Supplementary information for:

Reproducing complex simulations of economic impacts of climate change with lower-cost emulators

SI.1 Economic impact simulation

While the main focus of this article is emulation, it is worthwhile explaining how the original simulation, which the emulators try to mimic, was conducted. This section describes the procedure of the simulation of the economic impact of climate change, reproduced (with minor modifications) from Takakura et al. (2019), based on the authors' retained rights.

Overall framework

To obtain projections of the overall impacts of climate change, we adopted a bottom-up approach, namely, we conducted process-based impact simulations for each modeled sector, and aggregated the monetized impacts. We incorporated as many sectors as possible whose impacts could be monetized. This included the impact of changes in (1) agricultural productivity, (2) undernourishment, (3) heat-related excess mortality, (4) cooling/heating demand, (5) occupational-health cost, (6) hydroelectric power generation capacity, (7) thermal power generation capacity, (8) fluvial flooding, and (9) coastal inundation, due to climate change. The impacts were originally calculated for a 0.5°×0.5° grid for each year during the 21st century, and the calculated impacts were aggregated to 17 regions unless otherwise noted (in the main text, results are further aggregated into 7 regions). Then, these sectoral impacts (except for fluvial flooding, coastal inundation, and heat-related excess mortality) were supplied as input to the AIM/Hub model (formerly known as the AIM/CGE model). The AIM/Hub model was then used to calculate changes in the GDP associated with these impacts. For undernourishment, heat-related excess mortality, and fluvial flooding, the non-market values of lives lost represented by willingness to pay (WTP) to avoid these risks were also incorporated. For fluvial flooding and coastal inundation, the economic impacts were directly monetized without using the AIM/Hub model, but they include both direct and indirect impacts. Autonomous adaptation to climate change was also incorporated. Here, autonomous adaptation refers to, for example, reduction of vulnerability due to increases in the income level, changes in the industrial structure, and the economy's response to the shock through the market mechanisms represented by the AIM/Hub model. Although we covered most of the major sectors that will likely be affected by climate change, there are sectors which are not covered, such as conflict (Burke et al., 2009) and crime (Ranson, 2014), where we note that the causal relationship between these sectors and climate change is controversial. The consequences of catastrophes were also not considered.

Scenario sets

We used the Shared Socioeconomic Pathway - Representative Concentration Pathway (SSP-RCP) scenario matrix. The SSP represents the socioeconomic development pathway (O'Neill et al., 2013), and we used SSP1, SSP2, SSP3, SSP4, and SSP5. The RCP scenarios represent the climate-change mitigation pathway (van Vuuren et al., 2011), and we used RCP2.6, RCP4.5, RCP6.0, and RCP8.5. While not all combinations of SSPs and RCPs are equally plausible (Riahi et al., 2017), we considered all SSP×RCP combinations to enable the decomposition of the effects by factor. To incorporate uncertainty in climate change projections, climate data from five different general circulation models (GCMs) were used, namely, GFDL-ESM2M, HadGEM2-ES, IPSL-CM5A-LR, MIROC-ESM-CHEM, and NorESM1-M. When simulating the impacts of climate change in each sector, the bias-corrected output of the GCMs (Hempel et al., 2013;Iizumi et al., 2017b) was used. Therefore, we have 5×4×5 scenario runs for each study unless otherwise noted. We also ran simulations under no climate change conditions, in which climate conditions were fixed at present-day levels, for each SSP. The differences in the impacts between the results generated under climate change conditions and no climate change conditions were regarded as the impacts of climate change.

Agricultural productivity

Changes in crop yields associated with climate change are computed with the Crop Yield Growth Model with Assumptions on climate and socioeconomy (CYGMA) (Iizumi et al., 2017a;Iizumi et al.). This is a bio/physical global gridded crop model that can explicitly consider changes in agronomic technology and management driven by economic growth as well as changes in the biophysical response of a crop to environmental conditions. The yields of major crops (rice, wheat, soybean, and maize) were based on the estimates from CYGMA (doi:10.20783/DIAS.529). For other crops (e.g., sugar), we used the climate change impacts on yield estimated by the Lund-Potsdam-Jena managed Land Dynamic Global Vegetation and Water Balance Model (LPJmL) (Rosenzweig et al., 2014). The grid-cell simulated yields were aggregated into regions and input to the AIM/Hub model (Fujimori et al., 2018).

Undernourishment

Climate change will affect food prices and impoverished people's access to food. We quantified the impacts of climate change on undernourishment and related negative health impacts using two economic metrics (Hasegawa et al., 2016a). First, morbidity and mortality caused by being underweight as a child and the associated economic loss were computed with the AIM/Hub model with consideration of changes in the labor force, population, and demands for healthcare. The prevalence of undernourishment, mortality, and morbidity were estimated based on the calculated income distribution and food price. Second, changes in mortality were assessed economically in the form of the value of lives lost. For this purpose, the value of statistical life (VSL), a summary measurement of the WTP for mortality risk (OECD, 2012), was used. A VSL reference value (data from China) was applied to other regions and periods considering income elasticity according to the OECD's guidelines (OECD, 2012;Hasegawa et al., 2016a). Then, the sum of the VSL was derived by multiplying the VSL and the mortality rate in each region.

Heat-related excess mortality

The impact of climate change on heat-related excess mortality was estimated using the method developed by Honda et al. (2014), and the associated economic impact was evaluated by the values of lives lost represented by the VSL (OECD, 2012;Hasegawa et al., 2016a) as explained in the undernourishment section. The temperature-mortality relationship follows a V-shaped function. The difference in mortality between the optimal temperature (the temperature at which mortality is lowest) and temperatures outside of the optimal temperature is defined as excess mortality. In the projections, we considered the annual mean mortality for the population over 65 years old and changes in the daily maximum temperature. Temperature-mortality relationships were determined separately for each grid based on the baseline climate conditions. Additional acclimatization to future warming in the temperature-mortality relationship is not considered. Since only the mortality of people over 65 years old is considered, we did not calculate the impact on the real economy through changes in the labor force.

Cooling/Heating demand

The economic impact of changes in cooling/heating demand (Hasegawa et al., 2016b;Park et al., 2018) considers both the cost of cooling/heating energy use and the cost of heating/cooling device installation and management using the AIM/Hub model. Cooling degree days (CDD) and heating degree days (HDD) were calculated with the output of the GCMs, and used as the climatic driver of the cooling/heating demands. Energy demand for cooling/heating was calculated as a function of CDD/HDD, labor force or population, floor area, and cooling/heating device penetration rate (Isaac and van Vuuren, 2009). These values were directly taken from the SSP scenarios or estimated based on the available data. The adoption of different kinds of cooling/heating technologies and their costs were determined using the AIM/End-use database (Fujimori et al., 2014). We used different assumptions for the autonomous energy efficiency improvement and the threshold for CDD/HDD among SSPs according to their storylines (Park et al., 2018).

Occupational-health cost

The occupational-health cost (Takakura et al., 2017) was defined as the economic loss caused by reduction of the per-hour workable time (labor capacity) due to workers' exposure to heat stress. We estimated the wet-bulb globe temperature (WBGT) (Budd, 2008) for work sites from the output of the GCMs. Labor capacity was calculated from the estimated WBGT and the intensity (metabolic rate) of work based on occupational-health recommendations (NIOSH, 2016), and used as the labor productivity coefficient in the AIM/Hub model. We assumed that the recommendations for labor capacity limitations are strictly followed. Different assumptions for the work location (indoor or outdoor) and the metabolic rate of work were used for the different industrial sectors. For industrial sectors where work is assumed to be conducted indoors, the penetration rate of air conditioners was also considered. To estimate the future penetration rate of air conditioners, we utilized the same method used in the cooling/heating demand study by (Isaac and van Vuuren, 2009).

Hydroelectric power generation capacity

The hydroelectric power generation (HG) capacity will be affected by changes in precipitation, and will influence the economy through changes in the cost of electricity generation and the prices for consumers (Zhou et al., 2018b). The grid-based theoretical hydroelectric power potential (THP) was projected using the H08 global hydrological model (Hanasaki et al., 2008a, b). THP [J] was defined as THP=Q×g×h, where Q is the annual streamflow or mass of water [kg]; g is the gravitational acceleration [m/s^2], and h is the height difference between the cell in question and the adjacent downstream cell into which the river flows [m]. Regional variations in THP were assumed to lead to the regional HG potential variation, which is used as the upper bound on the hydropower generation capacity in the AIM/Hub model (Zhou et al., 2018b).

Thermal power generation capacity

Cooling water shortages lead to changes in the usable thermoelectric capacity. Climate change increases the probability of lower river flow, which then increases the probability of a reduction in usable capacity. We used the H08 global hydrology model (Hanasaki et al., 2008a, b) to calculate the magnitude of regional usable capacity changes attributable to cooling water shortages (Zhou et al., 2018c). We measured changes in the generation capacity using the cooling water sufficiency index, which is calculated as the ratio of the yearly total cooling water abstraction to yearly total cooling water demand. Regional variations in the cooling water shortage index were assumed to lead to the variation in the regional thermal power generation potential, which is used as the capital productivity of the thermal power generation sector in the AIM/Hub model (Zhou et al., 2018a).

Fluvial flooding

The consequences of fluvial flooding (economic loss and mortality) were calculated as the exposure multiplied by the vulnerability (Kinoshita et al., 2018). Mortality was monetized by multiplying the VSL by the mortality rate as explained in the undernourishment section. Flood exposures were calculated as the gridded GDP and population exposed to the projected annual maximum inundation extent. The vulnerability was calculated as a function of the income level and time estimated from historical data (Tanoue et al., 2016). The inundation extent was calculated using a global river and inundation model simulation (CaMa-Flood) (Yamazaki et al., 2011) at 0.25°×0.25° horizontal resolution, driven by daily runoff data obtained from a land surface model (MATSIRO) (Takata et al., 2003) simulation at 0.5°×0.5° resolution. The result was then downscaled to 5′×5′ using the method put forward by Ikeuchi et al. (2015). A gridded map of the population was created by distributing the country-level population from the SSP scenarios as a 5′×5′ population map (HYDE3.1) (Klein Goldewijk et al., 2011). A gridded GDP map was calculated from the population multiplied by the GDP per capita for the SSP scenarios, under the assumption that GDP per capita does not vary within a country.

Coastal inundation

Inundation damage in costal zones (Tsuchida et al., 2018) will be one of the most serious consequences of sea level rise. Inundated areas and temporal changes in inundation were estimated using topographic data (ETOPO1), astronomical high tides (i.e., mean higher height water levels) data, and sea surface height data from four GCMs (HadGEM2-ES was not included due to data availability), adjusted vertically at the geoid. The ETOPO1, which provides elevation data on land (meters above mean sea level) and water depth at 1 arc-minute resolution and is a global relief model of the Earth’s surface that integrates land topography and ocean bathymetry, was averaged onto a 2.5 arc-minute gridded resolution. A macro estimation method was used to evaluate the economic impact of inundation. Economic damage estimates were based on the econometric relationship between past hydrological disasters, the affected population, and GDP per capita (Yotsukuri et al., 2017;Tamura et al., 2019) using the Centre for Research on the Epidemiology of Disasters (CRED) Emergency Events Database (CRED) and the World Bank’s national statistics. This estimation only includes the effects of gradual sea level rise, and acute events such as storm surges were not considered. We could simulate the impact of sea level rise only for SSP1, SSP2, and SSP3 due to data availability. To obtain estimates for SSP4 and SSP5, the results were extrapolated by constructing and using simple emulators.

AIM/Hub model

The AIM/Hub model is a global-scale economic model based on general equilibrium theory (Fujimori et al., 2012). The AIM/Hub model has been widely applied to climate-change mitigation and impact studies. In the model, the world is divided into 17 regions (Supplementary Table 1), and each region has about 40 industrial sectors and a household sector. Production for each industrial sector is represented with multi-nested production functions, which receive labor, capital, land, energy, and materials as input. The preference of consumers (household sector) is expressed with a utility function. Industrial sectors maximize their profits and the household sector maximizes its utility under budget constraints. International trade, taxes, and capital formation/depreciation are also considered in the model. Calculations are conducted at yearly intervals recursively from the base year (2005) until the end of the 21st century. The model parameters are calibrated based on a social accounting matrix for the base year (2005), then updated every year according to the SSP storyline. We did not place constraints on GHG emissions when running the AIM/Hub model and thus the interaction between climate-change impacts and climate-change mitigation is not considered. However, the potential effects of the interaction between climate-change impacts and mitigation are miniscule compared to the aggregated total economic impact (Zhou et al., 2018b;Matsumoto, 2019). The interactions between impacts among sectors were also not considered. These interactions will be of interest particularly when considering multiple specific indicators, but are beyond the scope of this study. The full model description is available in the model manual (Fujimori et al., 2012), and how to incorporate SSP storylines into the model is described in (Fujimori et al., 2017). The ways to integrate the sectoral impacts and the AIM/Hub model are described in their respective articles (Fujimori et al., 2018;Hasegawa et al., 2016a;Hasegawa et al., 2016b;Takakura et al., 2017;Zhou et al., 2018b;Zhou et al., 2018a).

Table.S1: Classification of regions in the AIM/Hub model

Region name	Abbreviation
Brazil	BRA
Canada	CAN
China	CHN
Former Soviet Union	CIS
India	IND
Japan	JPN
Turkey	TUR
United States	USA
Sub-Saharan Africa	XAF
European Union	XE25
Rest of Europe	XER
Latin America excluding Brazil	XLM
Middle East	XME
North Africa	XNF
Australasia	XOC
Rest of Asia	XSA
South East Asia	XSE

Table S2: Classification of regions in SREX

Region name	Abbreviation
Alaska/N.W. Canada	ALA
Amazon	AMZ
Central America/Mexico	CAM
Central Asia	CAS
Central Europe	CEU
Canada/Greenland/Iceland	CGI
Central North America	CNA
East Africa	EAF
East Asia	EAS
East North America	ENA
South Europe/Mediterranean	MED
North Australia	NAS
North-East Australia	NAU
North-East Brazil	NEB
North Europe	NEU
Sothern Africa	SAF
Sahara	SAH
South Asia	SAS
South Australia/New Zealand	SAU
Southeast Asia	SEA
Southeastern South America	SSA
Tibetan Plateau	TIB
West Africa	WAF
West Asia	WAS
West North America	WNA
West Coast South America	WSA

Table S3: Correspondence of AIM 17 regions and SREX 26 regions

r	rs(r)
BRA	{AMZ, NEB, SSA}
CAN	{ALA, CGI, ENA, WNA}
CHN	{EAS, TIB}
CIS	{CAS, CEU, NAS, WAS}
IND	{SAS, TIB}
JPN	{EAS}
TUR	{MED, WAS}
USA	{ALA, CNA, ENA, WNA}
XAF	{EAF, SAF, SAH, WAF}
XE25	{CEU, MED, NEU}
XER	{CEU, CGI, MED, NEU}
XLM	{AMZ, CAM, CGI, SSA, WSA}
XME	{MED, SAH, WAS}
XNF	{MED, SAH}
XOC	{NAU, SAU}
XSA	{CAS, SAS, SEA}
XSE	{EAS, SAS, SEA, TIB}

Table S4: Summarized results for agricultural productivity. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.2559 (-0.2058, 0.5531)	0.0374 (0.0087, 0.1889)	0.9670 (0.8331, 1.0186)	-0.0001 (-0.0005, 0.0003)
GMT-1	OLS2	0.3786 (-0.1379, 0.6206)	0.0360 (0.0087, 0.1887)	0.9259 (0.7842, 1.0286)	-0.0001 (-0.0007, 0.0003)
CA(0)-CS(0)-SE(0)-1	OLS1	0.2274 (-0.0397, 0.5481)	0.0381 (0.0086, 0.1888)	0.9757 (0.8369, 1.0094)	-0.0001 (-0.0011, 0.0002)
CA(0)-CS(0)-SE(0)-1	OLS2	0.3341 (0.0407, 0.5830)	0.0373 (0.0088, 0.1911)	0.9505 (0.8145, 1.0164)	-0.0001 (-0.0021, 0.0002)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.3070 (-0.0153, 0.5331)	0.0382 (0.0089, 0.1950)	0.9589 (0.8525, 1.0346)	-0.0002 (-0.0032, 0.0003)
CA(0)-CS(0)-SA(0)-1	OLS2	0.4826 (0.2682, 0.7492)	0.0297 (0.0085, 0.1799)	0.8775 (0.6629, 0.9753)	0.0000 (-0.0017, 0.0003)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.6067 (0.2663, 0.8566)	0.0303 (0.0074, 0.1582)	0.7988 (0.5161, 0.9851)	-0.0001 (-0.0009, 0.0004)
CA(0)-CS(0)-SA(0)-1	MLP	0.5812 (0.2209, 0.9284)	0.0299 (0.0083, 0.1677)	0.8159 (0.3754, 0.9840)	0.0002 (-0.0072, 0.0060)
CA(0)-CS(0)-SA(1)-1	OLS2	0.5217 (0.2879, 0.7914)	0.0280 (0.0085, 0.1646)	0.8595 (0.6121, 0.9758)	0.0001 (-0.0017, 0.0003)
CA(0)-CS(0)-SA(1)-1	MLP	0.7762 (0.2508, 0.9355)	0.0257 (0.0072, 0.1098)	0.6572 (0.3551, 0.9834)	0.0003 (-0.0071, 0.0072)
CA(0)-CS(1)-SA(0)-1	OLS2	0.4682 (0.2695, 0.7385)	0.0303 (0.0085, 0.1863)	0.8867 (0.6756, 0.9779)	-0.0002 (-0.0023, 0.0005)
CA(0)-CS(1)-SA(0)-1	MLP	0.5650 (0.2647, 0.9310)	0.0291 (0.0084, 0.1719)	0.8427 (0.3707, 0.9667)	0.0005 (-0.0070, 0.0162)
CA(0)-CS(1)-SA(1)-1	OLS2	0.5110 (0.2846, 0.7827)	0.0285 (0.0086, 0.1719)	0.8682 (0.6238, 0.9812)	-0.0001 (-0.0016, 0.0005)
CA(0)-CS(1)-SA(1)-1	MLP	0.7753 (0.3222, 0.9520)	0.0227 (0.0070, 0.1095)	0.6377 (0.3063, 0.9557)	0.0008 (-0.0036, 0.0068)
CA(1)-CS(0)-SA(0)-1	OLS2	0.4559 (0.1674, 0.7231)	0.0310 (0.0086, 0.1913)	0.8992 (0.6928, 1.0280)	-0.0005 (-0.0040, 0.0006)
CA(1)-CS(0)-SA(0)-1	MLP	0.4907 (0.2803, 0.9471)	0.0313 (0.0081, 0.1779)	0.8868 (0.3290, 0.9852)	-0.0012 (-0.0083, 0.0154)
CA(1)-CS(0)-SA(1)-1	OLS2	0.5298 (0.2806, 0.7788)	0.0290 (0.0086, 0.1782)	0.8593 (0.6302, 0.9892)	-0.0003 (-0.0031, 0.0006)
CA(1)-CS(0)-SA(1)-1	MLP	0.8228 (0.5127, 0.9539)	0.0175 (0.0070, 0.1144)	0.5716 (0.3131, 0.8819)	-0.0001 (-0.0064, 0.0015)
CA(1)-CS(1)-SA(0)-1	OLS2	0.4460 (0.1440, 0.7166)	0.0314 (0.0086, 0.1930)	0.9159 (0.7010, 1.0480)	-0.0002 (-0.0051, 0.0006)
CA(1)-CS(1)-SA(0)-1	MLP	0.4285 (0.1642, 0.9053)	0.0318 (0.0089, 0.1959)	0.9120 (0.4747, 1.0214)	-0.0005 (-0.0132, 0.0047)
CA(1)-CS(1)-SA(1)-1	OLS2	0.5080 (0.3029, 0.7791)	0.0291 (0.0086, 0.1803)	0.8783 (0.6314, 0.9895)	-0.0001 (-0.0034, 0.0006)
CA(1)-CS(1)-SA(1)-1	MLP	0.7590 (0.5986, 0.9443)	0.0247 (0.0068, 0.1176)	0.6561 (0.3436, 0.8118)	-0.0006 (-0.0078, 0.0060)
CA(1)-CS(1)-SA(1)-10	LSTM	0.8163 (0.6743, 0.9637)	0.0201 (0.0063, 0.1263)	0.5888 (0.2710, 0.7412)	0.0002 (-0.0059, 0.0036)
CA(1)-CS(1)-SA(1)-95	LSTM	0.7919 (0.6021, 0.9633)	0.0235 (0.0057, 0.1110)	0.6267 (0.2700, 0.8298)	0.0000 (-0.0079, 0.0044)

Table S5: Summarized results for undernourishment. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.2526 (-0.1349, 0.5769)	0.1552 (0.0163, 0.6990)	0.9703 (0.8173, 1.0162)	0.0000 (-0.0020, 0.0011)
GMT-1	OLS2	0.3152 (0.0875, 0.5808)	0.1543 (0.0153, 0.6803)	0.9507 (0.8145, 1.0035)	0.0000 (-0.0022, 0.0012)
CA(0)-CS(0)-SE(0)-1	OLS1	0.2201 (-0.0815, 0.6219)	0.1510 (0.0166, 0.7058)	0.9790 (0.7835, 1.0261)	0.0003 (-0.0003, 0.0042)
CA(0)-CS(0)-SE(0)-1	OLS2	0.2832 (0.0133, 0.6250)	0.1500 (0.0157, 0.6901)	0.9677 (0.7818, 1.0204)	0.0002 (-0.0013, 0.0050)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.2779 (-0.0018, 0.6352)	0.1503 (0.0155, 0.7009)	0.9633 (0.7740, 1.0258)	0.0001 (-0.0029, 0.0035)
CA(0)-CS(0)-SA(0)-1	OLS2	0.5451 (0.2405, 0.7720)	0.1430 (0.0140, 0.6454)	0.8389 (0.6358, 0.9754)	0.0011 (-0.0013, 0.0058)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.5844 (0.2261, 0.8145)	0.1390 (0.0138, 0.6562)	0.8120 (0.5802, 0.9969)	0.0008 (-0.0031, 0.0042)
CA(0)-CS(0)-SA(0)-1	MLP	0.3937 (-0.0228, 0.7684)	0.1434 (0.0162, 0.6341)	0.9219 (0.6431, 1.0184)	0.0020 (-0.0075, 0.0211)
CA(0)-CS(0)-SA(1)-1	OLS2	0.7795 (0.2317, 0.9972)	0.0702 (0.0104, 0.3766)	0.6271 (0.0748, 0.9826)	0.0000 (-0.0015, 0.0047)
CA(0)-CS(0)-SA(1)-1	MLP	0.7694 (0.1962, 0.9900)	0.0712 (0.0109, 0.3255)	0.6401 (0.1420, 1.0026)	-0.0004 (-0.0106, 0.0149)
CA(0)-CS(1)-SA(0)-1	OLS2	0.5542 (0.3538, 0.7775)	0.1400 (0.0140, 0.6481)	0.8325 (0.6291, 0.9423)	0.0009 (-0.0024, 0.0064)
CA(0)-CS(1)-SA(0)-1	MLP	0.4090 (0.1739, 0.8059)	0.1481 (0.0153, 0.6329)	0.9159 (0.5950, 1.0052)	-0.0007 (-0.0118, 0.0499)
CA(0)-CS(1)-SA(1)-1	OLS2	0.7782 (0.3408, 0.9972)	0.0675 (0.0105, 0.3743)	0.6288 (0.0748, 0.9488)	0.0000 (-0.0014, 0.0043)
CA(0)-CS(1)-SA(1)-1	MLP	0.8018 (0.3921, 0.9895)	0.0730 (0.0106, 0.3170)	0.6076 (0.1443, 0.9414)	-0.0003 (-0.0084, 0.0224)
CA(1)-CS(0)-SA(0)-1	OLS2	0.6152 (0.3360, 0.7808)	0.1228 (0.0138, 0.6551)	0.7909 (0.6259, 0.9524)	0.0006 (-0.0023, 0.0075)
CA(1)-CS(0)-SA(0)-1	MLP	0.5767 (0.1426, 0.8280)	0.1355 (0.0134, 0.6463)	0.8196 (0.5649, 1.0228)	-0.0004 (-0.0312, 0.0406)
CA(1)-CS(0)-SA(1)-1	OLS2	0.8149 (0.5075, 0.9972)	0.0658 (0.0101, 0.3798)	0.5810 (0.0741, 0.8693)	0.0000 (-0.0017, 0.0029)
CA(1)-CS(0)-SA(1)-1	MLP	0.8462 (0.7162, 0.9889)	0.0697 (0.0095, 0.3117)	0.5347 (0.1485, 0.7012)	0.0007 (-0.0152, 0.0256)
CA(1)-CS(1)-SA(0)-1	OLS2	0.6264 (0.3313, 0.8067)	0.1145 (0.0121, 0.6620)	0.7849 (0.5924, 0.9626)	0.0005 (-0.0021, 0.0124)
CA(1)-CS(1)-SA(0)-1	MLP	0.5955 (0.0096, 0.8732)	0.1200 (0.0101, 0.6618)	0.8087 (0.4875, 1.0416)	0.0004 (-0.0186, 0.0546)
CA(1)-CS(1)-SA(1)-1	OLS2	0.8606 (0.5547, 0.9973)	0.0641 (0.0096, 0.3792)	0.5097 (0.0736, 0.8542)	0.0001 (-0.0018, 0.0034)
CA(1)-CS(1)-SA(1)-1	MLP	0.9423 (0.8252, 0.9857)	0.0574 (0.0050, 0.2641)	0.3354 (0.1723, 0.5683)	0.0001 (-0.0238, 0.0161)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9650 (0.7593, 0.9856)	0.0467 (0.0042, 0.2887)	0.2625 (0.2013, 0.6605)	0.0000 (-0.0270, 0.0225)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9731 (0.8937, 0.9883)	0.0298 (0.0030, 0.2749)	0.2341 (0.1629, 0.4542)	-0.0002 (-0.0433, 0.0195)

Table S6: Summarized results for heat-related excess mortality. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	R	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.8197 (0.6852, 0.9109)	0.4671 (0.1771, 0.8257)	0.5729 (0.4126, 0.7283)	-0.0007 (-0.0026, 0.0020)
GMT-1	OLS2	0.8529 (0.7046, 0.9417)	0.4039 (0.1725, 0.7301)	0.5221 (0.3363, 0.7096)	-0.0009 (-0.0029, 0.0031)
CA(0)-CS(0)-SE(0)-1	OLS1	0.8267 (0.7467, 0.9140)	0.4241 (0.1502, 0.8188)	0.5629 (0.4058, 0.6652)	-0.0010 (-0.0042, 0.0030)
CA(0)-CS(0)-SE(0)-1	OLS2	0.8702 (0.7680, 0.9507)	0.3688 (0.1431, 0.6872)	0.4927 (0.3102, 0.6404)	0.0004 (-0.0046, 0.0030)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.8704 (0.7635, 0.9503)	0.3734 (0.1441, 0.6868)	0.4925 (0.3114, 0.6460)	0.0000 (-0.0056, 0.0037)
CA(0)-CS(0)-SA(0)-1	OLS2	0.9088 (0.8021, 0.9680)	0.2992 (0.1154, 0.6707)	0.4173 (0.2512, 0.5972)	-0.0021 (-0.0053, 0.0034)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.9248 (0.8215, 0.9728)	0.2803 (0.1017, 0.6639)	0.3803 (0.2316, 0.5703)	-0.0022 (-0.0064, 0.0026)
CA(0)-CS(0)-SA(0)-1	MLP	0.9194 (0.8016, 0.9744)	0.2938 (0.1032, 0.6951)	0.3944 (0.2263, 0.5991)	0.0026 (-0.0667, 0.0357)
CA(0)-CS(0)-SA(1)-1	OLS2	0.9149 (0.8106, 0.9757)	0.2763 (0.1133, 0.5800)	0.4036 (0.2190, 0.5855)	-0.0015 (-0.0053, 0.0072)
CA(0)-CS(0)-SA(1)-1	MLP	0.9342 (0.8226, 0.9887)	0.2546 (0.0984, 0.5682)	0.3579 (0.1507, 0.5690)	-0.0015 (-0.0416, 0.0412)
CA(0)-CS(1)-SA(0)-1	OLS2	0.9198 (0.8221, 0.9718)	0.2951 (0.1050, 0.5922)	0.3924 (0.2358, 0.5693)	-0.0033 (-0.0077, 0.0004)
CA(0)-CS(1)-SA(0)-1	MLP	0.9308 (0.8214, 0.9680)	0.2755 (0.0889, 0.5758)	0.3658 (0.2509, 0.5704)	0.0020 (-0.0385, 0.0645)
CA(0)-CS(1)-SA(1)-1	OLS2	0.9394 (0.8328, 0.9779)	0.2643 (0.1029, 0.4884)	0.3427 (0.2090, 0.5535)	-0.0023 (-0.0071, 0.0016)
CA(0)-CS(1)-SA(1)-1	MLP	0.9562 (0.8450, 0.9907)	0.2143 (0.0845, 0.4438)	0.2934 (0.1405, 0.5353)	-0.0038 (-0.0345, 0.0399)
CA(1)-CS(0)-SA(0)-1	OLS2	0.9133 (0.8354, 0.9704)	0.2994 (0.1149, 0.5960)	0.4074 (0.2413, 0.5498)	-0.0026 (-0.0086, 0.0012)
CA(1)-CS(0)-SA(0)-1	MLP	0.9217 (0.8368, 0.9651)	0.2826 (0.0971, 0.6048)	0.3891 (0.2651, 0.5619)	0.0071 (-0.1117, 0.0767)
CA(1)-CS(0)-SA(1)-1	OLS2	0.9312 (0.8480, 0.9772)	0.2782 (0.1135, 0.5066)	0.3646 (0.2124, 0.5300)	-0.0022 (-0.0080, 0.0007)
CA(1)-CS(0)-SA(1)-1	MLP	0.9520 (0.8582, 0.9895)	0.2303 (0.0940, 0.4455)	0.3075 (0.1524, 0.5143)	-0.0060 (-0.0947, 0.0653)
CA(1)-CS(1)-SA(0)-1	OLS2	0.9283 (0.8650, 0.9763)	0.2895 (0.1049, 0.5591)	0.3729 (0.2165, 0.5021)	-0.0031 (-0.0085, 0.0012)
CA(1)-CS(1)-SA(0)-1	MLP	0.9315 (0.8756, 0.9646)	0.2649 (0.0946, 0.6047)	0.3637 (0.2698, 0.4874)	-0.0083 (-0.0582, 0.0613)
CA(1)-CS(1)-SA(1)-1	OLS2	0.9445 (0.8771, 0.9832)	0.2537 (0.1033, 0.4376)	0.3286 (0.1825, 0.4804)	-0.0029 (-0.0083, 0.0000)
CA(1)-CS(1)-SA(1)-1	MLP	0.9769 (0.9461, 0.9918)	0.1722 (0.0635, 0.3418)	0.2142 (0.1278, 0.3254)	-0.0066 (-0.0395, 0.0166)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9849 (0.9627, 0.9950)	0.1430 (0.0290, 0.3102)	0.1781 (0.1016, 0.2821)	-0.0092 (-0.0548, 0.0451)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9923 (0.9806, 0.9985)	0.1009 (0.0243, 0.2205)	0.1242 (0.0587, 0.2058)	-0.0032 (-0.0417, 0.0165)

Table S7: Summarized results for cooling/heating demand. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.6353 (-0.2817, 0.8521)	0.1768 (0.0187, 0.6883)	0.7722 (0.5234, 1.0357)	-0.0001 (-0.0011, 0.0011)
GMT-1	OLS2	0.6353 (-0.0423, 0.8759)	0.1780 (0.0183, 0.6914)	0.7723 (0.4825, 1.0294)	-0.0001 (-0.0019, 0.0019)
CA(0)-CS(0)-SE(0)-1	OLS1	0.6213 (-0.3115, 0.8496)	0.1807 (0.0188, 0.6982)	0.7837 (0.5273, 1.0531)	0.0001 (-0.0068, 0.0025)
CA(0)-CS(0)-SE(0)-1	OLS2	0.6090 (-0.1373, 0.8597)	0.1849 (0.0185, 0.7324)	0.7947 (0.5107, 1.0668)	0.0000 (-0.0110, 0.0049)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.6047 (-0.1898, 0.8578)	0.1843 (0.0184, 0.7460)	0.7986 (0.5141, 1.0950)	-0.0001 (-0.0146, 0.0068)
CA(0)-CS(0)-SA(0)-1	OLS2	0.8542 (0.6612, 0.9174)	0.1278 (0.0152, 0.5737)	0.5201 (0.3979, 0.7506)	-0.0001 (-0.0084, 0.0029)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.8865 (0.6639, 0.9574)	0.1052 (0.0154, 0.3844)	0.4629 (0.2889, 0.7504)	0.0000 (-0.0007, 0.0023)
CA(0)-CS(0)-SA(0)-1	MLP	0.8852 (0.6454, 0.9653)	0.1006 (0.0156, 0.2804)	0.4676 (0.2649, 0.7659)	0.0025 (-0.0122, 0.0261)
CA(0)-CS(0)-SA(1)-1	OLS2	0.9015 (0.7372, 0.9482)	0.1154 (0.0133, 0.4503)	0.4330 (0.3179, 0.6766)	-0.0004 (-0.0041, 0.0039)
CA(0)-CS(0)-SA(1)-1	MLP	0.9427 (0.7347, 0.9834)	0.0734 (0.0140, 0.1944)	0.3343 (0.1817, 0.6830)	0.0006 (-0.0106, 0.0298)
CA(0)-CS(1)-SA(0)-1	OLS2	0.8678 (0.6920, 0.9387)	0.1291 (0.0138, 0.5818)	0.4969 (0.3448, 0.7223)	-0.0001 (-0.0111, 0.0040)
CA(0)-CS(1)-SA(0)-1	MLP	0.9222 (0.6546, 0.9632)	0.0992 (0.0142, 0.2918)	0.3880 (0.2716, 0.7572)	-0.0011 (-0.0457, 0.0168)
CA(0)-CS(1)-SA(1)-1	OLS2	0.9005 (0.7654, 0.9551)	0.1048 (0.0114, 0.4600)	0.4351 (0.2963, 0.6442)	-0.0005 (-0.0061, 0.0048)
CA(0)-CS(1)-SA(1)-1	MLP	0.9635 (0.8297, 0.9856)	0.0598 (0.0112, 0.1735)	0.2683 (0.1696, 0.5591)	-0.0016 (-0.0142, 0.0150)
CA(1)-CS(0)-SA(0)-1	OLS2	0.8733 (0.7009, 0.9473)	0.1261 (0.0127, 0.5879)	0.4874 (0.3203, 0.7148)	-0.0007 (-0.0164, 0.0050)
CA(1)-CS(0)-SA(0)-1	MLP	0.9078 (0.6511, 0.9767)	0.1122 (0.0130, 0.2844)	0.4197 (0.2147, 0.7612)	0.0022 (-0.0305, 0.0152)
CA(1)-CS(0)-SA(1)-1	OLS2	0.8994 (0.7750, 0.9595)	0.1010 (0.0101, 0.4657)	0.4377 (0.2818, 0.6333)	-0.0005 (-0.0097, 0.0057)
CA(1)-CS(0)-SA(1)-1	MLP	0.9705 (0.8793, 0.9898)	0.0556 (0.0099, 0.1483)	0.2418 (0.1445, 0.4819)	-0.0017 (-0.0194, 0.0118)
CA(1)-CS(1)-SA(0)-1	OLS2	0.8798 (0.7144, 0.9548)	0.1256 (0.0119, 0.5819)	0.4761 (0.2973, 0.7034)	-0.0008 (-0.0172, 0.0057)
CA(1)-CS(1)-SA(0)-1	MLP	0.9056 (0.6573, 0.9815)	0.1215 (0.0107, 0.2991)	0.4242 (0.2248, 0.7561)	-0.0008 (-0.0232, 0.0232)
CA(1)-CS(1)-SA(1)-1	OLS2	0.9036 (0.7818, 0.9666)	0.0992 (0.0091, 0.4718)	0.4286 (0.2564, 0.6265)	-0.0005 (-0.0092, 0.0061)
CA(1)-CS(1)-SA(1)-1	MLP	0.9705 (0.8724, 0.9868)	0.0664 (0.0057, 0.1967)	0.2515 (0.1636, 0.4937)	0.0008 (-0.0317, 0.0243)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9841 (0.8884, 0.9910)	0.0488 (0.0035, 0.1788)	0.1813 (0.1360, 0.4605)	-0.0002 (-0.0237, 0.0153)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9846 (0.9288, 0.9958)	0.0388 (0.0041, 0.2077)	0.1759 (0.0950, 0.3710)	-0.0017 (-0.0110, 0.0170)

Table S8: Summarized results for occupational-health cost. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.8089 (0.5211, 0.9293)	0.1340 (0.0344, 1.3456)	0.5880 (0.3693, 0.8537)	-0.0001 (-0.0027, 0.0011)
GMT-1	OLS2	0.8355 (0.5323, 0.9466)	0.1341 (0.0341, 1.3787)	0.5494 (0.3223, 0.8468)	-0.0001 (-0.0059, 0.0016)
CA(0)-CS(0)-SE(0)-1	OLS1	0.8099 (0.5222, 0.9419)	0.1271 (0.0349, 1.3628)	0.5866 (0.3358, 0.8535)	-0.0002 (-0.0078, 0.0028)
CA(0)-CS(0)-SE(0)-1	OLS2	0.8589 (0.5030, 0.9660)	0.1252 (0.0326, 1.4355)	0.5123 (0.2586, 0.8666)	-0.0004 (-0.0242, 0.0058)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.8678 (0.4720, 0.9659)	0.1237 (0.0302, 1.4634)	0.4969 (0.2588, 0.8883)	-0.0005 (-0.0311, 0.0077)
CA(0)-CS(0)-SA(0)-1	OLS2	0.8762 (0.6600, 0.9759)	0.1200 (0.0246, 1.2862)	0.4819 (0.2183, 0.7538)	-0.0003 (-0.0222, 0.0049)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.9309 (0.8289, 0.9767)	0.0989 (0.0224, 0.8261)	0.3652 (0.2146, 0.5594)	-0.0002 (-0.0092, 0.0058)
CA(0)-CS(0)-SA(0)-1	MLP	0.9262 (0.8080, 0.9774)	0.0929 (0.0273, 0.8158)	0.3779 (0.2115, 0.5989)	-0.0021 (-0.0324, 0.0174)
CA(0)-CS(0)-SA(1)-1	OLS2	0.8958 (0.6528, 0.9752)	0.1216 (0.0220, 1.2986)	0.4446 (0.2214, 0.7610)	-0.0001 (-0.0235, 0.0055)
CA(0)-CS(0)-SA(1)-1	MLP	0.9281 (0.8259, 0.9757)	0.0941 (0.0217, 0.8402)	0.3727 (0.2193, 0.5660)	0.0030 (-0.0241, 0.0969)
CA(0)-CS(1)-SA(0)-1	OLS2	0.9122 (0.6351, 0.9746)	0.1040 (0.0239, 1.3280)	0.4098 (0.2239, 0.7783)	-0.0009 (-0.0301, 0.0053)
CA(0)-CS(1)-SA(0)-1	MLP	0.9395 (0.8416, 0.9747)	0.0905 (0.0248, 0.7619)	0.3434 (0.2243, 0.5440)	0.0004 (-0.0528, 0.0388)
CA(0)-CS(1)-SA(1)-1	OLS2	0.9100 (0.6251, 0.9737)	0.1049 (0.0210, 1.3456)	0.4149 (0.2278, 0.7886)	-0.0006 (-0.0320, 0.0052)
CA(0)-CS(1)-SA(1)-1	MLP	0.9444 (0.8510, 0.9768)	0.0885 (0.0204, 0.7313)	0.3293 (0.2158, 0.5252)	-0.0011 (-0.0174, 0.0378)
CA(1)-CS(0)-SA(0)-1	OLS2	0.9287 (0.6022, 0.9801)	0.0997 (0.0236, 1.3807)	0.3709 (0.1988, 0.8091)	-0.0015 (-0.0447, 0.0071)
CA(1)-CS(0)-SA(0)-1	MLP	0.9545 (0.7928, 0.9804)	0.0785 (0.0245, 0.7380)	0.3030 (0.2012, 0.6110)	-0.0022 (-0.0652, 0.0238)
CA(1)-CS(0)-SA(1)-1	OLS2	0.9266 (0.5925, 0.9796)	0.1001 (0.0212, 1.3982)	0.3763 (0.2013, 0.8194)	-0.0011 (-0.0455, 0.0059)
CA(1)-CS(0)-SA(1)-1	MLP	0.9622 (0.8926, 0.9821)	0.0748 (0.0226, 0.6413)	0.2745 (0.1886, 0.4574)	-0.0051 (-0.0274, 0.0143)
CA(1)-CS(1)-SA(0)-1	OLS2	0.9465 (0.5928, 0.9894)	0.0789 (0.0193, 1.4017)	0.3230 (0.1455, 0.8215)	-0.0011 (-0.0479, 0.0070)
CA(1)-CS(1)-SA(0)-1	MLP	0.9684 (0.8171, 0.9887)	0.0743 (0.0225, 0.7405)	0.2581 (0.1501, 0.5771)	-0.0028 (-0.1416, 0.0500)
CA(1)-CS(1)-SA(1)-1	OLS2	0.9500 (0.5848, 0.9896)	0.0783 (0.0195, 1.4164)	0.3129 (0.1441, 0.8301)	-0.0008 (-0.0497, 0.0056)
CA(1)-CS(1)-SA(1)-1	MLP	0.9853 (0.9045, 0.9925)	0.0463 (0.0191, 0.5402)	0.1768 (0.1241, 0.4294)	0.0017 (-0.0400, 0.0202)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9898 (0.9183, 0.9995)	0.0340 (0.0064, 0.5717)	0.1479 (0.0348, 0.3972)	-0.0022 (-0.0764, 0.0171)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9935 (0.8849, 0.9996)	0.0326 (0.0054, 0.8262)	0.1205 (0.0290, 0.4842)	0.0003 (-0.0117, 0.0601)

Table S9: Summarized results for hydropower generation. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.2292 (-0.2111, 0.6280)	0.0045 (0.0004, 0.0247)	0.9749 (0.7793, 1.0285)	0.0000 (-0.0001, 0.0001)
GMT-1	OLS2	0.2470 (-0.1775, 0.6320)	0.0045 (0.0004, 0.0239)	0.9731 (0.7749, 1.0359)	0.0000 (-0.0001, 0.0001)
CA(0)-CS(0)-SE(0)-1	OLS1	0.2538 (0.0175, 0.6322)	0.0045 (0.0004, 0.0239)	0.9732 (0.7750, 1.0187)	0.0000 (-0.0001, 0.0001)
CA(0)-CS(0)-SE(0)-1	OLS2	0.3097 (0.2043, 0.6467)	0.0045 (0.0004, 0.0240)	0.9544 (0.7633, 0.9859)	0.0000 (-0.0001, 0.0002)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.3429 (0.1819, 0.6552)	0.0045 (0.0004, 0.0241)	0.9415 (0.7561, 0.9951)	0.0000 (-0.0001, 0.0002)
CA(0)-CS(0)-SA(0)-1	OLS2	0.3894 (0.2120, 0.8009)	0.0045 (0.0004, 0.0185)	0.9237 (0.5992, 1.0173)	0.0000 (-0.0002, 0.0002)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.4425 (0.1641, 0.8304)	0.0047 (0.0004, 0.0172)	0.9064 (0.5572, 1.0399)	0.0000 (-0.0002, 0.0002)
CA(0)-CS(0)-SA(0)-1	MLP	0.1906 (-0.1016, 0.8287)	0.0048 (0.0004, 0.0195)	1.0213 (0.5599, 1.3536)	-0.0002 (-0.0018, 0.0004)
CA(0)-CS(0)-SA(1)-1	OLS2	0.5494 (0.2129, 0.8623)	0.0044 (0.0003, 0.0173)	0.8396 (0.5068, 1.0340)	0.0000 (-0.0001, 0.0002)
CA(0)-CS(0)-SA(1)-1	MLP	0.2697 (-0.0623, 0.8182)	0.0048 (0.0004, 0.0184)	1.0532 (0.5777, 1.9231)	0.0001 (-0.0016, 0.0009)
CA(0)-CS(1)-SA(0)-1	OLS2	0.4745 (0.1904, 0.8293)	0.0046 (0.0004, 0.0172)	0.8814 (0.5591, 1.0084)	0.0000 (-0.0002, 0.0003)
CA(0)-CS(1)-SA(0)-1	MLP	0.2221 (0.0785, 0.8509)	0.0046 (0.0004, 0.0186)	1.0351 (0.5452, 1.3913)	0.0000 (-0.0045, 0.0010)
CA(0)-CS(1)-SA(1)-1	OLS2	0.5532 (0.3361, 0.8901)	0.0044 (0.0003, 0.0160)	0.8395 (0.4559, 0.9768)	0.0000 (-0.0002, 0.0003)
CA(0)-CS(1)-SA(1)-1	MLP	0.3281 (0.1290, 0.9030)	0.0044 (0.0005, 0.0176)	0.9720 (0.4299, 1.5019)	0.0001 (-0.0021, 0.0017)
CA(1)-CS(0)-SA(0)-1	OLS2	0.5238 (0.1714, 0.8563)	0.0046 (0.0004, 0.0163)	0.8549 (0.5174, 1.0204)	0.0000 (-0.0001, 0.0004)
CA(1)-CS(0)-SA(0)-1	MLP	0.2575 (0.1670, 0.8587)	0.0044 (0.0004, 0.0187)	0.9934 (0.5137, 1.2939)	0.0002 (-0.0009, 0.0027)
CA(1)-CS(0)-SA(1)-1	OLS2	0.6287 (0.3308, 0.9099)	0.0044 (0.0003, 0.0156)	0.7879 (0.4151, 0.9711)	0.0000 (-0.0001, 0.0004)
CA(1)-CS(0)-SA(1)-1	MLP	0.3498 (0.0638, 0.9206)	0.0046 (0.0005, 0.0169)	0.9646 (0.4139, 1.9051)	0.0003 (-0.0013, 0.0039)
CA(1)-CS(1)-SA(0)-1	OLS2	0.5467 (0.1483, 0.8689)	0.0047 (0.0004, 0.0165)	0.8438 (0.4971, 1.0364)	0.0000 (-0.0001, 0.0004)
CA(1)-CS(1)-SA(0)-1	MLP	0.3830 (-0.0152, 0.8469)	0.0044 (0.0005, 0.0186)	0.9483 (0.5409, 1.9590)	-0.0001 (-0.0033, 0.0012)
CA(1)-CS(1)-SA(1)-1	OLS2	0.6409 (0.3221, 0.9232)	0.0044 (0.0003, 0.0157)	0.7821 (0.3848, 0.9796)	0.0000 (-0.0001, 0.0003)
CA(1)-CS(1)-SA(1)-1	MLP	0.4778 (0.1111, 0.9320)	0.0034 (0.0004, 0.0143)	0.8893 (0.3662, 1.8185)	0.0001 (-0.0014, 0.0020)
CA(1)-CS(1)-SA(1)-10	LSTM	0.7336 (0.1648, 0.9602)	0.0023 (0.0004, 0.0128)	0.6806 (0.2842, 1.0505)	-0.0001 (-0.0011, 0.0004)
CA(1)-CS(1)-SA(1)-95	LSTM	0.7830 (0.1732, 0.9709)	0.0022 (0.0003, 0.0113)	0.6876 (0.2398, 1.0079)	0.0000 (-0.0007, 0.0010)

Table S10: Summarized results for thermal power generation. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.2102 (-0.1018, 0.6893)	0.0407 (0.0030, 0.1338)	0.9798 (0.7245, 1.0108)	0.0000 (-0.0002, 0.0004)
GMT-1	OLS2	0.2181 (-0.0243, 0.6946)	0.0408 (0.0029, 0.1339)	0.9781 (0.7193, 1.0059)	0.0000 (-0.0002, 0.0004)
CA(0)-CS(0)-SE(0)-1	OLS1	0.3555 (0.1008, 0.6970)	0.0390 (0.0030, 0.1311)	0.9351 (0.7172, 1.0009)	0.0000 (-0.0002, 0.0007)
CA(0)-CS(0)-SE(0)-1	OLS2	0.3747 (0.1546, 0.7051)	0.0396 (0.0029, 0.1293)	0.9281 (0.7094, 0.9944)	0.0000 (-0.0002, 0.0007)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.3893 (0.1726, 0.7154)	0.0396 (0.0029, 0.1294)	0.9227 (0.6993, 0.9933)	0.0000 (-0.0003, 0.0009)
CA(0)-CS(0)-SA(0)-1	OLS2	0.5266 (0.2962, 0.7979)	0.0350 (0.0027, 0.1289)	0.8509 (0.6031, 0.9606)	0.0000 (-0.0002, 0.0014)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.5367 (0.3176, 0.8138)	0.0342 (0.0027, 0.1304)	0.8447 (0.5825, 0.9580)	0.0000 (-0.0004, 0.0009)
CA(0)-CS(0)-SA(0)-1	MLP	0.4352 (0.1759, 0.7688)	0.0389 (0.0031, 0.1297)	0.9061 (0.6398, 1.0074)	0.0002 (-0.0068, 0.0033)
CA(0)-CS(0)-SA(1)-1	OLS2	0.6212 (0.3367, 0.8403)	0.0334 (0.0022, 0.1235)	0.7850 (0.5432, 0.9584)	0.0001 (-0.0002, 0.0016)
CA(0)-CS(0)-SA(1)-1	MLP	0.5457 (0.2580, 0.8169)	0.0359 (0.0031, 0.1245)	0.8406 (0.5782, 1.0253)	0.0003 (-0.0126, 0.0062)
CA(0)-CS(1)-SA(0)-1	OLS2	0.5632 (0.3406, 0.8155)	0.0340 (0.0027, 0.1245)	0.8270 (0.5792, 0.9486)	0.0000 (-0.0004, 0.0012)
CA(0)-CS(1)-SA(0)-1	MLP	0.5123 (0.2801, 0.8087)	0.0364 (0.0030, 0.1251)	0.8593 (0.5894, 0.9707)	-0.0003 (-0.0019, 0.0043)
CA(0)-CS(1)-SA(1)-1	OLS2	0.6679 (0.3820, 0.8571)	0.0322 (0.0022, 0.1184)	0.7454 (0.5162, 0.9443)	0.0001 (-0.0004, 0.0014)
CA(0)-CS(1)-SA(1)-1	MLP	0.6054 (0.2903, 0.8545)	0.0337 (0.0030, 0.1206)	0.8003 (0.5196, 0.9786)	0.0010 (-0.0048, 0.0068)
CA(1)-CS(0)-SA(0)-1	OLS2	0.5963 (0.3601, 0.8305)	0.0342 (0.0027, 0.1206)	0.8043 (0.5575, 0.9466)	0.0000 (-0.0014, 0.0012)
CA(1)-CS(0)-SA(0)-1	MLP	0.5117 (0.2567, 0.7857)	0.0368 (0.0031, 0.1252)	0.8618 (0.6220, 1.0150)	-0.0013 (-0.0113, 0.0063)
CA(1)-CS(0)-SA(1)-1	OLS2	0.6873 (0.4037, 0.8750)	0.0322 (0.0022, 0.1135)	0.7281 (0.4850, 0.9414)	0.0000 (-0.0007, 0.0009)
CA(1)-CS(0)-SA(1)-1	MLP	0.6350 (0.3783, 0.8641)	0.0332 (0.0029, 0.1185)	0.7744 (0.5128, 0.9450)	-0.0002 (-0.0147, 0.0097)
CA(1)-CS(1)-SA(0)-1	OLS2	0.6441 (0.4457, 0.8509)	0.0332 (0.0027, 0.1137)	0.7704 (0.5265, 0.9144)	0.0000 (-0.0011, 0.0014)
CA(1)-CS(1)-SA(0)-1	MLP	0.6971 (0.2681, 0.8917)	0.0307 (0.0032, 0.1101)	0.7373 (0.4607, 1.0316)	-0.0009 (-0.0090, 0.0099)
CA(1)-CS(1)-SA(1)-1	OLS2	0.7426 (0.4783, 0.8987)	0.0309 (0.0022, 0.1047)	0.6731 (0.4398, 0.9100)	0.0000 (-0.0010, 0.0011)
CA(1)-CS(1)-SA(1)-1	MLP	0.7776 (0.3634, 0.9447)	0.0255 (0.0030, 0.0930)	0.6349 (0.3407, 0.9933)	0.0012 (-0.0122, 0.0132)
CA(1)-CS(1)-SA(1)-10	LSTM	0.8626 (0.4859, 0.9560)	0.0223 (0.0027, 0.0688)	0.5093 (0.3082, 0.9478)	-0.0001 (-0.0104, 0.0065)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9020 (0.6090, 0.9740)	0.0196 (0.0025, 0.0676)	0.4354 (0.2269, 0.8307)	-0.0001 (-0.0031, 0.0044)

Table S11: Summarized results for fluvial flood. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	R	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.0648 (-0.0747, 0.1742)	0.0156 (0.0032, 0.1063)	0.9980 (0.9847, 1.0035)	0.0000 (0.0000, 0.0000)
GMT-1	OLS2	0.0746 (-0.0568, 0.1961)	0.0156 (0.0032, 0.1062)	0.9974 (0.9805, 1.0051)	0.0000 (0.0000, 0.0000)
CA(0)-CS(0)-SE(0)-1	OLS1	0.3545 (0.1297, 0.4815)	0.0141 (0.0028, 0.1030)	0.9350 (0.8764, 0.9915)	0.0000 (-0.0001, 0.0001)
CA(0)-CS(0)-SE(0)-1	OLS2	0.3691 (0.1374, 0.4899)	0.0140 (0.0028, 0.1030)	0.9294 (0.8718, 0.9905)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.3759 (0.1403, 0.5122)	0.0140 (0.0028, 0.1028)	0.9268 (0.8589, 0.9901)	0.0000 (-0.0001, 0.0001)
CA(0)-CS(0)-SA(0)-1	OLS2	0.3758 (0.1442, 0.4929)	0.0140 (0.0028, 0.1026)	0.9267 (0.8701, 0.9896)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.3844 (0.1487, 0.5113)	0.0140 (0.0028, 0.1024)	0.9234 (0.8596, 0.9889)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(0)-SA(0)-1	MLP	0.2982 (0.0519, 0.4774)	0.0145 (0.0041, 0.1030)	0.9619 (0.8787, 1.2914)	-0.0003 (-0.0035, 0.0024)
CA(0)-CS(0)-SA(1)-1	OLS2	0.3960 (0.1794, 0.5009)	0.0139 (0.0028, 0.1017)	0.9185 (0.8658, 0.9858)	0.0000 (-0.0002, 0.0002)
CA(0)-CS(0)-SA(1)-1	MLP	0.3067 (0.0376, 0.4828)	0.0142 (0.0031, 0.1026)	0.9584 (0.8826, 1.0538)	-0.0004 (-0.0100, 0.0034)
CA(0)-CS(1)-SA(0)-1	OLS2	0.4253 (0.1596, 0.5446)	0.0139 (0.0027, 0.1011)	0.9051 (0.8388, 0.9874)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(1)-SA(0)-1	MLP	0.3672 (0.0622, 0.4961)	0.0150 (0.0029, 0.0996)	0.9343 (0.8696, 1.0211)	-0.0005 (-0.0030, 0.0026)
CA(0)-CS(1)-SA(1)-1	OLS2	0.4422 (0.1941, 0.5499)	0.0138 (0.0027, 0.1002)	0.8974 (0.8357, 0.9831)	0.0000 (-0.0002, 0.0003)
CA(0)-CS(1)-SA(1)-1	MLP	0.3709 (0.0686, 0.5070)	0.0142 (0.0029, 0.1002)	0.9341 (0.8788, 1.0275)	0.0000 (-0.0026, 0.0050)
CA(1)-CS(0)-SA(0)-1	OLS2	0.4574 (0.2550, 0.5563)	0.0137 (0.0027, 0.1001)	0.8894 (0.8312, 0.9680)	0.0000 (-0.0001, 0.0001)
CA(1)-CS(0)-SA(0)-1	MLP	0.3991 (0.1261, 0.5489)	0.0141 (0.0033, 0.0962)	0.9222 (0.8365, 1.0176)	0.0001 (-0.0031, 0.0046)
CA(1)-CS(0)-SA(1)-1	OLS2	0.4601 (0.2777, 0.5677)	0.0136 (0.0026, 0.0990)	0.8890 (0.8238, 0.9633)	0.0000 (-0.0001, 0.0002)
CA(1)-CS(0)-SA(1)-1	MLP	0.4010 (0.0994, 0.5469)	0.0140 (0.0028, 0.0997)	0.9225 (0.8418, 1.0287)	0.0002 (-0.0031, 0.0119)
CA(1)-CS(1)-SA(0)-1	OLS2	0.5598 (0.4228, 0.6586)	0.0129 (0.0024, 0.0936)	0.8310 (0.7537, 0.9102)	0.0000 (-0.0003, 0.0001)
CA(1)-CS(1)-SA(0)-1	MLP	0.9246 (0.7784, 0.9478)	0.0067 (0.0020, 0.0379)	0.4069 (0.3193, 0.6348)	0.0002 (-0.0119, 0.0031)
CA(1)-CS(1)-SA(1)-1	OLS2	0.5815 (0.4386, 0.6630)	0.0129 (0.0024, 0.0924)	0.8166 (0.7503, 0.9039)	0.0000 (-0.0004, 0.0001)
CA(1)-CS(1)-SA(1)-1	MLP	0.9216 (0.5688, 0.9461)	0.0061 (0.0028, 0.0366)	0.3953 (0.3314, 0.8861)	0.0004 (-0.0024, 0.0101)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9614 (0.9542, 0.9691)	0.0044 (0.0009, 0.0277)	0.2777 (0.2472, 0.2991)	0.0000 (-0.0016, 0.0022)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9673 (0.9588, 0.9724)	0.0041 (0.0008, 0.0259)	0.2554 (0.2341, 0.2843)	0.0000 (-0.0005, 0.0010)

Table S12: Summarized results for coastal inundation. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	r	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.5435 (-0.1213, 0.6150)	0.0095 (0.0024, 0.0645)	0.8395 (0.7886, 1.0060)	0.0000 (0.0000, 0.0001)
GMT-1	OLS2	0.5536 (0.0095, 0.6921)	0.0095 (0.0024, 0.0585)	0.8328 (0.7219, 1.0030)	0.0000 (0.0000, 0.0000)
CA(0)-CS(0)-SE(0)-1	OLS1	0.6044 (0.2597, 0.6424)	0.0091 (0.0022, 0.0646)	0.7968 (0.7663, 0.9658)	0.0000 (0.0000, 0.0002)
CA(0)-CS(0)-SE(0)-1	OLS2	0.6316 (0.3622, 0.7173)	0.0088 (0.0021, 0.0585)	0.7753 (0.6969, 0.9321)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.6320 (0.3748, 0.7240)	0.0088 (0.0021, 0.0580)	0.7750 (0.6899, 0.9272)	0.0000 (-0.0001, 0.0001)
CA(0)-CS(0)-SA(0)-1	OLS2	0.8022 (0.4143, 0.9346)	0.0074 (0.0020, 0.0371)	0.5970 (0.3558, 0.9103)	0.0000 (-0.0001, 0.0001)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.8066 (0.4248, 0.9335)	0.0069 (0.0020, 0.0370)	0.5911 (0.3586, 0.9060)	0.0000 (-0.0001, 0.0002)
CA(0)-CS(0)-SA(0)-1	MLP	0.7867 (0.1751, 0.9142)	0.0078 (0.0022, 0.0388)	0.6203 (0.4076, 1.0305)	0.0000 (-0.0036, 0.0014)
CA(0)-CS(0)-SA(1)-1	OLS2	0.8481 (0.3786, 0.9575)	0.0069 (0.0019, 0.0338)	0.5303 (0.2886, 0.9296)	0.0000 (-0.0003, 0.0001)
CA(0)-CS(0)-SA(1)-1	MLP	0.7853 (0.2998, 0.9536)	0.0079 (0.0026, 0.0354)	0.6223 (0.3053, 0.9636)	-0.0004 (-0.0015, 0.0029)
CA(0)-CS(1)-SA(0)-1	OLS2	0.8249 (0.5648, 0.9377)	0.0071 (0.0018, 0.0367)	0.5658 (0.3475, 0.8255)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(1)-SA(0)-1	MLP	0.8215 (0.4057, 0.9080)	0.0074 (0.0022, 0.0382)	0.5934 (0.4196, 0.9325)	0.0001 (-0.0022, 0.0048)
CA(0)-CS(1)-SA(1)-1	OLS2	0.8671 (0.5458, 0.9641)	0.0064 (0.0017, 0.0332)	0.4985 (0.2655, 0.8402)	0.0000 (-0.0002, 0.0001)
CA(0)-CS(1)-SA(1)-1	MLP	0.8231 (0.4737, 0.9550)	0.0073 (0.0021, 0.0351)	0.5710 (0.2966, 0.8949)	0.0001 (-0.0030, 0.0034)
CA(1)-CS(0)-SA(0)-1	OLS2	0.8511 (0.7470, 0.9514)	0.0058 (0.0016, 0.0362)	0.5254 (0.3079, 0.6657)	0.0000 (-0.0001, 0.0001)
CA(1)-CS(0)-SA(0)-1	MLP	0.8313 (0.5677, 0.9220)	0.0066 (0.0017, 0.0374)	0.5807 (0.3910, 0.8418)	0.0002 (-0.0029, 0.0034)
CA(1)-CS(0)-SA(1)-1	OLS2	0.8943 (0.7566, 0.9670)	0.0058 (0.0016, 0.0321)	0.4476 (0.2550, 0.6548)	0.0000 (-0.0001, 0.0000)
CA(1)-CS(0)-SA(1)-1	MLP	0.8561 (0.6866, 0.9581)	0.0060 (0.0018, 0.0340)	0.5223 (0.2886, 0.7724)	-0.0005 (-0.0018, 0.0028)
CA(1)-CS(1)-SA(0)-1	OLS2	0.8757 (0.7498, 0.9518)	0.0052 (0.0014, 0.0363)	0.4837 (0.3069, 0.6634)	0.0000 (-0.0002, 0.0002)
CA(1)-CS(1)-SA(0)-1	MLP	0.8613 (0.5900, 0.9158)	0.0062 (0.0016, 0.0378)	0.5331 (0.4030, 0.8507)	-0.0005 (-0.0024, 0.0048)
CA(1)-CS(1)-SA(1)-1	OLS2	0.8995 (0.7865, 0.9694)	0.0048 (0.0014, 0.0316)	0.4376 (0.2456, 0.6197)	0.0000 (-0.0001, 0.0000)
CA(1)-CS(1)-SA(1)-1	MLP	0.9128 (0.7058, 0.9572)	0.0044 (0.0016, 0.0341)	0.4208 (0.2922, 0.7556)	0.0006 (-0.0043, 0.0020)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9416 (0.8563, 0.9712)	0.0042 (0.0012, 0.0275)	0.3400 (0.2400, 0.5346)	-0.0004 (-0.0011, 0.0012)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9534 (0.8844, 0.9739)	0.0038 (0.0011, 0.0310)	0.3037 (0.2272, 0.4745)	-0.0001 (-0.0011, 0.0005)

Table S13: Summarized results for aggregated impact. Median (minimum, maximum) of 17 regional results are shown. CA(1) denotes that climate variables for all regions (including non-target region) are used. CS(1) denotes that seasonal climate variables are used. SA(1) denotes that socioeconomic variables for all regions (including non-target region) are used. SE(0) denotes that socioeconomic variables are not used. GMT denotes that only the global mean temperature is used. Numbers at the tail represent length of the time series.

INPUT	MODEL	R	RMSE (%GDP)	RSR	Bias (%GDP)
GMT-1	OLS1	0.8385 (0.2422, 0.9121)	0.6530 (0.2786, 1.9706)	0.5448 (0.4100, 0.9708)	-0.0010 (-0.0068, 0.0016)
GMT-1	OLS2	0.8522 (0.4964, 0.9320)	0.5883 (0.2656, 1.6593)	0.5232 (0.3624, 0.8682)	-0.0012 (-0.0085, 0.0020)
CA(0)-CS(0)-SE(0)-1	OLS1	0.8526 (0.2820, 0.9355)	0.6440 (0.2541, 1.7954)	0.5225 (0.3533, 0.9618)	-0.0011 (-0.0064, 0.0048)
CA(0)-CS(0)-SE(0)-1	OLS2	0.8740 (0.4809, 0.9548)	0.5779 (0.2381, 1.6968)	0.4859 (0.2972, 0.8787)	-0.0008 (-0.0204, 0.0047)
CA(0)-CS(0)-SE(0)-1	OLS2i	0.8776 (0.4724, 0.9544)	0.5849 (0.2400, 1.7185)	0.4794 (0.2986, 0.8848)	-0.0029 (-0.0301, 0.0087)
CA(0)-CS(0)-SA(0)-1	OLS2	0.9116 (0.6033, 0.9767)	0.4928 (0.1933, 1.5523)	0.4113 (0.2145, 0.7991)	-0.0003 (-0.0171, 0.0071)
CA(0)-CS(0)-SA(0)-1	OLS2i	0.9326 (0.7659, 0.9756)	0.4492 (0.1672, 1.2274)	0.3611 (0.2197, 0.6430)	-0.0011 (-0.0059, 0.0026)
CA(0)-CS(0)-SA(0)-1	MLP	0.9244 (0.8207, 0.9775)	0.4480 (0.1688, 1.3417)	0.3828 (0.2111, 0.5729)	-0.0082 (-0.0376, 0.0284)
CA(0)-CS(0)-SA(1)-1	OLS2	0.9187 (0.6907, 0.9767)	0.4578 (0.1907, 1.5662)	0.3950 (0.2144, 0.7243)	-0.0011 (-0.0118, 0.0085)
CA(0)-CS(0)-SA(1)-1	MLP	0.9485 (0.8747, 0.9852)	0.3717 (0.1624, 1.2992)	0.3169 (0.1717, 0.4849)	0.0114 (-0.0275, 0.0377)
CA(0)-CS(1)-SA(0)-1	OLS2	0.9238 (0.6166, 0.9776)	0.4464 (0.1867, 1.4948)	0.3828 (0.2105, 0.7904)	-0.0030 (-0.0326, 0.0022)
CA(0)-CS(1)-SA(0)-1	MLP	0.9473 (0.8551, 0.9789)	0.4268 (0.1591, 1.2303)	0.3205 (0.2044, 0.5216)	0.0014 (-0.0395, 0.0512)
CA(0)-CS(1)-SA(1)-1	OLS2	0.9335 (0.7009, 0.9773)	0.3983 (0.1847, 1.5116)	0.3587 (0.2118, 0.7155)	-0.0032 (-0.0275, 0.0038)
CA(0)-CS(1)-SA(1)-1	MLP	0.9686 (0.8943, 0.9906)	0.3088 (0.1568, 1.0761)	0.2501 (0.1380, 0.4474)	0.0077 (-0.0397, 0.0316)
CA(1)-CS(0)-SA(0)-1	OLS2	0.9167 (0.5973, 0.9806)	0.4823 (0.1915, 1.5483)	0.3997 (0.1961, 0.8064)	-0.0051 (-0.0510, 0.0004)
CA(1)-CS(0)-SA(0)-1	MLP	0.9372 (0.8469, 0.9797)	0.4009 (0.1491, 1.1998)	0.3569 (0.2010, 0.5376)	-0.0163 (-0.0920, 0.0625)
CA(1)-CS(0)-SA(1)-1	OLS2	0.9325 (0.6906, 0.9806)	0.4455 (0.1899, 1.5631)	0.3612 (0.1959, 0.7258)	-0.0061 (-0.0437, 0.0016)
CA(1)-CS(0)-SA(1)-1	MLP	0.9584 (0.9011, 0.9885)	0.3329 (0.1549, 1.0249)	0.2882 (0.1516, 0.4343)	-0.0183 (-0.0848, 0.0420)
CA(1)-CS(1)-SA(0)-1	OLS2	0.9291 (0.6335, 0.9847)	0.4506 (0.1785, 1.5203)	0.3699 (0.1743, 0.7797)	-0.0057 (-0.0559, -0.0001)
CA(1)-CS(1)-SA(0)-1	MLP	0.9522 (0.8044, 0.9827)	0.4565 (0.1295, 1.3060)	0.3093 (0.1871, 0.6137)	-0.0262 (-0.1360, 0.1109)
CA(1)-CS(1)-SA(1)-1	OLS2	0.9465 (0.7123, 0.9849)	0.4155 (0.1767, 1.5346)	0.3226 (0.1729, 0.7060)	-0.0069 (-0.0494, -0.0002)
CA(1)-CS(1)-SA(1)-1	MLP	0.9796 (0.9052, 0.9906)	0.2662 (0.0900, 0.9939)	0.2054 (0.1420, 0.4252)	-0.0087 (-0.0820, 0.0765)
CA(1)-CS(1)-SA(1)-10	LSTM	0.9886 (0.9596, 0.9951)	0.2086 (0.0676, 0.9891)	0.1698 (0.1028, 0.2986)	-0.0125 (-0.2014, 0.0610)
CA(1)-CS(1)-SA(1)-95	LSTM	0.9927 (0.9499, 0.9976)	0.1605 (0.0494, 0.7223)	0.1222 (0.0710, 0.3147)	-0.0036 (-0.1113, 0.0582)

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