Recreation of Temperature and Decisions: Evidence from 207,000 Court Cases

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Abstract

(note: cursive indicates my comments) 0. Abstract: summarize the key points of the paper. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.
Keywords: decision-making; temperature; fixed-effects regression; spatial panel data

1 Introduction

introduce the topic and state the aim of your work, stating clearly the research questions and the methodology used, give a brief overview of the results and the limitations of your analysis. a what my paper does, b what underlying paper does (and why relevant?), c what i can confirm reject

This paper examines the robustness of the results in the article "Temperature and Decisions: Evidence from 207,000" by Heyes and Saberian in 2018. Using the same dataset, this paper recreates the main findings. The aim of this paper is to either empirically confirm the results of Heyes and Saberian or to disprove them and illuminate the reasons for that. I reimplement the entire analysis in Python and add a few more model specifications to further analyise the validity of the results.

Heyes and Saberian (2019) use a dataset of 207,000 court cases in the U.S. for a holistic regression analysis to evaluate the influence of climate on professionally made decisions. The authors use a holistic set of explanatory variables including various fixed effects - over time, across judges and locations, etc - to control for heterogeneity in the regression of court case outcome on temperature. In this analysis they find a significant relation between temperature and case outcome.

I am able to replicate the paper's main finding. In my analysis, estimated coefficients differ in values but not in direction and significance. The added specifications omitted by the original paper *(not yet implemented)* further confirm the underlying relation between climate and decisions. Moreover, I contribute a more accessible technical infrastructure in Python for other researchers to also replicate these results.

2 Literature review

introduce the topic and state the aim of your work, stating clearly the research questions and the methodology used, give a brief overview of the results and the limitations of your analysis. a what my paper does, b what underlying aper does (and why relevant?), c what i can confirm rejectsummarize the current state of knowledge on the topic of your paper (including the latest relevant publications).all post 2019

Heyes and Saberian already give an exhaustive overview in their paper from 2019. Their work is in line with numerous publications showing that temperature - both indoors and outside - does have a significant effect and human decisions and rationality. More recently, in this branch of temperature x decisions literature Gavresi et al. (2021) show that higher outdoor temperature increases risk appetite in (optimist) financial decisions. Chen et al. (2020) find that people perform worse in neurobehavioral cognitive tests when exposed to higher temperature indoors and Hadi and Block (2019) show that extreme heat makes consumers less rational (ie affectual). Even more temperature effects are shown by Stevens et al. (2021) on agression on social media and by Ryan (2020) on law officials behaviour.

There is also a group of researchers who disprove the link between temperature and decisions, which Heyes and Saberian omit in their paper. Recent contributions in this branch are Stroom et al. (2021), who find no relation between indoor temperature and cognitive rationality, and Liu et al. (2020), who observe no effect of heat on fraudulent behaiour. *(maybe give here some older literature too, as heyes and saberian do not mention it in their literature review)*

Concerning temperature effects on juridical outcomes specifically, Heyes and Saberian are the first to conduct a full empirical analysis. This motivated Evans and Siminski (2021) to do their own empirical analysis about criminal court cases in Australia, which resulted in no significant effect between weather variables and decision making. Also, as direct response to the underyling paper Holger Spamann (2020) recalculate its results within a larger timeframe (1990 - 2019) and finds no significant effects.

3 Data

Describe the main sources of your data, the data cleaning and merging process, include a table(s) of summary statistics and a brief description of these. Note: missing explanation of avg temp units 10°F and bins.
The main dataset is constructed out of several sources. asylumlaw.org contains the law data in the form of the variables case outcome, case type and nationality of applicant structured along the dimensions judge, city and date *(I still have to check here what the unique key is or how i phrase that)*. For the environment data, the National Oceanic and Atmospheric Administration yields air temperature, dew point, air pressure, precipitation and wind speed sorted hourly by datetime and location. The variable cloud cover is available at the Northeast Regional Climate Center. The pollution variables quantity of micro particles, carbon monoxide and ozone are delivered by United States Environmental Protection Agency. Some of the environment data is collected hourly and some daily. As the law variables are in a daily format, hourly data is averaged daily form 6AM to 4PM. Each environment observation is at maxium 32 kilometers away from the respective court location. All variables are joined by date (daily) and city in the dataset machet.dta, thus that every row represents one case outcome marked by a respective date and location containing values for case and environment characteristics.
Once matched.dta is created, the (stata) code puts certain temperature variables into promils and creates variables for all relevant dimensions (city, judge, year, month, day), averages of some characteristics across various dimensions, dummies and interactions between variables and/or dummies. The final dataset contains 207207 observations for 666 variables. The issue of missing values is addressed by dropping every row that contains NA for at least one variable used in at least one regression. Note that this reduces the effective number of observations to 169006.

Table 1: Summary Statistics

	Mean	Std. Dev.
res	0.162965	0.369334
tempmean	61.439452	14.859341
heat	57.398058	16.094140
airpressure0	29.661536	0.751446
avgdewpt	49.392714	16.657781
precip0	0.003891	0.034818
windspeed0	6.518397	4.402740
skycover	0.546602	0.280155
ozone	0.021916	0.012003
co	0.930650	0.504708
pm25	14.869682	11.204614

Table 1 shows summary statistics for the most relevant variables. About 16 percent of all cases end in granting the applicant asylum. As noted by Heyes and Saberian, the grant rate differs greatly across judges and location. over the study period in the Los Angeles courthouse there are five judges that granted asylum to fewer than 4 percent while three others granted in over 67 percent. The mean over the entire dataset for daily average temperature is 61.4°F, which is around 14°C.

4 Empirical strategy

describe the empirical method used and its appropriateness in this context, state the main hypotheses to be tested. (checken ob spezfik auch die von table 2 ist... besonders)

0. main hyp to test: The main hypothesis to be tested is whether outdoor temperature has an impact on professional high-stakes decisions. In a more empiric logic, this hypothesis is tested using a linear probability model for binary response (for a detailed description see Wooldridge (2010)). The probability model allows for each regressor to influence the likelihood that the dependent variable takes the value of 1. A value of 1 means that asylum is granted.

1. method: pols with fixed effects. The following model tests the main hypothesis,

$$g_{it} = \beta_0 + \beta_1 temp_{it} + W_{it}\beta_2 + P_{it}\beta_3 + X_{it}\beta_4 + \gamma_i + \psi_{ct} + \theta t + \epsilon_{it} \quad (1)$$

where the dimensions i, t and c represent application, date and city respectively. Thus, the regressand g_{it} is the outcome of an application i on the date t having the value 1 if asylum was granted and 0 otherwise. β_j are the j slope parameters of each regressor (matrix) and β_0 is used as the intercept. *temp* is the main regressor of interest, whereas W, P and X are a set of control variables representing weather, pollution (see table 1 for details) and case-specific characteristics, like for instance nationality of applicant. γ, ψ and θ are included to control for judge-specific fixed effects (ie which judge is ruling the case), time fixed effects (weekday and years) and city-by-month effects. ϵ contains unobserved heterogeneity along the dimensions of case and date.

standard errors are clustered by city-month which serves two purposes: to account for spatial correlation across cities and to allow for autocorrelation in decisions in each month. For the purposes of robustness we establish later that the results are robust to a variety of other ways of calculating standard er i

2. why appropriate easy control, easy interpretation Therefore, b1 is the change in the probability of success given a one-unit increase in x1.

3. my further analysis (to be continued)

5 Results

present and comment on your results.
Table 2 contains the results of the regression using the default specification. All four regressions are use pooled OLS to estimate the effects of average temperature and its one-day lag as well as lead in different combinations. Also, all specifications control for a set of averaged weather characteristics (skycover, air pressure, wind, precipitation, dewpoint), air pollution (ozone, co, pm) and weekday dummies. In (1), the estimated slope parameter is -1.363. This value means that a 10°F (5.4°C) increase in daily average temperature during a judge decision reduces the probablilty of a positive outcome by 1.363% (ceterus paribus). Considering that the overall average grant rate is 16.3%, 10°F warmer temperature implies a 8.36% (0.01363/0.163) decrease in expected grant rate. This effect is significant at 1% and so are all other effects in in (2) and (3). Analogously to the just interpreted parameter, the lag or lead estimates quantify the effect of the average temperature the day before or after the decision. In (4), all three regressors are used jointly which leads to significant estimates only for lag and lean. This means that in this dataset when controlling for the temperature the day after and before, the daily average temperature when the decision is made has no effect on its outcome. *I am surprised my results differ that much from the original.*

Table 2: Fixed effect estimates: 6 AM - 4 PM average

	(1) Preferred	(2) 1-Day lag	(3) 1-Day lead	(4) All
Temperaturet/1000	-1.363***	1.108***	-2.21***	-0.278
	[0.155]	[0.211]	[0.262]	[0.352]
Temperaturet-1/1000	-	-2.17***	-	-1.866***
	-	[0.174]	-	[0.228]
Temperaturet+1/1000	-	-	0.818***	1.022***
	-	-	[0.203]	[0.205]
F-statistic of joint significance of weather variables	2417.651	2268.988	2257.756	2121.681
P-value	0.000	0.000	0.000	0.000
Observations	169006	169006	169006	169006

6 Discussion

reflect on the meaning and policy implications of your results, think of potential limitations to your work and avenues for future research.

7 Conclusion

7.1 testsubsection

summarize your main work and conclude. 1. Select a paper that uses one of the empirical methods reviewed in class 2. Get the raw data 3. Replicate the data analysis 4. Write a report summarizing your work. 5. Include a literature review section in your report that summarizes the current state of knowledge on your topic.

Appendix

use it for additional material that might support your analysis + (in the

final version) include a separate paragraph that provides a response to the referee's comments and mentions where, how, why, why not the paper has changed.

A Summary statistics

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