706)	(0.0366)	(0.0265)	(0.0586)	(0.0120)	(0.0107)	(0.0203)
17.hour	0.0568	0.0738**	0.0702***	-0.217***	0.0276***	-0.0162	0.0249
	(0.0768)	(0.0347)	(0.0247)	(0.0586)	(0.00967)	(0.0104)	(0.0221)

18.hour	11.08 (25.37)	-25.15 (17.69)	51.57*** (18.73)	3.496 (19.20)	-7.941* (4.719)	-8.759 (6.838)	-16.86 (10.45)
19.hour	0.301*** (0.0743)	-0.00309 (0.0365)	0.0159 (0.0304)	-0.251*** (0.0629)	-0.00589 (0.0110)	-0.0173 (0.0113)	-0.0219 (0.0304)
20.hour	0.267*** (0.0738)	0.000428 (0.0373)	-0.00729 (0.0282)	-0.182*** (0.0660)	-0.0143 (0.0117)	-0.0169 (0.0113)	-0.0332 (0.0206)
21.hour	11.31 (25.37)	-25.21 (17.69)	51.52*** (18.73)	3.477 (19.20)	-7.962* (4.721)	-8.763 (6.839)	-16.94 (10.45)
22.hour	0.0581 (0.0769)	0.0559 (0.0376)	0.0242 (0.0317)	-0.142** (0.0672)	0.00703 (0.0140)	0.00611 (0.0154)	-0.0315 (0.0235)
23.hour	-0.0799 (0.0754)	0.109** (0.0523)	-0.0439 (0.0276)	0.00300 (0.0748)	-0.0321*** (0.00884)	0.0658** (0.0277)	-0.0470** (0.0205)
Constant	-12.28 (28.25)	28.04 (19.70)	-57.18*** (20.84)	-3.552 (21.37)	8.937* (5.254)	9.781 (7.620)	18.93 (11.65)
Observations	958	958	958	958	958	958	958
R-squared	0.276	0.195	0.134	0.228	0.107	0.036	0.136
Sanderson-Windmeijer F-statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.438	0.671	0.830	0.224	0.578	0.0916	0.241
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.421	0.658	0.822	0.208	0.563	0.0809	0.224
Stock-Wright weak instrument-robust inference p-value	0.284	0.534	0.697	0.143	0.157	1.73e-05	0.0158
Hansen overidentification test p-value	0.226	0.410	0.537	0.344	0.436	0.127	0.201

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 32b. Travel mode share IV regressions using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000209 (0.000442)	-0.000121 (0.000287)	-3.79e-05 (0.000295)	-0.000548 (0.000401)	-7.81e-05 (9.28e-05)	0.000264* (0.000157)	0.000312 (0.000289)
Wind speed	-0.00269 (0.00780)	-0.00953** (0.00483)	-0.00805* (0.00473)	0.0211*** (0.00727)	0.00271 (0.00233)	-0.00439* (0.00227)	0.000885 (0.00365)
Temperature	0.00649** (0.00272)	0.00880*** (0.00233)	-0.00231 (0.00206)	-0.00866*** (0.00243)	-0.00293*** (0.000870)	-0.000328 (0.000539)	-0.00106 (0.00133)
Dew point temperature	-0.00285 (0.00529)	-0.000349 (0.00369)	-0.00201 (0.00362)	0.00914* (0.00512)	0.00147 (0.00138)	-0.00311* (0.00183)	-0.00230 (0.00348)
Sea Level Pressure	0.000712 (0.00245)	-0.00247 (0.00173)	0.00551*** (0.00208)	-3.56e-05 (0.00209)	-0.000832* (0.000493)	-0.000968 (0.000760)	-0.00191* (0.00115)
Cloud Ceiling	0.000158 (0.000253)	0.000207 (0.000158)	-0.000305 (0.000255)	-0.000209 (0.000202)	5.55e-05 (7.15e-05)	4.15e-05 (5.37e-05)	5.25e-05 (0.000105)
Altitude	-4.64e-06 (8.90e-06)	2.26e-05 (2.93e-05)	-5.75e-06 (8.56e-06)	-2.51e-06 (1.47e-05)	-1.76e-06 (1.88e-06)	-1.21e-06 (1.54e-06)	-6.72e-06* (3.45e-06)
North wind	-0.0453 (0.0275)	0.0154 (0.0186)	0.0565** (0.0223)	-0.0314 (0.0247)	0.0106 (0.00963)	0.0109 (0.00941)	-0.0169 (0.0158)
Northeast wind	0.0532 (0.0369)	-0.0248 (0.0261)	-0.0144 (0.0327)	0.0187 (0.0365)	-0.0151 (0.0127)	-0.0147 (0.0108)	-0.00291 (0.0180)
East wind	0.0718** (0.0307)	-0.00968 (0.0205)	-0.0387* (0.0231)	-0.0109 (0.0270)	-0.0157 (0.0105)	-0.00561 (0.00775)	0.00882 (0.0165)
Southeast wind	-0.00624 (0.0280)	0.000854 (0.0196)	-0.0348* (0.0207)	0.0293 (0.0253)	-0.0179* (0.00980)	2.00e-05 (0.0108)	0.0288 (0.0178)
South wind	0.0295 (0.0273)	0.00745 (0.0217)	-0.0454** (0.0210)	-0.00260 (0.0249)	-0.0136 (0.00982)	-0.00665 (0.00837)	0.0313** (0.0156)
Southwest wind	0.00108 (0.0432)	-0.0928*** (0.0321)	0.0372 (0.0434)	0.0426 (0.0371)	0.00209 (0.0105)	-0.0114 (0.00882)	0.0212 (0.0158)
West wind	0.0867	-0.00727	-0.0749***	-0.0512	-0.00428	-0.00994	0.0609

	(0.0605)	(0.0397)	(0.0262)	(0.0350)	(0.00864)	(0.00739)	(0.0421)
Precipitation	0.00747***	0.000348	-0.00384***	-0.00280*	-0.000293	0.000290	-0.00118
	(0.00278)	(0.00222)	(0.00116)	(0.00154)	(0.000678)	(0.000588)	(0.000747)
Lag Precipitation	0.00308	0.000711	-0.000981	-0.00325	-0.000179	0.000967	-0.000341
	(0.00255)	(0.00215)	(0.00147)	(0.00207)	(0.000468)	(0.000748)	(0.00139)
10.month	-0.0130	0.0172	-0.0236	0.110*	-0.00209	-0.0396	-0.0492
	(0.0725)	(0.0514)	(0.0462)	(0.0665)	(0.0171)	(0.0244)	(0.0514)
11.month	0.0127	0.0245	-0.0318	0.146	-0.0263	-0.0713*	-0.0542
	(0.121)	(0.0891)	(0.0816)	(0.112)	(0.0299)	(0.0429)	(0.0792)
1.weekday	0.0678*	0.0525*	0.0154	-0.115***	-0.00796	0.00218	-0.0149
	(0.0375)	(0.0278)	(0.0289)	(0.0395)	(0.0139)	(0.00451)	(0.0165)
2.weekday	0.0700*	0.0165	0.0450*	-0.151***	-0.00179	0.0107*	0.0100
	(0.0385)	(0.0284)	(0.0271)	(0.0385)	(0.0140)	(0.00566)	(0.0199)
3.weekday	0.0607	0.0397	0.0271	-0.136***	0.000312	-0.00136	0.00926
	(0.0375)	(0.0272)	(0.0247)	(0.0395)	(0.0144)	(0.00670)	(0.0180)
4.weekday	0.0584	0.0460*	0.0449*	-0.121***	-0.00782	-0.00194	-0.0186
	(0.0373)	(0.0265)	(0.0254)	(0.0400)	(0.0138)	(0.00677)	(0.0189)
5.weekday	0.0602	0.00681	0.0595**	-0.0996***	-0.000310	-0.00445	-0.0221
	(0.0373)	(0.0266)	(0.0246)	(0.0384)	(0.0132)	(0.00583)	(0.0177)
6.weekday	0.0419	-0.0255	0.0171	-0.0543	-0.0227*	0.0171	0.0263
	(0.0485)	(0.0321)	(0.0304)	(0.0470)	(0.0136)	(0.0146)	(0.0280)
5.hour	0.0532	-0.00352	0.101***	-0.223***	0.0277**	-0.0112	0.0564*
	(0.0584)	(0.0371)	(0.0237)	(0.0580)	(0.0138)	(0.00952)	(0.0312)
6.hour	6.389	-22.23	49.56***	-0.482	-7.431*	-8.704	-17.10*
	(22.06)	(15.51)	(18.66)	(18.73)	(4.426)	(6.827)	(10.32)
7.hour	0.0836	0.00538	0.0736***	-0.197***	0.0388***	-0.0120	0.00769
	(0.0511)	(0.0342)	(0.0255)	(0.0559)	(0.0102)	(0.00946)	(0.0190)
8.hour	0.170***	-0.00415	0.0781***	-0.235***	0.0371***	0.000874	-0.0463***
	(0.0527)	(0.0348)	(0.0217)	(0.0584)	(0.0109)	(0.0113)	(0.0164)
9.hour	6.721	-22.23	49.49***	-0.630	-7.458*	-8.686	-17.21*
	(22.05)	(15.51)	(18.66)	(18.73)	(4.428)	(6.813)	(10.32)
10.hour	0.349***	0.0147	0.0502**	-0.347***	0.00486	-0.0131	-0.0586***
	(0.0528)	(0.0381)	(0.0214)	(0.0554)	(0.0118)	(0.00919)	(0.0155)
11.hour	0.279***	0.0636	0.0614**	-0.333***	-0.00756	-0.0130	-0.0503***
	(0.0554)	(0.0388)	(0.0269)	(0.0593)	(0.00774)	(0.00933)	(0.0162)

12.hour	6.709 (22.05)	-22.20 (15.51)	49.52*** (18.67)	-0.672 (18.73)	-7.477* (4.430)	-8.706 (6.827)	-17.18* (10.31)
13.hour	0.242*** (0.0550)	0.0894** (0.0361)	0.0427 (0.0319)	-0.312*** (0.0592)	-0.0148*** (0.00753)	-0.00246 (0.0118)	-0.0450*** (0.0181)
14.hour	0.179*** (0.0551)	0.0922** (0.0436)	0.0353 (0.0259)	-0.275*** (0.0629)	-0.0144 (0.00881)	0.00573 (0.0145)	-0.0228 (0.0276)
15.hour	6.659 (22.05)	-22.19 (15.50)	49.51*** (18.67)	-0.636 (18.73)	-7.480* (4.432)	-8.706 (6.826)	-17.16* (10.31)
16.hour	0.241*** (0.0521)	0.0673* (0.0358)	0.0584** (0.0264)	-0.340*** (0.0583)	0.00294 (0.0119)	-0.0148 (0.0105)	-0.0142 (0.0200)
17.hour	0.0591 (0.0528)	0.0653* (0.0344)	0.0669*** (0.0246)	-0.225*** (0.0584)	0.0263*** (0.00956)	-0.0162 (0.0103)	0.0237 (0.0220)
18.hour	6.415 (22.05)	-22.14 (15.51)	49.53*** (18.67)	-0.555 (18.74)	-7.439* (4.430)	-8.710 (6.826)	-17.10* (10.31)
19.hour	0.303*** (0.0583)	-0.00935 (0.0363)	0.0136 (0.0304)	-0.261*** (0.0625)	-0.00633 (0.0109)	-0.0174 (0.0111)	-0.0221 (0.0303)
20.hour	0.274*** (0.0567)	-0.00731 (0.0365)	-0.00783 (0.0282)	-0.191*** (0.0655)	-0.0142 (0.0116)	-0.0168 (0.0111)	-0.0371* (0.0195)
21.hour	6.648 (22.05)	-22.20 (15.50)	49.48*** (18.66)	-0.571 (18.74)	-7.458* (4.432)	-8.713 (6.827)	-17.18* (10.31)
22.hour	0.0829 (0.0603)	0.0537 (0.0374)	0.0253 (0.0317)	-0.146** (0.0669)	0.00747 (0.0140)	0.00639 (0.0153)	-0.0301 (0.0232)
23.hour	-0.0524 (0.0583)	0.107** (0.0522)	-0.0429 (0.0276)	-0.000605 (0.0746)	-0.0316*** (0.00874)	0.0659** (0.0277)	-0.0457** (0.0204)
Constant	-7.051 (24.55)	24.70 (17.27)	-54.91*** (20.77)	0.959 (20.85)	8.378* (4.933)	9.726 (7.606)	19.19* (11.49)
Observations	958	958	958	958	958	958	958
R-squared	0.293	0.190	0.128	0.235	0.104	0.039	0.134
Sanderson-Windmeijer F- statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07

Anderson-Rubin weak instrument-robust inference F test p-value	0.580	0.665	0.874	0.181	0.582	0.102	0.245
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.564	0.652	0.868	0.166	0.567	0.0908	0.228
Stock-Wright weak instrument-robust inference p-value	0.452	0.532	0.764	0.106	0.149	2.47e-05	0.0142
Hansen overidentification test p-value	0.348	0.413	0.596	0.269	0.439	0.142	0.189

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000181 (0.000454)	-0.000163 (0.000313)	-9.74e-06 (0.000346)	-0.000690* (0.000407)	-0.000144 (0.000143)	0.000212* (0.000123)	0.000236 (0.000305)
Wind speed	-0.00305 (0.00813)	-0.00732 (0.00509)	-0.00766 (0.00514)	0.0213*** (0.00733)	0.00531 (0.00408)	-0.00356* (0.00197)	0.00295 (0.00387)
Temperature	0.00630** (0.00283)	0.00861*** (0.00239)	-0.00256 (0.00222)	-0.00952*** (0.00247)	-0.00402*** (0.00130)	-0.000302 (0.000480)	-0.00140 (0.00145)
Dew point temperature	-0.00264 (0.00555)	0.000561 (0.00393)	-0.00195 (0.00417)	0.0111** (0.00522)	0.00288 (0.00234)	-0.00249* (0.00147)	-0.00103 (0.00375)
Sea Level Pressure	0.000454 (0.00244)	-0.00331* (0.00177)	0.00529** (0.00214)	-0.000128 (0.00210)	-0.000952 (0.000659)	-0.000917 (0.000745)	-0.00204* (0.00121)
Cloud Ceiling	9.11e-05 (0.000250)	0.000234 (0.000165)	-0.000274 (0.000257)	-0.000187 (0.000202)	5.75e-05 (9.47e-05)	2.19e-05 (4.64e-05)	8.52e-05 (0.000115)
Altitude	-3.81e-06 (9.13e-06)	2.21e-05 (2.91e-05)	-6.88e-06 (8.48e-06)	-3.72e-06 (1.54e-05)	-1.49e-06 (2.30e-06)	-9.49e-07 (1.24e-06)	-6.00e-06* (3.63e-06)
North wind	-0.0399 (0.0278)	0.0124 (0.0195)	0.0583** (0.0227)	-0.0171 (0.0254)	0.00964 (0.0116)	0.00688 (0.00672)	-0.0178 (0.0159)
Northeast wind	0.0483 (0.0375)	-0.0276 (0.0269)	-0.0194 (0.0327)	0.00161 (0.0362)	-0.0161 (0.0144)	-0.0110 (0.00809)	-0.00280 (0.0183)
East wind	0.0609**	-0.0123	-0.0398*	-0.0268	-0.0181	-0.00295	0.00536

	(0.0309)	(0.0215)	(0.0236)	(0.0276)	(0.0121)	(0.00596)	(0.0165)
Southeast wind	-0.00379	-0.000833	-0.0371*	0.0116	-0.0201*	0.00211	0.0289
	(0.0284)	(0.0206)	(0.0214)	(0.0256)	(0.0113)	(0.00923)	(0.0181)
South wind	0.0273	0.0131	-0.0439**	-0.00481	-0.0120	-0.00494	0.0334**
	(0.0279)	(0.0231)	(0.0222)	(0.0262)	(0.0124)	(0.00623)	(0.0167)
Southwest wind	-0.0166	-0.0911***	0.0356	0.0364	0.00646	-0.00776	0.0204
	(0.0408)	(0.0343)	(0.0435)	(0.0376)	(0.0132)	(0.00640)	(0.0180)
West wind	0.0751	0.00616	-0.0767***	-0.0594*	-0.00537	-0.00760	0.0582
	(0.0562)	(0.0436)	(0.0284)	(0.0357)	(0.0110)	(0.00570)	(0.0429)
Precipitation	0.00694**	5.23e-05	-0.00404***	-0.00286*	-0.000655	0.000133	-0.00130
	(0.00269)	(0.00223)	(0.00123)	(0.00158)	(0.000809)	(0.000502)	(0.000840)
Lag Precipitation	0.00367	-0.000296	-0.00146	-0.00394*	-0.000457	0.000780	-0.000773
	(0.00256)	(0.00226)	(0.00168)	(0.00212)	(0.000655)	(0.000614)	(0.00147)
10.month	-0.0104	0.0231	-0.0307	0.127*	0.00549	-0.0312	-0.0355
	(0.0733)	(0.0555)	(0.0527)	(0.0671)	(0.0248)	(0.0193)	(0.0539)
11.month	0.0162	0.0326	-0.0372	0.171	-0.0109	-0.0586*	-0.0328
	(0.124)	(0.0962)	(0.0895)	(0.114)	(0.0460)	(0.0331)	(0.0839)
1.weekday	0.0584	0.0523*	0.0235	-0.130***	-0.00668	0.00346	-0.00752
	(0.0389)	(0.0291)	(0.0295)	(0.0411)	(0.0151)	(0.00394)	(0.0169)
2.weekday	0.0616	0.0198	0.0590**	-0.173***	-9.32e-05	0.00896*	0.0157
	(0.0402)	(0.0301)	(0.0295)	(0.0404)	(0.0156)	(0.00459)	(0.0200)
3.weekday	0.0484	0.0506*	0.0354	-0.144***	0.00427	0.000723	0.0179
	(0.0390)	(0.0295)	(0.0260)	(0.0412)	(0.0162)	(0.00564)	(0.0184)
4.weekday	0.0451	0.0480*	0.0554**	-0.132***	-0.00604	-0.00113	-0.00854
	(0.0384)	(0.0284)	(0.0269)	(0.0414)	(0.0150)	(0.00612)	(0.0194)
5.weekday	0.0498	0.00245	0.0689***	-0.111***	0.00213	-0.00242	-0.0143
	(0.0383)	(0.0282)	(0.0255)	(0.0397)	(0.0145)	(0.00519)	(0.0181)
6.weekday	0.0268	-0.00719	0.0288	-0.0781*	-0.0255*	0.0177	0.0346
	(0.0496)	(0.0360)	(0.0336)	(0.0466)	(0.0147)	(0.0142)	(0.0287)
5.hour	0.0704	-0.00996	0.0965***	-0.229***	0.0315**	-0.00463	0.0611*
	(0.0573)	(0.0391)	(0.0266)	(0.0578)	(0.0140)	(0.00671)	(0.0339)
6.hour	4.097	-29.74*	47.62**	-1.325	-8.494	-8.240	-18.27*
	(21.90)	(15.85)	(19.21)	(18.90)	(5.913)	(6.690)	(10.88)
7.hour	0.147***	0.0352	0.108***	-0.172***	0.0599***	-0.00481	0.0335
	(0.0514)	(0.0370)	(0.0288)	(0.0561)	(0.0118)	(0.00682)	(0.0239)

8.hour	0.225*** (0.0526)	0.0188 (0.0371)	0.0927*** (0.0262)	-0.219*** (0.0586)	0.0563*** (0.0179)	0.00602 (0.00865)	-0.0488** (0.0195)
9.hour	4.428 (21.90)	-29.74* (15.85)	47.52** (19.21)	-1.456 (18.90)	-8.533 (5.923)	-8.221 (6.675)	-18.40* (10.88)
10.hour	0.374*** (0.0524)	0.0137 (0.0390)	0.0419* (0.0246)	-0.337*** (0.0573)	0.00542 (0.0123)	-0.00714 (0.00636)	-0.0657*** (0.0183)
11.hour	0.326*** (0.0544)	0.0677* (0.0405)	0.0493* (0.0287)	-0.342*** (0.0590)	-0.00913 (0.00932)	-0.00737 (0.00655)	-0.0587*** (0.0189)
12.hour	4.377 (21.90)	-29.71* (15.85)	47.56** (19.21)	-1.497 (18.90)	-8.559 (5.925)	-8.241 (6.690)	-18.37* (10.87)
13.hour	0.281*** (0.0538)	0.0947** (0.0387)	0.0361 (0.0336)	-0.320*** (0.0588)	-0.0169* (0.00884)	0.000339 (0.00873)	-0.0501** (0.0217)
14.hour	0.202*** (0.0549)	0.0975** (0.0456)	0.0345 (0.0295)	-0.296*** (0.0621)	-0.0190* (0.0108)	0.00715 (0.0109)	-0.0344 (0.0291)
15.hour	4.362 (21.90)	-29.71* (15.85)	47.54** (19.22)	-1.479 (18.90)	-8.563 (5.927)	-8.242 (6.689)	-18.35* (10.87)
16.hour	0.269*** (0.0533)	0.0846** (0.0426)	0.0773*** (0.0298)	-0.352*** (0.0584)	0.00648 (0.0150)	-0.00804 (0.00800)	-0.0133 (0.0227)
17.hour	0.120** (0.0520)	0.100*** (0.0371)	0.110*** (0.0294)	-0.193*** (0.0588)	0.0368*** (0.0123)	-0.00961 (0.00761)	0.0401 (0.0251)
18.hour	4.121 (21.90)	-29.65* (15.85)	47.57** (19.21)	-1.379 (18.90)	-8.514 (5.927)	-8.244 (6.689)	-18.29* (10.87)
19.hour	0.296*** (0.0567)	0.00205 (0.0393)	0.0133 (0.0332)	-0.271*** (0.0620)	-0.00426 (0.0140)	-0.00934 (0.00829)	-0.0269 (0.0316)
20.hour	0.273*** (0.0566)	0.00401 (0.0397)	-0.0132 (0.0303)	-0.184*** (0.0659)	-0.0163 (0.0133)	-0.00926 (0.00818)	-0.0416* (0.0223)
21.hour	4.333 (21.90)	-29.72* (15.85)	47.51** (19.21)	-1.417 (18.91)	-8.540 (5.926)	-8.245 (6.690)	-18.37* (10.87)
22.hour	0.0893 (0.0596)	0.0531 (0.0396)	0.0168 (0.0345)	-0.162** (0.0668)	0.00687 (0.0161)	0.0151 (0.0128)	-0.0372 (0.0252)
23.hour	-0.0488 (0.0560)	0.0998* (0.0550)	-0.0555* (0.0300)	0.00248 (0.0739)	-0.0372*** (0.0102)	0.0586*** (0.0210)	-0.0567** (0.0228)
Constant	-4.467 (24.38)	33.07* (17.65)	-52.71** (21.38)	1.905 (21.04)	9.585 (6.598)	9.205 (7.454)	20.51* (12.11)

Observations	958	958	958	958	958	958	958
R-squared	0.284	0.181	0.142	0.228	0.089	0.051	0.166
Sanderson-Windmeijer F-statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.557	0.681	0.742	0.0586	0.454	0.0449	0.216
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.541	0.668	0.731	0.0505	0.436	0.0381	0.200
Stock-Wright weak instrument-robust inference p-value	0.427	0.584	0.579	0.0235	0.0280	5.10e-05	0.0182
Hansen overidentification test p-value	0.312	0.463	0.431	0.139	0.336	0.0722	0.106

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	9.70e-05 (0.000762)	-0.000267 (0.000360)	0.000206 (0.000390)	-0.000810 (0.000516)	-0.000165 (0.000146)	0.000487 (0.000322)	0.000292 (0.000337)
Wind speed	0.0104 (0.0131)	-0.00818 (0.00595)	-0.0116* (0.00622)	0.0277*** (0.00933)	0.00527 (0.00410)	-0.00781* (0.00442)	0.00281 (0.00462)
Temperature	0.00958** (0.00437)	0.0111*** (0.00272)	-0.00240 (0.00277)	-0.0123*** (0.00339)	-0.00420*** (0.00131)	-0.000666 (0.000801)	-0.00275 (0.00173)
Dew point temperature	-8.25e-05 (0.00888)	0.00102 (0.00449)	-0.00580 (0.00543)	0.0147** (0.00672)	0.00306 (0.00236)	-0.00567 (0.00370)	-0.00114 (0.00426)
Sea Level Pressure	0.00387 (0.00435)	-0.00404 (0.00267)	0.00747** (0.00292)	0.000332 (0.00288)	-0.00125* (0.000712)	-0.00167 (0.00148)	-0.00260 (0.00173)
Cloud Ceiling	0.000103 (0.000424)	0.000238 (0.000204)	-0.000310 (0.000290)	-0.000228 (0.000289)	6.46e-05 (9.54e-05)	6.87e-05 (8.81e-05)	9.10e-05 (0.000140)
Altitude	-1.12e-05	1.80e-05	-1.19e-05	-4.61e-06	-1.37e-06	-1.98e-06	-6.35e-06

	(9.24e-06)	(2.99e-05)	(1.16e-05)	(1.69e-05)	(2.51e-06)	(2.80e-06)	(4.14e-06)
North wind	-0.0894**	0.00946	0.0634**	-0.0525	0.0101	0.0257	-0.0197
	(0.0422)	(0.0211)	(0.0254)	(0.0344)	(0.0117)	(0.0212)	(0.0180)
Northeast wind	0.0874	-0.0354	0.00555	0.0336	-0.0170	-0.0309	-0.00356
	(0.0615)	(0.0289)	(0.0534)	(0.0474)	(0.0146)	(0.0235)	(0.0197)
East wind	0.0984**	-0.00928	-0.0323	-0.00223	-0.0176	-0.0148	0.00815
	(0.0440)	(0.0250)	(0.0304)	(0.0356)	(0.0123)	(0.0162)	(0.0182)
Southeast wind	-0.00389	0.00328	-0.0327	0.0572	-0.0202*	-0.00300	0.0405
	(0.0399)	(0.0232)	(0.0247)	(0.0352)	(0.0114)	(0.0229)	(0.0253)
South wind	0.0723	0.0128	-0.0469*	0.0124	-0.0120	-0.0181	0.0413**
	(0.0466)	(0.0258)	(0.0252)	(0.0327)	(0.0125)	(0.0172)	(0.0196)
Southwest wind	0.00151	-0.126***	0.0252	0.0603	0.00611	-0.0224	0.0314
	(0.0613)	(0.0397)	(0.0454)	(0.0439)	(0.0133)	(0.0185)	(0.0216)
West wind	0.202	-0.00242	-0.0882***	-0.0361	-0.00503	-0.0169	0.0687
	(0.139)	(0.0480)	(0.0329)	(0.0479)	(0.0113)	(0.0136)	(0.0438)
Precipitation	0.00713**	0.00143	-0.00428***	-0.00350*	-0.000464	0.000561	-0.00158*
	(0.00316)	(0.00364)	(0.00142)	(0.00205)	(0.000883)	(0.000741)	(0.000946)
Lag Precipitation	0.000526	0.000630	-0.000448	-0.00505*	-0.000539	0.00196	-0.000768
	(0.00408)	(0.00256)	(0.00203)	(0.00264)	(0.000679)	(0.00148)	(0.00170)
10.month	0.0219	0.0423	-0.0692	0.165*	0.00871	-0.0724	-0.0474
	(0.120)	(0.0636)	(0.0600)	(0.0882)	(0.0252)	(0.0498)	(0.0583)
11.month	0.130	0.0519	-0.111	0.232	-0.0105	-0.133	-0.0527
	(0.205)	(0.107)	(0.104)	(0.151)	(0.0465)	(0.0893)	(0.0925)
1.weekday	0.104*	0.0707**	0.0157	-0.134**	-0.00549	0.00352	-0.00728
	(0.0558)	(0.0351)	(0.0447)	(0.0528)	(0.0151)	(0.00632)	(0.0173)
2.weekday	0.111*	0.0247	0.0626	-0.185***	0.000173	0.0179*	0.0204
	(0.0575)	(0.0379)	(0.0397)	(0.0533)	(0.0157)	(0.0105)	(0.0213)
3.weekday	0.124**	0.0595*	0.0293	-0.158***	0.00755	-0.00762	0.0262
	(0.0591)	(0.0353)	(0.0384)	(0.0518)	(0.0163)	(0.0112)	(0.0206)
4.weekday	0.0943*	0.0654*	0.0436	-0.141***	-0.00416	-0.00205	-0.00954
	(0.0552)	(0.0347)	(0.0368)	(0.0511)	(0.0151)	(0.00970)	(0.0204)
5.weekday	0.0988*	0.0183	0.0651*	-0.126**	0.00457	-0.00728	-0.0146
	(0.0549)	(0.0357)	(0.0351)	(0.0502)	(0.0146)	(0.00854)	(0.0187)
6.weekday	0.0575	-0.0275	0.0110	-0.0438	-0.0259*	0.0293	0.0573
	(0.0687)	(0.0425)	(0.0408)	(0.0647)	(0.0148)	(0.0265)	(0.0380)

5.hour	0.0266 (0.0781)	0.00676 (0.0414)	0.109*** (0.0279)	-0.267*** (0.0754)	0.0311** (0.0147)	-0.0146 (0.0121)	0.0729* (0.0406)
6.hour	34.80 (39.08)	-36.25 (23.96)	67.24** (26.18)	2.862 (25.86)	-11.15* (6.390)	-14.98 (13.26)	-23.27 (15.52)
7.hour	0.259*** (0.0853)	0.115*** (0.0413)	0.150*** (0.0395)	-0.129* (0.0761)	0.0637*** (0.0126)	-0.0144 (0.0116)	0.0489* (0.0287)
8.hour	0.277*** (0.0765)	0.0409 (0.0387)	0.127*** (0.0289)	-0.255*** (0.0770)	0.0577*** (0.0183)	0.000151 (0.0135)	-0.0479** (0.0208)
9.hour	35.24 (39.06)	-36.26 (23.97)	67.14** (26.19)	2.635 (25.86)	-11.19* (6.399)	-14.94 (13.24)	-23.41 (15.52)
10.hour	0.494*** (0.0820)	0.0470 (0.0425)	0.0701*** (0.0263)	-0.394*** (0.0760)	0.00339 (0.0131)	-0.0160 (0.0116)	-0.0716*** (0.0195)
11.hour	0.374*** (0.0783)	0.113*** (0.0423)	0.101*** (0.0392)	-0.384*** (0.0804)	-0.0111 (0.0104)	-0.0153 (0.0120)	-0.0631*** (0.0207)
12.hour	35.30 (39.08)	-36.23 (23.97)	67.18** (26.19)	2.576 (25.86)	-11.22* (6.401)	-14.98 (13.27)	-23.36 (15.49)
13.hour	0.295*** (0.0754)	0.150*** (0.0424)	0.0477 (0.0351)	-0.368*** (0.0805)	-0.0198** (0.0100)	-0.00418 (0.0155)	-0.0590** (0.0234)
14.hour	0.234*** (0.0833)	0.129*** (0.0469)	0.0549* (0.0329)	-0.312*** (0.0894)	-0.0210* (0.0121)	0.00711 (0.0186)	-0.0380 (0.0315)
15.hour	35.17 (39.06)	-36.18 (23.95)	67.17** (26.20)	2.627 (25.86)	-11.22* (6.403)	-14.98 (13.26)	-23.36 (15.51)
16.hour	0.423*** (0.0928)	0.166*** (0.0465)	0.0940*** (0.0325)	-0.388*** (0.0809)	0.00400 (0.0157)	-0.0192 (0.0143)	-0.0198 (0.0250)
17.hour	0.153* (0.0822)	0.155*** (0.0396)	0.129*** (0.0324)	-0.209*** (0.0806)	0.0418*** (0.0135)	-0.0207 (0.0138)	0.0394 (0.0280)
18.hour	34.85 (39.06)	-36.16 (23.97)	67.21** (26.21)	2.709 (25.86)	-11.17* (6.402)	-14.99 (13.26)	-23.29 (15.51)
19.hour	0.433*** (0.0852)	0.0216 (0.0409)	0.0398 (0.0438)	-0.283*** (0.0866)	-0.00726 (0.0148)	-0.0251 (0.0157)	-0.0369 (0.0330)
20.hour	0.393*** (0.0841)	0.0368 (0.0454)	-0.0139 (0.0335)	-0.221** (0.0883)	-0.0196 (0.0142)	-0.0256 (0.0161)	-0.0473* (0.0245)
21.hour	35.13 (39.07)	-36.24 (23.96)	67.10** (26.19)	2.694 (25.88)	-11.20* (6.402)	-15.00 (13.26)	-23.39 (15.51)
22.hour	0.0842	0.0676	0.0151	-0.209**	0.00389	-0.00617	-0.0501*

	(0.0844)	(0.0413)	(0.0373)	(0.0870)	(0.0168)	(0.0218)	(0.0264)
23.hour	-0.0606	0.113**	-0.0576*	0.00422	-0.0411***	0.0972*	-0.0679***
	(0.0842)	(0.0556)	(0.0329)	(0.111)	(0.0113)	(0.0561)	(0.0239)
Constant	-38.74	40.32	-74.48**	-2.606	12.54*	16.74	26.10
	(43.47)	(26.68)	(29.14)	(28.78)	(7.128)	(14.78)	(17.28)
Observations	958	958	958	958	958	958	958
R-squared	0.262	0.215	0.136	0.193	0.101	0.004	0.157
Sanderson-Windmeijer F- statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.241	0.659	0.498	0.181	0.405	0.261	0.251
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.224	0.645	0.481	0.166	0.387	0.244	0.234
Stock-Wright weak instrument- robust inference p-value	0.111	0.527	0.220	0.0889	0.0234	2.51e-08	0.0247
Hansen overidentification test p- value	0.0867	0.536	0.295	0.420	0.336	0.256	0.162

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000240	-0.000120	-6.29e-05	-0.000550	-8.00e-05	0.000269*	0.000335
	(0.000498)	(0.000298)	(0.000298)	(0.000405)	(9.42e-05)	(0.000159)	(0.000296)
Wind speed	0.00333	-0.00865*	-0.00726	0.0214***	0.00310	-0.00437*	0.00112
	(0.0103)	(0.00496)	(0.00478)	(0.00750)	(0.00240)	(0.00228)	(0.00371)
Temperature	0.00659**	0.00909***	-0.00259	-0.00844***	-0.00302***	-0.000330	-0.00114
	(0.00298)	(0.00237)	(0.00207)	(0.00259)	(0.000879)	(0.000546)	(0.00136)
Dew point temperature	-0.00205	-0.000311	-0.00147	0.00939*	0.00155	-0.00315*	-0.00247

	(0.00600)	(0.00379)	(0.00367)	(0.00521)	(0.00140)	(0.00185)	(0.00357)
Sea Level Pressure	0.00123	-0.00281	0.00573***	0.000415	-0.000888*	-0.000974	-0.00188
	(0.00282)	(0.00197)	(0.00208)	(0.00214)	(0.000525)	(0.000761)	(0.00116)
Cloud Ceiling	0.000276	0.000225	-0.000289	-0.000231	6.86e-05	4.37e-05	5.64e-05
	(0.000308)	(0.000166)	(0.000256)	(0.000212)	(7.85e-05)	(5.46e-05)	(0.000108)
Altitude	-5.07e-06	2.17e-05	-5.77e-06	-3.18e-06	-1.74e-06	-1.26e-06	-6.89e-06*
	(8.41e-06)	(2.99e-05)	(8.58e-06)	(1.48e-05)	(1.90e-06)	(1.57e-06)	(3.58e-06)
North wind	-0.0629**	0.0141	0.0563**	-0.0348	0.0101	0.0109	-0.0181
	(0.0312)	(0.0189)	(0.0222)	(0.0250)	(0.00966)	(0.00944)	(0.0159)
Northeast wind	0.0726	-0.0261	-0.0144	0.0196	-0.0151	-0.0149	-0.00292
	(0.0475)	(0.0265)	(0.0326)	(0.0367)	(0.0127)	(0.0108)	(0.0182)
East wind	0.0796**	-0.00810	-0.0390*	-0.00796	-0.0154	-0.00559	0.0100
	(0.0325)	(0.0211)	(0.0230)	(0.0275)	(0.0105)	(0.00780)	(0.0166)
Southeast wind	-0.000424	0.00183	-0.0351*	0.0303	-0.0178*	0.000163	0.0295*
	(0.0305)	(0.0199)	(0.0207)	(0.0256)	(0.00982)	(0.0109)	(0.0179)
South wind	0.0384	0.00987	-0.0462**	-0.000396	-0.0135	-0.00667	0.0332**
	(0.0300)	(0.0224)	(0.0210)	(0.0253)	(0.00984)	(0.00842)	(0.0159)
Southwest wind	0.000145	-0.100***	0.0369	0.0430	0.00389	-0.0116	0.0214
	(0.0449)	(0.0330)	(0.0433)	(0.0379)	(0.0114)	(0.00888)	(0.0162)
West wind	0.0952	-0.0107	-0.0747***	-0.0506	-0.00437	-0.0102	0.0607
	(0.0756)	(0.0401)	(0.0266)	(0.0361)	(0.00885)	(0.00745)	(0.0421)
Precipitation	0.00788***	0.000891	-0.00397***	-0.00291*	-0.000182	0.000316	-0.00121
	(0.00288)	(0.00259)	(0.00117)	(0.00155)	(0.000761)	(0.000601)	(0.000765)
Lag Precipitation	0.00310	0.000933	-0.00115	-0.00339	-0.000163	0.000974	-0.000329
	(0.00272)	(0.00220)	(0.00149)	(0.00210)	(0.000479)	(0.000757)	(0.00141)
10.month	-0.0128	0.0184	-0.0194	0.116*	-0.00188	-0.0402	-0.0528
	(0.0817)	(0.0535)	(0.0467)	(0.0673)	(0.0174)	(0.0246)	(0.0525)
11.month	0.0305	0.0220	-0.0275	0.153	-0.0270	-0.0726*	-0.0600
	(0.138)	(0.0918)	(0.0825)	(0.113)	(0.0303)	(0.0432)	(0.0809)
1.weekday	0.0921**	0.0589**	0.0211	-0.111***	-0.00683	0.00227	-0.0136
	(0.0424)	(0.0283)	(0.0289)	(0.0400)	(0.0139)	(0.00473)	(0.0166)
2.weekday	0.0806**	0.0217	0.0522*	-0.148***	-0.000948	0.0108*	0.0122
	(0.0402)	(0.0293)	(0.0272)	(0.0390)	(0.0140)	(0.00576)	(0.0200)
3.weekday	0.0706*	0.0453	0.0328	-0.135***	0.00128	-0.00165	0.0113
	(0.0411)	(0.0278)	(0.0247)	(0.0399)	(0.0144)	(0.00708)	(0.0182)

4.weekday	0.0664 (0.0413)	0.0513* (0.0271)	0.0517** (0.0255)	-0.119*** (0.0404)	-0.00698 (0.0139)	-0.00218 (0.00717)	-0.0182 (0.0191)
5.weekday	0.0712* (0.0413)	0.0113 (0.0273)	0.0659*** (0.0246)	-0.0992** (0.0389)	0.000707 (0.0132)	-0.00461 (0.00616)	-0.0215 (0.0178)
6.weekday	0.0407 (0.0519)	-0.0235 (0.0335)	0.0194 (0.0307)	-0.0558 (0.0475)	-0.0227* (0.0136)	0.0170 (0.0148)	0.0260 (0.0281)
5.hour	0.0254 (0.0732)	0.000176 (0.0376)	0.104*** (0.0236)	-0.222*** (0.0580)	0.0282** (0.0138)	-0.0113 (0.00964)	0.0580* (0.0315)
6.hour	11.07 (25.38)	-25.23 (17.69)	51.61*** (18.72)	3.578 (19.20)	-7.933* (4.715)	-8.754 (6.839)	-16.86 (10.46)
7.hour	0.0896 (0.0696)	0.0263 (0.0354)	0.0856*** (0.0256)	-0.178*** (0.0561)	0.0425*** (0.0103)	-0.0120 (0.00957)	0.0147 (0.0197)
8.hour	0.149** (0.0691)	0.000123 (0.0349)	0.0835*** (0.0217)	-0.231*** (0.0584)	0.0381*** (0.0109)	0.00135 (0.0115)	-0.0462*** (0.0166)
9.hour	11.42 (25.37)	-25.23 (17.69)	51.53*** (18.72)	3.419 (19.19)	-7.958* (4.716)	-8.735 (6.825)	-16.97 (10.46)
10.hour	0.343*** (0.0692)	0.0214 (0.0381)	0.0579*** (0.0217)	-0.343*** (0.0554)	0.00515 (0.0118)	-0.0130 (0.00932)	-0.0590*** (0.0157)
11.hour	0.265*** (0.0714)	0.0719* (0.0390)	0.0651** (0.0269)	-0.330*** (0.0593)	-0.00752 (0.00782)	-0.0131 (0.00947)	-0.0504*** (0.0163)
12.hour	11.46 (25.38)	-25.19 (17.69)	51.57*** (18.73)	3.385 (19.20)	-7.979* (4.718)	-8.754 (6.839)	-16.94 (10.45)
13.hour	0.227*** (0.0704)	0.0990*** (0.0363)	0.0446 (0.0319)	-0.308*** (0.0592)	-0.0148* (0.00762)	-0.00255 (0.0119)	-0.0451** (0.0182)
14.hour	0.162** (0.0701)	0.0999** (0.0438)	0.0380 (0.0261)	-0.271*** (0.0629)	-0.0143 (0.00893)	0.00571 (0.0146)	-0.0228 (0.0278)
15.hour	11.35 (25.37)	-25.17 (17.68)	51.55*** (18.74)	3.420 (19.20)	-7.983* (4.720)	-8.755 (6.838)	-16.92 (10.46)
16.hour	0.261*** (0.0706)	0.0922** (0.0366)	0.0704*** (0.0265)	-0.326*** (0.0586)	0.00456 (0.0120)	-0.0145 (0.0107)	-0.0102 (0.0203)
17.hour	0.0568 (0.0768)	0.0738** (0.0347)	0.0702*** (0.0247)	-0.217*** (0.0586)	0.0276*** (0.00967)	-0.0162 (0.0104)	0.0249 (0.0221)
18.hour	11.08 (25.37)	-25.15 (17.69)	51.57*** (18.73)	3.496 (19.20)	-7.941* (4.719)	-8.759 (6.838)	-16.86 (10.45)
19.hour	0.301***	-0.00309	0.0159	-0.251***	-0.00589	-0.0173	-0.0219

	(0.0743)	(0.0365)	(0.0304)	(0.0629)	(0.0110)	(0.0113)	(0.0304)
20.hour	0.267***	0.000428	-0.00729	-0.182***	-0.0143	-0.0169	-0.0332
	(0.0738)	(0.0373)	(0.0282)	(0.0660)	(0.0117)	(0.0113)	(0.0206)
21.hour	11.31	-25.21	51.52***	3.477	-7.962*	-8.763	-16.94
	(25.37)	(17.69)	(18.73)	(19.20)	(4.721)	(6.839)	(10.45)
22.hour	0.0581	0.0559	0.0242	-0.142**	0.00703	0.00611	-0.0315
	(0.0769)	(0.0376)	(0.0317)	(0.0672)	(0.0140)	(0.0154)	(0.0235)
23.hour	-0.0799	0.109**	-0.0439	0.00300	-0.0321***	0.0658**	-0.0470**
	(0.0754)	(0.0523)	(0.0276)	(0.0748)	(0.00884)	(0.0277)	(0.0205)
Constant	-12.28	28.04	-57.18***	-3.552	8.937*	9.781	18.93
	(28.25)	(19.70)	(20.84)	(21.37)	(5.254)	(7.620)	(11.65)
Observations	958	958	958	958	958	958	958
R-squared	0.276	0.195	0.134	0.228	0.107	0.036	0.136
Sanderson-Windmeijer F- statistic	13.46	13.46	13.46	13.46	13.46	13.46	13.46
underidentification test p-value	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07	8.60e-07
Anderson-Rubin weak instrument-robust inference F test p-value	0.438	0.671	0.830	0.224	0.578	0.0916	0.241
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.421	0.658	0.822	0.208	0.563	0.0809	0.224
Stock-Wright weak instrument- robust inference p-value	0.284	0.534	0.697	0.143	0.157	1.73e-05	0.0158
Hansen overidentification test p- value	0.226	0.410	0.537	0.344	0.436	0.127	0.201

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 32c. Travel mode share IV regressions using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000216 (0.000380)	0.000198 (0.000257)	-0.000174 (0.000284)	-0.000754** (0.000344)	-3.24e-06 (9.79e-05)	3.56e-05 (9.82e-05)	0.000482** (0.000245)
Wind speed	-0.00183 (0.00777)	-0.0113** (0.00508)	-0.00752 (0.00506)	0.0211*** (0.00772)	0.00225 (0.00246)	-0.00273 (0.00179)	9.09e-05 (0.00372)
Temperature	0.00638** (0.00274)	0.00912*** (0.00244)	-0.00254 (0.00208)	-0.00794*** (0.00251)	-0.00297*** (0.000891)	-0.000735 (0.000527)	-0.00131 (0.00136)
Dew point temperature	-0.00283 (0.00470)	-0.00381 (0.00333)	-0.000385 (0.00369)	0.0110** (0.00462)	0.000605 (0.00150)	-0.000338 (0.00112)	-0.00421 (0.00281)
Sea Level Pressure	0.000402 (0.00245)	-0.00252 (0.00171)	0.00560*** (0.00208)	0.000347 (0.00210)	-0.000812 (0.000495)	-0.00107 (0.000779)	-0.00194* (0.00117)
Cloud Ceiling	0.000121 (0.000265)	0.000238 (0.000164)	-0.000325 (0.000272)	-0.000201 (0.000214)	5.07e-05 (7.53e-05)	6.11e-05 (5.17e-05)	5.43e-05 (0.000108)
Altitude	-3.30e-06 (1.23e-05)	3.48e-05 (4.22e-05)	-1.11e-05 (1.03e-05)	-5.80e-06 (2.27e-05)	-3.91e-06** (1.80e-06)	3.06e-07 (1.17e-06)	-1.09e-05*** (3.08e-06)
North wind	-0.0506* (0.0290)	0.0183 (0.0209)	0.0543** (0.0238)	-0.0267 (0.0260)	0.0114 (0.0104)	0.0102 (0.00955)	-0.0170 (0.0173)
Northeast wind	0.0579 (0.0385)	-0.0348 (0.0284)	-0.0102 (0.0350)	0.0220 (0.0367)	-0.0178 (0.0133)	-0.00987 (0.00978)	-0.00728 (0.0202)
East wind	0.0762** (0.0317)	-0.0102 (0.0216)	-0.0389 (0.0244)	-0.0132 (0.0286)	-0.0160 (0.0110)	-0.00786 (0.00828)	0.0100 (0.0174)
Southeast wind	-0.00561 (0.0295)	-0.00249 (0.0216)	-0.0326 (0.0224)	0.0294 (0.0270)	-0.0188* (0.0105)	0.00157 (0.0113)	0.0285 (0.0190)
South wind	0.0312 (0.0284)	0.00455 (0.0231)	-0.0438** (0.0222)	-0.00473 (0.0261)	-0.0138 (0.0102)	-0.00648 (0.00849)	0.0330** (0.0165)
Southwest wind	0.00437 (0.0439)	-0.0962*** (0.0330)	0.0399 (0.0432)	0.0379 (0.0379)	0.00153 (0.0109)	-0.00983 (0.00854)	0.0223 (0.0168)
West wind	0.0880 (0.0605)	-0.0100 (0.0418)	-0.0725*** (0.0272)	-0.0523 (0.0359)	-0.00465 (0.00880)	-0.00935 (0.00695)	0.0608 (0.0418)
Precipitation	0.00743*** (0.00280)	0.000462 (0.00223)	-0.00389*** (0.00116)	-0.00286* (0.00154)	-0.000283 (0.000680)	0.000287 (0.000595)	-0.00114 (0.000797)

Lag Precipitation	0.00301 (0.00224)	0.00206 (0.00198)	-0.00151 (0.00147)	-0.00397** (0.00188)	0.000132 (0.000520)	-4.93e-05 (0.000541)	0.000334 (0.00120)
10.month	-0.0144 (0.0647)	-0.0345 (0.0466)	-0.00150 (0.0471)	0.148** (0.0585)	-0.0149 (0.0190)	-0.00300 (0.0165)	-0.0793* (0.0446)
11.month	0.0166 (0.106)	-0.0538 (0.0765)	0.00386 (0.0816)	0.188** (0.0959)	-0.0464 (0.0335)	-0.0117 (0.0290)	-0.0970 (0.0682)
1.weekday	0.0745* (0.0386)	0.0560** (0.0283)	0.0135 (0.0303)	-0.118*** (0.0413)	-0.00891 (0.0143)	0.000939 (0.00469)	-0.0183 (0.0175)
2.weekday	0.0760** (0.0379)	0.0229 (0.0280)	0.0389 (0.0276)	-0.152*** (0.0402)	-0.00110 (0.0140)	0.00446 (0.00494)	0.0109 (0.0191)
3.weekday	0.0693* (0.0378)	0.0294 (0.0287)	0.0267 (0.0249)	-0.133*** (0.0401)	-0.00187 (0.0154)	0.00392 (0.00571)	0.00527 (0.0194)
4.weekday	0.0651* (0.0383)	0.0329 (0.0289)	0.0488* (0.0265)	-0.117*** (0.0404)	-0.0102 (0.0147)	0.00536 (0.00655)	-0.0252 (0.0209)
5.weekday	0.0676* (0.0379)	0.000773 (0.0277)	0.0590** (0.0252)	-0.0966** (0.0394)	-0.00165 (0.0137)	-0.00332 (0.00544)	-0.0257 (0.0189)
6.weekday	0.0486 (0.0496)	-0.0331 (0.0340)	0.0173 (0.0304)	-0.0516 (0.0480)	-0.0248* (0.0143)	0.0210 (0.0148)	0.0226 (0.0286)
5.hour	0.0528 (0.0584)	-0.00820 (0.0383)	0.103*** (0.0237)	-0.220*** (0.0592)	0.0265** (0.0135)	-0.00761 (0.00923)	0.0533* (0.0302)
6.hour	3.605 (22.05)	-22.69 (15.35)	50.43*** (18.67)	2.962 (18.83)	-7.259 (4.444)	-9.639 (6.995)	-17.41* (10.50)
7.hour	0.0836 (0.0509)	0.00172 (0.0349)	0.0754*** (0.0253)	-0.194*** (0.0564)	0.0379*** (0.00984)	-0.00945 (0.00942)	0.00483 (0.0194)
8.hour	0.168*** (0.0531)	-0.0104 (0.0357)	0.0797*** (0.0221)	-0.228*** (0.0593)	0.0360*** (0.0112)	0.00379 (0.0115)	-0.0493*** (0.0173)
9.hour	3.930 (22.05)	-22.69 (15.35)	50.36*** (18.67)	2.815 (18.83)	-7.285 (4.446)	-9.621 (6.980)	-17.51* (10.50)
10.hour	0.344*** (0.0529)	0.0171 (0.0386)	0.0523** (0.0216)	-0.345*** (0.0558)	0.00473 (0.0117)	-0.0123 (0.00908)	-0.0610*** (0.0163)
11.hour	0.283*** (0.0559)	0.0622 (0.0403)	0.0614** (0.0282)	-0.331*** (0.0597)	-0.00737 (0.00785)	-0.0156* (0.00932)	-0.0524*** (0.0169)
12.hour	3.925 (22.05)	-22.65 (15.35)	50.39*** (18.68)	2.765 (18.83)	-7.303 (4.448)	-9.645 (6.996)	-17.48* (10.49)
13.hour	0.246***	0.0866**	0.0420	-0.309***	-0.0154**	-0.00352	-0.0467**

	(0.0561)	(0.0375)	(0.0335)	(0.0597)	(0.00771)	(0.0120)	(0.0189)
14.hour	0.179***	0.0961**	0.0365	-0.276***	-0.0139	0.00116	-0.0226
	(0.0545)	(0.0457)	(0.0263)	(0.0619)	(0.00874)	(0.0146)	(0.0277)
15.hour	3.883	-22.64	50.38***	2.793	-7.306	-9.650	-17.46*
	(22.04)	(15.34)	(18.68)	(18.82)	(4.449)	(6.995)	(10.49)
16.hour	0.240***	0.0734**	0.0525**	-0.337***	0.00400	-0.0183*	-0.0147
	(0.0514)	(0.0366)	(0.0259)	(0.0578)	(0.0117)	(0.0102)	(0.0205)
17.hour	0.0600	0.0653*	0.0636**	-0.221***	0.0269***	-0.0186*	0.0244
	(0.0526)	(0.0351)	(0.0247)	(0.0581)	(0.00956)	(0.00994)	(0.0224)
18.hour	3.637	-22.60	50.40***	2.889	-7.264	-9.651	-17.40*
	(22.05)	(15.35)	(18.68)	(18.83)	(4.448)	(6.995)	(10.49)
19.hour	0.302***	-0.00965	0.0150	-0.260***	-0.00723	-0.0177*	-0.0228
	(0.0586)	(0.0374)	(0.0308)	(0.0629)	(0.0111)	(0.0106)	(0.0315)
20.hour	0.277***	-0.0104	-0.00328	-0.190***	-0.0151	-0.0159	-0.0431**
	(0.0566)	(0.0376)	(0.0293)	(0.0655)	(0.0120)	(0.0108)	(0.0208)
21.hour	3.852	-22.67	50.35***	2.890	-7.287	-9.647	-17.49*
	(22.05)	(15.35)	(18.68)	(18.84)	(4.450)	(6.994)	(10.49)
22.hour	0.0816	0.0428	0.0274	-0.132*	0.00613	0.0106	-0.0366
	(0.0617)	(0.0387)	(0.0329)	(0.0690)	(0.0143)	(0.0147)	(0.0247)
23.hour	-0.0531	0.105**	-0.0430	0.00736	-0.0329***	0.0662**	-0.0497**
	(0.0584)	(0.0523)	(0.0278)	(0.0746)	(0.00897)	(0.0278)	(0.0210)
Constant	-3.957	25.22	-55.87***	-2.900	8.197*	10.75	19.56*
	(24.55)	(17.10)	(20.78)	(20.97)	(4.953)	(7.791)	(11.69)
Observations	935	935	935	935	935	935	935
R-squared	0.295	0.152	0.119	0.218	0.122	0.110	0.112
Sanderson-Windmeijer F-statistic	25.67	25.67	25.67	25.67	25.67	25.67	25.67
underidentification test p-value	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11
Anderson-Rubin weak instrument-robust inference F test p-value	0.509	0.0912	0.521	0.0511	0.455	0.544	0.147
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.492	0.0802	0.504	0.0435	0.437	0.527	0.133

Stock-Wright weak instrument-robust inference p-value	0.372	0.0235	0.238	0.0216	0.135	0.181	0.000977
Hansen overidentification test p-value	0.270	0.0478	0.326	0.354	0.210	0.259	0.247

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000178 (0.000389)	0.000163 (0.000273)	-0.000191 (0.000312)	-0.000927*** (0.000350)	-8.25e-05 (0.000153)	1.91e-05 (7.49e-05)	0.000445* (0.000251)
Wind speed	-0.00236 (0.00802)	-0.00918* (0.00529)	-0.00693 (0.00542)	0.0216*** (0.00781)	0.00500 (0.00423)	-0.00216 (0.00157)	0.00182 (0.00382)
Temperature	0.00641** (0.00283)	0.00897*** (0.00249)	-0.00274 (0.00219)	-0.00872*** (0.00254)	-0.00410*** (0.00133)	-0.000634 (0.000460)	-0.00159 (0.00147)
Dew point temperature	-0.00268 (0.00489)	-0.00299 (0.00347)	0.000165 (0.00398)	0.0133*** (0.00469)	0.00219 (0.00253)	-0.000150 (0.000855)	-0.00341 (0.00290)
Sea Level Pressure	0.000207 (0.00243)	-0.00337* (0.00174)	0.00539** (0.00214)	0.000213 (0.00213)	-0.000941 (0.000669)	-0.00100 (0.000769)	-0.00205* (0.00123)
Cloud Ceiling	4.08e-05 (0.000261)	0.000265 (0.000170)	-0.000294 (0.000275)	-0.000182 (0.000214)	5.28e-05 (9.88e-05)	3.82e-05 (4.40e-05)	8.65e-05 (0.000119)
Altitude	-4.36e-06 (1.28e-05)	3.39e-05 (4.21e-05)	-1.23e-05 (1.00e-05)	-5.93e-06 (2.38e-05)	-3.40e-06 (2.58e-06)	3.81e-07 (9.59e-07)	-1.07e-05*** (3.13e-06)
North wind	-0.0434 (0.0293)	0.0157 (0.0219)	0.0546** (0.0242)	-0.0121 (0.0270)	0.0101 (0.0126)	0.00613 (0.00669)	-0.0176 (0.0174)
Northeast wind	0.0527 (0.0392)	-0.0384 (0.0295)	-0.0129 (0.0349)	0.00511 (0.0370)	-0.0185 (0.0153)	-0.00676 (0.00742)	-0.00819 (0.0205)
East wind	0.0646** (0.0320)	-0.0130 (0.0226)	-0.0392 (0.0249)	-0.0304 (0.0293)	-0.0185 (0.0125)	-0.00469 (0.00609)	0.00659 (0.0175)
Southeast wind	-0.00531 (0.0297)	-0.00424 (0.0227)	-0.0333 (0.0230)	0.0109 (0.0274)	-0.0209* (0.0121)	0.00359 (0.00972)	0.0282 (0.0193)
South wind	0.0265	0.0100	-0.0413* (0.0230)	-0.0128 (0.0274)	-0.0120 (0.0121)	-0.00470 (0.00972)	0.0351** (0.0193)

	(0.0289)	(0.0246)	(0.0234)	(0.0270)	(0.0129)	(0.00622)	(0.0176)
Southwest wind	-0.0156	-0.0946***	0.0395	0.0280	0.00611	-0.00636	0.0210
	(0.0416)	(0.0353)	(0.0432)	(0.0385)	(0.0137)	(0.00615)	(0.0188)
West wind	0.0739	0.00303	-0.0734**	-0.0648*	-0.00568	-0.00702	0.0581
	(0.0564)	(0.0457)	(0.0293)	(0.0370)	(0.0110)	(0.00543)	(0.0426)
Precipitation	0.00683**	0.000161	-0.00408***	-0.00288*	-0.000641	0.000130	-0.00125
	(0.00271)	(0.00224)	(0.00122)	(0.00160)	(0.000808)	(0.000510)	(0.000893)
Lag Precipitation	0.00363	0.00108	-0.00219	-0.00473**	-0.000211	-7.61e-05	7.93e-05
	(0.00222)	(0.00206)	(0.00158)	(0.00192)	(0.000748)	(0.000486)	(0.00125)
10.month	-0.00936	-0.0296	-0.000600	0.171***	-0.00517	-0.000150	-0.0717
	(0.0653)	(0.0491)	(0.0508)	(0.0591)	(0.0275)	(0.0133)	(0.0455)
11.month	0.0215	-0.0474	0.0106	0.224**	-0.0274	-0.00821	-0.0858
	(0.108)	(0.0806)	(0.0860)	(0.0982)	(0.0511)	(0.0218)	(0.0696)
1.weekday	0.0696*	0.0557*	0.0216	-0.123***	-0.00761	0.00240	-0.0109
	(0.0394)	(0.0297)	(0.0309)	(0.0419)	(0.0154)	(0.00414)	(0.0179)
2.weekday	0.0729*	0.0262	0.0516*	-0.167***	-6.27e-05	0.00358	0.0175
	(0.0391)	(0.0297)	(0.0293)	(0.0406)	(0.0156)	(0.00430)	(0.0194)
3.weekday	0.0619	0.0399	0.0355	-0.133***	0.00214	0.00502	0.0126
	(0.0383)	(0.0308)	(0.0262)	(0.0410)	(0.0174)	(0.00514)	(0.0197)
4.weekday	0.0561	0.0341	0.0603**	-0.115***	-0.00809	0.00493	-0.0160
	(0.0384)	(0.0306)	(0.0281)	(0.0410)	(0.0161)	(0.00559)	(0.0212)
5.weekday	0.0623	-0.00406	0.0683***	-0.0997**	0.000623	-0.00154	-0.0183
	(0.0383)	(0.0293)	(0.0262)	(0.0399)	(0.0150)	(0.00492)	(0.0192)
6.weekday	0.0381	-0.0153	0.0296	-0.0664	-0.0276*	0.0209	0.0301
	(0.0501)	(0.0378)	(0.0338)	(0.0470)	(0.0155)	(0.0145)	(0.0292)
5.hour	0.0704	-0.0147	0.0991***	-0.224***	0.0305**	-0.00159	0.0575*
	(0.0574)	(0.0400)	(0.0265)	(0.0593)	(0.0136)	(0.00639)	(0.0331)
6.hour	1.877	-30.29*	48.53**	1.746	-8.396	-9.003	-18.34*
	(21.85)	(15.66)	(19.23)	(19.10)	(5.994)	(6.912)	(11.04)
7.hour	0.148***	0.0313	0.111***	-0.168***	0.0593***	-0.00267	0.0302
	(0.0510)	(0.0376)	(0.0286)	(0.0568)	(0.0113)	(0.00672)	(0.0242)
8.hour	0.226***	0.0120	0.0950***	-0.210***	0.0556***	0.00850	-0.0521**
	(0.0530)	(0.0379)	(0.0266)	(0.0597)	(0.0183)	(0.00884)	(0.0205)
9.hour	2.199	-30.29*	48.43**	1.616	-8.435	-8.984	-18.47*
	(21.85)	(15.66)	(19.23)	(19.10)	(6.004)	(6.897)	(11.04)

10.hour	0.364*** (0.0519)	0.0165 (0.0394)	0.0445* (0.0248)	-0.347*** (0.0561)	0.00543 (0.0121)	-0.00645 (0.00620)	-0.0683*** (0.0192)
11.hour	0.332*** (0.0547)	0.0655 (0.0418)	0.0489 (0.0298)	-0.339*** (0.0594)	-0.00913 (0.00956)	-0.00949 (0.00654)	-0.0606*** (0.0196)
12.hour	2.158 (21.85)	-30.25* (15.66)	48.46** (19.24)	1.567 (19.10)	-8.461 (6.007)	-9.008 (6.914)	-18.43* (11.02)
13.hour	0.287*** (0.0547)	0.0921** (0.0400)	0.0355 (0.0350)	-0.316*** (0.0593)	-0.0176* (0.00912)	-0.000501 (0.00892)	-0.0515** (0.0225)
14.hour	0.204*** (0.0542)	0.100** (0.0473)	0.0357 (0.0295)	-0.294*** (0.0615)	-0.0186* (0.0108)	0.00328 (0.0110)	-0.0335 (0.0291)
15.hour	2.148 (21.85)	-30.25* (15.66)	48.44** (19.24)	1.581 (19.09)	-8.464 (6.008)	-9.012 (6.913)	-18.42* (11.03)
16.hour	0.270*** (0.0526)	0.0918** (0.0436)	0.0701** (0.0290)	-0.346*** (0.0581)	0.00775 (0.0150)	-0.0110 (0.00773)	-0.0128 (0.0231)
17.hour	0.123** (0.0517)	0.101*** (0.0376)	0.105*** (0.0293)	-0.189*** (0.0587)	0.0371*** (0.0124)	-0.0117 (0.00731)	0.0410 (0.0254)
18.hour	1.909 (21.85)	-30.20* (15.66)	48.47** (19.24)	1.692 (19.10)	-8.415 (6.008)	-9.012 (6.912)	-18.35* (11.02)
19.hour	0.297*** (0.0569)	0.00245 (0.0402)	0.0160 (0.0335)	-0.271*** (0.0625)	-0.00526 (0.0141)	-0.00943 (0.00777)	-0.0278 (0.0330)
20.hour	0.279*** (0.0567)	0.00153 (0.0406)	-0.00734 (0.0312)	-0.180*** (0.0663)	-0.0168 (0.0134)	-0.00827 (0.00786)	-0.0475** (0.0235)
21.hour	2.103 (21.85)	-30.28* (15.66)	48.42** (19.24)	1.674 (19.10)	-8.443 (6.007)	-9.007 (6.912)	-18.45* (11.03)
22.hour	0.0893 (0.0611)	0.0425 (0.0407)	0.0210 (0.0358)	-0.147** (0.0692)	0.00591 (0.0162)	0.0190 (0.0124)	-0.0443* (0.0269)
23.hour	-0.0480 (0.0560)	0.0979* (0.0551)	-0.0545* (0.0301)	0.0113 (0.0741)	-0.0387*** (0.0102)	0.0590*** (0.0212)	-0.0609*** (0.0234)
Constant	-2.008 (24.32)	33.70* (17.44)	-53.72** (21.41)	-1.552 (21.27)	9.487 (6.687)	10.04 (7.700)	20.61* (12.29)
Observations	935	935	935	935	935	935	935
R-squared	0.286	0.148	0.132	0.201	0.106	0.107	0.146

Sanderson-Windmeijer F-statistic	25.67	25.67	25.67	25.67	25.67	25.67	25.67
underidentification test p-value	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11
Anderson-Rubin weak instrument-robust inference F test p-value	0.475	0.138	0.359	0.0140	0.443	0.785	0.203
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.458	0.124	0.340	0.0110	0.425	0.775	0.186
Stock-Wright weak instrument-robust inference p-value	0.339	0.0534	0.135	0.00413	0.0772	0.512	0.00545
Hansen overidentification test p-value	0.227	0.0647	0.206	0.310	0.200	0.482	0.244

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000371 (0.000643)	0.000113 (0.000323)	-0.000131 (0.000342)	-0.00107** (0.000485)	-9.31e-05 (0.000155)	8.79e-05 (0.000168)	0.000530* (0.000276)
Wind speed	0.0101 (0.0127)	-0.0106* (0.00625)	-0.00977 (0.00631)	0.0278*** (0.0100)	0.00487 (0.00424)	-0.00493 (0.00323)	0.00159 (0.00467)
Temperature	0.0102** (0.00431)	0.0116*** (0.00281)	-0.00287 (0.00273)	-0.0110*** (0.00352)	-0.00427*** (0.00134)	-0.00139 (0.000857)	-0.00302* (0.00171)
Dew point temperature	-0.00343 (0.00774)	-0.00323 (0.00410)	-0.00184 (0.00482)	0.0168*** (0.00613)	0.00224 (0.00254)	-0.000812 (0.00178)	-0.00384 (0.00323)
Sea Level Pressure	0.00364 (0.00440)	-0.00406 (0.00267)	0.00756*** (0.00292)	0.000702 (0.00293)	-0.00123* (0.000719)	-0.00185 (0.00151)	-0.00264 (0.00176)
Cloud Ceiling	7.50e-06 (0.000449)	0.000268 (0.000213)	-0.000324 (0.000306)	-0.000237 (0.000307)	6.03e-05 (9.94e-05)	0.000104 (8.57e-05)	9.50e-05 (0.000142)
Altitude	-1.46e-05 (1.04e-05)	2.88e-05 (4.38e-05)	-2.01e-05 (1.25e-05)	-8.25e-06 (2.62e-05)	-3.71e-06 (2.66e-06)	7.11e-07 (2.05e-06)	-1.15e-05*** (3.86e-06)
North wind	-0.0978** (0.0446)	0.0122 (0.0235)	0.0580** (0.0270)	-0.0504 (0.0363)	0.0107 (0.0127)	0.0254 (0.0219)	-0.0194 (0.0197)

Northeast wind	0.0890 (0.0611)	-0.0469 (0.0314)	0.0175 (0.0570)	0.0410 (0.0483)	-0.0198 (0.0155)	-0.0232 (0.0207)	-0.00998 (0.0222)
East wind	0.109** (0.0455)	-0.00915 (0.0260)	-0.0315 (0.0321)	-0.00138 (0.0372)	-0.0179 (0.0127)	-0.0194 (0.0184)	0.00951 (0.0191)
Southeast wind	-0.00346 (0.0418)	0.000381 (0.0254)	-0.0263 (0.0270)	0.0608 (0.0379)	-0.0210* (0.0121)	-0.000967 (0.0237)	0.0395 (0.0260)
South wind	0.0674 (0.0473)	0.0107 (0.0273)	-0.0420 (0.0267)	0.00784 (0.0341)	-0.0120 (0.0130)	-0.0185 (0.0178)	0.0429** (0.0205)
Southwest wind	0.00115 (0.0624)	-0.129*** (0.0404)	0.0318 (0.0448)	0.0540 (0.0454)	0.00567 (0.0137)	-0.0203 (0.0178)	0.0321 (0.0222)
West wind	0.195 (0.139)	-0.00468 (0.0504)	-0.0829** (0.0336)	-0.0402 (0.0491)	-0.00535 (0.0112)	-0.0163 (0.0127)	0.0684 (0.0433)
Precipitation	0.00703** (0.00318)	0.00157 (0.00366)	-0.00434*** (0.00139)	-0.00362* (0.00205)	-0.000446 (0.000883)	0.000548 (0.000736)	-0.00152 (0.00101)
Lag Precipitation	0.00174 (0.00337)	0.00228 (0.00240)	-0.00186 (0.00174)	-0.00589** (0.00269)	-0.000248 (0.000764)	0.000183 (0.000798)	0.000191 (0.00145)
10.month	-0.0191 (0.104)	-0.0195 (0.0575)	-0.0145 (0.0556)	0.216*** (0.0812)	-0.00368 (0.0277)	-0.00844 (0.0269)	-0.0891* (0.0488)
11.month	0.0758 (0.171)	-0.0434 (0.0928)	-0.0232 (0.0924)	0.290** (0.126)	-0.0300 (0.0514)	-0.0292 (0.0495)	-0.113 (0.0770)
1.weekday	0.129** (0.0554)	0.0732** (0.0361)	0.0104 (0.0474)	-0.128** (0.0543)	-0.00667 (0.0155)	0.00155 (0.00606)	-0.0111 (0.0184)
2.weekday	0.140*** (0.0535)	0.0316 (0.0372)	0.0495 (0.0407)	-0.180*** (0.0558)	0.000397 (0.0157)	0.00728 (0.00785)	0.0224 (0.0206)
3.weekday	0.143*** (0.0548)	0.0454 (0.0377)	0.0320 (0.0376)	-0.147*** (0.0523)	0.00518 (0.0175)	0.00195 (0.00754)	0.0204 (0.0216)
4.weekday	0.108** (0.0533)	0.0490 (0.0381)	0.0522 (0.0370)	-0.130*** (0.0504)	-0.00653 (0.0162)	0.0110 (0.0109)	-0.0181 (0.0222)
5.weekday	0.119** (0.0536)	0.0105 (0.0374)	0.0645* (0.0358)	-0.117** (0.0505)	0.00298 (0.0151)	-0.00508 (0.00731)	-0.0190 (0.0199)
6.weekday	0.0751 (0.0687)	-0.0372 (0.0450)	0.0137 (0.0407)	-0.0335 (0.0652)	-0.0282* (0.0156)	0.0362 (0.0269)	0.0522 (0.0375)
5.hour	0.0227 (0.0780)	0.00105 (0.0427)	0.113*** (0.0273)	-0.262*** (0.0752)	0.0300** (0.0144)	-0.00821 (0.0108)	0.0688* (0.0390)
6.hour	32.70	-36.41	68.04***	6.192	-11.02*	-16.64	-23.62

	(39.49)	(23.98)	(26.20)	(26.28)	(6.452)	(13.59)	(15.79)
7.hour	0.256***	0.110***	0.154***	-0.126*	0.0628***	-0.00987	0.0452
	(0.0838)	(0.0418)	(0.0386)	(0.0754)	(0.0122)	(0.0110)	(0.0286)
8.hour	0.274***	0.0337	0.131***	-0.245***	0.0569***	0.00512	-0.0517**
	(0.0775)	(0.0396)	(0.0291)	(0.0767)	(0.0188)	(0.0133)	(0.0218)
9.hour	33.14	-36.42	67.94***	5.967	-11.06*	-16.60	-23.76
	(39.48)	(23.98)	(26.20)	(26.28)	(6.462)	(13.56)	(15.79)
10.hour	0.466***	0.0502	0.0732***	-0.403***	0.00329	-0.0145	-0.0747***
	(0.0787)	(0.0429)	(0.0264)	(0.0746)	(0.0130)	(0.0108)	(0.0204)
11.hour	0.382***	0.110**	0.100**	-0.379***	-0.0110	-0.0196*	-0.0654***
	(0.0778)	(0.0437)	(0.0414)	(0.0818)	(0.0105)	(0.0114)	(0.0214)
12.hour	33.21	-36.38	67.98***	5.899	-11.08*	-16.65	-23.70
	(39.50)	(23.97)	(26.20)	(26.28)	(6.464)	(13.60)	(15.76)
13.hour	0.304***	0.147***	0.0448	-0.362***	-0.0207**	-0.00634	-0.0610**
	(0.0755)	(0.0441)	(0.0362)	(0.0817)	(0.0102)	(0.0156)	(0.0244)
14.hour	0.242***	0.133***	0.0529	-0.311***	-0.0206*	-0.000835	-0.0371
	(0.0812)	(0.0486)	(0.0324)	(0.0890)	(0.0121)	(0.0182)	(0.0313)
15.hour	33.10	-36.33	67.96***	5.936	-11.09*	-16.66	-23.71
	(39.48)	(23.95)	(26.21)	(26.28)	(6.466)	(13.60)	(15.78)
16.hour	0.429***	0.174***	0.0837***	-0.381***	0.00525	-0.0253*	-0.0197
	(0.0932)	(0.0476)	(0.0311)	(0.0812)	(0.0157)	(0.0136)	(0.0252)
17.hour	0.160*	0.153***	0.122***	-0.204**	0.0422***	-0.0250*	0.0404
	(0.0820)	(0.0398)	(0.0316)	(0.0809)	(0.0135)	(0.0128)	(0.0281)
18.hour	32.77	-36.32	68.00***	6.045	-11.03*	-16.66	-23.64
	(39.48)	(23.98)	(26.22)	(26.28)	(6.464)	(13.59)	(15.78)
19.hour	0.439***	0.0215	0.0430	-0.275***	-0.00838	-0.0258*	-0.0381
	(0.0849)	(0.0419)	(0.0441)	(0.0871)	(0.0150)	(0.0144)	(0.0345)
20.hour	0.400***	0.0342	-0.00814	-0.210**	-0.0201	-0.0242	-0.0542**
	(0.0832)	(0.0465)	(0.0343)	(0.0879)	(0.0143)	(0.0150)	(0.0260)
21.hour	33.03	-36.42	67.91***	6.053	-11.07*	-16.66	-23.75
	(39.49)	(23.97)	(26.21)	(26.30)	(6.465)	(13.59)	(15.78)
22.hour	0.0814	0.0566	0.0216	-0.186**	0.00275	0.000235	-0.0587**
	(0.0848)	(0.0425)	(0.0396)	(0.0872)	(0.0170)	(0.0195)	(0.0288)
23.hour	-0.0593	0.111**	-0.0565*	0.0178	-0.0427***	0.0977*	-0.0730***
	(0.0834)	(0.0556)	(0.0329)	(0.110)	(0.0114)	(0.0560)	(0.0248)

Constant	-36.42 (43.94)	40.51 (26.70)	-75.38*** (29.16)	-6.359 (29.25)	12.41* (7.196)	18.56 (15.14)	26.53 (17.58)
Observations	935	935	935	935	935	935	935
R-squared	0.259	0.192	0.133	0.179	0.120	0.083	0.146
Sanderson-Windmeijer F-statistic	25.67	25.67	25.67	25.67	25.67	25.67	25.67
underidentification test p-value	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11
Anderson-Rubin weak instrument-robust inference F test p-value	0.384	0.175	0.183	0.0513	0.420	0.345	0.161
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.365	0.160	0.167	0.0437	0.402	0.327	0.147
Stock-Wright weak instrument-robust inference p-value	0.219	0.0821	0.0217	0.0143	0.0677	0.00884	0.00596
Hansen overidentification test p-value	0.170	0.0707	0.0758	0.436	0.189	0.136	0.253

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000239 (0.000439)	0.000169 (0.000267)	-0.000214 (0.000286)	-0.000749** (0.000355)	-7.56e-06 (9.89e-05)	3.65e-05 (9.91e-05)	0.000490** (0.000248)
Wind speed	0.00459 (0.0101)	-0.0103** (0.00522)	-0.00665 (0.00510)	0.0214*** (0.00803)	0.00265 (0.00252)	-0.00267 (0.00179)	0.000440 (0.00376)
Temperature	0.00634** (0.00299)	0.00938*** (0.00247)	-0.00285 (0.00209)	-0.00772*** (0.00269)	-0.00307*** (0.000901)	-0.000746 (0.000530)	-0.00143 (0.00139)
Dew point temperature	-0.00182 (0.00541)	-0.00341 (0.00342)	0.000331 (0.00372)	0.0111** (0.00484)	0.000715 (0.00151)	-0.000330 (0.00112)	-0.00420 (0.00284)
Sea Level Pressure	0.000896 (0.00283)	-0.00287 (0.00196)	0.00583*** (0.00209)	0.000811 (0.00215)	-0.000870 (0.000530)	-0.00108 (0.000779)	-0.00193 (0.00119)

Cloud Ceiling	0.000243 (0.000322)	0.000262 (0.000172)	-0.000306 (0.000274)	-0.000222 (0.000226)	6.46e-05 (8.28e-05)	6.37e-05 (5.26e-05)	5.96e-05 (0.000111)
Altitude	-3.44e-06 (1.15e-05)	3.40e-05 (4.31e-05)	-1.14e-05 (1.01e-05)	-6.86e-06 (2.27e-05)	-3.89e-06** (1.84e-06)	2.93e-07 (1.18e-06)	-1.11e-05*** (3.17e-06)
North wind	-0.0690** (0.0327)	0.0168 (0.0211)	0.0540** (0.0238)	-0.0306 (0.0263)	0.0109 (0.0104)	0.0102 (0.00957)	-0.0183 (0.0174)
Northeast wind	0.0774 (0.0483)	-0.0354 (0.0287)	-0.00970 (0.0349)	0.0231 (0.0369)	-0.0178 (0.0133)	-0.0100 (0.00980)	-0.00692 (0.0203)
East wind	0.0838** (0.0337)	-0.00891 (0.0221)	-0.0394 (0.0244)	-0.0100 (0.0290)	-0.0156 (0.0110)	-0.00786 (0.00832)	0.0111 (0.0176)
Southeast wind	0.000134 (0.0319)	-0.00122 (0.0219)	-0.0327 (0.0224)	0.0307 (0.0272)	-0.0186* (0.0105)	0.00176 (0.0114)	0.0294 (0.0191)
South wind	0.0401 (0.0311)	0.00709 (0.0237)	-0.0445** (0.0223)	-0.00212 (0.0265)	-0.0136 (0.0102)	-0.00647 (0.00853)	0.0351** (0.0168)
Southwest wind	0.00396 (0.0456)	-0.104*** (0.0338)	0.0397 (0.0431)	0.0385 (0.0387)	0.00336 (0.0118)	-0.00995 (0.00858)	0.0226 (0.0171)
West wind	0.0963 (0.0755)	-0.0133 (0.0420)	-0.0721*** (0.0277)	-0.0514 (0.0370)	-0.00472 (0.00900)	-0.00957 (0.00699)	0.0608 (0.0418)
Precipitation	0.00784*** (0.00291)	0.00102 (0.00260)	-0.00401*** (0.00117)	-0.00296* (0.00155)	-0.000169 (0.000765)	0.000313 (0.000608)	-0.00117 (0.000814)
Lag Precipitation	0.00297 (0.00242)	0.00215 (0.00203)	-0.00175 (0.00148)	-0.00408** (0.00194)	0.000137 (0.000527)	-5.95e-05 (0.000547)	0.000278 (0.00121)
10.month	-0.0133 (0.0749)	-0.0283 (0.0482)	0.00521 (0.0475)	0.152** (0.0599)	-0.0143 (0.0192)	-0.00300 (0.0166)	-0.0807* (0.0450)
11.month	0.0382 (0.124)	-0.0484 (0.0787)	0.0119 (0.0822)	0.194** (0.0977)	-0.0464 (0.0338)	-0.0120 (0.0291)	-0.0989 (0.0688)
1.weekday	0.0992** (0.0440)	0.0621** (0.0288)	0.0190 (0.0303)	-0.113*** (0.0418)	-0.00783 (0.0143)	0.000992 (0.00494)	-0.0171 (0.0176)
2.weekday	0.0856** (0.0401)	0.0272 (0.0289)	0.0456* (0.0277)	-0.150*** (0.0406)	-0.000350 (0.0141)	0.00433 (0.00513)	0.0127 (0.0192)
3.weekday	0.0792* (0.0409)	0.0354 (0.0293)	0.0325 (0.0249)	-0.132*** (0.0405)	-0.000864 (0.0154)	0.00371 (0.00609)	0.00765 (0.0195)
4.weekday	0.0733* (0.0420)	0.0392 (0.0294)	0.0562** (0.0265)	-0.115*** (0.0410)	-0.00931 (0.0148)	0.00521 (0.00690)	-0.0244 (0.0210)
5.weekday	0.0778* (0.0420)	0.00527 (0.0294)	0.0653*** (0.0265)	-0.0965** (0.0410)	-0.000650 (0.0148)	-0.00348 (0.00690)	-0.0251 (0.0210)

	(0.0419)	(0.0285)	(0.0252)	(0.0400)	(0.0137)	(0.00581)	(0.0190)
6.weekday	0.0469	-0.0307	0.0198	-0.0533	-0.0247*	0.0209	0.0225
	(0.0530)	(0.0354)	(0.0307)	(0.0486)	(0.0143)	(0.0150)	(0.0286)
5.hour	0.0252	-0.00405	0.106***	-0.218***	0.0271**	-0.00763	0.0551*
	(0.0736)	(0.0386)	(0.0236)	(0.0593)	(0.0136)	(0.00934)	(0.0305)
6.hour	8.033	-25.75	52.48***	7.145	-7.777	-9.714	-17.25
	(25.41)	(17.58)	(18.75)	(19.35)	(4.753)	(7.000)	(10.65)
7.hour	0.0898	0.0229	0.0876***	-0.175***	0.0416***	-0.00944	0.0119
	(0.0694)	(0.0360)	(0.0254)	(0.0566)	(0.00996)	(0.00952)	(0.0199)
8.hour	0.148**	-0.00569	0.0853***	-0.224***	0.0371***	0.00433	-0.0490***
	(0.0697)	(0.0357)	(0.0221)	(0.0593)	(0.0112)	(0.0118)	(0.0174)
9.hour	8.376	-25.75	52.40***	6.988	-7.802	-9.695	-17.35
	(25.40)	(17.58)	(18.75)	(19.35)	(4.754)	(6.986)	(10.65)
10.hour	0.339***	0.0241	0.0601***	-0.341***	0.00502	-0.0122	-0.0614***
	(0.0694)	(0.0385)	(0.0220)	(0.0558)	(0.0118)	(0.00921)	(0.0164)
11.hour	0.268***	0.0699*	0.0649**	-0.328***	-0.00737	-0.0157*	-0.0527***
	(0.0710)	(0.0404)	(0.0282)	(0.0597)	(0.00794)	(0.00945)	(0.0170)
12.hour	8.429	-25.71	52.44***	6.945	-7.822	-9.720	-17.32
	(25.41)	(17.58)	(18.75)	(19.35)	(4.757)	(7.002)	(10.64)
13.hour	0.231***	0.0959**	0.0437	-0.305***	-0.0155**	-0.00363	-0.0470**
	(0.0708)	(0.0377)	(0.0335)	(0.0598)	(0.00780)	(0.0121)	(0.0190)
14.hour	0.162**	0.103**	0.0390	-0.272***	-0.0139	0.00104	-0.0229
	(0.0689)	(0.0458)	(0.0266)	(0.0620)	(0.00887)	(0.0147)	(0.0278)
15.hour	8.325	-25.68	52.42***	6.973	-7.826	-9.725	-17.30
	(25.40)	(17.57)	(18.76)	(19.35)	(4.759)	(7.001)	(10.64)
16.hour	0.260***	0.0981***	0.0645**	-0.323***	0.00557	-0.0181*	-0.0108
	(0.0697)	(0.0373)	(0.0262)	(0.0581)	(0.0118)	(0.0104)	(0.0207)
17.hour	0.0571	0.0731**	0.0664***	-0.214***	0.0281***	-0.0187*	0.0253
	(0.0766)	(0.0353)	(0.0248)	(0.0583)	(0.00966)	(0.0101)	(0.0225)
18.hour	8.052	-25.67	52.43***	7.064	-7.783	-9.726	-17.24
	(25.40)	(17.58)	(18.75)	(19.35)	(4.758)	(7.000)	(10.64)
19.hour	0.300***	-0.00354	0.0171	-0.249***	-0.00681	-0.0176	-0.0226
	(0.0744)	(0.0375)	(0.0308)	(0.0633)	(0.0111)	(0.0108)	(0.0316)
20.hour	0.269***	-0.00250	-0.00255	-0.181***	-0.0152	-0.0160	-0.0391*
	(0.0740)	(0.0383)	(0.0293)	(0.0660)	(0.0121)	(0.0110)	(0.0217)

21.hour	8.268 (25.40)	-25.74 (17.58)	52.39*** (18.75)	7.062 (19.36)	-7.807 (4.759)	-9.722 (7.000)	-17.33 (10.64)
22.hour	0.0558 (0.0786)	0.0456 (0.0387)	0.0267 (0.0330)	-0.129* (0.0692)	0.00573 (0.0144)	0.0103 (0.0148)	-0.0378 (0.0249)
23.hour	-0.0815 (0.0755)	0.107** (0.0523)	-0.0439 (0.0278)	0.0109 (0.0748)	-0.0335*** (0.00906)	0.0661** (0.0278)	-0.0511** (0.0211)
Constant	-8.909 (28.28)	28.63 (19.58)	-58.15*** (20.87)	-7.546 (21.55)	8.775* (5.296)	10.83 (7.797)	19.38 (11.86)
Observations	935	935	935	935	935	935	935
R-squared	0.279	0.164	0.122	0.211	0.125	0.109	0.117
Sanderson-Windmeijer F- statistic	25.67	25.67	25.67	25.67	25.67	25.67	25.67
underidentification test p-value	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11	7.16e-11
Anderson-Rubin weak instrument-robust inference F test p-value	0.394	0.118	0.418	0.0690	0.477	0.558	0.143
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.376	0.105	0.400	0.0598	0.459	0.542	0.129
Stock-Wright weak instrument- robust inference p-value	0.238	0.0381	0.152	0.0314	0.162	0.193	0.00123
Hansen overidentification test p- value	0.183	0.0578	0.270	0.414	0.222	0.270	0.235

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 32d. Travel mode share IV regressions using south wind at Zhoushuizi as the only IV (in “7iv”), 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000134 (0.000603)	0.000125 (0.000417)	-0.000282 (0.000477)	-0.000123 (0.000544)	-1.20e-05 (0.000127)	0.000406* (0.000208)	1.91e-05 (0.000380)
Wind speed	0.00114 (0.00830)	-0.0100* (0.00524)	-0.00746 (0.00538)	0.0169** (0.00756)	0.00227 (0.00239)	-0.00548** (0.00253)	0.00268 (0.00381)
Temperature	0.00525* (0.00276)	0.00839*** (0.00232)	-0.00207 (0.00222)	-0.00750*** (0.00238)	-0.00288*** (0.000883)	-0.000126 (0.000624)	-0.00106 (0.00135)
Dew point temperature	0.00189 (0.00722)	-0.00262 (0.00515)	0.000250 (0.00590)	0.00369 (0.00680)	0.000681 (0.00177)	-0.00486** (0.00242)	0.000958 (0.00460)
Sea Level Pressure	0.000748 (0.00245)	-0.00215 (0.00169)	0.00545*** (0.00210)	-0.000100 (0.00209)	-0.000764* (0.000464)	-0.00100 (0.000797)	-0.00218* (0.00117)
Cloud Ceiling	0.000117 (0.000269)	7.64e-05 (0.000165)	-0.000394 (0.000325)	-6.30e-05 (0.000216)	3.49e-05 (6.60e-05)	8.96e-05 (6.48e-05)	0.000139 (0.000107)
Altitude	-4.40e-07 (1.02e-05)	2.30e-05 (3.01e-05)	-5.38e-06 (9.43e-06)	-6.64e-06 (1.43e-05)	-2.08e-06 (1.99e-06)	-2.87e-06 (2.14e-06)	-5.62e-06 (3.76e-06)
North wind	-0.0404 (0.0280)	0.0244 (0.0194)	0.0460** (0.0230)	-0.0301 (0.0244)	0.0107 (0.00955)	0.00934 (0.00970)	-0.0198 (0.0159)
Northeast wind	0.0497 (0.0390)	-0.0370 (0.0268)	-0.00604 (0.0329)	0.0224 (0.0393)	-0.0165 (0.0128)	-0.0162 (0.0117)	0.00364 (0.0167)
East wind	0.0582* (0.0320)	-0.0211 (0.0217)	-0.0339 (0.0239)	0.00352 (0.0284)	-0.0158 (0.0109)	-0.00241 (0.00826)	0.0115 (0.0175)
Southeast wind	-0.0121 (0.0284)	-0.0111 (0.0200)	-0.0248 (0.0214)	0.0310 (0.0252)	-0.0186* (0.00985)	0.00211 (0.0110)	0.0334* (0.0179)
South wind	0.0208 (0.0282)	-0.00214 (0.0228)	-0.0367* (0.0221)	0.00194 (0.0253)	-0.0139 (0.00997)	-0.00338 (0.00864)	0.0334** (0.0158)
Southwest wind	-0.00734 (0.0431)	-0.103*** (0.0321)	0.0496 (0.0432)	0.0448 (0.0355)	0.00130 (0.0102)	-0.00873 (0.00924)	0.0238 (0.0160)
West wind	0.0815 (0.0603)	-0.0154 (0.0402)	-0.0688** (0.0269)	-0.0490 (0.0326)	-0.00468 (0.00878)	-0.00568 (0.00841)	0.0621 (0.0427)
Precipitation	0.00812***	0.000874	-0.00457***	-0.00291**	-0.000238	8.96e-05	-0.00137**

	(0.00287)	(0.00240)	(0.00104)	(0.00147)	(0.000690)	(0.000557)	(0.000679)
Lag Precipitation	0.00234	0.00262	-0.00229	-0.00217	0.000211	0.00131	-0.00202
	(0.00319)	(0.00256)	(0.00202)	(0.00251)	(0.000552)	(0.000914)	(0.00173)
holiday	-0.0485	-0.0526**	0.0251	0.0387*	-0.00510	0.0186***	0.0238**
	(0.0327)	(0.0268)	(0.0216)	(0.0229)	(0.00717)	(0.00678)	(0.00971)
10.month	0.0382	-0.0270	0.0144	0.0470	-0.0137	-0.0610*	0.00214
	(0.0984)	(0.0728)	(0.0744)	(0.0900)	(0.0218)	(0.0326)	(0.0649)
11.month	0.0950	-0.0429	0.0299	0.0450	-0.0450	-0.108*	0.0262
	(0.164)	(0.124)	(0.127)	(0.151)	(0.0358)	(0.0561)	(0.102)
1.weekday	0.0824**	0.0637**	0.0112	-0.130***	-0.00633	-0.000640	-0.0207
	(0.0377)	(0.0276)	(0.0289)	(0.0402)	(0.0132)	(0.00518)	(0.0164)
2.weekday	0.0737*	0.0318	0.0369	-0.153***	0.00115	0.0119*	-0.00209
	(0.0386)	(0.0278)	(0.0272)	(0.0389)	(0.0142)	(0.00678)	(0.0206)
3.weekday	0.0775*	0.0418	0.0329	-0.156***	-0.000560	-0.00709	0.0118
	(0.0397)	(0.0290)	(0.0280)	(0.0410)	(0.0127)	(0.00817)	(0.0188)
4.weekday	0.0755*	0.0409	0.0543*	-0.143***	-0.00901	-0.00677	-0.0119
	(0.0392)	(0.0287)	(0.0277)	(0.0417)	(0.0126)	(0.00794)	(0.0198)
5.weekday	0.0715*	0.00912	0.0615**	-0.113***	0.000195	-0.00702	-0.0222
	(0.0369)	(0.0263)	(0.0243)	(0.0386)	(0.0125)	(0.00673)	(0.0176)
6.weekday	0.0423	-0.0334	0.0357	-0.0619	-0.0230*	0.0124	0.0278
	(0.0485)	(0.0311)	(0.0351)	(0.0476)	(0.0124)	(0.0151)	(0.0290)
5.hour	0.0598	-0.00728	0.103***	-0.231***	0.0266*	-0.0132	0.0613*
	(0.0589)	(0.0383)	(0.0243)	(0.0580)	(0.0138)	(0.0103)	(0.0330)
6.hour	6.720	-19.31	49.04***	-1.062	-6.828	-9.031	-19.53*
	(22.01)	(15.21)	(18.87)	(18.79)	(4.169)	(7.158)	(10.53)
7.hour	0.0901*	0.00398	0.0753***	-0.205***	0.0382***	-0.0134	0.0105
	(0.0512)	(0.0348)	(0.0261)	(0.0561)	(0.0102)	(0.00985)	(0.0189)
8.hour	0.176***	-0.00755	0.0805***	-0.242***	0.0366***	-0.00330	-0.0402**
	(0.0527)	(0.0358)	(0.0228)	(0.0581)	(0.0111)	(0.0115)	(0.0168)
9.hour	7.052	-19.31	48.97***	-1.211	-6.854	-9.013	-19.64*
	(22.00)	(15.21)	(18.87)	(18.79)	(4.171)	(7.145)	(10.53)
10.hour	0.354***	0.0134	0.0484**	-0.351***	0.00400	-0.0136	-0.0556***
	(0.0523)	(0.0379)	(0.0215)	(0.0553)	(0.0116)	(0.00959)	(0.0151)
11.hour	0.276***	0.0635	0.0614**	-0.331***	-0.00704	-0.0115	-0.0512***
	(0.0560)	(0.0394)	(0.0269)	(0.0595)	(0.00777)	(0.00976)	(0.0158)

12.hour	7.029 (22.00)	-19.28 (15.21)	49.00*** (18.88)	-1.243 (18.79)	-6.872* (4.172)	-9.029 (7.159)	-19.61* (10.52)
13.hour	0.240*** (0.0555)	0.0880** (0.0368)	0.0439 (0.0320)	-0.311*** (0.0592)	-0.0146* (0.00751)	-0.00180 (0.0122)	-0.0443** (0.0179)
14.hour	0.170*** (0.0571)	0.0927** (0.0447)	0.0334 (0.0278)	-0.266*** (0.0635)	-0.0134 (0.00887)	0.00869 (0.0149)	-0.0255 (0.0276)
15.hour	6.976 (22.00)	-19.25 (15.20)	48.99*** (18.88)	-1.209 (18.79)	-6.874* (4.173)	-9.030 (7.158)	-19.60* (10.53)
16.hour	0.232*** (0.0534)	0.0648* (0.0372)	0.0600** (0.0283)	-0.334*** (0.0587)	0.00359 (0.0122)	-0.0119 (0.0112)	-0.0149 (0.0199)
17.hour	0.0486 (0.0530)	0.0665* (0.0355)	0.0651*** (0.0252)	-0.216*** (0.0582)	0.0246** (0.00969)	-0.0150 (0.0108)	0.0265 (0.0222)
18.hour	6.735 (22.00)	-19.22 (15.21)	49.02*** (18.88)	-1.134 (18.80)	-6.833 (4.172)	-9.036 (7.158)	-19.54* (10.52)
19.hour	0.287*** (0.0597)	-0.0181 (0.0373)	0.0175 (0.0302)	-0.244*** (0.0637)	-0.00707 (0.0109)	-0.0164 (0.0117)	-0.0192 (0.0288)
20.hour	0.260*** (0.0580)	-0.0176 (0.0374)	0.0189 (0.0362)	-0.196*** (0.0651)	-0.0145 (0.0114)	-0.0177 (0.0118)	-0.0333* (0.0195)
21.hour	6.978 (22.01)	-19.28 (15.20)	48.98*** (18.88)	-1.162 (18.80)	-6.855 (4.175)	-9.044 (7.158)	-19.61* (10.52)
22.hour	0.0726 (0.0609)	0.0356 (0.0396)	0.0347 (0.0331)	-0.128* (0.0695)	0.00568 (0.0138)	0.00221 (0.0166)	-0.0225 (0.0234)
23.hour	-0.0566 (0.0591)	0.101* (0.0522)	-0.0377 (0.0275)	0.00170 (0.0752)	-0.0322*** (0.00873)	0.0656** (0.0275)	-0.0414** (0.0206)
Constant	-7.441 (24.49)	21.47 (16.93)	-54.35*** (21.00)	1.631 (20.92)	7.713* (4.649)	10.10 (7.974)	21.87* (11.72)
Observations	968	968	968	968	968	968	968
R-squared	0.296	0.167	0.098	0.264	0.119	-0.089	0.135
Sanderson-Windmeijer F- statistic	17.11	17.11	17.11	17.11	17.11	17.11	17.11
underidentification test p-value	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05

Anderson-Rubin weak instrument-robust inference F test p-value	0.828	0.767	0.561	0.825	0.927	0.0327	0.961
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.824	0.761	0.552	0.821	0.925	0.0285	0.960
Stock-Wright weak instrument-robust inference p-value	0.801	0.696	0.417	0.785	0.885	2.05e-06	0.935

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000199 (0.000615)	7.69e-05 (0.000448)	-0.000342 (0.000525)	-0.000150 (0.000534)	-2.82e-05 (0.000178)	0.000364** (0.000168)	-0.000131 (0.000399)
Wind speed	0.00118 (0.00860)	-0.00784 (0.00549)	-0.00650 (0.00580)	0.0163** (0.00750)	0.00447 (0.00419)	-0.00471** (0.00215)	0.00516 (0.00413)
Temperature	0.00492* (0.00287)	0.00822*** (0.00238)	-0.00241 (0.00237)	-0.00823*** (0.00236)	-0.00390*** (0.00130)	-8.26e-05 (0.000567)	-0.00138 (0.00150)
Dew point temperature	0.00262 (0.00745)	-0.00170 (0.00549)	0.00131 (0.00641)	0.00429 (0.00670)	0.00148 (0.00270)	-0.00435** (0.00198)	0.00308 (0.00491)
Sea Level Pressure	0.000537 (0.00243)	-0.00302* (0.00173)	0.00518** (0.00217)	-0.000102 (0.00211)	-0.000851 (0.000604)	-0.000956 (0.000779)	-0.00235* (0.00125)
Cloud Ceiling	2.12e-05 (0.000267)	0.000118 (0.000172)	-0.000343 (0.000327)	-6.56e-05 (0.000216)	2.90e-05 (8.87e-05)	6.99e-05 (5.61e-05)	0.000179 (0.000118)
Altitude	9.59e-07 (1.06e-05)	2.25e-05 (2.99e-05)	-6.14e-06 (9.46e-06)	-8.43e-06 (1.47e-05)	-2.11e-06 (2.39e-06)	-2.67e-06 (1.83e-06)	-4.47e-06 (4.00e-06)
North wind	-0.0352 (0.0283)	0.0213 (0.0202)	0.0465** (0.0236)	-0.0153 (0.0246)	0.00982 (0.0114)	0.00544 (0.00730)	-0.0213 (0.0162)
Northeast wind	0.0461 (0.0396)	-0.0400 (0.0276)	-0.00846 (0.0333)	0.00291 (0.0384)	-0.0185 (0.0143)	-0.0129 (0.00912)	0.00538 (0.0174)
East wind	0.0461 (0.0322)	-0.0237 (0.0226)	-0.0347 (0.0246)	-0.0120 (0.0287)	-0.0179 (0.0125)	0.000259 (0.00685)	0.00885 (0.0179)
Southeast wind	-0.0103	-0.0123	-0.0254	0.0121	-0.0211*	0.00400	0.0343*

	(0.0288)	(0.0210)	(0.0222)	(0.0251)	(0.0112)	(0.00951)	(0.0185)
South wind	0.0182	0.00329	-0.0341	-0.000896	-0.0124	-0.00184	0.0358**
	(0.0288)	(0.0240)	(0.0234)	(0.0264)	(0.0123)	(0.00687)	(0.0171)
Southwest wind	-0.0248	-0.102***	0.0495	0.0371	0.00520	-0.00538	0.0236
	(0.0409)	(0.0343)	(0.0431)	(0.0355)	(0.0126)	(0.00722)	(0.0186)
West wind	0.0698	-0.00235	-0.0694**	-0.0581*	-0.00595	-0.00366	0.0594
	(0.0560)	(0.0442)	(0.0294)	(0.0321)	(0.0109)	(0.00709)	(0.0436)
Precipitation	0.00765***	0.000578	-0.00483***	-0.00287*	-0.000570	-6.87e-05	-0.00150*
	(0.00277)	(0.00241)	(0.00109)	(0.00151)	(0.000805)	(0.000485)	(0.000767)
Lag Precipitation	0.00291	0.00155	-0.00325	-0.00224	0.000187	0.00116	-0.00282
	(0.00319)	(0.00267)	(0.00224)	(0.00249)	(0.000696)	(0.000740)	(0.00181)
holiday	-0.0575*	-0.0500*	0.0311	0.0317	-0.00686	0.0188***	0.0257**
	(0.0324)	(0.0272)	(0.0221)	(0.0233)	(0.00893)	(0.00648)	(0.0107)
10.month	0.0457	-0.0201	0.0218	0.0443	-0.0144	-0.0541**	0.0288
	(0.0995)	(0.0779)	(0.0812)	(0.0884)	(0.0301)	(0.0266)	(0.0681)
11.month	0.107	-0.0338	0.0472	0.0378	-0.0432	-0.0979**	0.0686
	(0.167)	(0.133)	(0.137)	(0.148)	(0.0511)	(0.0450)	(0.108)
1.weekday	0.0742*	0.0640**	0.0186	-0.142***	-0.00448	0.000650	-0.0149
	(0.0390)	(0.0289)	(0.0296)	(0.0417)	(0.0143)	(0.00465)	(0.0171)
2.weekday	0.0658	0.0351	0.0484	-0.172***	0.00441	0.0104*	0.000366
	(0.0400)	(0.0297)	(0.0298)	(0.0405)	(0.0156)	(0.00558)	(0.0211)
3.weekday	0.0670	0.0528*	0.0432	-0.167***	0.00227	-0.00514	0.0210
	(0.0412)	(0.0312)	(0.0292)	(0.0422)	(0.0141)	(0.00685)	(0.0197)
4.weekday	0.0638	0.0438	0.0679**	-0.157***	-0.00861	-0.00618	-0.000682
	(0.0402)	(0.0305)	(0.0291)	(0.0428)	(0.0142)	(0.00723)	(0.0208)
5.weekday	0.0620	0.00575	0.0718***	-0.124***	0.00246	-0.00488	-0.0151
	(0.0378)	(0.0279)	(0.0253)	(0.0398)	(0.0139)	(0.00600)	(0.0185)
6.weekday	0.0286	-0.0148	0.0496	-0.0868*	-0.0262*	0.0130	0.0366
	(0.0497)	(0.0347)	(0.0382)	(0.0472)	(0.0137)	(0.0144)	(0.0302)
5.hour	0.0773	-0.0134	0.101***	-0.238***	0.0296**	-0.00674	0.0672*
	(0.0580)	(0.0402)	(0.0272)	(0.0577)	(0.0139)	(0.00761)	(0.0356)
6.hour	4.849	-27.14*	46.62**	-1.093	-7.591	-8.587	-21.06*
	(21.85)	(15.52)	(19.46)	(18.92)	(5.420)	(7.000)	(11.23)
7.hour	0.154***	0.0339	0.111***	-0.181***	0.0588***	-0.00633	0.0369
	(0.0515)	(0.0376)	(0.0294)	(0.0562)	(0.0116)	(0.00733)	(0.0239)

8.hour	0.232*** (0.0526)	0.0163 (0.0380)	0.0960*** (0.0266)	-0.227*** (0.0579)	0.0552*** (0.0182)	0.00196 (0.00883)	-0.0415** (0.0200)
9.hour	5.179 (21.85)	-27.14* (15.52)	46.52** (19.46)	-1.223 (18.92)	-7.629 (5.429)	-8.569 (6.987)	-21.18* (11.23)
10.hour	0.379*** (0.0520)	0.0138 (0.0389)	0.0405 (0.0247)	-0.342*** (0.0568)	0.00436 (0.0119)	-0.00760 (0.00690)	-0.0623*** (0.0180)
11.hour	0.323*** (0.0551)	0.0679* (0.0410)	0.0488* (0.0287)	-0.339*** (0.0589)	-0.00822 (0.00913)	-0.00576 (0.00717)	-0.0600*** (0.0187)
12.hour	5.117 (21.85)	-27.11* (15.52)	46.56** (19.47)	-1.254 (18.92)	-7.654 (5.431)	-8.586 (7.001)	-21.16* (11.22)
13.hour	0.278*** (0.0544)	0.0936** (0.0392)	0.0372 (0.0336)	-0.318*** (0.0586)	-0.0166* (0.00865)	0.00106 (0.00923)	-0.0493** (0.0218)
14.hour	0.192*** (0.0571)	0.0982** (0.0465)	0.0313 (0.0315)	-0.285*** (0.0623)	-0.0172 (0.0105)	0.0103 (0.0113)	-0.0379 (0.0291)
15.hour	5.099 (21.85)	-27.10* (15.51)	46.54** (19.47)	-1.234 (18.92)	-7.655 (5.431)	-8.586 (7.000)	-21.16* (11.22)
16.hour	0.259*** (0.0548)	0.0823* (0.0438)	0.0784** (0.0317)	-0.344*** (0.0584)	0.00772 (0.0149)	-0.00500 (0.00891)	-0.0144 (0.0225)
17.hour	0.107** (0.0525)	0.101*** (0.0379)	0.107*** (0.0298)	-0.186*** (0.0580)	0.0349*** (0.0122)	-0.00826 (0.00841)	0.0446* (0.0260)
18.hour	4.862 (21.84)	-27.05* (15.52)	46.58** (19.47)	-1.142 (18.92)	-7.608 (5.432)	-8.590 (7.000)	-21.08* (11.22)
19.hour	0.280*** (0.0583)	-0.00681 (0.0400)	0.0177 (0.0330)	-0.255*** (0.0627)	-0.00517 (0.0138)	-0.00836 (0.00918)	-0.0232 (0.0302)
20.hour	0.259*** (0.0580)	-0.00659 (0.0405)	0.0145 (0.0377)	-0.191*** (0.0653)	-0.0168 (0.0130)	-0.0102 (0.00916)	-0.0364 (0.0226)
21.hour	5.086 (21.85)	-27.13* (15.51)	46.52** (19.47)	-1.196 (18.93)	-7.637 (5.434)	-8.597 (7.001)	-21.16* (11.22)
22.hour	0.0794 (0.0604)	0.0350 (0.0419)	0.0283 (0.0363)	-0.147** (0.0693)	0.00436 (0.0159)	0.0110 (0.0140)	-0.0266 (0.0256)
23.hour	-0.0534 (0.0569)	0.0934* (0.0550)	-0.0496* (0.0299)	0.00390 (0.0744)	-0.0381*** (0.0101)	0.0583*** (0.0208)	-0.0512** (0.0232)
Constant	-5.328 (24.32)	30.21* (17.28)	-51.62** (21.66)	1.683 (21.06)	8.590 (6.054)	9.603 (7.799)	23.57* (12.50)

Observations	968	968	968	968	968	968	968
R-squared	0.287	0.164	0.109	0.271	0.115	-0.097	0.144
Sanderson-Windmeijer F-statistic	17.11	17.11	17.11	17.11	17.11	17.11	17.11
underidentification test p-value	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.752	0.866	0.524	0.784	0.877	0.0145	0.745
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.746	0.863	0.514	0.778	0.875	0.0121	0.739
Stock-Wright weak instrument-robust inference p-value	0.715	0.833	0.381	0.741	0.783	3.53e-06	0.608

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000789 (0.000959)	-5.07e-05 (0.000496)	-0.000277 (0.000592)	-0.000382 (0.000765)	-4.87e-05 (0.000181)	0.000672 (0.000421)	-0.000108 (0.000480)
Wind speed	0.0180 (0.0145)	-0.00827 (0.00626)	-0.00929 (0.00670)	0.0224** (0.0100)	0.00443 (0.00420)	-0.00921* (0.00498)	0.00530 (0.00474)
Temperature	0.00757* (0.00451)	0.0105*** (0.00268)	-0.00247 (0.00291)	-0.0108*** (0.00333)	-0.00407*** (0.00130)	-0.000435 (0.000950)	-0.00275 (0.00182)
Dew point temperature	0.0111 (0.0113)	-0.000761 (0.00611)	-0.000767 (0.00790)	0.00864 (0.00963)	0.00164 (0.00272)	-0.00789 (0.00484)	0.00333 (0.00596)
Sea Level Pressure	0.00369 (0.00434)	-0.00363 (0.00253)	0.00724** (0.00293)	0.000291 (0.00286)	-0.00114* (0.000654)	-0.00171 (0.00154)	-0.00294* (0.00178)
Cloud Ceiling	0.000117 (0.000446)	6.43e-05 (0.000203)	-0.000347 (0.000348)	-4.94e-05 (0.000319)	3.46e-05 (8.92e-05)	0.000130 (0.000104)	0.000191 (0.000143)
Altitude	-3.38e-06 (1.21e-05)	1.93e-05 (3.07e-05)	-1.05e-05 (1.25e-05)	-8.98e-06 (1.69e-05)	-1.99e-06 (2.61e-06)	-4.13e-06 (3.80e-06)	-4.61e-06 (4.67e-06)
North wind	-0.0874**	0.0197	0.0496*	-0.0527	0.0102	0.0234	-0.0231

	(0.0441)	(0.0214)	(0.0263)	(0.0338)	(0.0115)	(0.0211)	(0.0184)
Northeast wind	0.0943	-0.0476	0.0197	0.0376	-0.0194	-0.0326	0.00530
	(0.0688)	(0.0291)	(0.0531)	(0.0498)	(0.0144)	(0.0250)	(0.0186)
East wind	0.0826*	-0.0237	-0.0271	0.0230	-0.0174	-0.0105	0.0111
	(0.0463)	(0.0265)	(0.0306)	(0.0405)	(0.0127)	(0.0159)	(0.0201)
Southeast wind	-0.00510	-0.0107	-0.0184	0.0615*	-0.0212*	-0.000105	0.0458*
	(0.0419)	(0.0236)	(0.0259)	(0.0351)	(0.0113)	(0.0224)	(0.0258)
South wind	0.0645	0.000886	-0.0351	0.0189	-0.0124	-0.0134	0.0432**
	(0.0480)	(0.0268)	(0.0265)	(0.0336)	(0.0124)	(0.0166)	(0.0201)
Southwest wind	-0.00304	-0.139***	0.0423	0.0641	0.00481	-0.0184	0.0340
	(0.0618)	(0.0407)	(0.0445)	(0.0423)	(0.0128)	(0.0183)	(0.0222)
West wind	0.198	-0.0126	-0.0783**	-0.0350	-0.00569	-0.0105	0.0691
	(0.139)	(0.0487)	(0.0334)	(0.0451)	(0.0111)	(0.0141)	(0.0450)
Precipitation	0.00776**	0.00217	-0.00524***	-0.00340*	-0.000379	0.000304	-0.00178**
	(0.00327)	(0.00396)	(0.00122)	(0.00196)	(0.000890)	(0.000689)	(0.000871)
Lag Precipitation	-0.00272	0.00271	-0.00308	-0.00421	0.000113	0.00242	-0.00296
	(0.00484)	(0.00316)	(0.00273)	(0.00338)	(0.000731)	(0.00183)	(0.00218)
holiday	-0.0444	-0.0713*	0.0421	0.0444	-0.00704	0.0234***	0.0265**
	(0.0414)	(0.0403)	(0.0260)	(0.0326)	(0.00949)	(0.00867)	(0.0124)
10.month	0.160	0.00107	0.00767	0.0974	-0.0114	-0.100	0.0223
	(0.152)	(0.0857)	(0.0924)	(0.128)	(0.0305)	(0.0652)	(0.0802)
11.month	0.353	-0.00952	0.0122	0.128	-0.0430	-0.181	0.0574
	(0.261)	(0.144)	(0.163)	(0.218)	(0.0518)	(0.115)	(0.128)
1.weekday	0.120**	0.0858**	0.00949	-0.150***	-0.00322	-0.000141	-0.0147
	(0.0560)	(0.0350)	(0.0456)	(0.0536)	(0.0143)	(0.00744)	(0.0176)
2.weekday	0.103*	0.0424	0.0479	-0.189***	0.00479	0.0195	0.00423
	(0.0576)	(0.0370)	(0.0400)	(0.0535)	(0.0157)	(0.0125)	(0.0230)
3.weekday	0.156**	0.0644*	0.0410	-0.178***	0.00561	-0.0152	0.0299
	(0.0631)	(0.0365)	(0.0427)	(0.0536)	(0.0142)	(0.0145)	(0.0224)
4.weekday	0.131**	0.0624*	0.0618	-0.162***	-0.00664	-0.00847	-0.000559
	(0.0575)	(0.0363)	(0.0386)	(0.0550)	(0.0142)	(0.0113)	(0.0228)
5.weekday	0.116**	0.0226	0.0698**	-0.138***	0.00506	-0.0111	-0.0146
	(0.0548)	(0.0349)	(0.0346)	(0.0500)	(0.0140)	(0.0104)	(0.0193)
6.weekday	0.0705	-0.0343	0.0358	-0.0353	-0.0264*	0.0225	0.0595
	(0.0673)	(0.0405)	(0.0452)	(0.0686)	(0.0138)	(0.0276)	(0.0405)

5.hour	0.0420 (0.0800)	0.00340 (0.0426)	0.115*** (0.0280)	-0.275*** (0.0774)	0.0292** (0.0146)	-0.0172 (0.0137)	0.0795* (0.0434)
6.hour	33.17 (38.98)	-32.55 (22.75)	65.23** (26.34)	2.494 (25.67)	-10.22* (5.871)	-15.33 (13.80)	-26.33* (15.98)
7.hour	0.272*** (0.0872)	0.114*** (0.0417)	0.155*** (0.0395)	-0.139* (0.0779)	0.0625*** (0.0124)	-0.0161 (0.0126)	0.0526* (0.0289)
8.hour	0.292*** (0.0769)	0.0388 (0.0397)	0.132*** (0.0289)	-0.260*** (0.0790)	0.0566*** (0.0186)	-0.00583 (0.0148)	-0.0390* (0.0219)
9.hour	33.61 (38.96)	-32.56 (22.75)	65.13** (26.34)	2.266 (25.67)	-10.26* (5.879)	-15.30 (13.77)	-26.47* (15.98)
10.hour	0.502*** (0.0814)	0.0457 (0.0423)	0.0692*** (0.0259)	-0.400*** (0.0769)	0.00230 (0.0128)	-0.0169 (0.0125)	-0.0677*** (0.0191)
11.hour	0.367*** (0.0806)	0.112*** (0.0429)	0.0999*** (0.0384)	-0.383*** (0.0804)	-0.0101 (0.0102)	-0.0133 (0.0130)	-0.0644*** (0.0208)
12.hour	33.64 (38.98)	-32.53 (22.75)	65.17** (26.35)	2.217 (25.67)	-10.29* (5.881)	-15.33 (13.80)	-26.43* (15.94)
13.hour	0.291*** (0.0775)	0.148*** (0.0429)	0.0484 (0.0350)	-0.368*** (0.0809)	-0.0195** (0.00985)	-0.00343 (0.0163)	-0.0580** (0.0236)
14.hour	0.215** (0.0877)	0.128*** (0.0479)	0.0491 (0.0356)	-0.303*** (0.0904)	-0.0192 (0.0119)	0.0108 (0.0197)	-0.0418 (0.0321)
15.hour	33.50 (38.96)	-32.47 (22.73)	65.15** (26.36)	2.265 (25.67)	-10.29* (5.881)	-15.33 (13.80)	-26.44* (15.97)
16.hour	0.407*** (0.0946)	0.161*** (0.0479)	0.0936*** (0.0349)	-0.381*** (0.0811)	0.00526 (0.0157)	-0.0156 (0.0157)	-0.0210 (0.0255)
17.hour	0.136 (0.0832)	0.153*** (0.0403)	0.124*** (0.0330)	-0.202** (0.0804)	0.0396*** (0.0134)	-0.0198 (0.0150)	0.0433 (0.0289)
18.hour	33.19 (38.96)	-32.45 (22.75)	65.20** (26.36)	2.343 (25.67)	-10.24* (5.880)	-15.34 (13.80)	-26.36* (15.97)
19.hour	0.415*** (0.0893)	0.0110 (0.0418)	0.0436 (0.0426)	-0.267*** (0.0872)	-0.00813 (0.0147)	-0.0238 (0.0169)	-0.0328 (0.0316)
20.hour	0.381*** (0.0880)	0.0245 (0.0462)	0.0152 (0.0398)	-0.227** (0.0889)	-0.0199 (0.0139)	-0.0273 (0.0177)	-0.0421* (0.0248)
21.hour	33.50 (38.97)	-32.55 (22.74)	65.11** (26.35)	2.316 (25.69)	-10.27* (5.883)	-15.36 (13.80)	-26.45* (15.97)
22.hour	0.0859	0.0484	0.0295	-0.163	0.00151	-0.0123	-0.0392

	(0.0884)	(0.0435)	(0.0387)	(0.101)	(0.0167)	(0.0251)	(0.0267)
23.hour	-0.0627	0.105*	-0.0510	0.00870	-0.0420***	0.0966*	-0.0621**
	(0.0875)	(0.0555)	(0.0321)	(0.112)	(0.0112)	(0.0557)	(0.0244)
Constant	-36.99	36.22	-72.28**	-2.172	11.53*	17.15	29.47*
	(43.36)	(25.33)	(29.31)	(28.57)	(6.555)	(15.37)	(17.79)
Observations	968	968	968	968	968	968	968
R-squared	0.251	0.211	0.119	0.214	0.127	-0.089	0.131
Sanderson-Windmeijer F- statistic	17.11	17.11	17.11	17.11	17.11	17.11	17.11
underidentification test p-value	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.420	0.921	0.647	0.625	0.793	0.0941	0.823
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.409	0.919	0.639	0.616	0.788	0.0861	0.819
Stock-Wright weak instrument- robust inference p-value	0.317	0.900	0.525	0.522	0.654	6.60e-09	0.718

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000248 (0.000665)	0.000133 (0.000431)	-0.000334 (0.000481)	-0.000171 (0.000551)	-1.32e-05 (0.000128)	0.000418** (0.000211)	5.00e-05 (0.000386)
Wind speed	0.00818 (0.0110)	-0.00918* (0.00533)	-0.00651 (0.00545)	0.0176** (0.00777)	0.00265 (0.00245)	-0.00551** (0.00255)	0.00282 (0.00387)
Temperature	0.00512* (0.00306)	0.00866*** (0.00236)	-0.00236 (0.00223)	-0.00733*** (0.00252)	-0.00297*** (0.000892)	-0.000120 (0.000634)	-0.00112 (0.00138)
Dew point temperature	0.00447 (0.00802)	-0.00261 (0.00530)	0.00108 (0.00596)	0.00448 (0.00689)	0.000753 (0.00178)	-0.00497** (0.00246)	0.000684 (0.00467)
Sea Level Pressure	0.00126	-0.00245	0.00566***	0.000325	-0.000819*	-0.00101	-0.00216*

	(0.00280)	(0.00190)	(0.00211)	(0.00214)	(0.000494)	(0.000800)	(0.00118)
Cloud Ceiling	0.000220	8.05e-05	-0.000374	-7.90e-05	4.72e-05	9.28e-05	0.000147
	(0.000314)	(0.000171)	(0.000327)	(0.000227)	(7.10e-05)	(6.63e-05)	(0.000109)
Altitude	3.87e-07	2.22e-05	-5.28e-06	-7.02e-06	-2.06e-06	-2.98e-06	-5.89e-06
	(1.01e-05)	(3.07e-05)	(9.45e-06)	(1.45e-05)	(2.01e-06)	(2.18e-06)	(3.80e-06)
North wind	-0.0582*	0.0235	0.0456**	-0.0338	0.0101	0.00929	-0.0211
	(0.0317)	(0.0196)	(0.0231)	(0.0247)	(0.00957)	(0.00977)	(0.0160)
Northeast wind	0.0718	-0.0386	-0.00539	0.0241	-0.0165	-0.0166	0.00356
	(0.0501)	(0.0272)	(0.0330)	(0.0394)	(0.0128)	(0.0119)	(0.0169)
East wind	0.0645*	-0.0201	-0.0341	0.00626	-0.0155	-0.00227	0.0131
	(0.0337)	(0.0224)	(0.0239)	(0.0288)	(0.0110)	(0.00837)	(0.0176)
Southeast wind	-0.00592	-0.0107	-0.0247	0.0323	-0.0185*	0.00229	0.0343*
	(0.0311)	(0.0204)	(0.0215)	(0.0254)	(0.00987)	(0.0110)	(0.0180)
South wind	0.0290	-0.000317	-0.0373*	0.00414	-0.0138	-0.00331	0.0355**
	(0.0311)	(0.0235)	(0.0221)	(0.0257)	(0.01000)	(0.00873)	(0.0161)
Southwest wind	-0.00807	-0.112***	0.0495	0.0454	0.00310	-0.00885	0.0241
	(0.0450)	(0.0334)	(0.0431)	(0.0365)	(0.0111)	(0.00934)	(0.0163)
West wind	0.0894	-0.0193	-0.0686**	-0.0484	-0.00478	-0.00582	0.0622
	(0.0757)	(0.0407)	(0.0276)	(0.0340)	(0.00900)	(0.00856)	(0.0426)
Precipitation	0.00861***	0.00148	-0.00471***	-0.00303**	-0.000126	0.000112	-0.00141**
	(0.00295)	(0.00281)	(0.00105)	(0.00148)	(0.000781)	(0.000567)	(0.000692)
Lag Precipitation	0.00184	0.00296	-0.00261	-0.00254	0.000233	0.00134	-0.00199
	(0.00340)	(0.00266)	(0.00204)	(0.00254)	(0.000571)	(0.000926)	(0.00174)
holiday	-0.0565	-0.0582*	0.0268	0.0398*	-0.00523	0.0190***	0.0249**
	(0.0352)	(0.0302)	(0.0217)	(0.0233)	(0.00751)	(0.00686)	(0.00989)
10.month	0.0612	-0.0272	0.0230	0.0598	-0.0136	-0.0626*	-0.00247
	(0.108)	(0.0754)	(0.0753)	(0.0912)	(0.0220)	(0.0330)	(0.0657)
11.month	0.150	-0.0474	0.0413	0.0640	-0.0459	-0.111**	0.0187
	(0.182)	(0.128)	(0.129)	(0.153)	(0.0361)	(0.0567)	(0.104)
1.weekday	0.108**	0.0710**	0.0165	-0.125***	-0.00518	-0.000604	-0.0198
	(0.0431)	(0.0282)	(0.0289)	(0.0406)	(0.0133)	(0.00541)	(0.0165)
2.weekday	0.0818**	0.0377	0.0432	-0.152***	0.00203	0.0121*	-0.000124
	(0.0403)	(0.0286)	(0.0273)	(0.0394)	(0.0143)	(0.00688)	(0.0208)
3.weekday	0.0919**	0.0476	0.0392	-0.154***	0.000396	-0.00758	0.0132
	(0.0437)	(0.0296)	(0.0280)	(0.0414)	(0.0128)	(0.00854)	(0.0191)

4.weekday	0.0884** (0.0433)	0.0460 (0.0293)	0.0618** (0.0278)	-0.140*** (0.0422)	-0.00819 (0.0127)	-0.00721 (0.00834)	-0.0120 (0.0200)
5.weekday	0.0839** (0.0411)	0.0135 (0.0269)	0.0681*** (0.0244)	-0.112*** (0.0390)	0.00121 (0.0125)	-0.00727 (0.00705)	-0.0221 (0.0178)
6.weekday	0.0443 (0.0519)	-0.0318 (0.0322)	0.0388 (0.0356)	-0.0625 (0.0481)	-0.0229* (0.0125)	0.0121 (0.0153)	0.0269 (0.0290)
5.hour	0.0342 (0.0738)	-0.00373 (0.0389)	0.107*** (0.0243)	-0.228*** (0.0580)	0.0271** (0.0138)	-0.0134 (0.0104)	0.0628* (0.0333)
6.hour	11.31 (25.16)	-22.00 (17.09)	50.91*** (18.97)	2.774 (19.24)	-7.322* (4.439)	-9.074 (7.185)	-19.31* (10.63)
7.hour	0.0978 (0.0699)	0.0249 (0.0358)	0.0875*** (0.0262)	-0.185*** (0.0564)	0.0419*** (0.0103)	-0.0135 (0.00998)	0.0173 (0.0196)
8.hour	0.157** (0.0691)	-0.00336 (0.0360)	0.0864*** (0.0229)	-0.237*** (0.0581)	0.0376*** (0.0111)	-0.00297 (0.0117)	-0.0403** (0.0170)
9.hour	11.66 (25.16)	-22.00 (17.09)	50.83*** (18.97)	2.614 (19.23)	-7.347* (4.439)	-9.055 (7.173)	-19.42* (10.63)
10.hour	0.349*** (0.0692)	0.0201 (0.0379)	0.0562** (0.0219)	-0.347*** (0.0554)	0.00429 (0.0117)	-0.0136 (0.00973)	-0.0560*** (0.0152)
11.hour	0.261*** (0.0726)	0.0717* (0.0396)	0.0649** (0.0271)	-0.329*** (0.0595)	-0.00699 (0.00785)	-0.0115 (0.00993)	-0.0512*** (0.0159)
12.hour	11.69 (25.16)	-21.95 (17.09)	50.87*** (18.97)	2.589 (19.24)	-7.366* (4.442)	-9.072 (7.186)	-19.39* (10.62)
13.hour	0.224*** (0.0714)	0.0975*** (0.0371)	0.0458 (0.0320)	-0.307*** (0.0593)	-0.0146* (0.00759)	-0.00187 (0.0123)	-0.0443** (0.0180)
14.hour	0.150** (0.0729)	0.100** (0.0449)	0.0357 (0.0281)	-0.262*** (0.0636)	-0.0134 (0.00899)	0.00879 (0.0150)	-0.0252 (0.0277)
15.hour	11.57 (25.15)	-21.92 (17.08)	50.86*** (18.98)	2.622 (19.24)	-7.368* (4.443)	-9.073 (7.185)	-19.38* (10.62)
16.hour	0.250*** (0.0728)	0.0893** (0.0381)	0.0719** (0.0285)	-0.320*** (0.0590)	0.00522 (0.0123)	-0.0115 (0.0114)	-0.0105 (0.0201)
17.hour	0.0443 (0.0768)	0.0746** (0.0358)	0.0685*** (0.0254)	-0.209*** (0.0583)	0.0259*** (0.00979)	-0.0150 (0.0110)	0.0282 (0.0224)
18.hour	11.31 (25.15)	-21.91 (17.09)	50.88*** (18.97)	2.693 (19.24)	-7.327* (4.442)	-9.079 (7.185)	-19.32* (10.62)
19.hour	0.284***	-0.0122	0.0200	-0.234***	-0.00662	-0.0163	-0.0187

	(0.0766)	(0.0376)	(0.0303)	(0.0640)	(0.0109)	(0.0119)	(0.0289)
20.hour	0.254***	-0.0104	0.0200	-0.188***	-0.0146	-0.0179	-0.0294
	(0.0756)	(0.0383)	(0.0364)	(0.0656)	(0.0115)	(0.0120)	(0.0206)
21.hour	11.56	-21.98	50.83***	2.663	-7.351*	-9.088	-19.39*
	(25.16)	(17.08)	(18.97)	(19.25)	(4.445)	(7.185)	(10.62)
22.hour	0.0505	0.0371	0.0347	-0.124*	0.00527	0.00179	-0.0239
	(0.0780)	(0.0400)	(0.0333)	(0.0699)	(0.0139)	(0.0167)	(0.0236)
23.hour	-0.0838	0.102**	-0.0383	0.00562	-0.0328***	0.0655**	-0.0426**
	(0.0768)	(0.0522)	(0.0276)	(0.0753)	(0.00883)	(0.0276)	(0.0206)
Constant	-12.58	24.46	-56.42***	-2.634	8.263*	10.15	21.63*
	(28.00)	(19.03)	(21.11)	(21.42)	(4.948)	(8.005)	(11.83)
Observations	968	968	968	968	968	968	968
R-squared	0.280	0.173	0.098	0.255	0.122	-0.099	0.140
Sanderson-Windmeijer F-statistic	17.11	17.11	17.11	17.11	17.11	17.11	17.11
underidentification test p-value	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05	2.26e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.715	0.760	0.494	0.761	0.920	0.0299	0.900
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.708	0.755	0.484	0.755	0.918	0.0259	0.897
Stock-Wright weak instrument-robust inference p-value	0.669	0.686	0.346	0.709	0.876	1.37e-06	0.836

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 32e. Travel mode share IV regressions using wind speed in Gaoyao as the only IV (in “8iv”), 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others

Hourly PM 2.5 pollution	-4.40e-05 (0.000411)	0.000591* (0.000316)	-0.000377 (0.000328)	-0.000514 (0.000403)	6.42e-05 (9.64e-05)	-3.76e-05 (0.000101)	0.000317 (0.000201)
Wind speed	0.00104 (0.00784)	-0.0130** (0.00552)	-0.00720 (0.00538)	0.0186** (0.00788)	0.00180 (0.00246)	-0.00215 (0.00160)	0.000854 (0.00357)
Temperature	0.00533* (0.00276)	0.00875*** (0.00254)	-0.00216 (0.00218)	-0.00712*** (0.00246)	-0.00295*** (0.000898)	-0.000757 (0.000542)	-0.00110 (0.00133)
Dew point temperature	0.000804 (0.00515)	-0.00782** (0.00395)	0.00138 (0.00437)	0.00781 (0.00524)	-0.000184 (0.00151)	0.000481 (0.00116)	-0.00247 (0.00227)
Sea Level Pressure	0.000495 (0.00245)	-0.00221 (0.00171)	0.00559*** (0.00211)	0.000211 (0.00208)	-0.000744 (0.000473)	-0.00117 (0.000798)	-0.00217* (0.00117)
Cloud Ceiling	9.04e-05 (0.000281)	0.000139 (0.000177)	-0.000434 (0.000341)	-7.20e-05 (0.000223)	3.09e-05 (7.04e-05)	9.67e-05* (5.60e-05)	0.000149 (0.000111)
Altitude	-7.47e-07 (1.29e-05)	3.24e-05 (4.45e-05)	-1.04e-05 (1.14e-05)	-7.77e-06 (2.22e-05)	-4.45e-06*** (1.57e-06)	8.38e-07 (1.16e-06)	-9.92e-06*** (2.87e-06)
North wind	-0.0458 (0.0293)	0.0264 (0.0226)	0.0440* (0.0245)	-0.0247 (0.0256)	0.0113 (0.0103)	0.00896 (0.00931)	-0.0202 (0.0172)
Northeast wind	0.0531 (0.0400)	-0.0493 (0.0303)	-0.00279 (0.0349)	0.0285 (0.0379)	-0.0190 (0.0134)	-0.00791 (0.00914)	-0.00268 (0.0187)
East wind	0.0641** (0.0320)	-0.0186 (0.0233)	-0.0342 (0.0249)	-0.00212 (0.0295)	-0.0159 (0.0111)	-0.00754 (0.00831)	0.0142 (0.0174)
Southeast wind	-0.0106 (0.0295)	-0.0128 (0.0229)	-0.0235 (0.0230)	0.0297 (0.0266)	-0.0191* (0.0105)	0.00291 (0.0110)	0.0335* (0.0188)
South wind	0.0236 (0.0285)	-0.00218 (0.0244)	-0.0361 (0.0228)	-0.00230 (0.0261)	-0.0137 (0.0101)	-0.00524 (0.00830)	0.0360** (0.0163)
Southwest wind	-0.00432 (0.0436)	-0.104*** (0.0339)	0.0509 (0.0434)	0.0395 (0.0372)	0.00118 (0.0107)	-0.00812 (0.00834)	0.0250 (0.0164)
West wind	0.0839 (0.0605)	-0.0147 (0.0437)	-0.0675** (0.0279)	-0.0529 (0.0345)	-0.00453 (0.00894)	-0.00793 (0.00688)	0.0637 (0.0424)
Precipitation	0.00815*** (0.00291)	0.000850 (0.00243)	-0.00459*** (0.00106)	-0.00296** (0.00148)	-0.000233 (0.000699)	0.000116 (0.000586)	-0.00134* (0.000715)
Lag Precipitation	0.00265 (0.00260)	0.00441* (0.00226)	-0.00258 (0.00168)	-0.00363* (0.00210)	0.000524 (0.000543)	-0.000568 (0.000527)	-0.000817 (0.00105)
holiday	-0.0484 (0.0329)	-0.0402 (0.0269)	0.0219 (0.0198)	0.0317 (0.0212)	-0.00490 (0.00730)	0.0128* (0.00687)	0.0270*** (0.00939)
10.month	0.0241	-0.102*	0.0302	0.113*	-0.0267	0.00978	-0.0476

	(0.0708)	(0.0565)	(0.0545)	(0.0682)	(0.0192)	(0.0177)	(0.0368)
11.month	0.0757	-0.159*	0.0547	0.137	-0.0654**	0.00826	-0.0507
	(0.117)	(0.0907)	(0.0937)	(0.111)	(0.0333)	(0.0297)	(0.0588)
1.weekday	0.0880**	0.0641**	0.0112	-0.132***	-0.00744	-0.000981	-0.0233
	(0.0385)	(0.0289)	(0.0301)	(0.0416)	(0.0137)	(0.00487)	(0.0172)
2.weekday	0.0813**	0.0395	0.0327	-0.159***	0.00176	0.00150	0.00169
	(0.0369)	(0.0273)	(0.0272)	(0.0406)	(0.0137)	(0.00524)	(0.0181)
3.weekday	0.0826**	0.0270	0.0316	-0.147***	-0.00276	0.00475	0.00340
	(0.0383)	(0.0306)	(0.0256)	(0.0400)	(0.0147)	(0.00567)	(0.0196)
4.weekday	0.0795**	0.0225	0.0573***	-0.133***	-0.0116	0.00780	-0.0226
	(0.0388)	(0.0313)	(0.0268)	(0.0405)	(0.0141)	(0.00684)	(0.0206)
5.weekday	0.0779**	0.000366	0.0613**	-0.108***	-0.00136	-0.00274	-0.0279
	(0.0374)	(0.0285)	(0.0245)	(0.0390)	(0.0133)	(0.00522)	(0.0187)
6.weekday	0.0469	-0.0449	0.0353	-0.0543	-0.0253*	0.0220	0.0204
	(0.0498)	(0.0351)	(0.0328)	(0.0483)	(0.0137)	(0.0150)	(0.0284)
5.hour	0.0580	-0.0142	0.105***	-0.224***	0.0254*	-0.00626	0.0564*
	(0.0590)	(0.0402)	(0.0239)	(0.0597)	(0.0134)	(0.00933)	(0.0304)
6.hour	4.444	-19.86	50.28***	1.744	-6.644	-10.54	-19.43*
	(21.98)	(15.37)	(18.94)	(18.71)	(4.248)	(7.166)	(10.48)
7.hour	0.0891*	-0.00147	0.0769***	-0.200***	0.0373***	-0.00856	0.00659
	(0.0509)	(0.0361)	(0.0257)	(0.0567)	(0.00975)	(0.00952)	(0.0189)
8.hour	0.173***	-0.0184	0.0825***	-0.231***	0.0351***	0.00454	-0.0457***
	(0.0532)	(0.0371)	(0.0227)	(0.0594)	(0.0113)	(0.0115)	(0.0169)
9.hour	4.769	-19.85	50.21***	1.596	-6.669	-10.52	-19.53*
	(21.98)	(15.37)	(18.94)	(18.71)	(4.251)	(7.151)	(10.48)
10.hour	0.350***	0.0144	0.0505**	-0.349***	0.00371	-0.0116	-0.0581***
	(0.0527)	(0.0390)	(0.0218)	(0.0559)	(0.0115)	(0.00915)	(0.0156)
11.hour	0.280***	0.0630	0.0623**	-0.331***	-0.00684	-0.0157*	-0.0519***
	(0.0564)	(0.0417)	(0.0285)	(0.0596)	(0.00791)	(0.00935)	(0.0162)
12.hour	4.755	-19.81	50.24***	1.553	-6.687	-10.55	-19.50*
	(21.98)	(15.37)	(18.94)	(18.71)	(4.252)	(7.167)	(10.47)
13.hour	0.243***	0.0852**	0.0444	-0.309***	-0.0153*	-0.00319	-0.0454**
	(0.0566)	(0.0389)	(0.0338)	(0.0597)	(0.00781)	(0.0120)	(0.0185)
14.hour	0.171***	0.0980**	0.0362	-0.271***	-0.0132	0.000760	-0.0223
	(0.0556)	(0.0482)	(0.0277)	(0.0618)	(0.00879)	(0.0146)	(0.0266)

15.hour	4.710 (21.97)	-19.79 (15.36)	50.23*** (18.95)	1.577 (18.70)	-6.688 (4.252)	-10.56 (7.167)	-19.49* (10.47)
16.hour	0.233*** (0.0523)	0.0718* (0.0389)	0.0556** (0.0271)	-0.334*** (0.0577)	0.00442 (0.0119)	-0.0180* (0.0102)	-0.0128 (0.0197)
17.hour	0.0500 (0.0528)	0.0674* (0.0370)	0.0623** (0.0252)	-0.213*** (0.0579)	0.0249** (0.00977)	-0.0186* (0.00991)	0.0276 (0.0224)
18.hour	4.466 (21.97)	-19.76 (15.37)	50.26*** (18.94)	1.670 (18.71)	-6.647 (4.252)	-10.56 (7.166)	-19.43* (10.47)
19.hour	0.286*** (0.0599)	-0.0178 (0.0396)	0.0186 (0.0308)	-0.242*** (0.0642)	-0.00791 (0.0112)	-0.0168 (0.0104)	-0.0198 (0.0303)
20.hour	0.264*** (0.0581)	-0.0246 (0.0397)	0.0255 (0.0375)	-0.195*** (0.0654)	-0.0160 (0.0120)	-0.0142 (0.0105)	-0.0394* (0.0206)
21.hour	4.690 (21.98)	-19.85 (15.37)	50.22*** (18.95)	1.664 (18.72)	-6.672 (4.255)	-10.55 (7.165)	-19.51* (10.47)
22.hour	0.0704 (0.0624)	0.0187 (0.0423)	0.0376 (0.0337)	-0.111 (0.0726)	0.00364 (0.0143)	0.0122 (0.0144)	-0.0314 (0.0240)
23.hour	-0.0573 (0.0591)	0.0971* (0.0529)	-0.0374 (0.0278)	0.00992 (0.0750)	-0.0338*** (0.00915)	0.0672** (0.0279)	-0.0458** (0.0206)
Constant	-4.905 (24.47)	22.11 (17.12)	-55.72*** (21.08)	-1.532 (20.84)	7.519 (4.736)	11.75 (7.979)	21.79* (11.67)
Observations	945	945	945	945	945	945	945
R-squared	0.298	0.053	0.084	0.246	0.124	0.101	0.137
Sanderson-Windmeijer F- statistic	40.7	40.70	40.70	40.70	40.70	40.70	40.70
underidentification test p-value	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10
Anderson-Rubin weak instrument-robust inference F test p-value	0.917	0.0437	0.246	0.212	0.517	0.714	0.129
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.915	0.0385	0.234	0.200	0.506	0.707	0.119
Stock-Wright weak instrument- robust inference p-value	0.906	0.0140	0.0960	0.117	0.251	0.495	0.0123

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-9.76e-05 (0.000417)	0.000554* (0.000329)	-0.000465 (0.000349)	-0.000658* (0.000399)	1.01e-05 (0.000142)	-2.40e-05 (8.28e-05)	0.000266 (0.000212)
Wind speed	0.000719 (0.00803)	-0.0108* (0.00571)	-0.00618 (0.00573)	0.0189** (0.00789)	0.00436 (0.00421)	-0.00178 (0.00138)	0.00253 (0.00363)
Temperature	0.00525* (0.00284)	0.00862*** (0.00260)	-0.00239 (0.00228)	-0.00788*** (0.00247)	-0.00405*** (0.00132)	-0.000625 (0.000470)	-0.00129 (0.00145)
Dew point temperature	0.00122 (0.00528)	-0.00704* (0.00408)	0.00270 (0.00458)	0.00974* (0.00521)	0.00109 (0.00244)	0.000308 (0.000940)	-0.00153 (0.00238)
Sea Level Pressure	0.000363 (0.00242)	-0.00309* (0.00174)	0.00532** (0.00218)	0.000133 (0.00210)	-0.000848 (0.000628)	-0.00110 (0.000788)	-0.00230* (0.00123)
Cloud Ceiling	-2.10e-05 (0.000277)	0.000181 (0.000182)	-0.000382 (0.000344)	-7.70e-05 (0.000223)	2.47e-05 (9.35e-05)	7.57e-05 (4.67e-05)	0.000190 (0.000121)
Altitude	-1.65e-06 (1.33e-05)	3.15e-05 (4.43e-05)	-1.10e-05 (1.14e-05)	-8.12e-06 (2.32e-05)	-4.14e-06* (2.26e-06)	6.88e-07 (1.05e-06)	-9.70e-06*** (2.93e-06)
North wind	-0.0387 (0.0296)	0.0238 (0.0235)	0.0431* (0.0251)	-0.00976 (0.0263)	0.0101 (0.0123)	0.00499 (0.00654)	-0.0214 (0.0173)
Northeast wind	0.0491 (0.0407)	-0.0532* (0.0313)	-0.00339 (0.0352)	0.0110 (0.0378)	-0.0203 (0.0152)	-0.00554 (0.00697)	-0.00300 (0.0191)
East wind	0.0516 (0.0322)	-0.0214 (0.0240)	-0.0342 (0.0254)	-0.0196 (0.0302)	-0.0184 (0.0125)	-0.00411 (0.00610)	0.0123 (0.0176)
Southeast wind	-0.0108 (0.0298)	-0.0141 (0.0240)	-0.0228 (0.0237)	0.0104 (0.0269)	-0.0215* (0.0120)	0.00478 (0.00944)	0.0340* (0.0191)
South wind	0.0186 (0.0290)	0.00314 (0.0256)	-0.0326 (0.0241)	-0.0112 (0.0268)	-0.0121 (0.0126)	-0.00343 (0.00613)	0.0387** (0.0174)
Southwest wind	-0.0241 (0.0413)	-0.103*** (0.0362)	0.0517 (0.0433)	0.0284 (0.0375)	0.00535 (0.0131)	-0.00477 (0.00608)	0.0243 (0.0185)
West wind	0.0700	-0.00187	-0.0674**	-0.0667*	-0.00593	-0.00560	0.0615

	(0.0563)	(0.0476)	(0.0305)	(0.0349)	(0.0109)	(0.00541)	(0.0431)
Precipitation	0.00763***	0.000544	-0.00484***	-0.00287*	-0.000563	-5.24e-05	-0.00146*
	(0.00280)	(0.00244)	(0.00110)	(0.00153)	(0.000811)	(0.000514)	(0.000801)
Lag Precipitation	0.00337	0.00339	-0.00365**	-0.00413**	0.000329	-0.000481	-0.00120
	(0.00254)	(0.00231)	(0.00176)	(0.00210)	(0.000675)	(0.000478)	(0.00113)
holiday	-0.0582*	-0.0371	0.0282	0.0240	-0.00704	0.0140**	0.0303***
	(0.0323)	(0.0274)	(0.0200)	(0.0219)	(0.00947)	(0.00665)	(0.0100)
10.month	0.0308	-0.0970*	0.0428	0.131*	-0.0215	0.00775	-0.0365
	(0.0714)	(0.0585)	(0.0578)	(0.0676)	(0.0262)	(0.0154)	(0.0383)
11.month	0.0838	-0.153	0.0795	0.164	-0.0535	0.00392	-0.0343
	(0.119)	(0.0937)	(0.0983)	(0.111)	(0.0483)	(0.0241)	(0.0606)
1.weekday	0.0842**	0.0644**	0.0188	-0.136***	-0.00565	0.000417	-0.0174
	(0.0393)	(0.0301)	(0.0309)	(0.0421)	(0.0148)	(0.00430)	(0.0178)
2.weekday	0.0791**	0.0430	0.0435	-0.171***	0.00378	0.00125	0.00631
	(0.0381)	(0.0291)	(0.0288)	(0.0409)	(0.0151)	(0.00464)	(0.0189)
3.weekday	0.0764**	0.0376	0.0417	-0.146***	0.000901	0.00510	0.00948
	(0.0386)	(0.0324)	(0.0269)	(0.0408)	(0.0167)	(0.00519)	(0.0203)
4.weekday	0.0713*	0.0243	0.0716**	-0.132***	-0.0100	0.00643	-0.0143
	(0.0386)	(0.0329)	(0.0283)	(0.0411)	(0.0156)	(0.00561)	(0.0213)
5.weekday	0.0732*	-0.00355	0.0715***	-0.110***	0.00107	-0.00121	-0.0220
	(0.0376)	(0.0299)	(0.0257)	(0.0395)	(0.0146)	(0.00469)	(0.0194)
6.weekday	0.0373	-0.0270	0.0496	-0.0684	-0.0280*	0.0213	0.0269
	(0.0502)	(0.0386)	(0.0361)	(0.0475)	(0.0150)	(0.0146)	(0.0294)
5.hour	0.0755	-0.0205	0.102***	-0.229***	0.0290**	-0.000684	0.0607*
	(0.0580)	(0.0418)	(0.0267)	(0.0596)	(0.0133)	(0.00638)	(0.0333)
6.hour	3.282	-27.78*	47.94**	1.026	-7.565	-9.900	-20.54*
	(21.78)	(15.64)	(19.54)	(18.89)	(5.633)	(7.076)	(11.02)
7.hour	0.154***	0.0283	0.113***	-0.174***	0.0584***	-0.00212	0.0319
	(0.0511)	(0.0387)	(0.0290)	(0.0570)	(0.0110)	(0.00671)	(0.0236)
8.hour	0.231***	0.00481	0.0986***	-0.213***	0.0545***	0.00882	-0.0485**
	(0.0532)	(0.0393)	(0.0270)	(0.0597)	(0.0184)	(0.00860)	(0.0202)
9.hour	3.603	-27.78*	47.84**	0.895	-7.603	-9.881	-20.67*
	(21.78)	(15.64)	(19.54)	(18.89)	(5.643)	(7.061)	(11.02)
10.hour	0.369***	0.0152	0.0432*	-0.351***	0.00429	-0.00588	-0.0652***
	(0.0518)	(0.0398)	(0.0250)	(0.0560)	(0.0118)	(0.00613)	(0.0186)

11.hour	0.328*** (0.0552)	0.0667 (0.0429)	0.0495 (0.0302)	-0.339*** (0.0591)	-0.00843 (0.00950)	-0.00927 (0.00649)	-0.0601*** (0.0188)
12.hour	3.553 (21.77)	-27.74* (15.64)	47.88** (19.54)	0.854 (18.89)	-7.628 (5.645)	-9.905 (7.077)	-20.64* (11.00)
13.hour	0.283*** (0.0553)	0.0911** (0.0412)	0.0380 (0.0353)	-0.316*** (0.0592)	-0.0174* (0.00912)	-4.97e-05 (0.00882)	-0.0499** (0.0221)
14.hour	0.195*** (0.0554)	0.102** (0.0494)	0.0348 (0.0310)	-0.288*** (0.0611)	-0.0175 (0.0107)	0.00339 (0.0109)	-0.0330 (0.0280)
15.hour	3.541 (21.77)	-27.73* (15.63)	47.86** (19.55)	0.865 (18.88)	-7.629 (5.645)	-9.912 (7.077)	-20.63* (11.01)
16.hour	0.262*** (0.0536)	0.0906** (0.0459)	0.0731** (0.0303)	-0.343*** (0.0577)	0.00833 (0.0151)	-0.0103 (0.00765)	-0.0104 (0.0222)
17.hour	0.110** (0.0521)	0.102*** (0.0392)	0.103*** (0.0296)	-0.183*** (0.0582)	0.0347*** (0.0125)	-0.0113 (0.00718)	0.0462* (0.0260)
18.hour	3.305 (21.77)	-27.69* (15.64)	47.90** (19.54)	0.973 (18.89)	-7.581 (5.646)	-9.911 (7.076)	-20.56* (11.00)
19.hour	0.281*** (0.0583)	-0.00575 (0.0420)	0.0201 (0.0337)	-0.254*** (0.0636)	-0.00610 (0.0142)	-0.00859 (0.00748)	-0.0239 (0.0318)
20.hour	0.265*** (0.0582)	-0.0130 (0.0425)	0.0228 (0.0391)	-0.187*** (0.0659)	-0.0178 (0.0133)	-0.00706 (0.00754)	-0.0429* (0.0234)
21.hour	3.509 (21.78)	-27.78* (15.64)	47.85** (19.55)	0.946 (18.90)	-7.613 (5.647)	-9.904 (7.075)	-20.65* (11.00)
22.hour	0.0780 (0.0618)	0.0183 (0.0442)	0.0335 (0.0372)	-0.126* (0.0730)	0.00318 (0.0159)	0.0199* (0.0121)	-0.0375 (0.0264)
23.hour	-0.0527 (0.0568)	0.0900 (0.0556)	-0.0482 (0.0303)	0.0134 (0.0743)	-0.0397*** (0.0103)	0.0598*** (0.0212)	-0.0560** (0.0231)
Constant	-3.586 (24.24)	30.95* (17.43)	-53.09** (21.75)	-0.736 (21.04)	8.571 (6.288)	11.03 (7.880)	23.05* (12.27)
Observations	945	945	945	945	945	945	945
R-squared	0.290	0.064	0.090	0.239	0.120	0.102	0.166
Sanderson-Windmeijer F-statistic	40.70	40.70	40.70	40.70	40.70	40.70	40.70
underidentification test p-value	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10

Anderson-Rubin weak instrument-robust inference F test p-value	0.819	0.0758	0.176	0.106	0.945	0.777	0.226
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.815	0.0685	0.165	0.0974	0.943	0.771	0.214
Stock-Wright weak instrument-robust inference p-value	0.797	0.0354	0.0626	0.0451	0.883	0.646	0.0548

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000170 (0.000649)	0.000557 (0.000377)	-0.000606 (0.000401)	-0.000799 (0.000587)	5.18e-06 (0.000145)	-6.89e-05 (0.000151)	0.000338 (0.000237)
Wind speed	0.0146 (0.0130)	-0.0124* (0.00666)	-0.00758 (0.00647)	0.0240** (0.0105)	0.00418 (0.00422)	-0.00372 (0.00273)	0.00244 (0.00439)
Temperature	0.00884** (0.00435)	0.0111*** (0.00290)	-0.00274 (0.00281)	-0.00971*** (0.00350)	-0.00422*** (0.00133)	-0.00149 (0.000932)	-0.00270 (0.00168)
Dew point temperature	0.00354 (0.00800)	-0.00771 (0.00476)	0.00303 (0.00552)	0.0127* (0.00708)	0.00106 (0.00246)	0.00101 (0.00162)	-0.00183 (0.00267)
Sea Level Pressure	0.00360 (0.00438)	-0.00362 (0.00255)	0.00739** (0.00295)	0.000600 (0.00290)	-0.00113* (0.000674)	-0.00199 (0.00156)	-0.00291 (0.00177)
Cloud Ceiling	5.30e-05 (0.000465)	0.000128 (0.000217)	-0.000394 (0.000371)	-8.07e-05 (0.000331)	3.00e-05 (9.40e-05)	0.000142 (8.92e-05)	0.000206 (0.000146)
Altitude	-9.98e-06 (1.16e-05)	2.61e-05 (4.64e-05)	-1.73e-05 (1.44e-05)	-1.07e-05 (2.57e-05)	-4.49e-06* (2.32e-06)	1.89e-06 (1.98e-06)	-1.04e-05*** (3.34e-06)
North wind	-0.0964** (0.0452)	0.0216 (0.0250)	0.0449 (0.0284)	-0.0498 (0.0357)	0.0106 (0.0124)	0.0236 (0.0213)	-0.0232 (0.0195)
Northeast wind	0.0909 (0.0643)	-0.0628* (0.0332)	0.0307 (0.0576)	0.0473 (0.0488)	-0.0216 (0.0153)	-0.0193 (0.0190)	-0.00436 (0.0206)
East wind	0.0981** (0.0458)	-0.0195 (0.0279)	-0.0274 (0.0327)	0.0208 (0.0413)	-0.0177 (0.0126)	-0.0197 (0.0185)	0.0150 (0.0193)

Southeast wind	-0.00255 (0.0423)	-0.0117 (0.0268)	-0.0139 (0.0284)	0.0636* (0.0375)	-0.0217* (0.0120)	0.000729 (0.0229)	0.0453* (0.0259)
South wind	0.0629 (0.0475)	0.00241 (0.0285)	-0.0325 (0.0279)	0.0123 (0.0340)	-0.0121 (0.0127)	-0.0171 (0.0174)	0.0463** (0.0204)
Southwest wind	-0.00318 (0.0618)	-0.139*** (0.0422)	0.0459 (0.0448)	0.0569 (0.0445)	0.00490 (0.0132)	-0.0180 (0.0172)	0.0349 (0.0219)
West wind	0.196 (0.140)	-0.0104 (0.0530)	-0.0760** (0.0355)	-0.0421 (0.0469)	-0.00560 (0.0112)	-0.0146 (0.0126)	0.0713 (0.0438)
Precipitation	0.00772** (0.00328)	0.00217 (0.00401)	-0.00520*** (0.00125)	-0.00347* (0.00199)	-0.000366 (0.000897)	0.000355 (0.000717)	-0.00173* (0.000909)
Lag Precipitation	-6.94e-05 (0.00358)	0.00514* (0.00292)	-0.00429** (0.00203)	-0.00561* (0.00314)	0.000325 (0.000715)	-0.000706 (0.000696)	-0.00116 (0.00129)
holiday	-0.0366 (0.0403)	-0.0577 (0.0411)	0.0338 (0.0231)	0.0353 (0.0287)	-0.00739 (0.00998)	0.0132* (0.00758)	0.0315*** (0.0118)
10.month	0.0664 (0.107)	-0.0972 (0.0665)	0.0611 (0.0665)	0.171* (0.0968)	-0.0210 (0.0266)	0.0181 (0.0259)	-0.0514 (0.0420)
11.month	0.206 (0.177)	-0.164 (0.106)	0.0972 (0.113)	0.227 (0.149)	-0.0577 (0.0488)	0.0127 (0.0440)	-0.0582 (0.0675)
1.weekday	0.144*** (0.0549)	0.0846** (0.0367)	0.00749 (0.0479)	-0.143*** (0.0544)	-0.00461 (0.0148)	-0.000742 (0.00640)	-0.0177 (0.0183)
2.weekday	0.139*** (0.0519)	0.0521 (0.0358)	0.0370 (0.0408)	-0.187*** (0.0566)	0.00449 (0.0151)	0.00233 (0.00790)	0.0108 (0.0199)
3.weekday	0.163*** (0.0541)	0.0436 (0.0395)	0.0437 (0.0382)	-0.161*** (0.0520)	0.00387 (0.0167)	0.00469 (0.00707)	0.0173 (0.0218)
4.weekday	0.133** (0.0523)	0.0379 (0.0406)	0.0711* (0.0365)	-0.146*** (0.0508)	-0.00855 (0.0157)	0.0162 (0.0124)	-0.0158 (0.0222)
5.weekday	0.131** (0.0522)	0.0110 (0.0380)	0.0707** (0.0348)	-0.126** (0.0493)	0.00350 (0.0147)	-0.00373 (0.00688)	-0.0222 (0.0200)
6.weekday	0.0786 (0.0676)	-0.0500 (0.0459)	0.0393 (0.0429)	-0.0207 (0.0684)	-0.0286* (0.0151)	0.0385 (0.0275)	0.0486 (0.0375)
5.hour	0.0327 (0.0789)	-0.00588 (0.0450)	0.120*** (0.0276)	-0.268*** (0.0763)	0.0284** (0.0141)	-0.00556 (0.0111)	0.0723* (0.0393)
6.hour	32.31 (39.32)	-32.53 (22.93)	66.56** (26.53)	5.273 (26.09)	-10.13* (6.049)	-17.84 (13.98)	-26.04 (15.89)
7.hour	0.265***	0.107**	0.159***	-0.134*	0.0619***	-0.00799	0.0471*

	(0.0845)	(0.0429)	(0.0389)	(0.0764)	(0.0120)	(0.0114)	(0.0279)
8.hour	0.282***	0.0252	0.138***	-0.247***	0.0557***	0.00713	-0.0469**
	(0.0783)	(0.0414)	(0.0296)	(0.0772)	(0.0189)	(0.0135)	(0.0215)
9.hour	32.74	-32.54	66.46**	5.046	-10.17*	-17.81	-26.17*
	(39.30)	(22.94)	(26.53)	(26.09)	(6.058)	(13.94)	(15.89)
10.hour	0.473***	0.0468	0.0729***	-0.408***	0.00207	-0.0136	-0.0712***
	(0.0782)	(0.0434)	(0.0267)	(0.0753)	(0.0127)	(0.0110)	(0.0197)
11.hour	0.377***	0.111**	0.0996**	-0.380***	-0.0103	-0.0203*	-0.0647***
	(0.0787)	(0.0450)	(0.0420)	(0.0822)	(0.0105)	(0.0117)	(0.0206)
12.hour	32.80	-32.50	66.49**	4.987	-10.20*	-17.85	-26.12*
	(39.32)	(22.93)	(26.53)	(26.09)	(6.060)	(13.98)	(15.86)
13.hour	0.300***	0.145***	0.0467	-0.363***	-0.0205**	-0.00623	-0.0592**
	(0.0766)	(0.0456)	(0.0368)	(0.0822)	(0.0102)	(0.0157)	(0.0239)
14.hour	0.230***	0.135***	0.0489	-0.305***	-0.0194	-0.00249	-0.0365
	(0.0829)	(0.0510)	(0.0350)	(0.0895)	(0.0119)	(0.0186)	(0.0303)
15.hour	32.68	-32.44	66.47**	5.019	-10.20*	-17.87	-26.13*
	(39.30)	(22.91)	(26.54)	(26.08)	(6.061)	(13.98)	(15.88)
16.hour	0.419***	0.172***	0.0850**	-0.378***	0.00589	-0.0257*	-0.0171
	(0.0942)	(0.0504)	(0.0332)	(0.0818)	(0.0158)	(0.0139)	(0.0242)
17.hour	0.145*	0.152***	0.117***	-0.198**	0.0396***	-0.0258**	0.0451
	(0.0819)	(0.0416)	(0.0326)	(0.0809)	(0.0136)	(0.0131)	(0.0286)
18.hour	32.36	-32.43	66.52**	5.126	-10.14*	-17.87	-26.06
	(39.30)	(22.93)	(26.55)	(26.09)	(6.060)	(13.98)	(15.88)
19.hour	0.421***	0.0115	0.0459	-0.259***	-0.00919	-0.0248*	-0.0338
	(0.0872)	(0.0442)	(0.0439)	(0.0878)	(0.0150)	(0.0142)	(0.0331)
20.hour	0.388***	0.0168	0.0252	-0.217**	-0.0211	-0.0215	-0.0498*
	(0.0859)	(0.0485)	(0.0422)	(0.0881)	(0.0143)	(0.0144)	(0.0261)
21.hour	32.63	-32.55	66.44**	5.126	-10.18*	-17.86	-26.16*
	(39.31)	(22.93)	(26.54)	(26.11)	(6.062)	(13.97)	(15.88)
22.hour	0.0773	0.0289	0.0395	-0.137	-6.86e-05	0.00370	-0.0521*
	(0.0869)	(0.0465)	(0.0421)	(0.102)	(0.0169)	(0.0185)	(0.0283)
23.hour	-0.0619	0.101*	-0.0488	0.0223	-0.0438***	0.0993*	-0.0678***
	(0.0851)	(0.0563)	(0.0335)	(0.110)	(0.0115)	(0.0565)	(0.0244)
Constant	-36.02	36.25	-73.77**	-5.323	11.44*	19.88	29.19*
	(43.74)	(25.55)	(29.53)	(29.04)	(6.751)	(15.56)	(17.70)

Observations	945	945	945	945	945	945	945
R-squared	0.268	0.125	0.081	0.197	0.134	0.074	0.158
Sanderson-Windmeijer F-statistic	40.70	40.70	40.70	40.70	40.70	40.70	40.70
underidentification test p-value	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10
Anderson-Rubin weak instrument-robust inference F test p-value	0.798	0.123	0.121	0.179	0.972	0.653	0.174
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.793	0.114	0.112	0.169	0.971	0.645	0.163
Stock-Wright weak instrument-robust inference p-value	0.758	0.0684	0.0361	0.0811	0.943	0.367	0.0390

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	-0.000116 (0.000474)	0.000558* (0.000319)	-0.000441 (0.000333)	-0.000533 (0.000413)	5.96e-05 (9.72e-05)	-3.59e-05 (0.000101)	0.000319 (0.000204)
Wind speed	0.00802 (0.0102)	-0.0118** (0.00562)	-0.00620 (0.00543)	0.0191** (0.00822)	0.00221 (0.00252)	-0.00210 (0.00160)	0.00122 (0.00359)
Temperature	0.00517* (0.00303)	0.00897*** (0.00256)	-0.00246 (0.00220)	-0.00691*** (0.00264)	-0.00305*** (0.000907)	-0.000766 (0.000544)	-0.00120 (0.00136)
Dew point temperature	0.00297 (0.00587)	-0.00732* (0.00399)	0.00233 (0.00443)	0.00825 (0.00546)	-7.17e-05 (0.00153)	0.000479 (0.00116)	-0.00239 (0.00230)
Sea Level Pressure	0.000998 (0.00281)	-0.00251 (0.00191)	0.00580*** (0.00212)	0.000658 (0.00214)	-0.000801 (0.000505)	-0.00118 (0.000798)	-0.00216* (0.00118)
Cloud Ceiling	0.000200 (0.000328)	0.000146 (0.000181)	-0.000411 (0.000344)	-8.75e-05 (0.000236)	4.38e-05 (7.57e-05)	0.000100* (5.72e-05)	0.000157 (0.000114)
Altitude	-1.70e-07 (1.24e-05)	3.17e-05 (4.54e-05)	-1.05e-05 (1.13e-05)	-8.65e-06 (2.24e-05)	-4.42e-06*** (1.61e-06)	8.18e-07 (1.16e-06)	-1.01e-05*** (2.89e-06)

North wind	-0.0645*	0.0255	0.0435*	-0.0288	0.0107	0.00888	-0.0216
	(0.0330)	(0.0226)	(0.0246)	(0.0259)	(0.0103)	(0.00933)	(0.0173)
Northeast wind	0.0746	-0.0500	-0.00182	0.0299	-0.0189	-0.00806	-0.00213
	(0.0497)	(0.0304)	(0.0350)	(0.0381)	(0.0134)	(0.00916)	(0.0189)
East wind	0.0711**	-0.0181	-0.0345	0.00115	-0.0156	-0.00750	0.0156
	(0.0341)	(0.0237)	(0.0249)	(0.0300)	(0.0111)	(0.00833)	(0.0175)
Southeast wind	-0.00421	-0.0122	-0.0234	0.0313	-0.0190*	0.00312	0.0345*
	(0.0321)	(0.0231)	(0.0231)	(0.0269)	(0.0105)	(0.0110)	(0.0188)
South wind	0.0322	-0.000340	-0.0367	0.000398	-0.0136	-0.00519	0.0381**
	(0.0314)	(0.0249)	(0.0229)	(0.0265)	(0.0102)	(0.00833)	(0.0166)
Southwest wind	-0.00457	-0.112***	0.0509	0.0403	0.00300	-0.00820	0.0254
	(0.0455)	(0.0349)	(0.0433)	(0.0381)	(0.0115)	(0.00838)	(0.0167)
West wind	0.0922	-0.0186	-0.0673**	-0.0520	-0.00463	-0.00811	0.0637
	(0.0760)	(0.0438)	(0.0287)	(0.0357)	(0.00914)	(0.00691)	(0.0424)
Precipitation	0.00865***	0.00148	-0.00472***	-0.00307**	-0.000118	0.000138	-0.00137*
	(0.00300)	(0.00285)	(0.00107)	(0.00149)	(0.000792)	(0.000597)	(0.000728)
Lag Precipitation	0.00230	0.00458*	-0.00294*	-0.00387*	0.000531	-0.000580	-0.000914
	(0.00282)	(0.00236)	(0.00170)	(0.00216)	(0.000558)	(0.000532)	(0.00106)
holiday	-0.0551	-0.0468	0.0234	0.0333	-0.00513	0.0131*	0.0276***
	(0.0344)	(0.0304)	(0.0199)	(0.0215)	(0.00769)	(0.00693)	(0.00953)
10.month	0.0404	-0.0958*	0.0407	0.121*	-0.0261	0.00966	-0.0477
	(0.0814)	(0.0570)	(0.0552)	(0.0695)	(0.0193)	(0.0178)	(0.0372)
11.month	0.121	-0.153*	0.0689	0.148	-0.0655*	0.00778	-0.0506
	(0.135)	(0.0915)	(0.0948)	(0.113)	(0.0336)	(0.0298)	(0.0592)
1.weekday	0.114**	0.0711**	0.0164	-0.127***	-0.00633	-0.000965	-0.0224
	(0.0443)	(0.0294)	(0.0302)	(0.0421)	(0.0137)	(0.00511)	(0.0173)
2.weekday	0.0895**	0.0444	0.0387	-0.157***	0.00253	0.00137	0.00292
	(0.0394)	(0.0279)	(0.0274)	(0.0410)	(0.0138)	(0.00545)	(0.0183)
3.weekday	0.0953**	0.0336	0.0379	-0.146***	-0.00173	0.00450	0.00557
	(0.0413)	(0.0310)	(0.0257)	(0.0405)	(0.0147)	(0.00601)	(0.0198)
4.weekday	0.0909**	0.0289	0.0655**	-0.130***	-0.0106	0.00763	-0.0218
	(0.0422)	(0.0318)	(0.0269)	(0.0412)	(0.0142)	(0.00712)	(0.0207)
5.weekday	0.0891**	0.00503	0.0679***	-0.107***	-0.000334	-0.00291	-0.0275
	(0.0411)	(0.0291)	(0.0246)	(0.0396)	(0.0133)	(0.00558)	(0.0189)
6.weekday	0.0474	-0.0426	0.0386	-0.0556	-0.0252*	0.0219	0.0201

	(0.0528)	(0.0363)	(0.0332)	(0.0489)	(0.0137)	(0.0151)	(0.0285)
5.hour	0.0318	-0.0101	0.109***	-0.223***	0.0260*	-0.00629	0.0583*
	(0.0745)	(0.0406)	(0.0239)	(0.0598)	(0.0134)	(0.00943)	(0.0307)
6.hour	8.950	-22.59	52.17***	5.769	-7.153	-10.63	-19.32*
	(25.20)	(17.19)	(19.05)	(19.27)	(4.532)	(7.169)	(10.62)
7.hour	0.0963	0.0198	0.0892***	-0.181***	0.0411***	-0.00856	0.0137
	(0.0699)	(0.0371)	(0.0259)	(0.0570)	(0.00986)	(0.00961)	(0.0194)
8.hour	0.154**	-0.0135	0.0887***	-0.227***	0.0361***	0.00504	-0.0453***
	(0.0704)	(0.0371)	(0.0228)	(0.0595)	(0.0113)	(0.0118)	(0.0170)
9.hour	9.293	-22.59	52.10***	5.611	-7.178	-10.61	-19.42*
	(25.20)	(17.19)	(19.05)	(19.27)	(4.533)	(7.154)	(10.62)
10.hour	0.345***	0.0213	0.0585***	-0.345***	0.00399	-0.0116	-0.0585***
	(0.0696)	(0.0390)	(0.0223)	(0.0560)	(0.0116)	(0.00925)	(0.0157)
11.hour	0.264***	0.0705*	0.0656**	-0.328***	-0.00685	-0.0158*	-0.0522***
	(0.0718)	(0.0417)	(0.0287)	(0.0596)	(0.00799)	(0.00947)	(0.0163)
12.hour	9.334	-22.54	52.13***	5.575	-7.197	-10.64	-19.39*
	(25.20)	(17.18)	(19.05)	(19.27)	(4.535)	(7.170)	(10.61)
13.hour	0.228***	0.0943**	0.0461	-0.305***	-0.0153*	-0.00330	-0.0456**
	(0.0717)	(0.0391)	(0.0338)	(0.0598)	(0.00789)	(0.0121)	(0.0186)
14.hour	0.152**	0.105**	0.0385	-0.267***	-0.0132	0.000663	-0.0227
	(0.0703)	(0.0482)	(0.0282)	(0.0619)	(0.00892)	(0.0147)	(0.0267)
15.hour	9.226	-22.51	52.12***	5.598	-7.199	-10.64	-19.38*
	(25.19)	(17.17)	(19.06)	(19.27)	(4.536)	(7.170)	(10.62)
16.hour	0.252***	0.0959**	0.0675**	-0.320***	0.00597	-0.0177*	-0.00891
	(0.0710)	(0.0396)	(0.0275)	(0.0580)	(0.0120)	(0.0104)	(0.0200)
17.hour	0.0455	0.0748**	0.0652**	-0.206***	0.0261***	-0.0187*	0.0290
	(0.0764)	(0.0371)	(0.0254)	(0.0581)	(0.00987)	(0.0100)	(0.0226)
18.hour	8.957	-22.50	52.14***	5.687	-7.157	-10.64	-19.32*
	(25.19)	(17.19)	(19.05)	(19.27)	(4.536)	(7.169)	(10.61)
19.hour	0.283***	-0.0121	0.0210	-0.232***	-0.00749	-0.0168	-0.0194
	(0.0763)	(0.0397)	(0.0310)	(0.0646)	(0.0112)	(0.0106)	(0.0303)
20.hour	0.257***	-0.0172	0.0269	-0.187***	-0.0161	-0.0143	-0.0353
	(0.0761)	(0.0404)	(0.0377)	(0.0659)	(0.0120)	(0.0107)	(0.0216)
21.hour	9.186	-22.59	52.10***	5.678	-7.184	-10.64	-19.40*
	(25.20)	(17.18)	(19.06)	(19.28)	(4.539)	(7.168)	(10.61)

22.hour	0.0470 (0.0802)	0.0211 (0.0423)	0.0380 (0.0340)	-0.107 (0.0728)	0.00330 (0.0143)	0.0120 (0.0145)	-0.0323 (0.0241)
23.hour	-0.0852 (0.0768)	0.0989* (0.0528)	-0.0380 (0.0280)	0.0137 (0.0751)	-0.0343*** (0.00923)	0.0672** (0.0280)	-0.0469** (0.0207)
Constant	-9.951 (28.05)	25.15 (19.15)	-57.83*** (21.20)	-6.006 (21.46)	8.088 (5.051)	11.84 (7.982)	21.67* (11.83)
Observations	945	945	945	945	945	945	945
R-squared	0.283	0.079	0.079	0.236	0.128	0.101	0.141
Sanderson-Windmeijer F- statistic	40.70	40.70	40.70	40.70	40.70	40.70	40.70
underidentification test p-value	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10	2.68e-10
Anderson-Rubin weak instrument-robust inference F test p-value	0.811	0.0616	0.178	0.206	0.551	0.728	0.132
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.807	0.0551	0.167	0.195	0.541	0.721	0.122
Stock-Wright weak instrument- robust inference p-value	0.776	0.0240	0.0553	0.111	0.299	0.520	0.0149

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 32f. Travel mode share IV regressions using wind blowing from Chengshantou as the only IV (in “9iv”), 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all trips whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000590 (0.000636)	-0.000394 (0.000416)	0.000136 (0.000412)	-0.000992* (0.000596)	-0.000174 (0.000170)	0.000170 (0.000169)	0.000664 (0.000411)
Wind speed	-0.00511 (0.00873)	-0.00714 (0.00542)	-0.00967* (0.00534)	0.0241*** (0.00835)	0.00345 (0.00266)	-0.00377 (0.00234)	-0.00187 (0.00448)
Temperature	0.00662**	0.00812***	-0.00182	-0.00894***	-0.00307***	-0.000406	-0.000501

	(0.00287)	(0.00237)	(0.00204)	(0.00269)	(0.000924)	(0.000496)	(0.00147)
Dew point temperature	-0.00718	0.00349	-0.00444	0.0144*	0.00272	-0.00212	-0.00690
	(0.00777)	(0.00525)	(0.00488)	(0.00751)	(0.00224)	(0.00203)	(0.00497)
Sea Level Pressure	0.00102	-0.00220	0.00534**	-0.000220	-0.000807	-0.00111	-0.00203*
	(0.00250)	(0.00169)	(0.00209)	(0.00215)	(0.000498)	(0.000754)	(0.00117)
Cloud Ceiling	2.07e-05	6.51e-05	-0.000209	-0.000118	4.21e-05	8.59e-05	0.000113
	(0.000264)	(0.000168)	(0.000279)	(0.000222)	(6.80e-05)	(5.59e-05)	(0.000115)
Altitude	-5.70e-06	2.64e-05	-8.25e-06	-4.98e-07	-8.90e-07	-1.03e-06	-1.00e-05**
	(8.51e-06)	(2.86e-05)	(8.22e-06)	(1.62e-05)	(2.44e-06)	(1.37e-06)	(3.94e-06)
North wind	-0.0398	0.0185	0.0544**	-0.0360	0.0106	0.00960	-0.0173
	(0.0279)	(0.0188)	(0.0227)	(0.0263)	(0.00998)	(0.00921)	(0.0171)
Northeast wind	0.0433	-0.0206	-0.0171	0.0295	-0.0131	-0.0121	-0.00987
	(0.0375)	(0.0272)	(0.0340)	(0.0382)	(0.0130)	(0.0104)	(0.0218)
East wind	0.0698**	-0.0194	-0.0325	-0.0119	-0.0175	-0.00435	0.0158
	(0.0320)	(0.0209)	(0.0240)	(0.0292)	(0.0108)	(0.00753)	(0.0180)
Southeast wind	-0.0130	-0.00425	-0.0316	0.0342	-0.0182*	0.00246	0.0304
	(0.0290)	(0.0198)	(0.0212)	(0.0270)	(0.0103)	(0.0106)	(0.0191)
South wind	0.0248	0.000931	-0.0413*	9.65e-05	-0.0144	-0.00480	0.0347**
	(0.0280)	(0.0219)	(0.0215)	(0.0265)	(0.0101)	(0.00803)	(0.0167)
Southwest wind	-0.00538	-0.0975***	0.0400	0.0473	0.00183	-0.00885	0.0226
	(0.0443)	(0.0326)	(0.0440)	(0.0405)	(0.0106)	(0.00826)	(0.0173)
West wind	0.0820	-0.0122	-0.0717***	-0.0481	-0.00476	-0.00825	0.0630
	(0.0624)	(0.0380)	(0.0260)	(0.0394)	(0.00915)	(0.00674)	(0.0423)
Precipitation	0.00793***	0.000982	-0.00425***	-0.00303**	-0.000212	9.73e-05	-0.00152**
	(0.00288)	(0.00242)	(0.00102)	(0.00151)	(0.000700)	(0.000562)	(0.000761)
Lag Precipitation	0.00549*	0.000409	-0.000824	-0.00567**	-0.000504	0.000322	0.000777
	(0.00328)	(0.00266)	(0.00204)	(0.00287)	(0.000798)	(0.000769)	(0.00189)
holiday	-0.0418	-0.0589**	0.0388**	0.0230	-0.00731	0.0153**	0.0310***
	(0.0329)	(0.0268)	(0.0175)	(0.0234)	(0.00766)	(0.00637)	(0.0110)
10.month	-0.0793	0.0594	-0.0497	0.187*	0.0137	-0.0242	-0.107
	(0.103)	(0.0691)	(0.0670)	(0.0976)	(0.0285)	(0.0267)	(0.0708)
11.month	-0.0921	0.0952	-0.0759	0.268*	-0.000514	-0.0468	-0.148
	(0.170)	(0.116)	(0.114)	(0.161)	(0.0493)	(0.0466)	(0.111)
1.weekday	0.0749*	0.0619**	0.00929	-0.119***	-0.00682	-0.000614	-0.0198
	(0.0388)	(0.0276)	(0.0291)	(0.0413)	(0.0138)	(0.00461)	(0.0173)

2.weekday	0.0841** (0.0403)	0.0169 (0.0294)	0.0447 (0.0289)	-0.164*** (0.0409)	-0.00324 (0.0135)	0.00664 (0.00539)	0.0148 (0.0209)
3.weekday	0.0541 (0.0397)	0.0512* (0.0275)	0.0196 (0.0251)	-0.126*** (0.0423)	0.00334 (0.0163)	-5.54e-05 (0.00699)	-0.00214 (0.0205)
4.weekday	0.0445 (0.0411)	0.0559** (0.0275)	0.0392 (0.0276)	-0.104** (0.0432)	-0.00423 (0.0159)	0.000329 (0.00760)	-0.0317 (0.0228)
5.weekday	0.0582 (0.0381)	0.00955 (0.0265)	0.0576** (0.0248)	-0.0971** (0.0393)	0.000437 (0.0136)	-0.00375 (0.00563)	-0.0250 (0.0186)
6.weekday	0.0347 (0.0498)	-0.0228 (0.0333)	0.0152 (0.0296)	-0.0469 (0.0489)	-0.0214 (0.0146)	0.0195 (0.0144)	0.0217 (0.0281)
5.hour	0.0469 (0.0587)	7.41e-05 (0.0372)	0.0985*** (0.0242)	-0.216*** (0.0595)	0.0291** (0.0141)	-0.00953 (0.00930)	0.0513* (0.0303)
6.hour	9.162 (22.50)	-19.79 (15.17)	48.09** (18.74)	-2.130 (19.33)	-7.210 (4.474)	-9.969 (6.773)	-18.16* (10.52)
7.hour	0.0796 (0.0516)	0.00931 (0.0347)	0.0712*** (0.0257)	-0.192*** (0.0568)	0.0400*** (0.0105)	-0.0112 (0.00934)	0.00313 (0.0201)
8.hour	0.165*** (0.0534)	0.000229 (0.0352)	0.0754*** (0.0221)	-0.229*** (0.0598)	0.0385*** (0.0111)	0.00175 (0.0114)	-0.0515*** (0.0180)
9.hour	9.494 (22.49)	-19.78 (15.17)	48.02** (18.75)	-2.278 (19.32)	-7.236 (4.476)	-9.951 (6.759)	-18.26* (10.52)
10.hour	0.345*** (0.0536)	0.0148 (0.0386)	0.0503** (0.0216)	-0.343*** (0.0565)	0.00526 (0.0118)	-0.0124 (0.00890)	-0.0599*** (0.0168)
11.hour	0.281*** (0.0554)	0.0603 (0.0392)	0.0637** (0.0273)	-0.335*** (0.0602)	-0.00833 (0.00801)	-0.0135 (0.00897)	-0.0474*** (0.0177)
12.hour	9.487 (22.49)	-19.76 (15.17)	48.06** (18.75)	-2.327 (19.33)	-7.257 (4.478)	-9.972 (6.773)	-18.22* (10.51)
13.hour	0.242*** (0.0551)	0.0873** (0.0364)	0.0442 (0.0319)	-0.312*** (0.0601)	-0.0151* (0.00777)	-0.00259 (0.0115)	-0.0437** (0.0191)
14.hour	0.180*** (0.0547)	0.0869** (0.0433)	0.0408 (0.0255)	-0.278*** (0.0636)	-0.0156* (0.00929)	0.00356 (0.0141)	-0.0183 (0.0288)
15.hour	9.448 (22.49)	-19.74 (15.16)	48.04** (18.76)	-2.298 (19.32)	-7.260 (4.480)	-9.977 (6.772)	-18.21* (10.52)
16.hour	0.239*** (0.0522)	0.0612* (0.0362)	0.0625** (0.0259)	-0.339*** (0.0597)	0.00207 (0.0118)	-0.0158 (0.00989)	-0.00990 (0.0216)
17.hour	0.0589	0.0593*	0.0710***	-0.226***	0.0251**	-0.0162*	0.0283

	(0.0534)	(0.0353)	(0.0248)	(0.0603)	(0.0100)	(0.00966)	(0.0234)
18.hour	9.199	-19.70	48.06**	-2.214	-7.218	-9.978	-18.15*
	(22.49)	(15.17)	(18.75)	(19.33)	(4.478)	(6.772)	(10.51)
19.hour	0.298***	-0.0129	0.0162	-0.258***	-0.00654	-0.0164	-0.0209
	(0.0586)	(0.0367)	(0.0309)	(0.0646)	(0.0113)	(0.0104)	(0.0326)
20.hour	0.268***	-0.00938	-0.00613	-0.185***	-0.0140	-0.0156	-0.0378*
	(0.0573)	(0.0370)	(0.0293)	(0.0670)	(0.0120)	(0.0106)	(0.0214)
21.hour	9.420	-19.75	48.00**	-2.216	-7.235	-9.979	-18.24*
	(22.50)	(15.16)	(18.75)	(19.33)	(4.480)	(6.773)	(10.51)
22.hour	0.0713	0.0532	0.0261	-0.135*	0.00866	0.00923	-0.0339
	(0.0616)	(0.0377)	(0.0326)	(0.0693)	(0.0145)	(0.0147)	(0.0262)
23.hour	-0.0569	0.106**	-0.0416	0.00350	-0.0314***	0.0669**	-0.0462**
	(0.0586)	(0.0522)	(0.0282)	(0.0749)	(0.00908)	(0.0276)	(0.0216)
Constant	-10.10	21.96	-53.26**	2.749	8.123	11.13	20.40*
	(25.04)	(16.89)	(20.86)	(21.52)	(4.983)	(7.548)	(11.71)
Observations	961	961	961	961	961	961	961
R-squared	0.267	0.196	0.130	0.161	0.060	0.087	0.051
Sanderson-Windmeijer F- statistic	14.20	14.20	14.20	14.20	14.20	14.20	14.20
underidentification test p-value	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.347	0.358	0.747	0.0669	0.290	0.318	0.0950
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.335	0.346	0.741	0.0602	0.279	0.306	0.0869
Stock-Wright weak instrument- robust inference p-value	0.254	0.258	0.643	0.0351	0.0480	0.0620	0.00357

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of all households who took at least 1 trip whose main mode was:							
walk		bicycle	bus	car	subway	taxi	others

Hourly PM 2.5 pollution	0.000585 (0.000641)	-0.000429 (0.000459)	0.000266 (0.000471)	-0.00129** (0.000636)	-0.000309 (0.000254)	0.000104 (0.000141)	0.000656 (0.000428)
Wind speed	-0.00561 (0.00908)	-0.00500 (0.00583)	-0.0101* (0.00588)	0.0255*** (0.00879)	0.00656 (0.00447)	-0.00284 (0.00209)	-0.000325 (0.00472)
Temperature	0.00639** (0.00299)	0.00796*** (0.00245)	-0.00190 (0.00221)	-0.0100*** (0.00285)	-0.00425*** (0.00141)	-0.000388 (0.000436)	-0.000723 (0.00160)
Dew point temperature	-0.00720 (0.00793)	0.00430 (0.00574)	-0.00571 (0.00561)	0.0185** (0.00805)	0.00500 (0.00356)	-0.00132 (0.00172)	-0.00647 (0.00523)
Sea Level Pressure	0.000805 (0.00249)	-0.00305* (0.00173)	0.00510** (0.00215)	-0.000268 (0.00221)	-0.000919 (0.000683)	-0.00106 (0.000742)	-0.00215* (0.00123)
Cloud Ceiling	-6.88e-05 (0.000262)	9.88e-05 (0.000175)	-0.000162 (0.000281)	-0.000114 (0.000228)	3.93e-05 (9.32e-05)	6.71e-05 (4.66e-05)	0.000152 (0.000125)
Altitude	-4.70e-06 (8.98e-06)	2.58e-05 (2.85e-05)	-1.04e-05 (8.00e-06)	-3.57e-07 (1.74e-05)	-6.03e-08 (3.26e-06)	-6.88e-07 (1.10e-06)	-9.90e-06** (4.16e-06)
North wind	-0.0336 (0.0281)	0.0154 (0.0197)	0.0561** (0.0233)	-0.0219 (0.0281)	0.00947 (0.0122)	0.00544 (0.00647)	-0.0182 (0.0173)
Northeast wind	0.0376 (0.0381)	-0.0234 (0.0281)	-0.0241 (0.0342)	0.0156 (0.0399)	-0.0127 (0.0155)	-0.00809 (0.00796)	-0.0112 (0.0224)
East wind	0.0581* (0.0323)	-0.0216 (0.0222)	-0.0317 (0.0248)	-0.0306 (0.0308)	-0.0209* (0.0126)	-0.00184 (0.00566)	0.0133 (0.0182)
Southeast wind	-0.0116 (0.0293)	-0.00571 (0.0209)	-0.0335 (0.0220)	0.0162 (0.0283)	-0.0204* (0.0120)	0.00459 (0.00910)	0.0305 (0.0195)
South wind	0.0216 (0.0286)	0.00678 (0.0234)	-0.0389* (0.0229)	-0.00326 (0.0286)	-0.0132 (0.0127)	-0.00311 (0.00589)	0.0372** (0.0178)
Southwest wind	-0.0240 (0.0415)	-0.0956*** (0.0347)	0.0387 (0.0443)	0.0407 (0.0420)	0.00618 (0.0134)	-0.00520 (0.00592)	0.0217 (0.0192)
West wind	0.0696 (0.0583)	0.00143 (0.0422)	-0.0729*** (0.0282)	-0.0570 (0.0425)	-0.00603 (0.0123)	-0.00590 (0.00514)	0.0605 (0.0431)
Precipitation	0.00748*** (0.00277)	0.000661 (0.00243)	-0.00453*** (0.00110)	-0.00296* (0.00158)	-0.000534 (0.000822)	-5.57e-05 (0.000494)	-0.00167* (0.000852)
Lag Precipitation	0.00631* (0.00324)	-0.000609 (0.00283)	-0.000979 (0.00226)	-0.00691** (0.00306)	-0.00104 (0.00114)	6.91e-05 (0.000654)	0.000586 (0.00198)
holiday	-0.0498 (0.0324)	-0.0565** (0.0272)	0.0473*** (0.0181)	0.0120 (0.0246)	-0.0108 (0.0104)	0.0151** (0.00613)	0.0346*** (0.0117)

10.month	-0.0810 (0.103)	0.0645 (0.0759)	-0.0732 (0.0754)	0.230** (0.104)	0.0326 (0.0419)	-0.0133 (0.0221)	-0.104 (0.0736)
11.month	-0.0953 (0.170)	0.102 (0.127)	-0.108 (0.125)	0.335* (0.173)	0.0332 (0.0746)	-0.0301 (0.0380)	-0.144 (0.116)
1.weekday	0.0667* (0.0402)	0.0613** (0.0289)	0.0162 (0.0297)	-0.132*** (0.0433)	-0.00500 (0.0151)	0.000698 (0.00406)	-0.0129 (0.0177)
2.weekday	0.0771* (0.0422)	0.0200 (0.0311)	0.0602* (0.0311)	-0.189*** (0.0434)	-0.00277 (0.0158)	0.00453 (0.00452)	0.0217 (0.0212)
3.weekday	0.0417 (0.0410)	0.0617** (0.0302)	0.0247 (0.0270)	-0.129*** (0.0448)	0.00931 (0.0192)	0.00241 (0.00606)	0.00443 (0.0210)
4.weekday	0.0303 (0.0421)	0.0577* (0.0299)	0.0461 (0.0299)	-0.109** (0.0456)	0.000106 (0.0178)	0.00177 (0.00696)	-0.0237 (0.0234)
5.weekday	0.0477 (0.0391)	0.00512 (0.0281)	0.0661** (0.0260)	-0.107*** (0.0411)	0.00337 (0.0150)	-0.00165 (0.00506)	-0.0178 (0.0190)
6.weekday	0.0190 (0.0508)	-0.00456 (0.0374)	0.0254 (0.0329)	-0.0686 (0.0492)	-0.0232 (0.0161)	0.0203 (0.0141)	0.0288 (0.0286)
5.hour	0.0636 (0.0576)	-0.00643 (0.0393)	0.0927*** (0.0275)	-0.219*** (0.0600)	0.0339** (0.0148)	-0.00274 (0.00650)	0.0550* (0.0331)
6.hour	7.234 (22.33)	-27.39* (15.58)	45.96** (19.28)	-2.569 (19.82)	-8.194 (6.124)	-9.489 (6.671)	-19.29* (11.04)
7.hour	0.143*** (0.0517)	0.0390 (0.0376)	0.105*** (0.0291)	-0.165*** (0.0576)	0.0620*** (0.0128)	-0.00381 (0.00672)	0.0281 (0.0253)
8.hour	0.220*** (0.0532)	0.0231 (0.0377)	0.0886*** (0.0268)	-0.212*** (0.0607)	0.0587*** (0.0184)	0.00710 (0.00885)	-0.0548*** (0.0209)
9.hour	7.565 (22.33)	-27.40* (15.58)	45.86** (19.28)	-2.700 (19.82)	-8.233 (6.133)	-9.471 (6.656)	-19.41* (11.04)
10.hour	0.371*** (0.0533)	0.0139 (0.0397)	0.0416* (0.0250)	-0.333*** (0.0590)	0.00614 (0.0126)	-0.00636 (0.00601)	-0.0673*** (0.0197)
11.hour	0.328*** (0.0544)	0.0645 (0.0411)	0.0524* (0.0294)	-0.345*** (0.0606)	-0.0104 (0.0102)	-0.00794 (0.00614)	-0.0552*** (0.0205)
12.hour	7.518 (22.33)	-27.37* (15.58)	45.90** (19.29)	-2.751 (19.82)	-8.262 (6.137)	-9.492 (6.671)	-19.38* (11.02)
13.hour	0.280*** (0.0537)	0.0928** (0.0392)	0.0381 (0.0338)	-0.320*** (0.0603)	-0.0174* (0.00959)	0.000225 (0.00835)	-0.0484** (0.0226)
14.hour	0.204***	0.0925**	0.0417	-0.302***	-0.0210*	0.00505	-0.0285

	(0.0543)	(0.0456)	(0.0290)	(0.0638)	(0.0120)	(0.0106)	(0.0306)
15.hour	7.514	-27.37*	45.88**	-2.739	-8.266	-9.496	-19.36*
	(22.32)	(15.57)	(19.29)	(19.82)	(6.139)	(6.669)	(11.03)
16.hour	0.266***	0.0785*	0.0827***	-0.352***	0.00517	-0.00904	-0.00754
	(0.0534)	(0.0427)	(0.0295)	(0.0607)	(0.0156)	(0.00726)	(0.0245)
17.hour	0.120**	0.0944**	0.116***	-0.197***	0.0349***	-0.00975	0.0456*
	(0.0525)	(0.0382)	(0.0298)	(0.0618)	(0.0135)	(0.00693)	(0.0265)
18.hour	7.268	-27.31*	45.91**	-2.635	-8.216	-9.496	-19.30*
	(22.32)	(15.58)	(19.29)	(19.82)	(6.138)	(6.670)	(11.03)
19.hour	0.291***	-0.00135	0.0163	-0.268***	-0.00449	-0.00828	-0.0256
	(0.0570)	(0.0399)	(0.0340)	(0.0653)	(0.0149)	(0.00752)	(0.0342)
20.hour	0.266***	0.00207	-0.0116	-0.178***	-0.0157	-0.00783	-0.0424*
	(0.0573)	(0.0404)	(0.0317)	(0.0683)	(0.0143)	(0.00755)	(0.0240)
21.hour	7.469	-27.37*	45.84**	-2.654	-8.236	-9.494	-19.40*
	(22.33)	(15.57)	(19.29)	(19.83)	(6.136)	(6.671)	(11.03)
22.hour	0.0765	0.0526	0.0164	-0.149**	0.00908	0.0183	-0.0419
	(0.0607)	(0.0401)	(0.0353)	(0.0705)	(0.0171)	(0.0122)	(0.0283)
23.hour	-0.0539	0.0983*	-0.0543*	0.00698	-0.0368***	0.0598***	-0.0572**
	(0.0562)	(0.0551)	(0.0309)	(0.0749)	(0.0111)	(0.0209)	(0.0240)
Constant	-7.917	30.45*	-50.84**	3.231	9.236	10.59	21.67*
	(24.85)	(17.35)	(21.46)	(22.07)	(6.826)	(7.435)	(12.29)
Observations	961	961	961	961	961	961	961
R-squared	0.257	0.184	0.136	0.100	0.015	0.101	0.087
Sanderson-Windmeijer F-statistic	14.20	14.20	14.20	14.20	14.20	14.20	14.20
underidentification test p-value	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.353	0.363	0.577	0.0174	0.204	0.469	0.115
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.341	0.351	0.568	0.0147	0.193	0.458	0.106
Stock-Wright weak instrument-robust inference p-value	0.262	0.279	0.441	0.00600	0.00686	0.215	0.00862

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per household whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.00107 (0.00106)	-0.000543 (0.000544)	0.000674 (0.000600)	-0.00132 (0.000825)	-0.000333 (0.000259)	0.000378 (0.000309)	0.000746 (0.000474)
Wind speed	0.00349 (0.0139)	-0.00566 (0.00689)	-0.0155** (0.00765)	0.0312*** (0.0110)	0.00655 (0.00449)	-0.00709 (0.00437)	-0.000727 (0.00572)
Temperature	0.0105** (0.00459)	0.0103*** (0.00279)	-0.00143 (0.00285)	-0.0126*** (0.00374)	-0.00443*** (0.00142)	-0.000785 (0.000743)	-0.00203 (0.00184)
Dew point temperature	-0.0118 (0.0128)	0.00505 (0.00678)	-0.0121 (0.00763)	0.0208** (0.0104)	0.00522 (0.00361)	-0.00455 (0.00363)	-0.00703 (0.00586)
Sea Level Pressure	0.00425 (0.00448)	-0.00365 (0.00255)	0.00723** (0.00292)	0.000144 (0.00295)	-0.00121* (0.000730)	-0.00186 (0.00147)	-0.00271 (0.00174)
Cloud Ceiling	-1.54e-05 (0.000448)	4.76e-05 (0.000209)	-0.000166 (0.000308)	-0.000129 (0.000323)	4.61e-05 (9.39e-05)	0.000123 (9.03e-05)	0.000160 (0.000148)
Altitude	-1.69e-05* (1.01e-05)	2.24e-05 (2.92e-05)	-1.72e-05 (1.09e-05)	-2.25e-06 (1.89e-05)	8.72e-08 (3.46e-06)	-1.79e-06 (2.41e-06)	-1.05e-05** (4.81e-06)
North wind	-0.0825* (0.0425)	0.0139 (0.0213)	0.0610** (0.0269)	-0.0577 (0.0363)	0.00987 (0.0123)	0.0243 (0.0210)	-0.0201 (0.0194)
Northeast wind	0.0648 (0.0589)	-0.0317 (0.0308)	-0.00293 (0.0555)	0.0459 (0.0495)	-0.0136 (0.0158)	-0.0279 (0.0223)	-0.0127 (0.0244)
East wind	0.104** (0.0467)	-0.0213 (0.0263)	-0.0205 (0.0335)	-0.00377 (0.0381)	-0.0204 (0.0128)	-0.0131 (0.0161)	0.0165 (0.0197)
Southeast wind	-0.0121 (0.0413)	-0.00396 (0.0236)	-0.0284 (0.0266)	0.0626* (0.0375)	-0.0206* (0.0122)	8.14e-05 (0.0224)	0.0420 (0.0264)
South wind	0.0693 (0.0482)	0.00415 (0.0263)	-0.0401 (0.0269)	0.0152 (0.0348)	-0.0132 (0.0128)	-0.0157 (0.0167)	0.0452** (0.0207)
Southwest wind	-0.00670 (0.0631)	-0.132*** (0.0413)	0.0289 (0.0470)	0.0654 (0.0484)	0.00582 (0.0136)	-0.0192 (0.0174)	0.0327 (0.0227)
West wind	0.197	-0.00910	-0.0833**	-0.0328	-0.00570	-0.0147	0.0711

	(0.142)	(0.0469)	(0.0343)	(0.0535)	(0.0126)	(0.0126)	(0.0436)
Precipitation	0.00741**	0.00227	-0.00495***	-0.00373*	-0.000340	0.000307	-0.00196**
	(0.00329)	(0.00399)	(0.00129)	(0.00198)	(0.000906)	(0.000676)	(0.000952)
Lag Precipitation	0.00529	0.000601	0.000651	-0.00780**	-0.00113	0.00120	0.000728
	(0.00508)	(0.00324)	(0.00277)	(0.00396)	(0.00116)	(0.00141)	(0.00225)
holiday	-0.0225	-0.0774*	0.0637***	0.0240	-0.0110	0.0192**	0.0360***
	(0.0423)	(0.0414)	(0.0231)	(0.0326)	(0.0110)	(0.00765)	(0.0137)
10.month	-0.141	0.0843	-0.143	0.253*	0.0364	-0.0551	-0.121
	(0.170)	(0.0899)	(0.0968)	(0.136)	(0.0426)	(0.0486)	(0.0800)
11.month	-0.131	0.123	-0.233	0.372*	0.0345	-0.106	-0.174
	(0.280)	(0.149)	(0.157)	(0.224)	(0.0757)	(0.0870)	(0.129)
1.weekday	0.109*	0.0832**	0.00578	-0.138**	-0.00378	-8.73e-05	-0.0128
	(0.0583)	(0.0354)	(0.0461)	(0.0548)	(0.0152)	(0.00626)	(0.0183)
2.weekday	0.137**	0.0272	0.0664	-0.200***	-0.00255	0.0129	0.0271
	(0.0605)	(0.0386)	(0.0422)	(0.0570)	(0.0160)	(0.00943)	(0.0225)
3.weekday	0.101	0.0724*	0.0124	-0.146***	0.0127	-0.00619	0.0117
	(0.0631)	(0.0370)	(0.0393)	(0.0560)	(0.0193)	(0.0111)	(0.0239)
4.weekday	0.0605	0.0757**	0.0274	-0.121**	0.00213	3.08e-05	-0.0259
	(0.0634)	(0.0368)	(0.0409)	(0.0547)	(0.0179)	(0.0111)	(0.0251)
5.weekday	0.0921	0.0212	0.0607*	-0.124**	0.00584	-0.00637	-0.0183
	(0.0568)	(0.0357)	(0.0359)	(0.0510)	(0.0151)	(0.00808)	(0.0198)
6.weekday	0.0409	-0.0254	0.00507	-0.0355	-0.0236	0.0323	0.0511
	(0.0729)	(0.0442)	(0.0403)	(0.0667)	(0.0162)	(0.0258)	(0.0370)
5.hour	0.0113	0.0102	0.102***	-0.259***	0.0336**	-0.0126	0.0662*
	(0.0791)	(0.0419)	(0.0305)	(0.0758)	(0.0155)	(0.0115)	(0.0389)
6.hour	38.18	-32.80	65.10**	1.188	-10.83*	-16.69	-24.30
	(40.22)	(22.90)	(26.20)	(26.50)	(6.550)	(13.22)	(15.61)
7.hour	0.248***	0.119***	0.144***	-0.124	0.0658***	-0.0135	0.0431
	(0.0848)	(0.0420)	(0.0408)	(0.0757)	(0.0135)	(0.0113)	(0.0300)
8.hour	0.264***	0.0456	0.120***	-0.248***	0.0601***	0.00107	-0.0544**
	(0.0779)	(0.0394)	(0.0311)	(0.0771)	(0.0188)	(0.0134)	(0.0222)
9.hour	38.62	-32.81	65.00**	0.960	-10.88*	-16.65	-24.43
	(40.21)	(22.90)	(26.20)	(26.49)	(6.559)	(13.20)	(15.61)
10.hour	0.489***	0.0468	0.0691**	-0.390***	0.00412	-0.0152	-0.0733***
	(0.0836)	(0.0432)	(0.0279)	(0.0765)	(0.0134)	(0.0110)	(0.0209)

11.hour	0.380*** (0.0781)	0.109** (0.0431)	0.106*** (0.0411)	-0.386*** (0.0820)	-0.0123 (0.0111)	-0.0160 (0.0112)	-0.0593*** (0.0221)
12.hour	38.69 (40.23)	-32.78 (22.91)	65.04** (26.21)	0.894 (26.50)	-10.91* (6.562)	-16.69 (13.23)	-24.38 (15.58)
13.hour	0.297*** (0.0753)	0.147*** (0.0429)	0.0504 (0.0361)	-0.368*** (0.0816)	-0.0203* (0.0107)	-0.00447 (0.0150)	-0.0572** (0.0243)
14.hour	0.245*** (0.0823)	0.124*** (0.0472)	0.0651** (0.0330)	-0.315*** (0.0903)	-0.0230* (0.0133)	0.00389 (0.0176)	-0.0318 (0.0326)
15.hour	38.58 (40.21)	-32.73 (22.89)	65.03** (26.22)	0.937 (26.49)	-10.91* (6.564)	-16.70 (13.22)	-24.38 (15.61)
16.hour	0.427*** (0.0941)	0.158*** (0.0469)	0.101*** (0.0331)	-0.386*** (0.0829)	0.00270 (0.0163)	-0.0213 (0.0133)	-0.0138 (0.0264)
17.hour	0.159* (0.0840)	0.148*** (0.0411)	0.137*** (0.0340)	-0.210** (0.0832)	0.0399*** (0.0146)	-0.0209 (0.0127)	0.0452 (0.0291)
18.hour	38.24 (40.21)	-32.71 (22.91)	65.07** (26.23)	1.024 (26.50)	-10.85* (6.562)	-16.70 (13.22)	-24.31 (15.60)
19.hour	0.429*** (0.0854)	0.0168 (0.0418)	0.0434 (0.0456)	-0.279*** (0.0888)	-0.00749 (0.0157)	-0.0240 (0.0148)	-0.0355 (0.0357)
20.hour	0.385*** (0.0845)	0.0336 (0.0465)	-0.0127 (0.0370)	-0.215** (0.0895)	-0.0189 (0.0151)	-0.0243 (0.0153)	-0.0482* (0.0262)
21.hour	38.49 (40.21)	-32.78 (22.90)	64.94** (26.21)	1.025 (26.51)	-10.88* (6.561)	-16.71 (13.22)	-24.43 (15.60)
22.hour	0.0637 (0.0864)	0.0654 (0.0423)	0.0126 (0.0402)	-0.196** (0.0885)	0.00615 (0.0178)	-0.00296 (0.0208)	-0.0553* (0.0301)
23.hour	-0.0672 (0.0840)	0.110** (0.0558)	-0.0566 (0.0353)	0.00889 (0.111)	-0.0407*** (0.0121)	0.0983* (0.0561)	-0.0686*** (0.0253)
Constant	-42.42 (44.75)	36.46 (25.50)	-72.05** (29.16)	-0.794 (29.48)	12.18* (7.299)	18.63 (14.74)	27.29 (17.38)
Observations	961	961	961	961	961	961	961
R-squared	0.210	0.214	0.097	0.130	0.024	0.039	0.103
Sanderson-Windmeijer F- statistic	14.20	14.20	14.20	14.20	14.20	14.20	14.20
underidentification test p-value	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05

Anderson-Rubin weak instrument-robust inference F test p-value	0.298	0.331	0.253	0.0835	0.177	0.216	0.108
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.286	0.319	0.241	0.0759	0.167	0.205	0.0995
Stock-Wright weak instrument-robust inference p-value	0.176	0.227	0.0970	0.0342	0.00545	0.00213	0.0110

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average number of trips taken per individual whose main mode was:	walk	bicycle	bus	car	subway	taxi	others
Hourly PM 2.5 pollution	0.000761 (0.000717)	-0.000409 (0.000437)	0.000137 (0.000415)	-0.000944 (0.000602)	-0.000178 (0.000172)	0.000169 (0.000171)	0.000681 (0.000417)
Wind speed	-8.60e-05 (0.0110)	-0.00611 (0.00565)	-0.00909* (0.00540)	0.0241*** (0.00856)	0.00385 (0.00274)	-0.00371 (0.00235)	-0.00159 (0.00454)
Temperature	0.00686** (0.00315)	0.00837*** (0.00243)	-0.00205 (0.00204)	-0.00863*** (0.00283)	-0.00317*** (0.000937)	-0.000415 (0.000501)	-0.000593 (0.00150)
Dew point temperature	-0.00806 (0.00880)	0.00378 (0.00551)	-0.00425 (0.00494)	0.0141* (0.00762)	0.00282 (0.00228)	-0.00210 (0.00204)	-0.00700 (0.00504)
Sea Level Pressure	0.00161 (0.00290)	-0.00250 (0.00190)	0.00557*** (0.00209)	0.000233 (0.00220)	-0.000862 (0.000527)	-0.00112 (0.000754)	-0.00201* (0.00119)
Cloud Ceiling	0.000120 (0.000315)	6.81e-05 (0.000173)	-0.000188 (0.000280)	-0.000136 (0.000232)	5.49e-05 (7.33e-05)	8.91e-05 (5.70e-05)	0.000120 (0.000118)
Altitude	-6.96e-06 (8.05e-06)	2.58e-05 (2.92e-05)	-8.55e-06 (8.16e-06)	-1.59e-06 (1.62e-05)	-8.55e-07 (2.47e-06)	-1.05e-06 (1.39e-06)	-1.02e-05** (4.06e-06)
North wind	-0.0565* (0.0315)	0.0176 (0.0190)	0.0541** (0.0226)	-0.0394 (0.0263)	0.0101 (0.0100)	0.00954 (0.00922)	-0.0185 (0.0172)
Northeast wind	0.0594 (0.0474)	-0.0217 (0.0277)	-0.0176 (0.0339)	0.0293 (0.0382)	-0.0131 (0.0130)	-0.0122 (0.0104)	-0.00971 (0.0221)
East wind	0.0783**	-0.0187	-0.0323	-0.00831	-0.0171	-0.00434	0.0170

	(0.0341)	(0.0217)	(0.0239)	(0.0295)	(0.0108)	(0.00756)	(0.0182)
Southeast wind	-0.00854	-0.00387	-0.0318	0.0352	-0.0181*	0.00266	0.0312
	(0.0317)	(0.0201)	(0.0212)	(0.0270)	(0.0103)	(0.0107)	(0.0192)
South wind	0.0330	0.00266	-0.0418*	0.00252	-0.0144	-0.00478	0.0368**
	(0.0310)	(0.0226)	(0.0215)	(0.0268)	(0.0101)	(0.00806)	(0.0170)
Southwest wind	-0.00766	-0.106***	0.0398	0.0476	0.00362	-0.00895	0.0229
	(0.0463)	(0.0339)	(0.0440)	(0.0410)	(0.0114)	(0.00829)	(0.0176)
West wind	0.0897	-0.0161	-0.0713***	-0.0474	-0.00486	-0.00845	0.0630
	(0.0779)	(0.0384)	(0.0264)	(0.0401)	(0.00939)	(0.00677)	(0.0423)
Precipitation	0.00838***	0.00159	-0.00440***	-0.00316**	-9.87e-05	0.000120	-0.00156**
	(0.00297)	(0.00284)	(0.00103)	(0.00151)	(0.000791)	(0.000573)	(0.000777)
Lag Precipitation	0.00620*	0.000651	-0.000920	-0.00562*	-0.000493	0.000301	0.000747
	(0.00354)	(0.00274)	(0.00205)	(0.00291)	(0.000808)	(0.000779)	(0.00191)
holiday	-0.0459	-0.0649**	0.0413**	0.0253	-0.00747	0.0155**	0.0318***
	(0.0354)	(0.0305)	(0.0176)	(0.0236)	(0.00805)	(0.00645)	(0.0112)
10.month	-0.102	0.0631	-0.0497	0.184*	0.0142	-0.0239	-0.109
	(0.117)	(0.0725)	(0.0676)	(0.0985)	(0.0289)	(0.0269)	(0.0717)
11.month	-0.112	0.0969	-0.0784	0.262	-0.000771	-0.0466	-0.152
	(0.194)	(0.121)	(0.115)	(0.163)	(0.0499)	(0.0469)	(0.113)
1.weekday	0.100**	0.0693**	0.0146	-0.115***	-0.00566	-0.000580	-0.0187
	(0.0444)	(0.0282)	(0.0290)	(0.0417)	(0.0138)	(0.00484)	(0.0174)
2.weekday	0.0985**	0.0223	0.0523*	-0.160***	-0.00242	0.00648	0.0168
	(0.0425)	(0.0302)	(0.0289)	(0.0413)	(0.0136)	(0.00550)	(0.0211)
3.weekday	0.0607	0.0577**	0.0245	-0.126***	0.00436	-0.000214	-2.47e-05
	(0.0436)	(0.0284)	(0.0251)	(0.0426)	(0.0163)	(0.00738)	(0.0207)
4.weekday	0.0479	0.0618**	0.0452	-0.104**	-0.00333	0.000256	-0.0311
	(0.0459)	(0.0283)	(0.0277)	(0.0435)	(0.0159)	(0.00798)	(0.0230)
5.weekday	0.0682	0.0142	0.0637**	-0.0971**	0.00147	-0.00388	-0.0243
	(0.0423)	(0.0272)	(0.0248)	(0.0398)	(0.0136)	(0.00597)	(0.0187)
6.weekday	0.0310	-0.0208	0.0171	-0.0492	-0.0214	0.0195	0.0215
	(0.0537)	(0.0349)	(0.0298)	(0.0493)	(0.0146)	(0.0146)	(0.0282)
5.hour	0.0169	0.00396	0.102***	-0.216***	0.0296**	-0.00952	0.0530*
	(0.0734)	(0.0378)	(0.0241)	(0.0594)	(0.0141)	(0.00941)	(0.0306)
6.hour	14.45	-22.51	50.11***	1.956	-7.705	-10.05	-17.99*
	(26.04)	(17.08)	(18.79)	(19.76)	(4.733)	(6.780)	(10.68)

7.hour	0.0841 (0.0694)	0.0305 (0.0360)	0.0828*** (0.0257)	-0.174*** (0.0569)	0.0437*** (0.0107)	-0.0111 (0.00945)	0.0102 (0.0208)
8.hour	0.143** (0.0695)	0.00481 (0.0353)	0.0804*** (0.0221)	-0.226*** (0.0597)	0.0395*** (0.0112)	0.00230 (0.0116)	-0.0512*** (0.0181)
9.hour	14.80 (26.03)	-22.51 (17.08)	50.04*** (18.79)	1.797 (19.75)	-7.731 (4.735)	-10.03 (6.766)	-18.10* (10.68)
10.hour	0.339*** (0.0696)	0.0216 (0.0386)	0.0579*** (0.0219)	-0.340*** (0.0564)	0.00555 (0.0118)	-0.0123 (0.00902)	-0.0603*** (0.0170)
11.hour	0.267*** (0.0710)	0.0684* (0.0395)	0.0676** (0.0274)	-0.332*** (0.0601)	-0.00829 (0.00809)	-0.0136 (0.00909)	-0.0475*** (0.0179)
12.hour	14.85 (26.04)	-22.48 (17.08)	50.08*** (18.79)	1.757 (19.75)	-7.753 (4.738)	-10.05 (6.780)	-18.06* (10.66)
13.hour	0.227*** (0.0701)	0.0968*** (0.0367)	0.0463 (0.0319)	-0.307*** (0.0601)	-0.0151* (0.00786)	-0.00269 (0.0116)	-0.0438** (0.0193)
14.hour	0.166** (0.0694)	0.0944** (0.0436)	0.0442* (0.0256)	-0.273*** (0.0636)	-0.0156* (0.00942)	0.00345 (0.0142)	-0.0184 (0.0290)
15.hour	14.75 (26.03)	-22.45 (17.07)	50.06*** (18.80)	1.786 (19.75)	-7.757 (4.739)	-10.06 (6.779)	-18.04* (10.67)
16.hour	0.261*** (0.0707)	0.0855** (0.0370)	0.0750*** (0.0260)	-0.325*** (0.0598)	0.00367 (0.0120)	-0.0156 (0.0100)	-0.00586 (0.0219)
17.hour	0.0575 (0.0774)	0.0673* (0.0357)	0.0748*** (0.0249)	-0.218*** (0.0602)	0.0264*** (0.0101)	-0.0163* (0.00980)	0.0295 (0.0236)
18.hour	14.47 (26.03)	-22.43 (17.08)	50.08*** (18.79)	1.865 (19.76)	-7.714 (4.738)	-10.06 (6.779)	-17.99* (10.66)
19.hour	0.296*** (0.0746)	-0.00703 (0.0371)	0.0186 (0.0309)	-0.247*** (0.0648)	-0.00611 (0.0114)	-0.0163 (0.0106)	-0.0206 (0.0327)
20.hour	0.260*** (0.0742)	-0.00191 (0.0380)	-0.00555 (0.0293)	-0.177*** (0.0674)	-0.0140 (0.0121)	-0.0156 (0.0107)	-0.0338 (0.0222)
21.hour	14.69 (26.03)	-22.48 (17.07)	50.01*** (18.79)	1.858 (19.76)	-7.732 (4.739)	-10.06 (6.780)	-18.08* (10.67)
22.hour	0.0435 (0.0784)	0.0551 (0.0380)	0.0248 (0.0325)	-0.132* (0.0693)	0.00823 (0.0146)	0.00907 (0.0148)	-0.0351 (0.0265)
23.hour	-0.0854 (0.0755)	0.108** (0.0523)	-0.0425 (0.0282)	0.00698 (0.0751)	-0.0319*** (0.00919)	0.0669** (0.0276)	-0.0474** (0.0218)
Constant	-15.99	24.99	-55.50***	-1.787	8.675*	11.22	20.22*

	(28.98)	(19.02)	(20.90)	(21.99)	(5.271)	(7.555)	(11.88)
Observations	961	961	961	961	961	961	961
R-squared	0.239	0.200	0.137	0.164	0.063	0.088	0.054
Sanderson-Windmeijer F-statistic	14.2	14.20	14.20	14.20	14.20	14.20	14.20
underidentification test p-value	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05	7.95e-05
Anderson-Rubin weak instrument-robust inference F test p-value	0.277	0.363	0.747	0.0878	0.288	0.326	0.0919
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.265	0.352	0.741	0.0801	0.276	0.314	0.0840
Stock-Wright weak instrument-robust inference p-value	0.174	0.257	0.646	0.0508	0.0511	0.0659	0.00388

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The results of our IV probit regressions for individual travel mode for 2014 using 2014 are in Table 33. Using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), we find that air pollution makes people less likely to bicycle, no significant effect on bus, no significant effect on car, less likely to take “others”, no significant effect on subway, no significant effect on taxi, and more likely to walk. Using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), we find that air pollution makes people less likely to bicycle, no significant effect on bus, more likely to take car, less likely to take “others”, more likely to take subway, more likely to take taxi, and no significant effect on walk. Using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), we find that when there is bad air, no significant effect on bicycle, less likely to take bus, less likely to take car, less likely to take “others”, no significant effect on subway, no significant effect on taxi, and more likely to walk.

Thus, our robust results for our IV probit regressions of individual travel mode for 2014 are that air pollution makes people weakly less likely to bicycle, less likely to take “others”, and weakly more likely to walk.

Table 33a. IV probit individual travel mode regressions using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), 2014

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	0.000334*** (8.43e-05)	-0.000240** (9.54e-05)	-8.77E-05 (0.000103)	-5.64E-05 (9.66e-05)	0.000146 (0.000158)	-1.25E-04 (0.000295)	-0.000362*** (0.000139)
Observations	193,115	193,115	193,115	193,115	193,115	193,115	193,115

Notes: Robust standard errors in parentheses. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver’s license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010). Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 33b. IV probit individual travel mode regressions using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), 2014

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	-3.59e-07 (0.000117)	-0.000692*** (0.000131)	0.000231 (0.000142)	0.000405*** (0.000133)	0.000864*** (0.000212)	0.000712* (0.000414)	-0.000377** (0.000188)
Observations	196,020	196,020	196,020	196,020	196,020	196,020	196,020

Notes: Robust standard errors in parentheses. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver’s license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin,

type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010). Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 33c. IV probit individual travel mode regressions using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), 2014

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	0.000511*** (9.29e-05)	-7.82e-05 (0.000105)	-0.000197* (0.000113)	-0.000202* (0.000106)	-8.14e-05 (0.000173)	-0.000480 (0.000318)	-0.000610*** (0.000151)
Observations	191,991	191,991	191,991	191,991	191,991	191,991	191,991

Notes: Robust standard errors in parentheses. Our individual-level controls include age; number of years of schooling; and dummies for different types of residency, education, driver’s license, employment status, and bus ticket. Our household-level controls include number of cars owned, number of bicycles owned, number of motorcycles owned, household size, number of household members with a job, and dummies for type of housing ownership. Our trip controls include trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, and travel mode of the first trip that day. We also control for precipitation, lagged precipitation, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. We use the Berndt-Hall-Hall-Hausman (BHHH) algorithm to determine how the likelihood function is to be maximized (Gould, Pitblado and Poi, 2010). Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Our first-stage and second-stage results for the IV fixed effect regressions of individual travel mode with household fixed effects results for year 2014 are in Tables 34 and 35, respectively. Using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs, we find that air pollution makes people more likely to walk, no significant effect on bicycle, no significant effect on bus, less likely to take car, less likely to take subway, no significant effect on taxi, and less likely to take others. Using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs, we find that air pollution makes people more likely to walk, no significant effect on bicycle, less likely to take bus, less likely to take car, no significant effect on subway, no significant effect on taxi, and less likely to take others. Using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs, we find that air pollution makes people more likely to walk, no significant effect on bicycle, less likely to take bus, less likely to take car, less likely to take subway, no significant effect on taxi, and less likely to take others.

Using south wind at Zhoushuizi and “wind_S544710” as the 2 IVs, we do not pass the overidentification test. We did not use iv_2014_7 = “wspd30000_hour0” due to collinearity. We did not use iv_2014_9 = “wspd100000_hour0” due to collinearity.

Thus, our robust results for the IV fixed effect regressions of individual travel mode are that air pollution makes people more likely to walk, weakly less likely to take bus, less likely to take car, weakly less likely to take subway, and less likely to take other modes of transport.

Table 34. First-stage regression for IV fixed effects individual travel mode regressions, 2014

	(1iv) hourly PM2.5	(2iv) hourly PM2.5	(4ivs) hourly PM2.5
south wind at Zhoushuizi	-0.1078 (0.1980)	-4.2680*** (0.1963)	-2.9114*** (0.1912)
wind speed in Gaoyao	-0.7085*** (0.0094)		
wind blowing from Chengshantou		18.7011*** (0.3484)	-17.7457*** (0.2581)
Controls	Y	Y	Y
Household fixed effects	Y	Y	Y
Observations	193,115	196,020	196,520
Number of households	36,773	36,718	36,801
R-squared	0.0353	0.0184	0.0292

Notes: Robust standard errors in parentheses. We control for age; number of years of schooling; dummies for different types of residency, education, driver's license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, travel mode of the first trip that day, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 35a. IV fixed effects individual travel mode regressions using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), 2014

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	0.00193*** (0.000184)	0.000112 (0.000147)	-0.000204 (0.000133)	-0.00129*** (0.000143)	-0.000150** (6.87e-05)	2.14e-05 (2.98e-05)	-0.000422*** (9.07e-05)
Controls	Y	Y	Y	Y	Y	Y	Y
Household fixed effects	Y	Y	Y	Y	Y	Y	Y
Observations	192,517	192,517	192,517	192,517	192,517	192,517	192,517
R-squared	-0.020	-0.000	-0.000	-0.018	-0.001	0.000	-0.004
Number of households	36,175	36,175	36,175	36,175	36,175	36,175	36,175
Sanderson-Windmeijer F-statistic	2864	2864	2864	2864	2864	2864	2864
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0	0.0181	0.282	0	0.0270	0.170	1.18e-05
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0	0.0181	0.282	0	0.0270	0.170	1.18e-05
Stock-Wright weak instrument-robust inference p-value	0	0.0181	0.282	0	0.0270	0.170	1.18e-05

Notes: Robust standard errors in parentheses. We control for age; number of years of schooling; dummies for different types of residency, education, driver’s license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, travel mode of the first trip that day, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 35b. IV fixed effects individual travel mode regressions using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), 2014

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	0.00200*** (0.000253)	-3.53e-05 (0.000202)	-0.000798*** (0.000183)	-0.000674*** (0.000196)	-0.000176* (9.42e-05)	8.03e-06 (4.10e-05)	-0.000323*** (0.000124)
Controls	Y	Y	Y	Y	Y	Y	Y
Household fixed effects	Y	Y	Y	Y	Y	Y	Y
Observations	195,506	195,506	195,506	195,506	195,506	195,506	195,506
R-squared	-0.021	0.000	-0.006	-0.005	-0.002	0.000	-0.002
Number of households	36,204	36,204	36,204	36,204	36,204	36,204	36,204
Sanderson-Windmeijer F-statistic	1496	1496	1496	1496	1496	1496	1496
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0	0.0266	4.87e-05	0.00174	0.0741	0.208	0.0278
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0	0.0266	4.86e-05	0.00174	0.0741	0.208	0.0278
Stock-Wright weak instrument-robust inference p-value	0	0.0266	4.87e-05	0.00174	0.0741	0.208	0.0278

Notes: Robust standard errors in parentheses. We control for age; number of years of schooling; dummies for different types of residency, education, driver’s license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, travel mode of the first trip that day, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 35c. IV fixed effects individual travel mode regressions using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), 2014

	(1) walk	(2) bicycle	(3) bus	(4) car	(5) subway	(6) taxi	(7) others
hourly PM2.5	-0.00135*** (0.000200)	-0.000395** (0.000161)	0.000595*** (0.000146)	0.000871*** (0.000156)	0.000102 (7.52e-05)	7.14e-06 (3.29e-05)	0.000167* (9.89e-05)
Controls	Y	Y	Y	Y	Y	Y	Y
Household fixed effects	Y	Y	Y	Y	Y	Y	Y
Observations	196,093	196,093	196,093	196,093	196,093	196,093	196,093
R-squared	-0.010	-0.000	-0.004	-0.005	-0.000	0.000	-0.001
Number of households	36,374	36,374	36,374	36,374	36,374	36,374	36,374
Sanderson-Windmeijer F-statistic	2400	2400	2400	2400	2400	2400	2400
underidentification test p-value	0	0	0	0	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0	0.00335	0.000205	1.13e-08	0.293	0.215	0.239
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0	0.00335	0.000205	1.12e-08	0.293	0.215	0.239
Stock-Wright weak instrument-robust inference p-value	0	0.00335	0.000205	1.13e-08	0.293	0.215	0.239

Notes: Robust standard errors in parentheses. We control for age; number of years of schooling; dummies for different types of residency, education, driver’s license, employment status, and bus ticket; trip origin, type of trip origin, trip destination, number of modes of transportation used in the trip, distance from origin to the nearest subway, distance from destination to the nearest subway, travel mode of the first trip that day, temperature, dew point temperature, wind speed, sea level pressure, cloud ceiling, altitude; and dummies for wind direction, holiday, month of year, day of week, and hour of day. Household-level controls and daily controls are absorbed by the household fixed effects. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

The results of our IV travel mode decision time series results for year 2014 are in Table 36. Across all the specifications with different IVs, we find no significant effect on travel mode decision time series variables when there is bad air. Similarly, when we use our 3 IVs one at a time, we find no significant effect on travel mode decision time series variables when there is bad air (not shown).

The robust results of our IV travel mode decision time series results for year 2014 are therefore that air pollution has no significant effect on either the share of all households surveyed that 24-hour period who took at least 1 trip; the share of all members of all households surveyed that 24-hour period who took at least 1 trip; or the average number of members surveyed that 24-hour period who took at least 1 trip.

Table 36a. IV travel mode decision time series regressions using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), 2014

	(1) s_hh_d	(2) s_all_d	(3) avg_hh_d
	Share of all households surveyed that 24-hour period who took at least 1 trip	Share of all members of all households surveyed that 24-hour period who took at least 1 trip	Average number of members surveyed that 24-hour period who took at least 1 trip
Hourly PM 2.5 pollution	4.50e-05 (0.000130)	-7.66e-05 (9.03e-05)	-0.000108 (0.000168)
Wind speed	-0.00104 (0.00392)	0.00147 (0.00364)	-0.000684 (0.00477)
Temperature	0.000302 (0.00112)	-0.000248 (0.000852)	0.000474 (0.00164)
Dew point temperature	0.000183 (0.00177)	0.00122 (0.00137)	0.00176 (0.00222)
Sea Level Pressure	0.000194	0.000561	0.000242

	(0.00105)	(0.000935)	(0.00140)
Cloud Ceiling	1.67e-05	1.21e-05	-2.04e-05
	(9.01e-05)	(6.23e-05)	(0.000137)
Altitude	-9.07e-06**	-4.96e-06*	-1.23e-05**
	(3.89e-06)	(2.99e-06)	(5.24e-06)
North wind	0.000570	0.000838	-0.00522
	(0.00873)	(0.00631)	(0.0137)
Northeast wind	-0.0238*	-0.00957	-0.0133
	(0.0139)	(0.0103)	(0.0216)
East wind	0.0123	0.00403	0.0225
	(0.0106)	(0.00720)	(0.0160)
Southeast wind	0.00902	0.00451	0.0258
	(0.0105)	(0.00805)	(0.0165)
South wind	0.00576	-0.00126	0.0168
	(0.0121)	(0.00876)	(0.0178)
Southwest wind	-0.0139	-0.0127	-0.0166
	(0.0163)	(0.0108)	(0.0241)
West wind	0.00500	-0.00114	0.0287
	(0.0274)	(0.0209)	(0.0429)
Precipitation	-0.000970	-0.000287	-0.00172
	(0.00113)	(0.000688)	(0.00154)
Lag Precipitation	0.000900	0.000119	3.17e-05
	(0.000970)	(0.000604)	(0.00137)
holiday	-0.00483	-0.00432	-0.00205
	(0.0122)	(0.00763)	(0.0170)
10.month	-0.0214	0.000792	0.00117
	(0.0220)	(0.0161)	(0.0299)
11.month	-0.0508	-0.00501	-0.0219
	(0.0370)	(0.0289)	(0.0487)
1.weekday	0.0142	-0.00689	0.0245
	(0.0139)	(0.0108)	(0.0191)
2.weekday	0.0118	-0.00755	0.0189
	(0.0133)	(0.0105)	(0.0176)
3.weekday	0.00695	-0.00217	0.0258
	(0.0138)	(0.0105)	(0.0189)
4.weekday	0.0164	0.00153	0.0350**
	(0.0129)	(0.00932)	(0.0174)
5.weekday	0.0143	-0.000749	0.0288*
	(0.0124)	(0.00948)	(0.0164)
6.weekday	0.0261	0.00791	0.0600**
	(0.0166)	(0.0115)	(0.0238)
5.hour	0.0402***	0.0209***	0.0445***
	(0.00866)	(0.00505)	(0.0109)
6.hour	1.937	5.148	2.429
	(9.472)	(8.392)	(12.59)
7.hour	0.473***	0.308***	0.721***

	(0.0172)	(0.0118)	(0.0288)
8.hour	0.426***	0.256***	0.572***
	(0.0188)	(0.0173)	(0.0248)
9.hour	1.989	5.173	2.485
	(9.472)	(8.393)	(12.59)
10.hour	0.186***	0.0981***	0.230***
	(0.0133)	(0.00832)	(0.0196)
11.hour	0.206***	0.109***	0.257***
	(0.0136)	(0.00776)	(0.0174)
12.hour	1.822	5.076	2.267
	(9.471)	(8.392)	(12.59)
13.hour	0.125***	0.0607***	0.147***
	(0.0117)	(0.00692)	(0.0155)
14.hour	0.0867***	0.0425***	0.104***
	(0.0123)	(0.00779)	(0.0166)
15.hour	1.846	5.086	2.302
	(9.472)	(8.393)	(12.59)
16.hour	0.187***	0.0978***	0.240***
	(0.0143)	(0.00918)	(0.0204)
17.hour	0.440***	0.264***	0.630***
	(0.0219)	(0.0154)	(0.0362)
18.hour	1.991	5.180	2.494
	(9.481)	(8.407)	(12.60)
19.hour	0.0990***	0.0497***	0.126***
	(0.0130)	(0.00797)	(0.0172)
20.hour	0.0775***	0.0404***	0.101***
	(0.0150)	(0.00902)	(0.0192)
21.hour	1.770	5.052	2.217
	(9.473)	(8.395)	(12.59)
22.hour	0.0124	0.00488	0.0200
	(0.0109)	(0.00769)	(0.0162)
23.hour	-0.00164	-0.00207	0.00289
	(0.00996)	(0.00702)	(0.0148)
Constant	-1.924	-5.593	-2.423
	(10.55)	(9.350)	(14.02)
Observations	1,105	1,105	1,105
R-squared	0.748	0.683	0.750
Sanderson-Windmeijer F-statistic	37.43	37.43	37.43
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.698	0.701	0.772
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.687	0.690	0.764
Stock-Wright weak instrument-robust inference p-value	0.594	0.421	0.651

Hansen overidentification test p-value	0.425	0.799	0.732
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Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 36b. IV travel mode decision time series regressions using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), 2014

	(1) s_hh_d	(2) s_all_d	(3) avg_hh_d
	Share of all households surveyed that 24-hour period who took at least 1 trip	Share of all members of all households surveyed that 24-hour period who took at least 1 trip	Average number of members surveyed that 24-hour period who took at least 1 trip
Hourly PM 2.5 pollution	4.91e-05 (0.000140)	-2.74e-06 (9.18e-05)	-3.19e-05 (0.000193)
Wind speed	-0.000739 (0.00386)	0.00103 (0.00351)	-0.000869 (0.00488)
Temperature	0.000279 (0.00120)	-0.000141 (0.000917)	0.000461 (0.00174)
Dew point temperature	0.000253 (0.00193)	0.000501 (0.00143)	0.00118 (0.00268)
Sea Level Pressure	0.000238 (0.00109)	0.000643 (0.000989)	0.000349 (0.00144)
Cloud Ceiling	1.41e-05 (9.07e-05)	8.93e-06 (6.27e-05)	-2.16e-05 (0.000137)
Altitude	-6.73e-06* (3.80e-06)	-4.05e-06 (2.78e-06)	-9.60e-06* (5.10e-06)
North wind	-0.000137 (0.00840)	0.00118 (0.00592)	-0.00423 (0.0130)
Northeast wind	-0.0219 (0.0140)	-0.0113 (0.0104)	-0.0155 (0.0212)
East wind	0.0122 (0.0105)	0.00387 (0.00702)	0.0208 (0.0159)
Southeast wind	0.00868 (0.0105)	0.00311 (0.00799)	0.0231 (0.0162)
South wind	0.00434 (0.0120)	-0.00262 (0.00871)	0.0135 (0.0175)
Southwest wind	-0.0124 (0.0163)	-0.0125 (0.0107)	-0.0158 (0.0239)
West wind	0.00509 (0.0273)	-0.00133 (0.0208)	0.0279 (0.0429)
Precipitation	-0.00106 (0.00112)	-0.000326 (0.000683)	-0.00183 (0.00153)
Lag Precipitation	0.000852	0.000371	0.000222

	(0.00103)	(0.000653)	(0.00146)
holiday	-0.00391 (0.0117)	-0.00273 (0.00732)	-0.000110 (0.0164)
10.month	-0.0217 (0.0213)	-0.01000 (0.0145)	-0.0100 (0.0311)
11.month	-0.0513 (0.0356)	-0.0211 (0.0251)	-0.0382 (0.0521)
1.weekday	0.0167 (0.0134)	-0.00518 (0.0103)	0.0272 (0.0185)
2.weekday	0.0150 (0.0131)	-0.00517 (0.0100)	0.0227 (0.0175)
3.weekday	0.0114 (0.0147)	-0.00202 (0.0114)	0.0292 (0.0198)
4.weekday	0.0191 (0.0135)	0.000682 (0.0101)	0.0355** (0.0180)
5.weekday	0.0151 (0.0126)	-0.00176 (0.00972)	0.0275* (0.0167)
6.weekday	0.0296 (0.0181)	0.00553 (0.0129)	0.0593** (0.0252)
5.hour	0.0405*** (0.00866)	0.0215*** (0.00494)	0.0453*** (0.0108)
6.hour	2.337 (9.818)	5.885 (8.886)	3.392 (12.92)
7.hour	0.474*** (0.0171)	0.309*** (0.0116)	0.722*** (0.0286)
8.hour	0.425*** (0.0188)	0.255*** (0.0170)	0.570*** (0.0247)
9.hour	2.388 (9.819)	5.909 (8.887)	3.448 (12.92)
10.hour	0.180*** (0.0136)	0.0971*** (0.00848)	0.226*** (0.0200)
11.hour	0.203*** (0.0136)	0.110*** (0.00777)	0.256*** (0.0174)
12.hour	2.221 (9.819)	5.814 (8.888)	3.230 (12.92)
13.hour	0.123*** (0.0122)	0.0626*** (0.00735)	0.147*** (0.0160)
14.hour	0.0874*** (0.0132)	0.0459*** (0.00872)	0.107*** (0.0182)
15.hour	2.246 (9.821)	5.826 (8.890)	3.267 (12.92)
16.hour	0.187*** (0.0150)	0.101*** (0.0100)	0.242*** (0.0215)
17.hour	0.441*** (0.0225)	0.270*** (0.0160)	0.639*** (0.0368)
18.hour	2.392	5.919	3.459

	(9.829)	(8.903)	(12.93)
19.hour	0.0996***	0.0512***	0.127***
	(0.0138)	(0.00875)	(0.0184)
20.hour	0.0797***	0.0418***	0.103***
	(0.0157)	(0.00967)	(0.0201)
21.hour	2.171	5.788	3.179
	(9.819)	(8.889)	(12.92)
22.hour	0.0131	0.00429	0.0179
	(0.0117)	(0.00804)	(0.0168)
23.hour	-0.00118	-0.00159	0.00298
	(0.0102)	(0.00700)	(0.0150)
Constant	-2.375	-6.411	-3.495
	(10.93)	(9.896)	(14.38)
Observations	1,123	1,123	1,123
R-squared	0.747	0.687	0.752
Sanderson-Windmeijer F-statistic	18.17	18.17	18.17
underidentification test p-value	1.07e-08	1.07e-08	1.07e-08
Anderson-Rubin weak instrument-robust inference F test p-value	0.410	1	0.865
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.394	1	0.860
Stock-Wright weak instrument-robust inference p-value	0.299	0.999	0.809
Hansen overidentification test p-value	0.180	0.997	0.605

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 36c. IV travel mode decision time series regressions using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), 2014

	(1) s_hh_d	(2) s_all_d	(3) avg_hh_d
	Share of all households surveyed that 24-hour period who took at least 1 trip	Share of all members of all households surveyed that 24-hour period who took at least 1 trip	Average number of members surveyed that 24-hour period who took at least 1 trip
Hourly PM 2.5 pollution	-6.56e-05 (0.000121)	-7.19e-05 (8.28e-05)	-0.000166 (0.000167)
Wind speed	-0.000216 (0.00386)	0.00135 (0.00356)	-0.000376 (0.00478)
Temperature	-7.15e-05 (0.00114)	-0.000317 (0.000863)	0.000148 (0.00169)
Dew point temperature	0.00157 (0.00165)	0.00129 (0.00126)	0.00265 (0.00215)
Sea Level Pressure	0.000176 (0.00107)	0.000618 (0.000955)	0.000306 (0.00142)
Cloud Ceiling	1.08e-05 (9.29e-05)	6.54e-06 (6.43e-05)	-3.14e-05 (0.000141)
Altitude	-8.02e-06** (4.01e-06)	-5.06e-06* (2.96e-06)	-1.18e-05** (5.29e-06)
North wind	0.000372 (0.00884)	0.00109 (0.00632)	-0.00453 (0.0137)
Northeast wind	-0.0205 (0.0146)	-0.0100 (0.0109)	-0.0128 (0.0227)
East wind	0.0109 (0.0107)	0.00350 (0.00726)	0.0204 (0.0162)
Southeast wind	0.0100 (0.0109)	0.00423 (0.00841)	0.0256 (0.0171)
South wind	0.00640 (0.0122)	-0.00104 (0.00886)	0.0169 (0.0179)
Southwest wind	-0.0117 (0.0164)	-0.0118 (0.0109)	-0.0145 (0.0243)
West wind	0.00679 (0.0275)	-0.000232 (0.0210)	0.0305 (0.0431)
Precipitation	-0.00102 (0.00114)	-0.000304 (0.000691)	-0.00178 (0.00154)
Lag Precipitation	0.000449 (0.000961)	0.000132 (0.000606)	-0.000209 (0.00139)
holiday	-0.00781 (0.0122)	-0.00528 (0.00760)	-0.00520 (0.0170)

10.month	-0.00449 (0.0199)	0.000570 (0.0144)	0.0105 (0.0279)
11.month	-0.0258 (0.0334)	-0.00558 (0.0260)	-0.00836 (0.0453)
1.weekday	0.0138 (0.0141)	-0.00697 (0.0109)	0.0243 (0.0195)
2.weekday	0.0105 (0.0136)	-0.00794 (0.0106)	0.0177 (0.0181)
3.weekday	0.0115 (0.0141)	-0.00214 (0.0109)	0.0287 (0.0192)
4.weekday	0.0206 (0.0131)	0.00121 (0.00966)	0.0371** (0.0179)
5.weekday	0.0140 (0.0126)	-0.00253 (0.00978)	0.0265 (0.0168)
6.weekday	0.0324* (0.0172)	0.00711 (0.0121)	0.0628** (0.0244)
5.hour	0.0395*** (0.00875)	0.0209*** (0.00508)	0.0440*** (0.0111)
6.hour	1.779 (9.589)	5.665 (8.573)	3.007 (12.74)
7.hour	0.473*** (0.0172)	0.308*** (0.0118)	0.720*** (0.0289)
8.hour	0.423*** (0.0196)	0.255*** (0.0178)	0.569*** (0.0256)
9.hour	1.830 (9.590)	5.690 (8.574)	3.063 (12.74)
10.hour	0.180*** (0.0134)	0.0964*** (0.00845)	0.225*** (0.0201)
11.hour	0.202*** (0.0135)	0.109*** (0.00763)	0.255*** (0.0174)
12.hour	1.661 (9.589)	5.593 (8.573)	2.843 (12.74)
13.hour	0.120*** (0.0121)	0.0604*** (0.00700)	0.143*** (0.0161)
14.hour	0.0813*** (0.0123)	0.0423*** (0.00770)	0.100*** (0.0169)
15.hour	1.684 (9.590)	5.605 (8.575)	2.878 (12.74)
16.hour	0.181*** (0.0140)	0.0979*** (0.00896)	0.236*** (0.0204)
17.hour	0.435*** (0.0227)	0.265*** (0.0160)	0.630*** (0.0378)
18.hour	1.830 (9.599)	5.697 (8.589)	3.070 (12.75)
19.hour	0.0967*** (0.0136)	0.0498*** (0.00831)	0.125*** (0.0181)

20.hour	0.0763*** (0.0154)	0.0404*** (0.00924)	0.1000*** (0.0198)
21.hour	1.613 (9.590)	5.569 (8.576)	2.795 (12.74)
22.hour	0.0102 (0.0115)	0.00290 (0.00784)	0.0156 (0.0169)
23.hour	-0.00319 (0.0103)	-0.00251 (0.00720)	0.00114 (0.0155)
Constant	-1.754 (10.68)	-6.168 (9.551)	-3.067 (14.19)
Observations	1,095	1,095	1,095
R-squared	0.745	0.682	0.748
Sanderson-Windmeijer F-statistic	34.14	34.14	34.14
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.780	0.684	0.618
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.771	0.673	0.605
Stock-Wright weak instrument-robust inference p-value	0.675	0.401	0.477
Hansen overidentification test p-value	0.672	0.708	0.953

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

The results for our IV regressions of each of the travel mode decision panel data variables with household fixed effects for 2014 are in Table 37. Using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), we find that when there is bad air, the number of members in household who took at least 1 trip that hour increases, and the number of members in household who did not take any trip that hour decreases. Using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), we find that when there is bad air, the share of household members in household who took at least 1 trip that hour increases, the number of members in household who took at least 1 trip that hour increases, and the number of members in household who did not take any trip that hour decreases. Using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), we find that when there is bad air, the number of members in household who took at least 1 trip that hour increases, and the number of members in household who did not take any trip that hour decreases.

Thus, the robust results for our IV regressions of our travel decision panel data variables with household fixed effects show that when there is bad air, the number of members in household who took at least 1 trip that hour increases, and the number of members in household who did not take any trip that hour decreases.

Table 37a. IV fixed effects travel mode decision panel regressions using south wind at Zhoushuizi and wind speed in Gaoyao as the 2 IVs (in “1iv”), 2014

	(1) s_mb_travel_hh Share of household members in household who took at least 1 trip that hour	(2) n_mb_travel_hh Number of members in household who took at least 1 trip that hour	(3) n_mb_stay_hh Number of members in household who did not take any trip that hour
Hourly PM 2.5 pollution	7.66e-05 (5.28e-05)	0.000290** (0.000120)	-0.000290** (0.000120)
Wind speed	-0.000607 (0.000393)	-0.00154* (0.000891)	0.00154* (0.000891)
Temperature	-0.000105 (0.000183)	-0.000437 (0.000414)	0.000437 (0.000414)
Dew point temperature	-0.000110 (0.000206)	-0.000504 (0.000467)	0.000504 (0.000467)
Sea Level Pressure	0.000100 (0.000145)	-1.59e-07 (0.000328)	1.59e-07 (0.000328)
Cloud Ceiling	-2.81e-05** (1.40e-05)	-7.41e-05** (3.16e-05)	7.41e-05** (3.16e-05)
Altitude	-5.21e-06 (3.41e-06)	-7.85e-06 (7.72e-06)	7.85e-06 (7.72e-06)
North wind	0.00188 (0.00125)	0.00311 (0.00283)	-0.00311 (0.00283)
Northeast wind	-7.94e-05 (0.00155)	0.00120 (0.00351)	-0.00120 (0.00351)
East wind	-0.00180 (0.00169)	-0.00271 (0.00383)	0.00271 (0.00383)
Southeast wind	-0.000242 (0.00154)	-0.000365 (0.00348)	0.000365 (0.00348)
South wind	0.000367 (0.00170)	0.00283 (0.00385)	-0.00283 (0.00385)
Southwest wind	-0.00170 (0.00197)	-0.00240 (0.00446)	0.00240 (0.00446)
West wind	-0.00578** (0.00230)	-0.0167*** (0.00521)	0.0167*** (0.00521)
o.Precipitation	-	-	-
o.Lag Precipitation	-	-	-
o.holiday	-	-	-
o.d_weekday1	-	-	-
o.d_weekday2	-	-	-

d_weekday3	-0.00793 (0.117)	0.0467 (0.265)	-0.0467 (0.265)
d_weekday4	-0.0176 (0.132)	-0.0322 (0.300)	0.0322 (0.300)
o.d_weekday5	-	-	-
o.d_weekday6	-	-	-
o.d_month1	-	-	-
d_hour1	0.00397 (0.00259)	0.0136** (0.00588)	-0.0136** (0.00588)
d_hour2	0.0198*** (0.00259)	0.0518*** (0.00588)	-0.0518*** (0.00588)
d_hour3	1.018 (1.302)	0.301 (2.951)	-0.301 (2.951)
d_hour4	0.323*** (0.00268)	0.799*** (0.00607)	-0.799*** (0.00607)
d_hour5	0.255*** (0.00257)	0.577*** (0.00582)	-0.577*** (0.00582)
d_hour6	1.053 (1.302)	0.338 (2.951)	-0.338 (2.951)
d_hour7	0.122*** (0.00228)	0.271*** (0.00517)	-0.271*** (0.00517)
d_hour8	0.131*** (0.00242)	0.307*** (0.00549)	-0.307*** (0.00549)
d_hour9	0.951 (1.302)	0.119 (2.951)	-0.119 (2.951)
d_hour10	0.0759*** (0.00225)	0.186*** (0.00511)	-0.186*** (0.00511)
d_hour11	0.0570*** (0.00226)	0.133*** (0.00511)	-0.133*** (0.00511)
d_hour12	0.968 (1.302)	0.167 (2.951)	-0.167 (2.951)
d_hour13	0.110*** (0.00213)	0.280*** (0.00483)	-0.280*** (0.00483)
d_hour14	0.283*** (0.00193)	0.680*** (0.00438)	-0.680*** (0.00438)
d_hour15	1.035 (1.302)	0.321 (2.951)	-0.321 (2.951)
d_hour16	0.0630*** (0.00177)	0.146*** (0.00401)	-0.146*** (0.00401)
d_hour17	0.0445*** (0.00168)	0.102*** (0.00381)	-0.102*** (0.00381)
d_hour18	0.922	0.0509	-0.0509

	(1.302)	(2.951)	(2.951)
d_hour19	0.00492*** (0.00167)	0.0117*** (0.00379)	-0.0117*** (0.00379)
o.d_hour20	-	-	-
Observations	716,548	716,548	716,548
R-squared	0.149	0.162	0.162
Number of households	37,866	37,866	37,866
Sanderson-Windmeijer F-statistic	11518	11518	11518
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.124	0.0262	0.0262
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.124	0.0262	0.0262
Stock-Wright weak instrument-robust inference p-value	0.124	0.0262	0.0262
Hansen overidentification test p-value	0.150	0.239	0.239

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 37b. IV fixed effects travel mode decision panel regressions using south wind at Zhoushuizi and wind blowing from Chengshantou as the 2 IVs (in “2iv”), 2014

	(1) s_mb_travel_hh Share of household members in household who took at least 1 trip that hour	(2) n_mb_travel_hh Number of members in household who took at least 1 trip that hour	(3) n_mb_stay_hh Number of members in household who did not take any trip that hour
Hourly PM 2.5 pollution	0.000261*** (9.96e-05)	0.000667*** (0.000226)	-0.000667*** (0.000226)
Wind speed	-0.00169*** (0.000589)	-0.00375*** (0.00134)	0.00375*** (0.00134)
Temperature	-0.000266 (0.000197)	-0.000778* (0.000447)	0.000778* (0.000447)
Dew point temperature	-0.000575** (0.000291)	-0.00142** (0.000659)	0.00142** (0.000659)
Sea Level Pressure	6.54e-05 (0.000144)	-6.72e-05 (0.000327)	6.72e-05 (0.000327)
Cloud Ceiling	-4.59e-05*** (1.58e-05)	-0.000105*** (3.58e-05)	0.000105*** (3.58e-05)
Altitude	-4.22e-07 (6.26e-07)	-8.38e-07 (1.42e-06)	8.38e-07 (1.42e-06)
North wind	0.00144	0.00255	-0.00255

	(0.00128)	(0.00290)	(0.00290)
Northeast wind	0.000554	0.00224	-0.00224
	(0.00165)	(0.00373)	(0.00373)
East wind	0.000957	0.00230	-0.00230
	(0.00213)	(0.00484)	(0.00484)
Southeast wind	0.00106	0.00199	-0.00199
	(0.00173)	(0.00391)	(0.00391)
South wind	0.00322	0.00854*	-0.00854*
	(0.00229)	(0.00519)	(0.00519)
Southwest wind	-0.000820	-0.000718	0.000718
	(0.00207)	(0.00468)	(0.00468)
West wind	-0.00902***	-0.0234***	0.0234***
	(0.00257)	(0.00582)	(0.00582)
o.Precipitation	-	-	-
o.Lag Precipitation	-	-	-
o.holiday	-	-	-
o.d_weekday1	-	-	-
o.d_weekday2	-	-	-
d_weekday3	0.00718	0.0780	-0.0780
	(0.117)	(0.265)	(0.265)
d_weekday4	-0.00648	-0.00921	0.00921
	(0.132)	(0.299)	(0.299)
o.d_weekday5	-	-	-
o.d_weekday6	-	-	-
o.d_month1	-	-	-
d_hour1	0.00986***	0.0258***	-0.0258***
	(0.00375)	(0.00850)	(0.00850)
d_hour2	0.0254***	0.0634***	-0.0634***
	(0.00364)	(0.00824)	(0.00824)
d_hour3	0.711	-0.291	0.291
	(1.298)	(2.941)	(2.941)
d_hour4	0.329***	0.811***	-0.811***
	(0.00377)	(0.00854)	(0.00854)
d_hour5	0.261***	0.589***	-0.589***
	(0.00359)	(0.00813)	(0.00813)
d_hour6	0.744	-0.256	0.256
	(1.298)	(2.941)	(2.941)
d_hour7	0.126***	0.279***	-0.279***

	(0.00304)	(0.00689)	(0.00689)
d_hour8	0.135***	0.314***	-0.314***
	(0.00325)	(0.00737)	(0.00737)
d_hour9	0.643	-0.475	0.475
	(1.298)	(2.941)	(2.941)
d_hour10	0.0803***	0.194***	-0.194***
	(0.00300)	(0.00679)	(0.00679)
d_hour11	0.0619***	0.143***	-0.143***
	(0.00310)	(0.00704)	(0.00704)
d_hour12	0.660	-0.425	0.425
	(1.298)	(2.941)	(2.941)
d_hour13	0.114***	0.288***	-0.288***
	(0.00289)	(0.00655)	(0.00655)
d_hour14	0.286***	0.688***	-0.688***
	(0.00247)	(0.00559)	(0.00559)
d_hour15	0.725	-0.276	0.276
	(1.298)	(2.940)	(2.940)
d_hour16	0.0648***	0.150***	-0.150***
	(0.00196)	(0.00445)	(0.00445)
d_hour17	0.0456***	0.105***	-0.105***
	(0.00170)	(0.00386)	(0.00386)
d_hour18	0.610	-0.551	0.551
	(1.298)	(2.940)	(2.940)
d_hour19	0.00475***	0.0112***	-0.0112***
	(0.00165)	(0.00374)	(0.00374)
o.d_hour20	-	-	-
Observations	735,905	735,905	735,905
R-squared	0.146	0.160	0.160
Number of households	37,866	37,866	37,866
Sanderson-Windmeijer F-statistic	3182	3182	3182
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.0303	0.0113	0.0113
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.0303	0.0113	0.0113
Stock-Wright weak instrument-robust inference p-value	0.0303	0.0113	0.0113
Hansen overidentification test p-value	0.706	0.646	0.646

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

Table 37c. IV fixed effects travel mode decision panel regressions using wind speed in Gaoyao and wind blowing from Chengshantou as the 2 IVs (in “4iv”), 2014

	(1)	(2)	(3)
	s_mb_travel_hh	n_mb_travel_hh	n_mb_stay_hh
	Share of household members in household who took at least 1 trip that hour	Number of members in household who took at least 1 trip that hour	Number of members in household who did not take any trip that hour
Hourly PM 2.5 pollution	6.64e-05 (5.36e-05)	0.000290** (0.000121)	-0.000290** (0.000121)
Wind speed	-0.000567 (0.000396)	-0.00148* (0.000899)	0.00148* (0.000899)
Temperature	-9.76e-05 (0.000182)	-0.000479 (0.000414)	0.000479 (0.000414)
Dew point temperature	-0.000155 (0.000209)	-0.000622 (0.000475)	0.000622 (0.000475)
Sea Level Pressure	9.12e-05 (0.000146)	9.77e-06 (0.000330)	-9.77e-06 (0.000330)
Cloud Ceiling	-2.89e-05** (1.40e-05)	-7.73e-05** (3.19e-05)	7.73e-05** (3.19e-05)
Altitude	-5.44e-06 (3.40e-06)	-8.47e-06 (7.71e-06)	8.47e-06 (7.71e-06)
North wind	0.00175 (0.00125)	0.00271 (0.00283)	-0.00271 (0.00283)
Northeast wind	-6.69e-05 (0.00155)	0.00130 (0.00352)	-0.00130 (0.00352)
East wind	-0.00152 (0.00172)	-0.00221 (0.00390)	0.00221 (0.00390)
Southeast wind	-0.000276 (0.00155)	-0.000540 (0.00351)	0.000540 (0.00351)
South wind	0.000274 (0.00170)	0.00290 (0.00386)	-0.00290 (0.00386)
Southwest wind	-0.00179 (0.00196)	-0.00241 (0.00445)	0.00241 (0.00445)
West wind	-0.00585** (0.00231)	-0.0169*** (0.00524)	0.0169*** (0.00524)
o.pp	-	-	-
o.pp_lag	-	-	-
o.holiday	-	-	-
o.d_weekday1	-	-	-
o.d_weekday2	-	-	-

d_weekday3	-0.00906 (0.117)	0.0460 (0.265)	-0.0460 (0.265)
d_weekday4	-0.0180 (0.132)	-0.0318 (0.300)	0.0318 (0.300)
o.d_weekday5	-	-	-
o.d_weekday6	-	-	-
o.d_month1	-	-	-
d_hour1	0.00359 (0.00260)	0.0137** (0.00590)	-0.0137** (0.00590)
d_hour2	0.0194*** (0.00260)	0.0518*** (0.00589)	-0.0518*** (0.00589)
d_hour3	0.938 (1.307)	0.390 (2.964)	-0.390 (2.964)
d_hour4	0.323*** (0.00269)	0.799*** (0.00609)	-0.799*** (0.00609)
d_hour5	0.256*** (0.00260)	0.578*** (0.00590)	-0.578*** (0.00590)
d_hour6	0.972 (1.307)	0.427 (2.964)	-0.427 (2.964)
d_hour7	0.121*** (0.00228)	0.270*** (0.00518)	-0.270*** (0.00518)
d_hour8	0.131*** (0.00243)	0.307*** (0.00550)	-0.307*** (0.00550)
d_hour9	0.871 (1.307)	0.208 (2.963)	-0.208 (2.963)
d_hour10	0.0757*** (0.00226)	0.187*** (0.00513)	-0.187*** (0.00513)
d_hour11	0.0569*** (0.00226)	0.133*** (0.00511)	-0.133*** (0.00511)
d_hour12	0.888 (1.307)	0.257 (2.964)	-0.257 (2.964)
d_hour13	0.110*** (0.00211)	0.280*** (0.00478)	-0.280*** (0.00478)
d_hour14	0.283*** (0.00193)	0.680*** (0.00438)	-0.680*** (0.00438)
d_hour15	0.955 (1.307)	0.410 (2.963)	-0.410 (2.963)
d_hour16	0.0630*** (0.00177)	0.146*** (0.00401)	-0.146*** (0.00401)
d_hour17	0.0445*** (0.00168)	0.102*** (0.00381)	-0.102*** (0.00381)
d_hour18	0.842 (1.307)	0.140 (2.963)	-0.140 (2.963)

d_hour19	0.00493*** (0.00167)	0.0117*** (0.00378)	-0.0117*** (0.00378)
o.d_hour20	-	-	-
Observations	715,006	715,006	715,006
R-squared	0.149	0.163	0.163
Number of households	37,866	37,866	37,866
Sanderson-Windmeijer F-statistic	11147	11147	11147
underidentification test p-value	0	0	0
Anderson-Rubin weak instrument-robust inference F test p-value	0.156	0.0189	0.0189
Anderson-Rubin weak instrument-robust inference Chi-sq test p-value	0.156	0.0189	0.0189
Stock-Wright weak instrument-robust inference p-value	0.156	0.0189	0.0189
Hansen overidentification test p-value	0.140	0.133	0.133

Notes: Robust standard errors in parentheses. Significance stars: *** p<0.01, ** p<0.05, * p<0.1

7. Conclusion

We analyze how air pollution affects travel mode decisions in China using a large and detailed hourly household-level data set on hourly household-level travel mode decisions in Beijing; and hourly air pollution, weather, wind speed, and wind direction in and around Beijing. We use machine learning, LASSO regressions, and atmospheric chemistry to select and construct instruments for air pollution to address its endogeneity. Our selected instruments for air pollution include wind speeds at high altitude that disperse pollution and wind blowing from upwind industrial areas towards Beijing that may increase pollution. We compare the effects of air pollution on travel mode before and after China launched a nation-wide, real-time air quality monitoring and disclosure program.

Our results from using machine learning and LASSO regressions to select instruments, show that, for Beijing, wind speed at high altitude, wind blowing from polluted cities elsewhere, and wind speed and direction at other locations are more related to the endogenous pollution than traditional instruments such as temperature inversion.

The results for our IV regressions in 2010, prior to the reform, are as follows. Our results for 2010 for the travel mode share IV regressions show that people are less likely to walk and weakly more likely to bike when there is bad air. Our robust results using across the different specifications using the two different IVs are that air pollution makes people weakly more likely to bicycle, weakly more likely to take other modes of transport, weakly more likely to take subway, and weakly less likely to walk. Our IV regressions of individual travel mode with household fixed effects show that air pollution makes people less likely to walk, more likely to take bus, more likely to take car, more likely to take subway, and more likely to take other modes of transport.

Our results for the IV travel mode decision time series results for 2010 show that the share

of all households members surveyed during that 24-hour period who took at least 1 trip that hour weakly decreases when there is bad air. Our IV regressions of each of the travel mode decision panel data variables with household fixed effects for 2010 show that when there is bad air, the share of household members in each household who took at least 1 trip that hour decreases, the number of members in that household who took at least 1 trip that hour decreases, and the number of members in that household who did not take any trip that hour increases.

The results for our IV regressions in 2014, after the reform, are as follows. Our robust results for the IV travel mode share regressions for 2014 are that air pollution makes people weakly less likely to take car, and weakly more likely to take a taxi. Our robust results for our IV probit regressions of individual travel mode for 2014 are that, air pollution makes people weakly less likely to bicycle, less likely to take “others”, and weakly more likely to walk. Our robust results for the IV fixed effect regressions of individual travel mode are that when there is bad air, more likely to walk, weakly less likely to take bus, less likely to take car, weakly less likely to take subway, and less likely to take other modes of transport.

The robust results of our IV travel mode decision time series results for year 2014 are that air pollution has no significant effect on either the share of all households surveyed that 24-hour period who took at least 1 trip; the share of all members of all households surveyed that 24-hour period who took at least 1 trip; or the average number of members surveyed that 24-hour period who took at least 1 trip. The robust results for our IV regressions of our travel decision panel data variables with household fixed effects show that when there is bad air, the number of members in household who took at least 1 trip that hour increases, and the number of members in household who did not take any trip that hour decreases.

Thus, in 2010, prior to the reform, air pollution makes people less likely to walk; and more likely to bicycle, take bus, take car, take subway, and take other modes of transport. Air pollution also decrease the share of all households members surveyed who took at least 1 trip that hour; decreases the share of household members in each household who took at least 1 trip that hour; decreases the number of members in that household who took at least 1 trip that hour; and increases the number of members in that household who did not take any trip that hour.

In contrast, in 2014, after the reform, air pollution makes people more likely to walk and take a taxi; and less likely to bicycle, take bus, take car, take subway, and take other modes of transport. Air pollution increases the number of members in household who took at least 1 trip that hour; and decreases the number of members in household who did not take any trip that hour.

Our results have important implications for air pollution and transportation mode choice in China and elsewhere.

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