Adversity-Hope Hypothesis: Air Pollution Raises Lottery Demand in China

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The following files containing source data and computer code are described in what follows:

(i). meteorology_CNM000#####.dta – surface and atmospheric meteorological data for different observatories across mainland China by date by reading time (UTC 0 and UTC 12), obtained from NOAA. The period is 2013 to 2017, except observatories CHM00054511 and CHM00058362 (nearest to the two municipalities examined in Table 3) for which the period is 2008 to 2017.

(ii). meteorology_TWM000#####-data.dta – surface and atmospheric meteorological data for Taiwan by date by reading time (UTC 0 and UTC 12), obtained from NOAA. The period is 2013 to 2017.

(iii). pm25_2013.dta to pm25_2017.dta – 1-h PM2.5 concentrations by monitor by date by hour in each year 2013 to 2017, obtained from China's MEE.

(iv). nearestObservatory.dta – specifies the NOAA observatory that is nearest to each province's capital city, with distance ranging from 0 km (Heilongjiang) to 136 km (Anhui).

(v). precipitation_2municip_2008_17.dta – 1-h precipitation for the two municipalities examined in Table 3, from 2008 to 2017, obtained from NASA.

(vi). pm25_USDOS_2008_17.dta – 1-h PM2.5 concentrations for the two municipalities examined in Table 3, from 2008 to 2017, obtained from the US State Department.

(vii). sales3D_32provinces_2013_17.dta – daily 3D lottery sales for 32 provinces, 2013-2017.

(viii). ShanghaiStockExchange_2013_17.dta – closing price of the Shanghai Stock Exchange composite index, from 2013 to 2017.

(ix). sales3D_2municip_2008_17.dta – daily 3D lottery sales for 2 municipalities, 2008-2017.

(x). salesSeveral_nationwide_2013_17.dta – daily nationwide sales for seven number lotteries, 2013 to 2017.

(xi). sales3D4D_Taiwan_2014_18.dta – Taiwan's daily 3D and 4D lottery sales, 2014-2018.

(xii). pm25_Taiwan_2014_18.csv – 1-h PM2.5 concentrations by monitor by date by hour in each year 2014 to 2018, obtained from Taiwan's Environmental Protection Administration.

(xiii). monitorsTaiwan.dta – Taiwan county-level data, including PM2.5 monitors.

All code runs in Stata version 15 or higher.

Stata do file "replicate_AHH_JRU2021.do" prepares, describes, and combines the lottery and environment samples, and implements the empirical models of lottery demand. This do file consists of a series of functions (Stata programs) that are described below.

a. Program "cleanNOAA" reads data source files (i) and (ii) described above, by observatory. This program is subsequently called on by program "combineNOAA," which combines data across observatories.

b. Program “MEE” reads data source files (iii) and, for each day and hour, computes the mean 1-h PM2.5 concentration across monitors within a province.

c. Program “holiday” and “holidayTaiwan” generate a dummy variable for public holidays in mainland China and Taiwan, respectively.

d. Program “environment” reads data source file (iv) and calls on programs “cleanNOAA,” “MEE,” and “holiday,” combining the temporary files generated by these programs. The program prepares the environment sample for the analysis of lottery demand at the province by date level, e.g., as in Table 2. The program further prepares Figures 1 and 2 and Figures A.1 to A.6.

e. Similarly, program “environment2municip” prepares the environment sample for the analysis of lottery demand using the decade-long panel at the municipality by date level, e.g., as in Table 3. The program additionally reads data source files (v) and (vi) containing rainfall (NASA) and PM2.5 (US State Department) over the longer sample period.

f. Program “analysisProvince” reads data source file (vii) and, after calling on program “environment,” combines the province-by-day lottery data with the environment sample. The program then replicates estimates reported in Tables 2, 4, 7, and A.1 to A.7, as well as Figures 1 and 3. The program also reads and merges in data source file (viii), for use in a robustness test (Table 7, columns 1 and 5). Summary statistics shown in the top panel of Table 1 are also reported.

g. Similarly, program “analysis2municip” reads data source file (ix) and, after calling on program “environment2municip,” combines the municipality-by-day lottery data with the environment sample. The program then replicates estimates reported in Table 3 and A.4 (columns 7-8 and 15-16).

h. Program “analysisNationwide” reads data source files (vii) and (x), generates nationally aggregated environmental variables from a temporary file that was prepared by program “environment,” and then replicates Table 5 and Figures 4 and 5. Summary statistics shown in the bottom panel of Table 1 are also reported.

i. Program “analysisTaiwan” reads and compiles source files (xi) to (xiii) and replicates Table 6.

Commands at the bottom of “replicate_AHH_JRU2021.do” call on programs analysisProvince, analysis2municip, analysisNationwide, and analysisTaiwan.