# Electronic Supplemental Material

## Unilateral climate policies can substantially reduce national carbon pollution

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# A Imputation procedure for missing data

Data on Germany's emissions per capita are missing in the World Bank's World Development Indicators (WDI) database prior to 1991. The underlying source of these data is the Carbon Dioxide Information Analysis Center (CDIAC) at Oak Ridge, which provides the most widely used inventory of national $CO_2$ emissions. We reconstruct Germany's emissions for the missing years by sourcing emissions from the Federal Republic of Germany and the German Democratic Republic directly from the CDIAC database. Emissions per capita are derived using the population indicator "SP.POP.TOTL" from the WDI database.

Data on Kuwait's emissions per capita are missing in the WDI database for the years 1992-1994, yet the WDI does have data on emissions in kilotons for those years. The WDI is also missing data on Kuwait's population for those years, so we turn to the underlying source of the population data in the WDI, which is the United Nations World Population Prospects (WPP) database. We use the 2019 WPP database to obtain data on Kuwait's total population for 1992-1994. We compute emissions per capita for Kuwait for 1992-1994 by dividing emissions from the indicator "EN.ATM.CO2E.KT" (multiplied by 1,000) by the population data from WPP.

The WDI and CDIAC do not have data on Liechtenstein's $CO_2$ emissions. Therefore, we obtain data from Liechtenstein's National Inventory Report in 2017 to the UNFCCC (Principality of Liechtenstein, 2017) on $CO_2$ emissions (excluding emissions from Land Use and Land Use Change in order to be comparable with CDIAC/WDI data) for 1990-2000. Following the procedure for Germany and Kuwait, we compute $CO_2$ emissions in metric tons per capita by dividing emissions (appropriately converted to metric tons) by total population.

# B Make-up of the synthetic UK

In order to construct our main donor pool, we proceed as follows. There are 85 countries that were either OECD members or classified as high or upper middle income countries in 2001 by the World Bank. We exclude the 8 countries that were treated in 2001 (which includes the UK). We exclude the 10 countries that had missing data on $CO_2$ emissions between 1990 and 2000. We also exclude countries that had a population smaller than 250,000 in 2001. The 51 countries that remain form our donor pool.

As a robustness check, we also restrict the donor pool to OECD or high income countries in 2001 ($n = 32$), and then to OECD members in 2001 ($n = 22$). The full list of countries can be found in table S3.

Figure S1 displays the weights applied to each country in the donor pool.

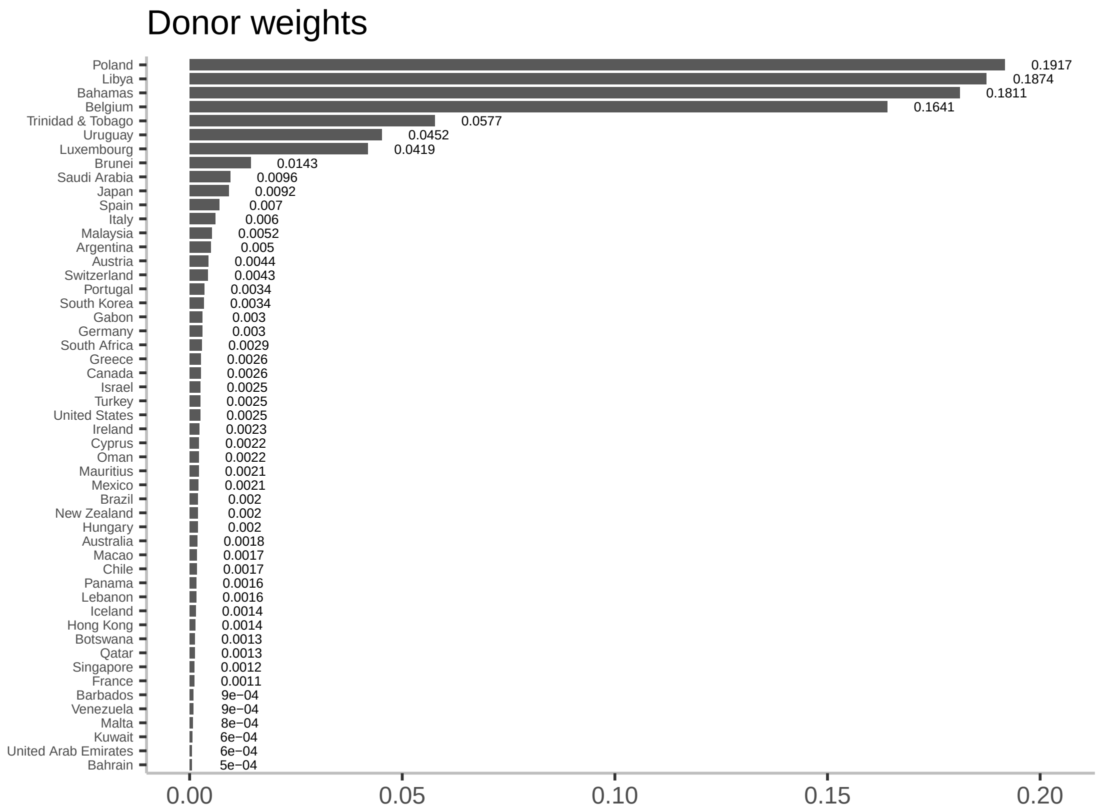


Figure S1: Weights applied to donor countries.

Figure S2 displays the per capita emissions trajectories in the 8 countries that make up 88% of the weights used to construct the synthetic UK.

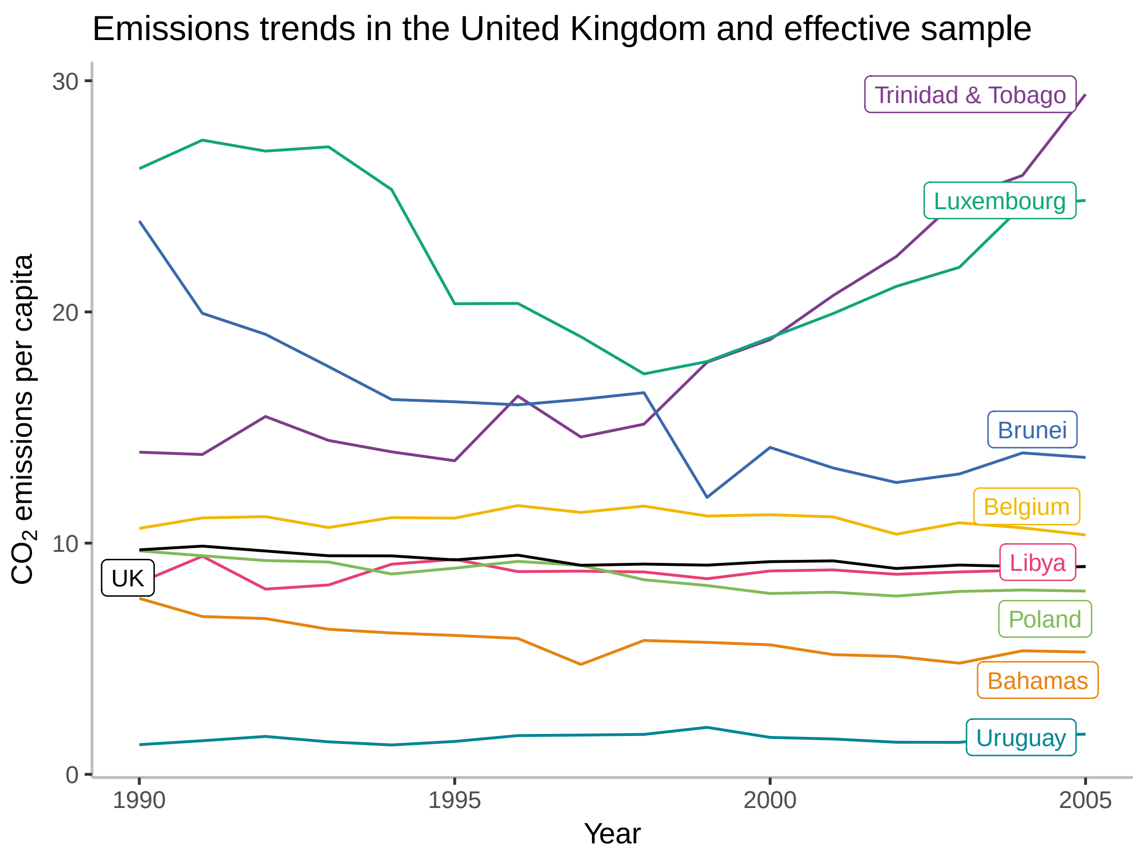


Figure S2: $CO_2$ per capita emissions in the UK and in the effective sample of countries used to construct the synthetic UK. The donor pool comprises countries that were OECD, high or upper middle income countries in 2001, excluding countries with population less than 250,000 in 2001.

While both Luxembourg and Trinidad and Tobago had increasing emissions trends, our results are not dependent on having them in the donor pool, and the treatment effects remain comparable. If we were to drop Luxembourg from the donor pool, we estimate a treatment effect of -8.5% ($p = 0.02$), and if we were to drop Trinidad and Tobago from the donor pool, we estimate a treatment effect of -6.3% ($p = 0.059$). To recall, our main treatment effect is -9.8% ($p = 0.02$).

# C Balance

The synthetic UK achieves much better balance on the predictor variables than an unweighted sample of OECD, high and upper middle income countries. Table S1 below shows that the pre-treatment values of the outcome variable as simulated by the synthetic UK are very similar to those actually observed in the UK in that time. By contrast, the pre-treatment values in the whole sample, when taking an unweighted mean, differ markedly from those observed in the UK.

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1990 emissions per capita | 9.711 | 9.714 | 9.101 | 0.061 |
| 1991 emissions per capita | 9.871 | 9.861 | 8.94 | 0.022 |
| 1992 emissions per capita | 9.661 | 9.654 | 9.353 | 0.153 |
| 1993 emissions per capita | 9.455 | 9.469 | 9.905 | 0.101 |
| 1994 emissions per capita | 9.448 | 9.451 | 9.949 | 0.095 |
| 1995 emissions per capita | 9.275 | 9.268 | 9.897 | 0.099 |
| 1996 emissions per capita | 9.480 | 9.477 | 9.818 | 0.079 |
| 1997 emissions per capita | 9.043 | 9.042 | 10.041 | 0.082 |
| 1998 emissions per capita | 9.094 | 9.101 | 10.022 | 0.096 |
| 1999 emissions per capita | 9.048 | 9.049 | 9.91 | 0.092 |
| 2000 emissions per capita | 9.200 | 9.199 | 10.297 | 0.122 |

Table S1: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

Figure 2 in the main text displays the difference in means in pre-treatment values of the dependent variable between the UK and the weighted synthetic counterfactual, and between the UK and the unweighted mean sample of OECD, high and upper middle income countries in 2001. Table S2 reports summary balance statistics. The p-value for the two sample t-test indicates that we fail to reject the null hypothesis that the difference in means between the pre-treatment emissions in the UK and in the synthetic UK is 0; and the p-value for the Kolmogorov-Smirnov test suggests that we fail to reject the null that the pre-treatment values of the UK and its synthetic control come from the same distribution.

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9813836 |
| p-value Kolmogorov Smirnov test | 1 |
| Mean difference in QQ plots | 0.0416667 |
| Median difference in QQ plots | 0.0416667 |
| Maximum difference in QQ plots | 0.0833333 |

Table S2: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

# D Falsification tests

In the main text we present results of a placebo test where we re-assign treatment to countries which we know to be unaffected by treatment and where we should expect to see null results. To increase our confidence that our results are not the product of chance, we should like to see the UK's treatment effect lie on the outer edges of that null distribution.

Since a large MSPE indicates a poor fit between the placebo unit and its synthetic counterpart, we cannot use these placebos are meaningful comparisons. In the main text, we present the result of the placebo test where we discard placebos with pre-treatment MSPE larger than 30. Figures S3 and S4 below display the gaps in the UK and in placebos where the pre-treatment MSPE cut-off is 50 and 100, respectively.

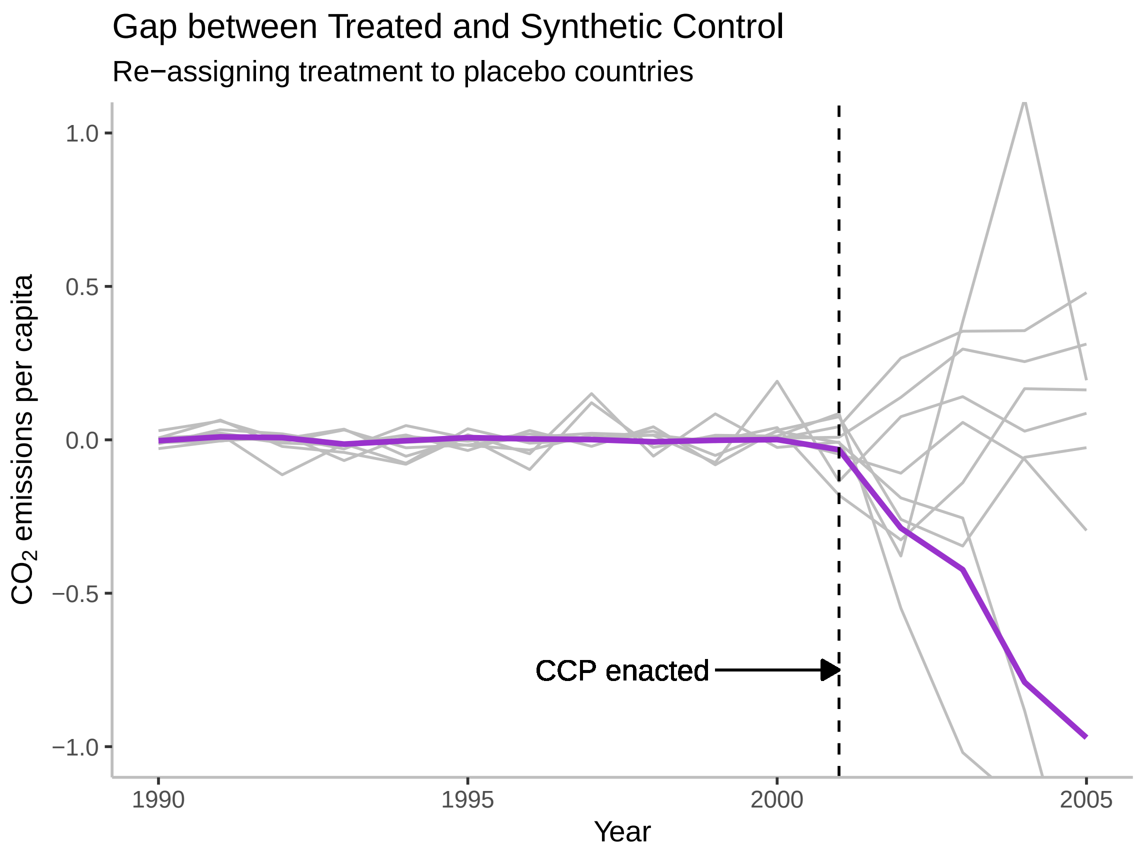


Figure S3: Gaps in emissions per capita between the treated unit and its synthetic counterpart. The thick purple line represents the gaps for the UK. The grey lines represent the distribution of placebo treatment effects. Countries with a pre-treatment MSPE greater than 50 times that of the UK have been excluded (see Methods for details).

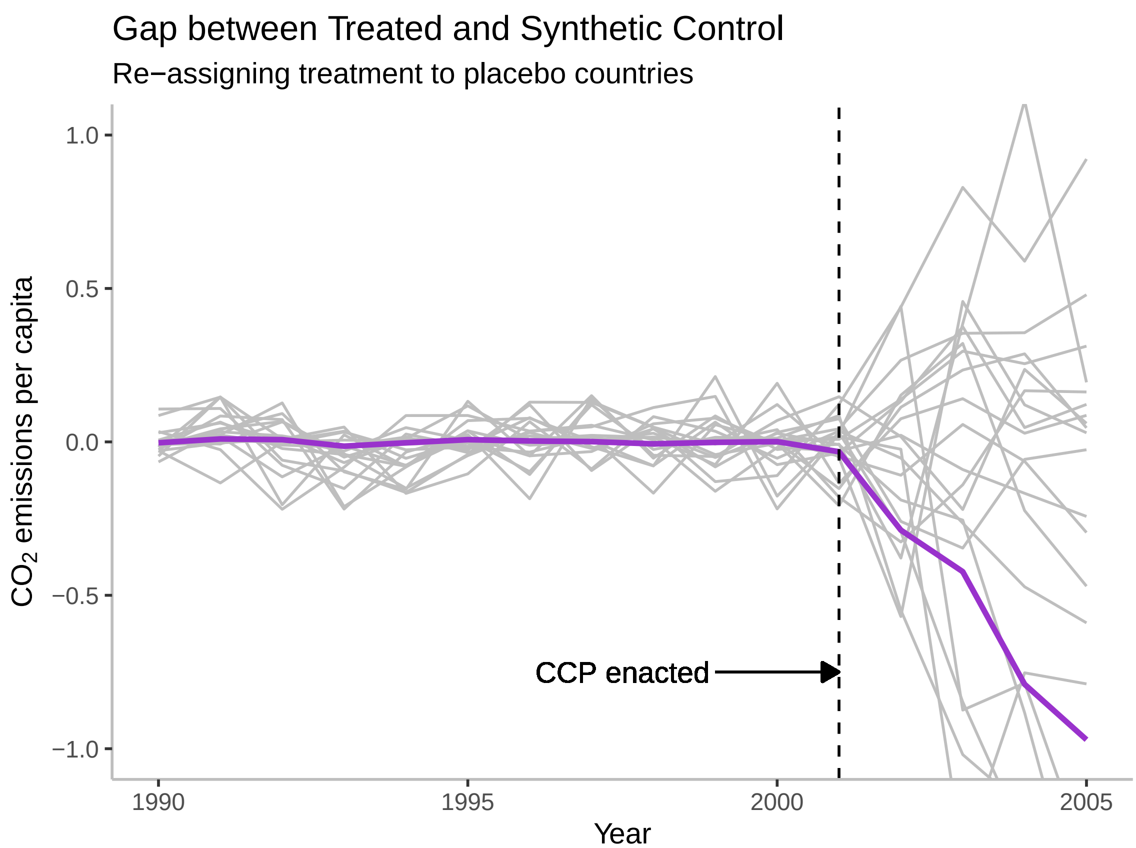


Figure S4: Gaps in emissions per capita between the treated unit and its synthetic counterpart. The thick purple line represents the gaps for the UK. The grey lines represent the distribution of placebo treatment effects. Countries with a pre-treatment MSPE greater than 100 times that of the UK have been excluded (see Methods for details).

We then use a test statistic that obviates the need to decide on a cut-off point: the ratio of post-treatment to pre-treatment MSPE for each country. Figure 4 in the main text shows that the ratio in the UK lies at the end of the right tail of that distribution, which indicates that the effect is likely not the result of chance.

Finally, figure S5 displays the ratio for each country in the sample. The UK has the largest ratio statistic out of all countries in the sample. If we were to pick a country at random under uniform sampling from the entire sample, the probability of obtaining a ratio statistic as large as the UK's is $1/51 \approx 0.02$.

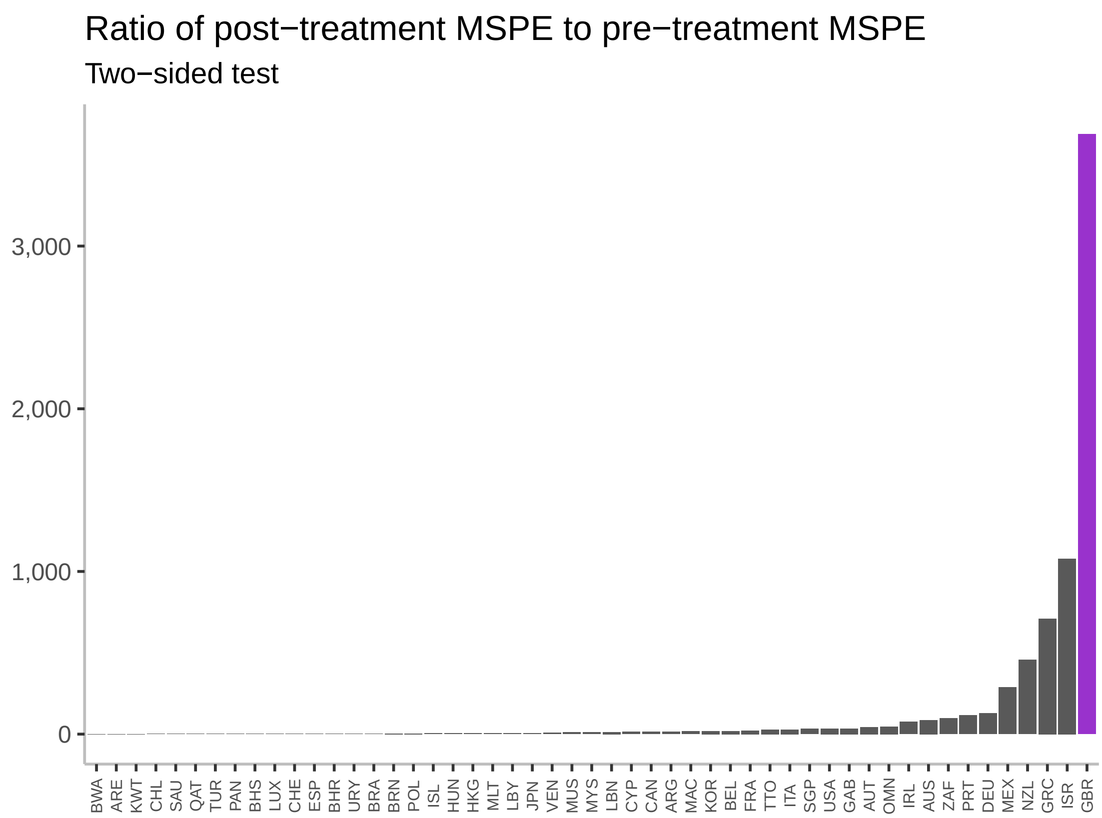


Figure S5: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

# E Robustness check: placebo treatment year

We conduct placebo "in time" checks, where we assign treatment to the years prior to the passage of the CCP, in which we expect to see no treatment effect. We report the results of those "in time" placebo tests in figure 6 in the main text, and in figures S6, S7, S8, S9, and S10 below. We use the same donor pool as reported in the main text ($n = 51$), but only include the pre-(placebo)-treatment years as predictor variables. A large positive placebo effect would weaken our confidence in our results. As shown in the pages below, our analysis passes the "in time" placebo test, except for the year 1998 where there is a positive placebo effect (figure S7). The placebo test for 1997 looks like it is positive (figure S8), though this placebo run demonstrates a poor fit between the UK and its placebo synthetic control and therefore should be discarded as uninformative.

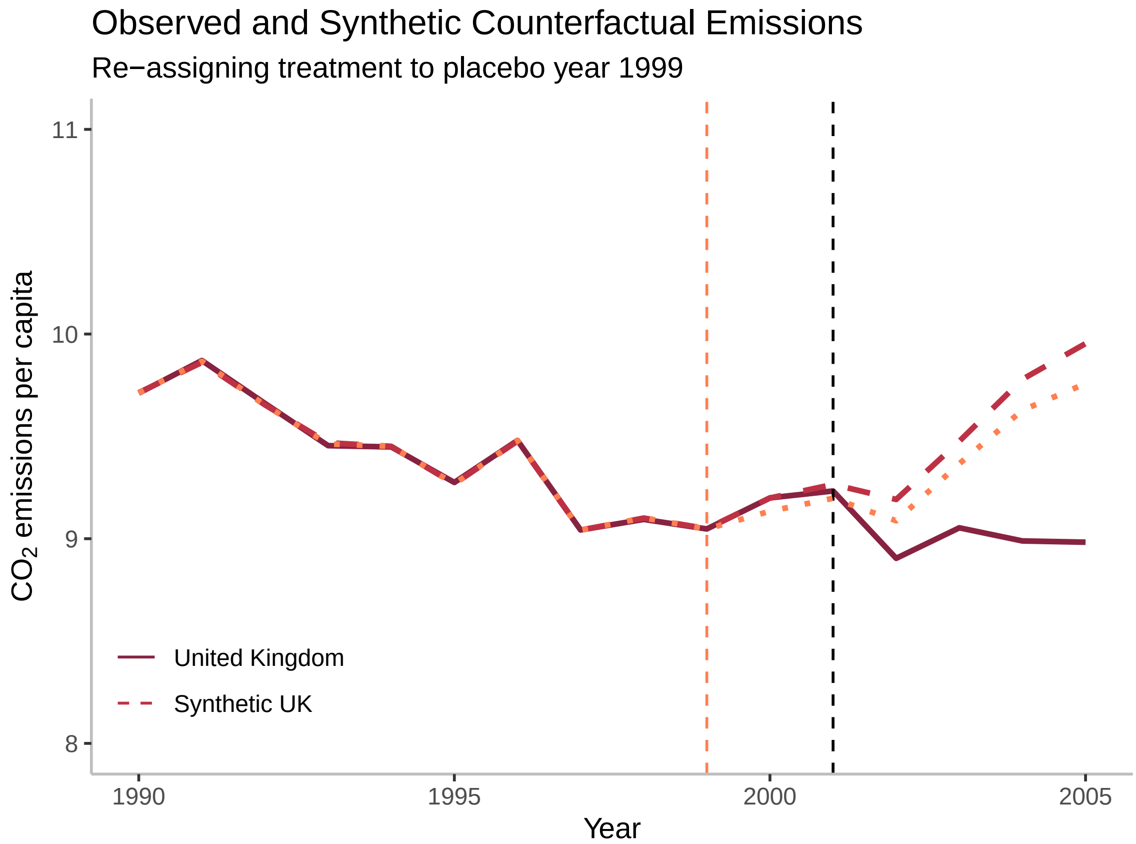


Figure S6: Observed and synthetic counterfactual emissions for a placebo run where treatment occurs in 1999.

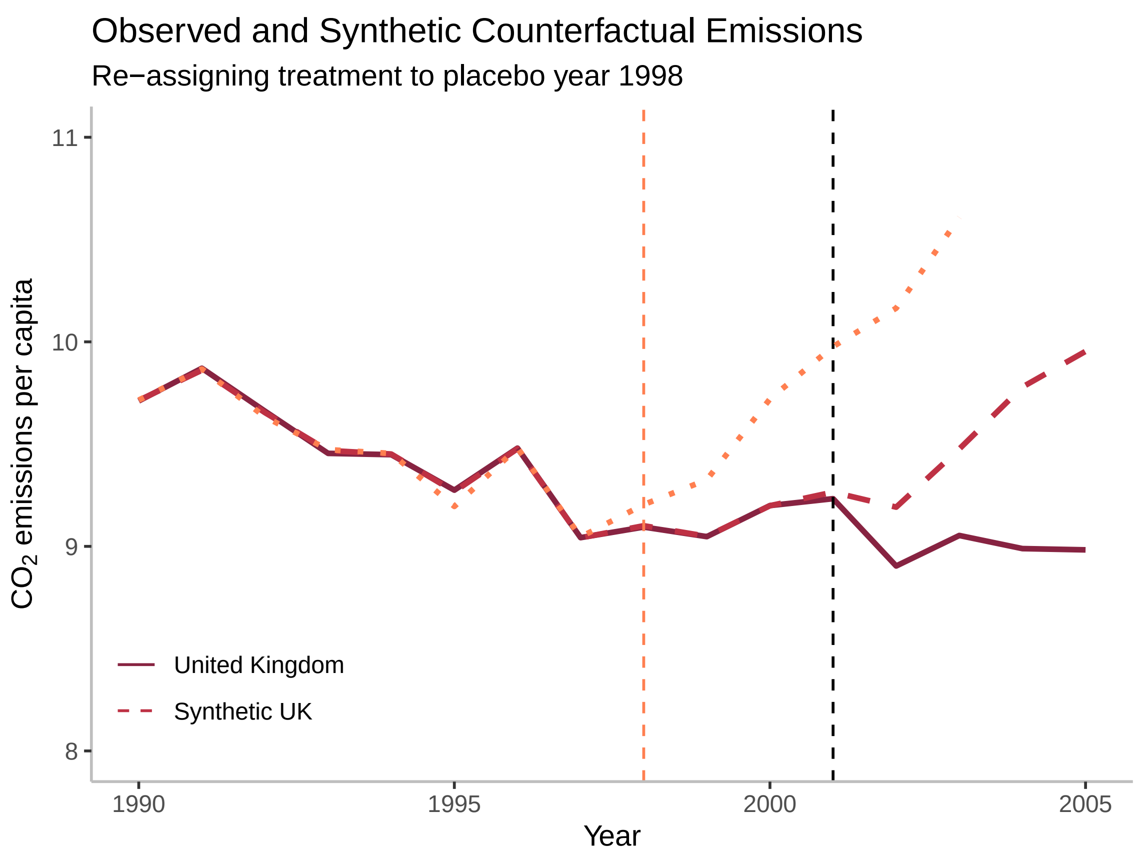


Figure S7: Observed and synthetic counterfactual emissions for a placebo run where treatment occurs in 1998.

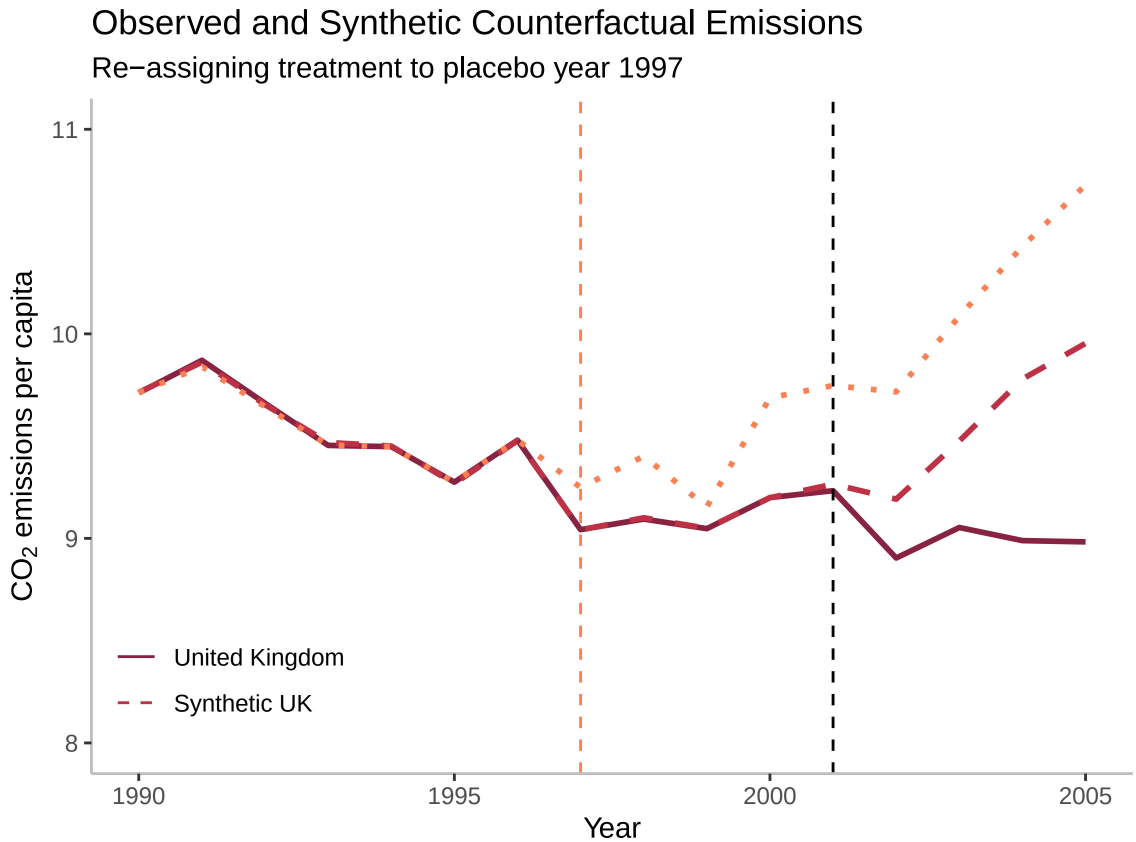


Figure S8: Observed and synthetic counterfactual emissions for a placebo run where treatment occurs in 1997.

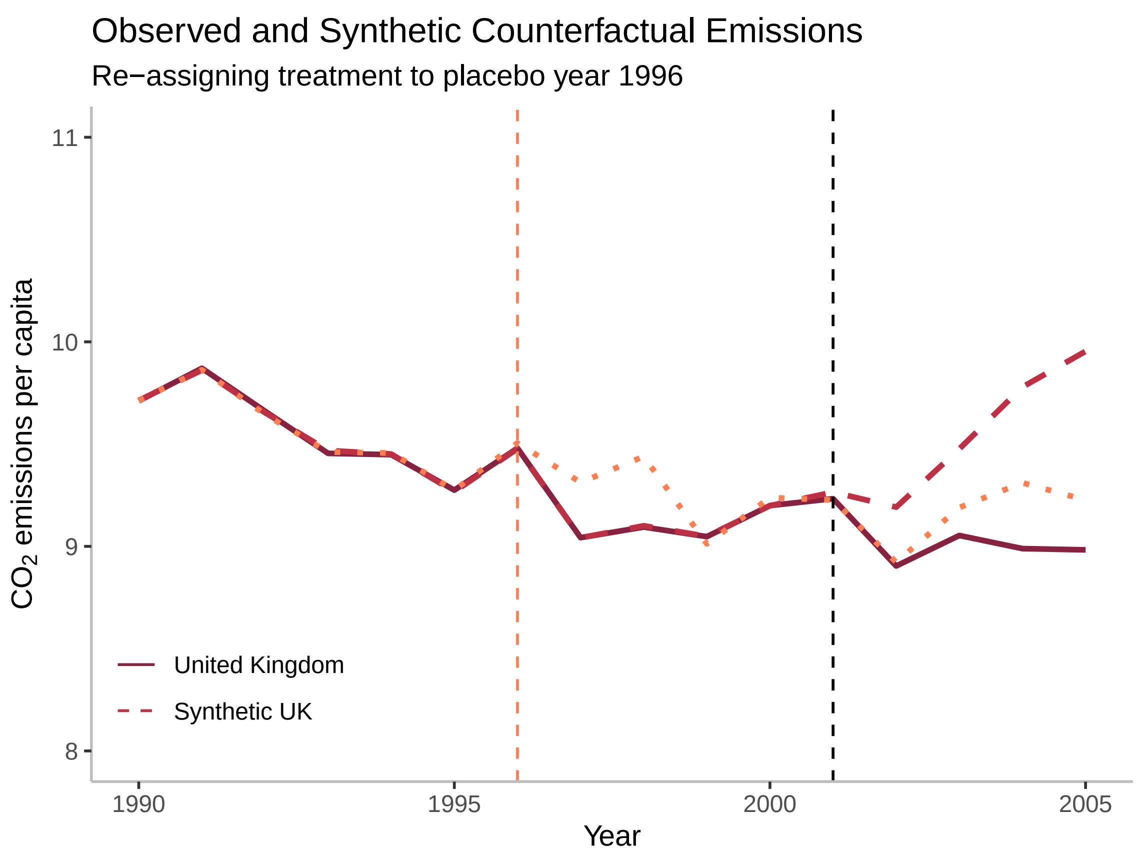


Figure S9: Observed and synthetic counterfactual emissions for a placebo run where treatment occurs in 1996.

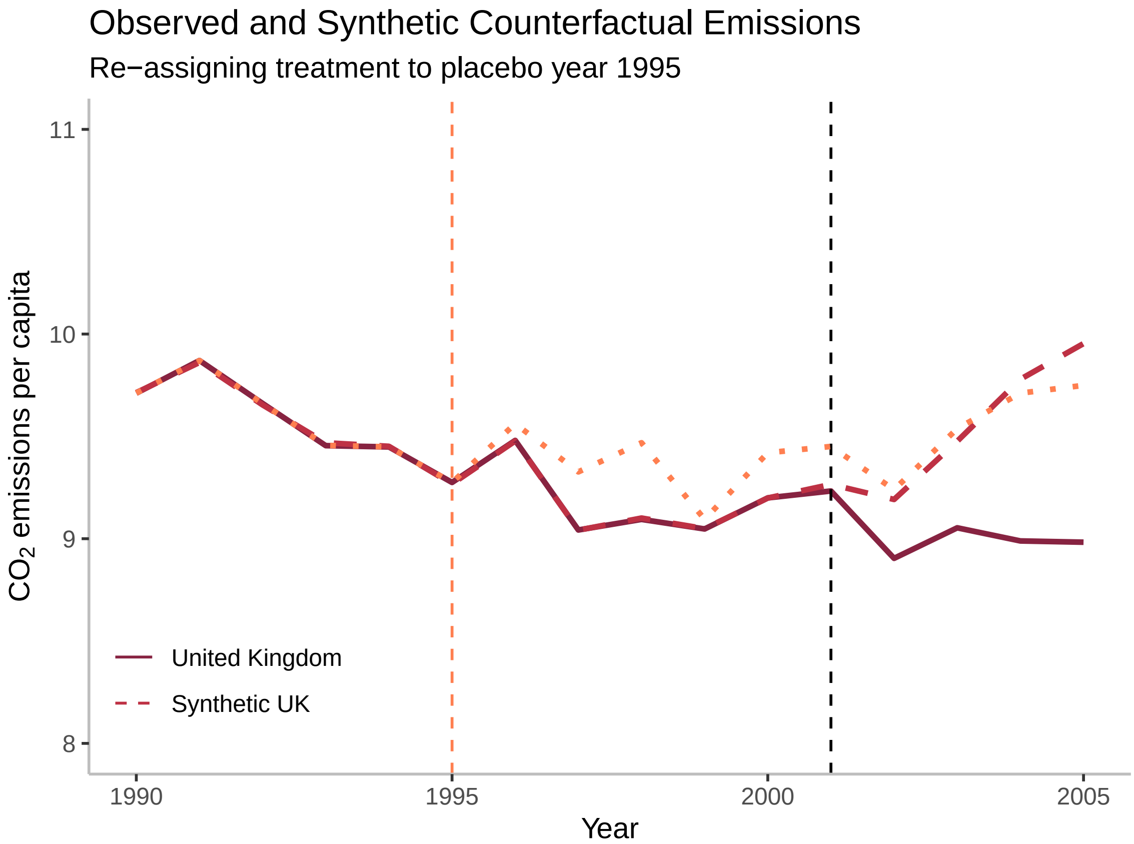


Figure S10: Observed and synthetic counterfactual emissions for a placebo run where treatment occurs in 1995.

# F Robustness check: placebo countries

Single-country placebos are provided on the following pages in figures S11-S60. The SCM algorithm failed when running a placebo test on Barbados, so the falsification test is out of 51 rather than out of 52. This happens in cases where the system is singular and the algorithm fails to converge.

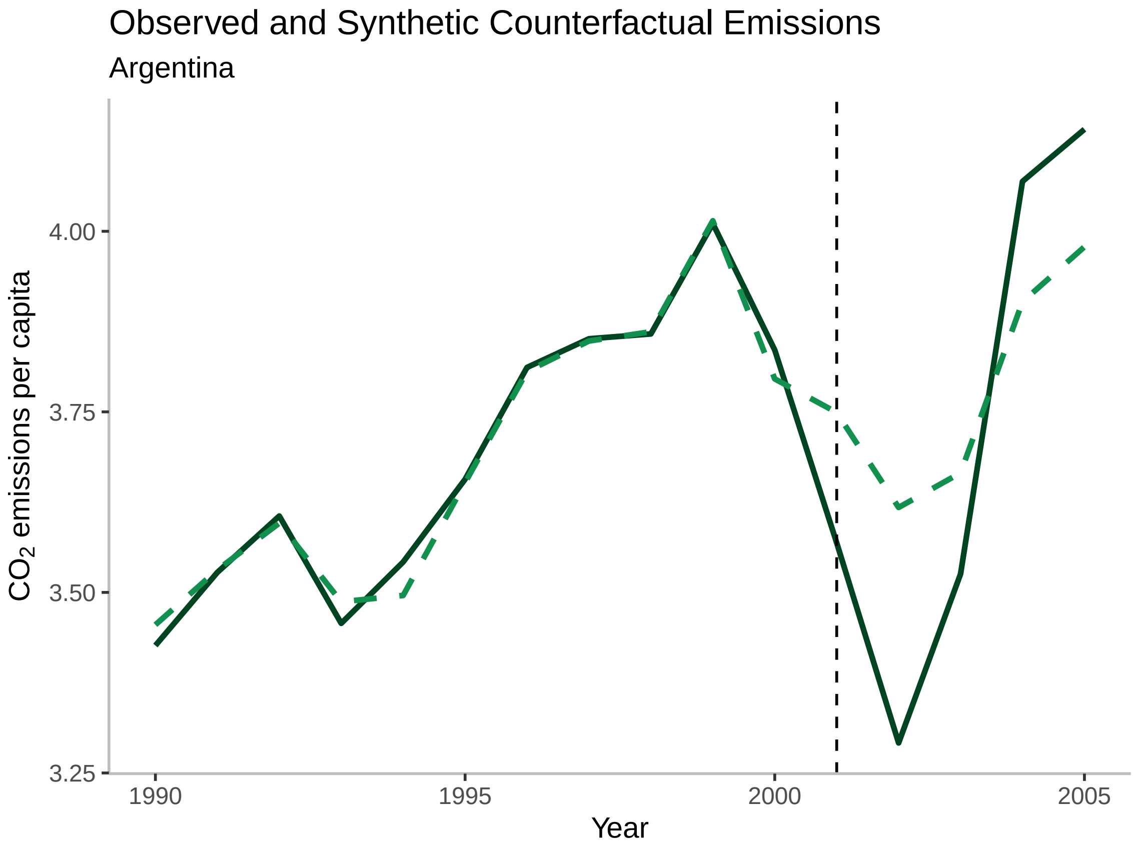


Figure S11: Observed and synthetic counterfactual emissions for placebo country Argentina.

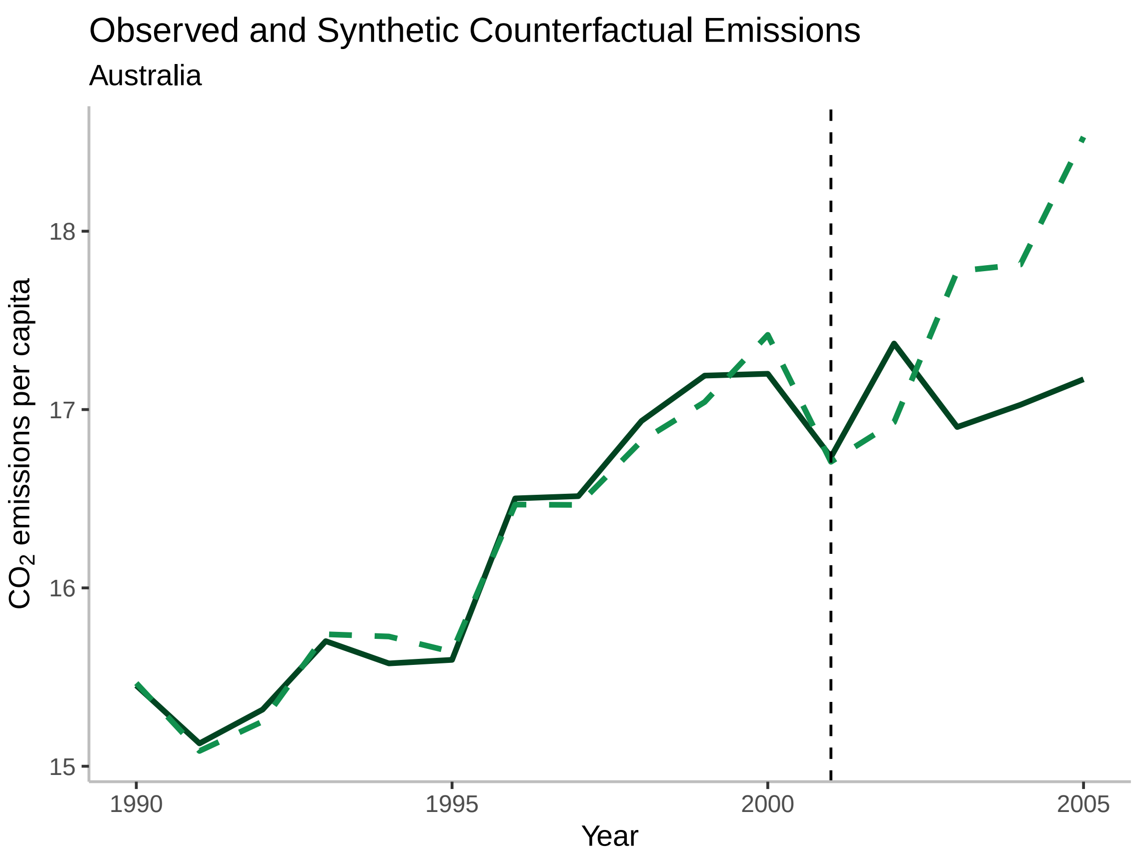


Figure S12: Observed and synthetic counterfactual emissions for placebo country Australia.

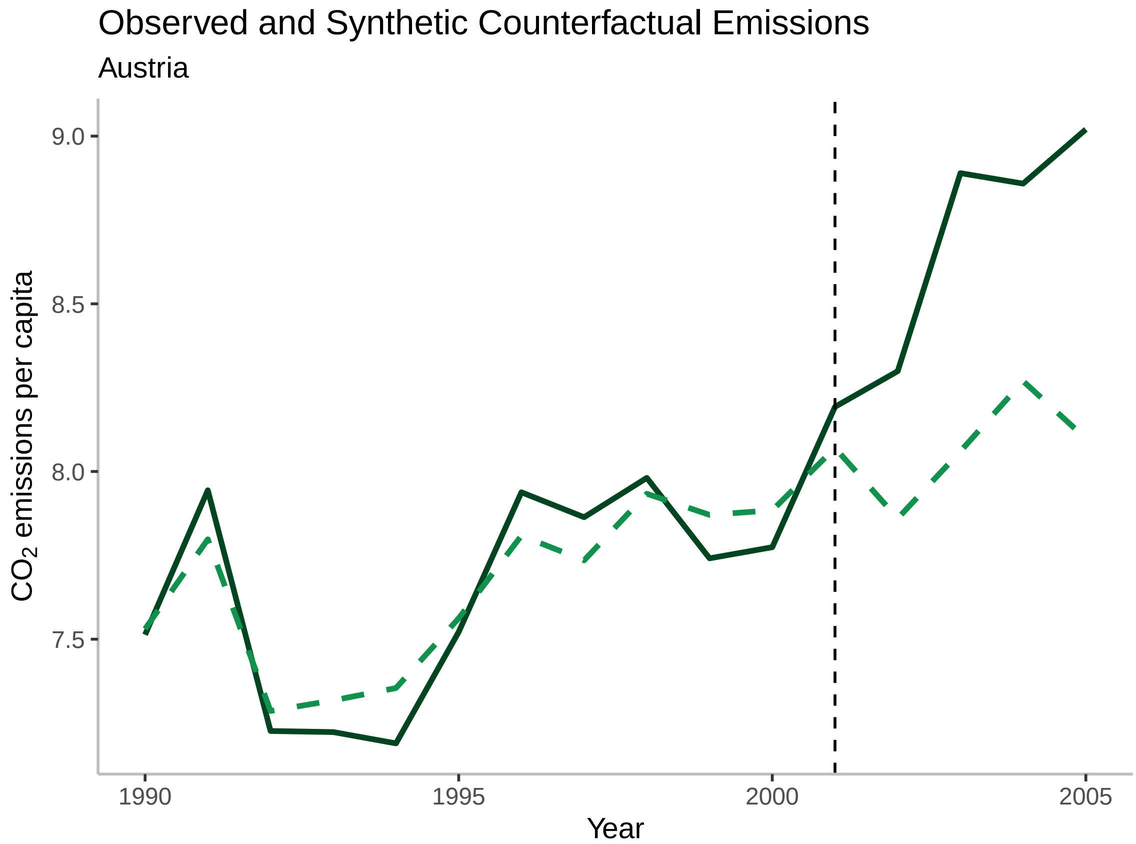


Figure S13: Observed and synthetic counterfactual emissions for placebo country Austria.

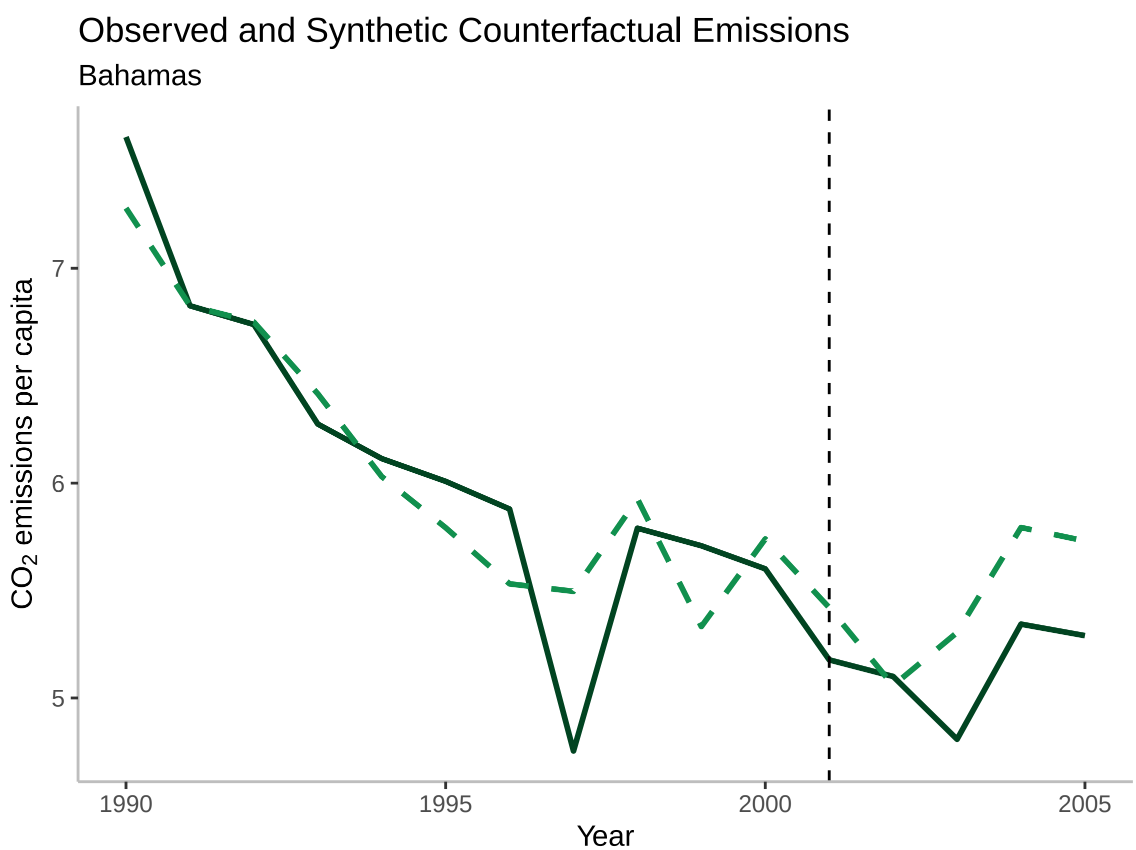


Figure S14: Observed and synthetic counterfactual emissions for placebo country Bahamas.

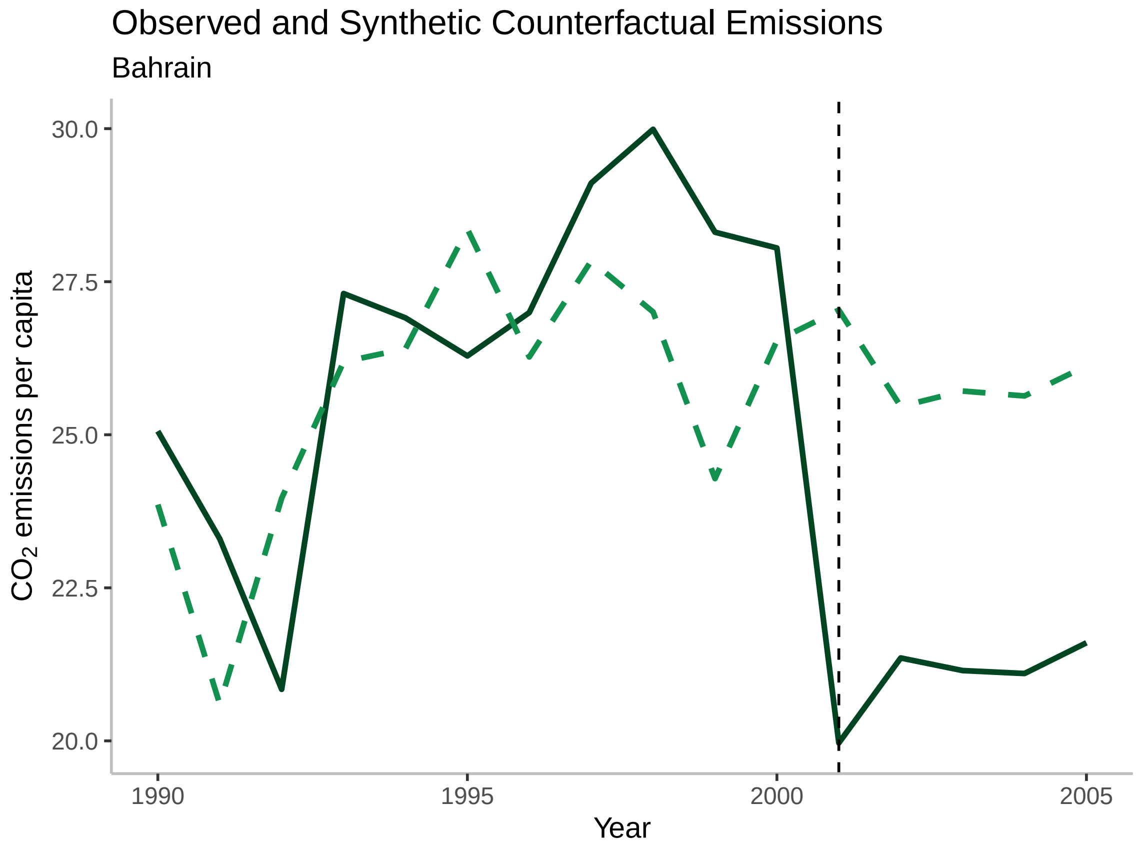


Figure S15: Observed and synthetic counterfactual emissions for placebo country Bahrain.

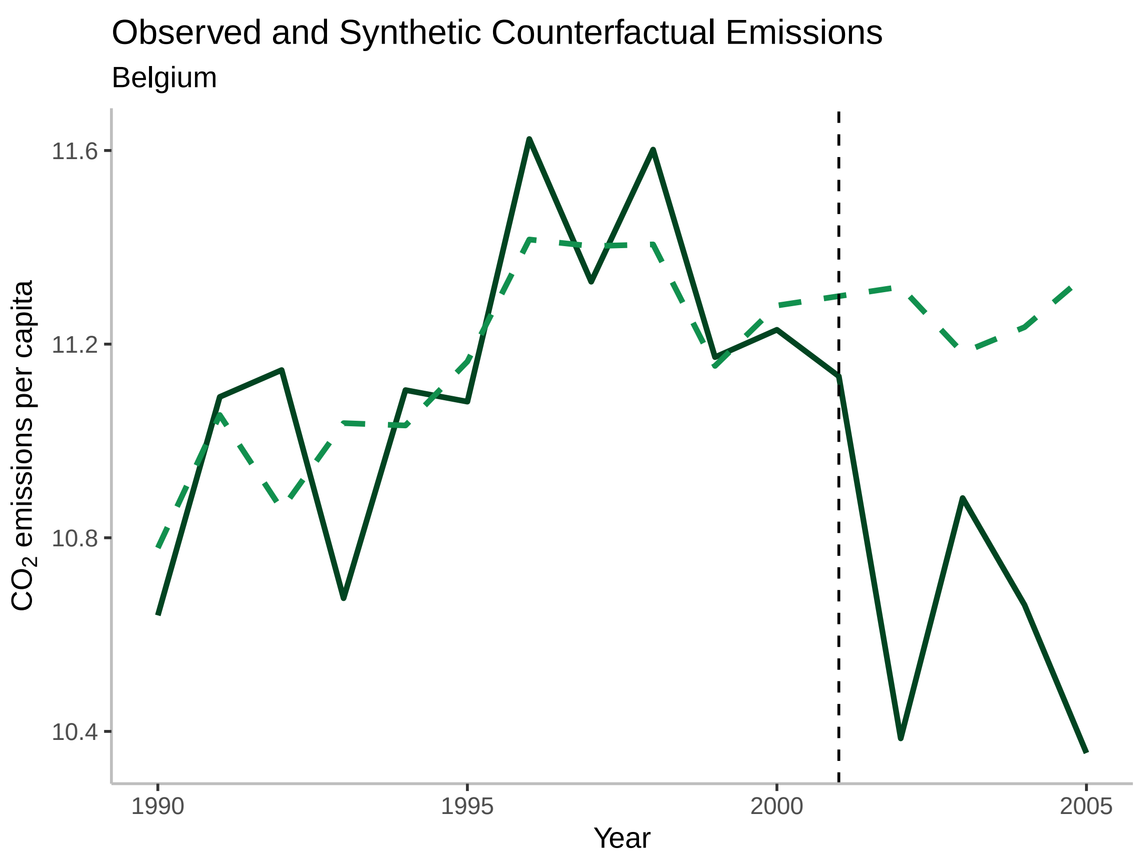


Figure S16: Observed and synthetic counterfactual emissions for placebo country Belgium.

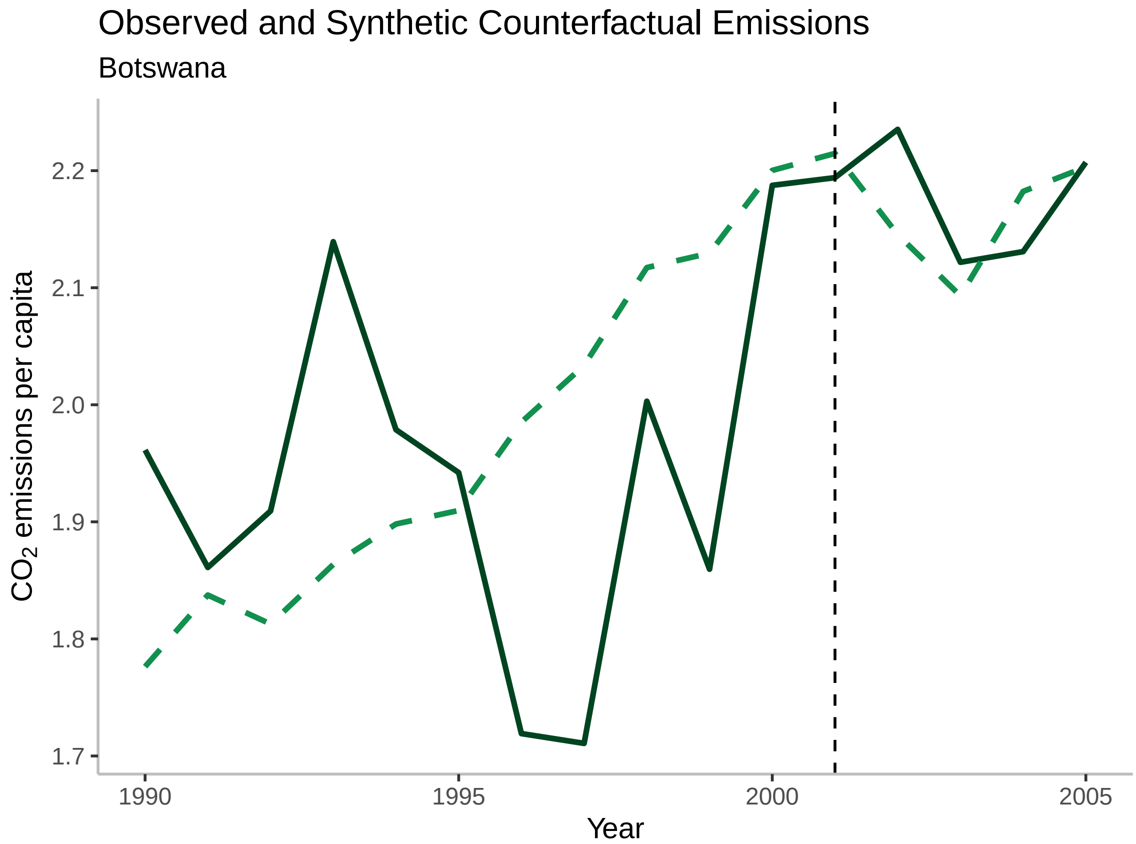


Figure S17: Observed and synthetic counterfactual emissions for placebo country Botswana.

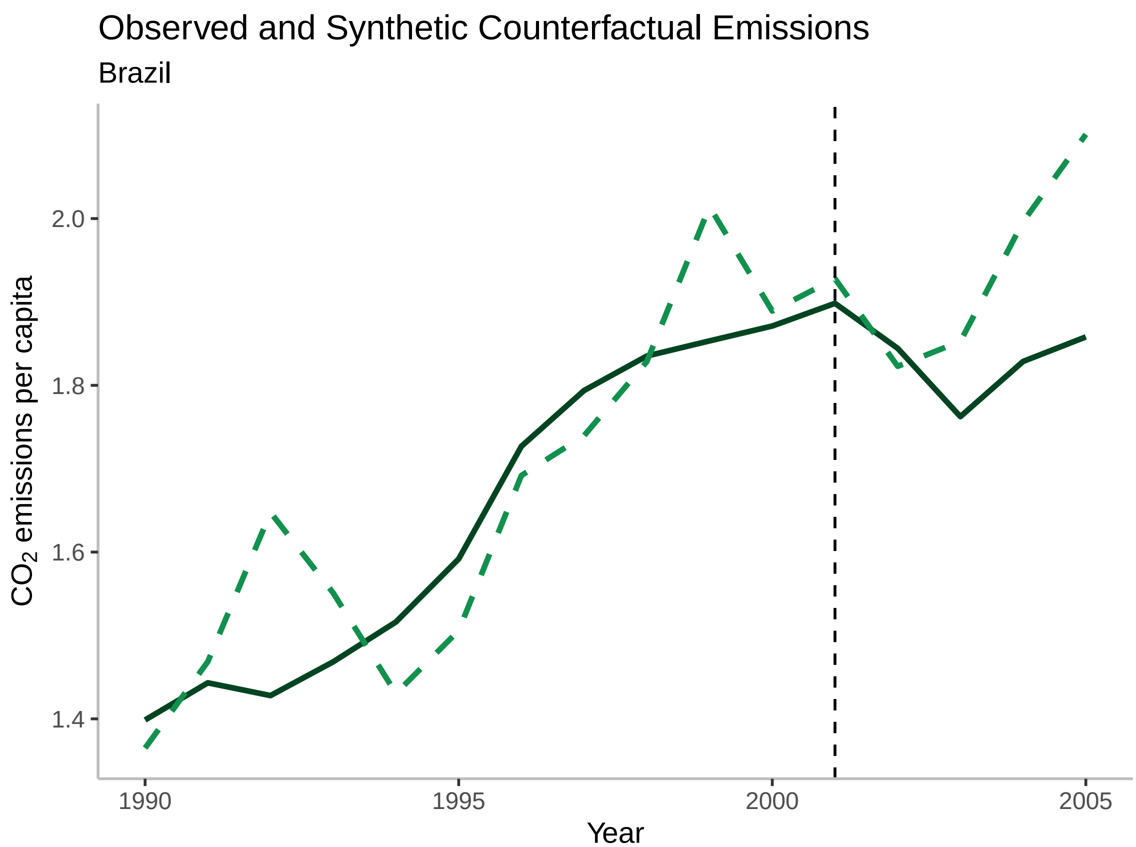


Figure S18: Observed and synthetic counterfactual emissions for placebo country Brazil.

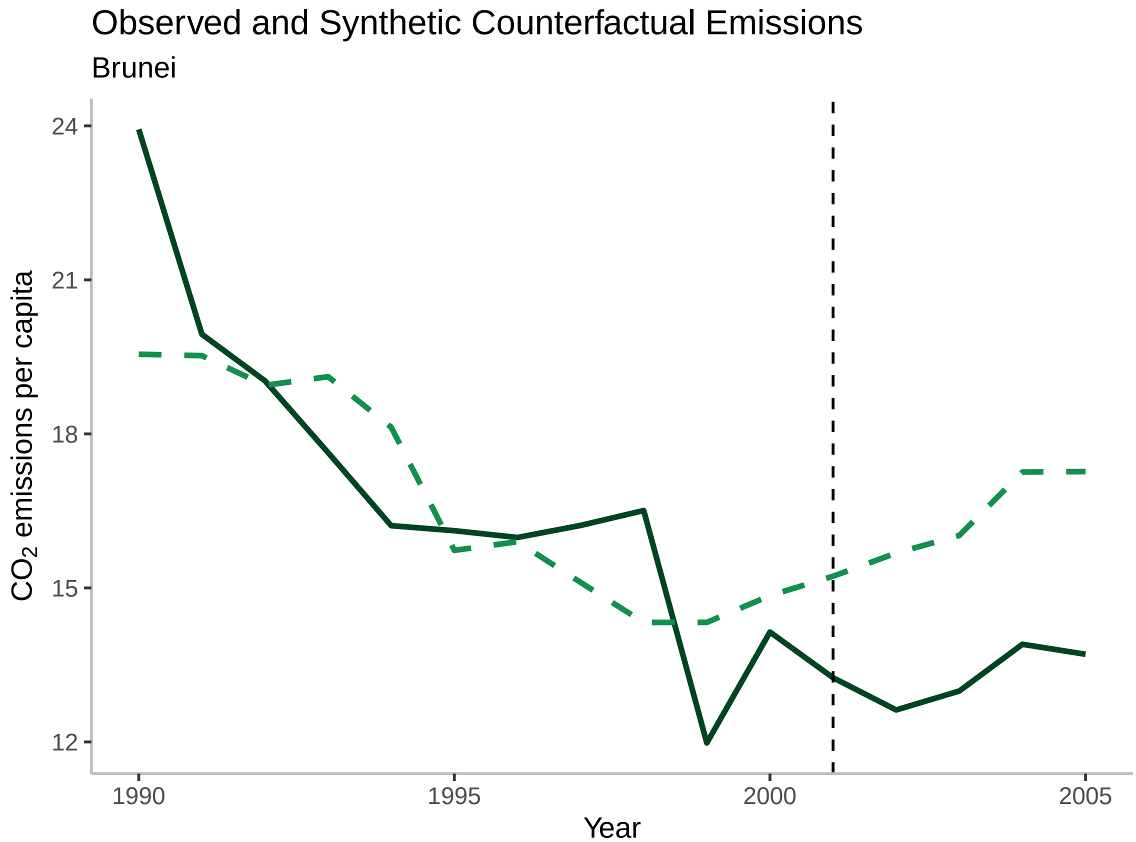


Figure S19: Observed and synthetic counterfactual emissions for placebo country Brunei.

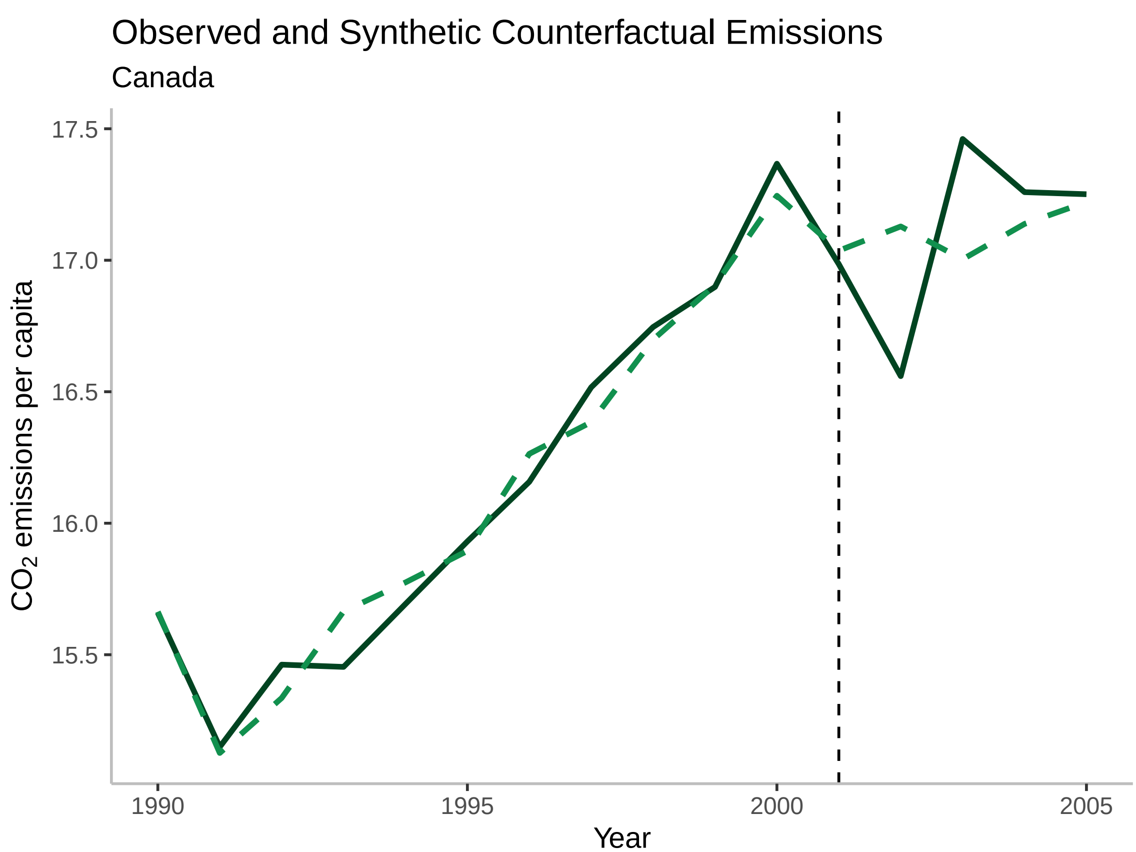


Figure S20: Observed and synthetic counterfactual emissions for placebo country Canada.

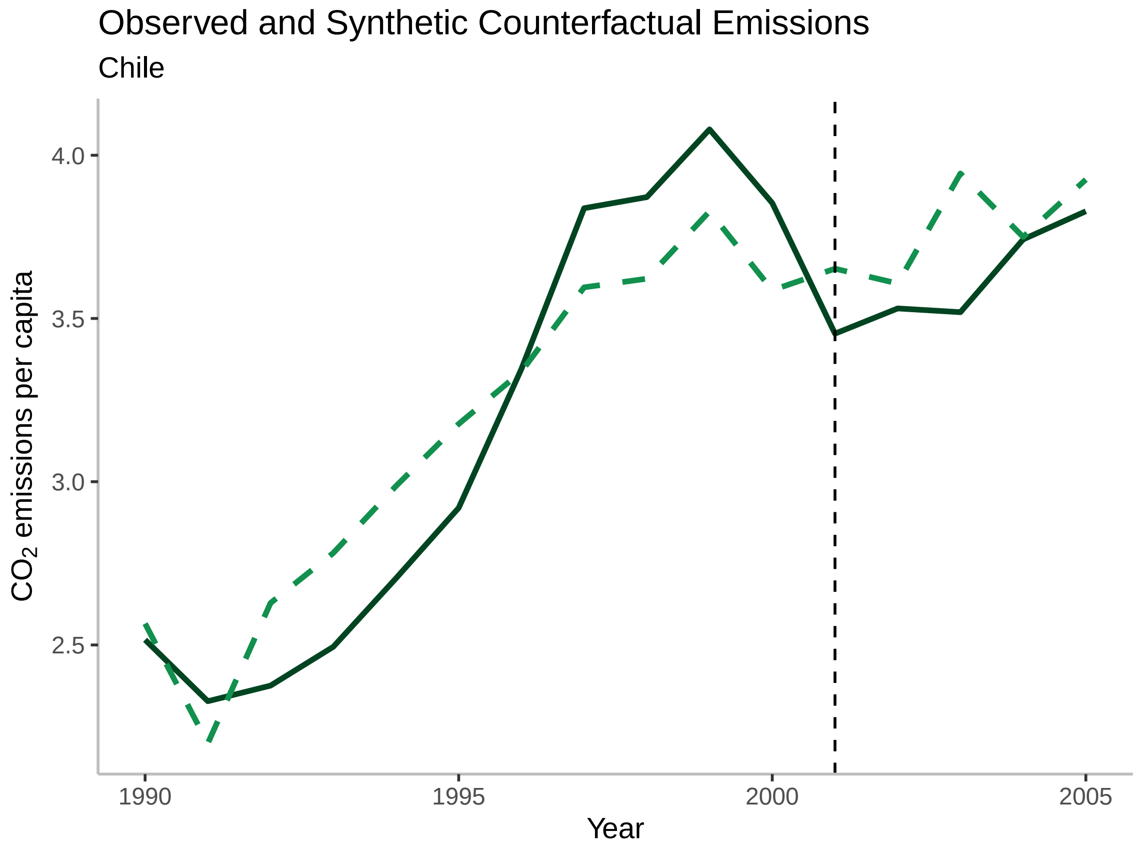


Figure S21: Observed and synthetic counterfactual emissions for placebo country Chile.

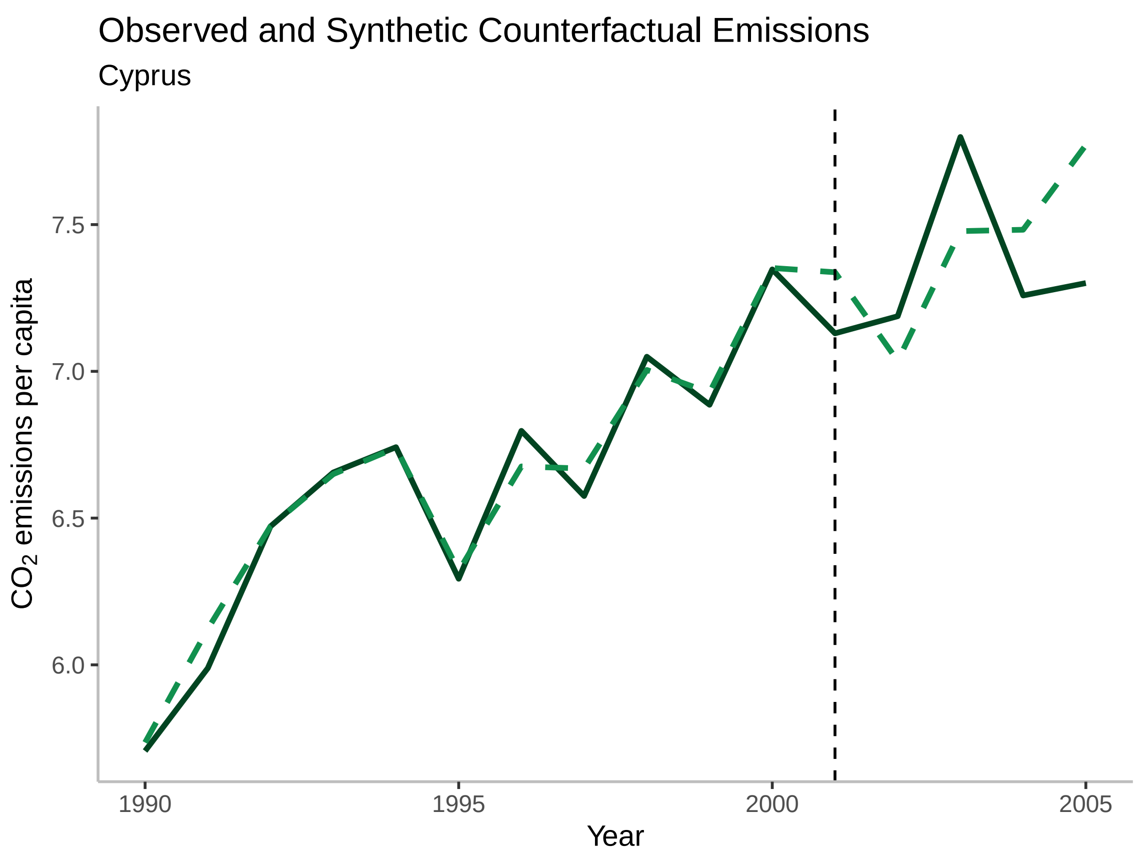


Figure S22: Observed and synthetic counterfactual emissions for placebo country Cyprus.

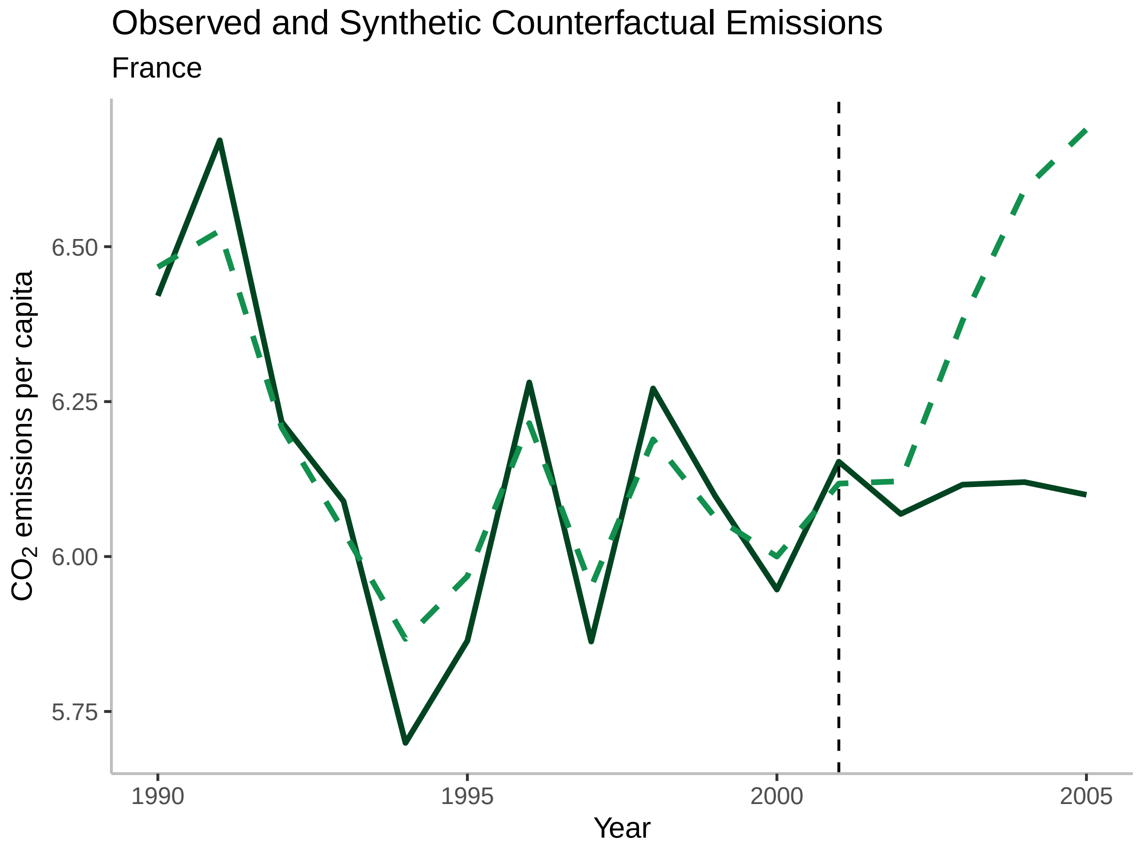


Figure S23: Observed and synthetic counterfactual emissions for placebo country France.

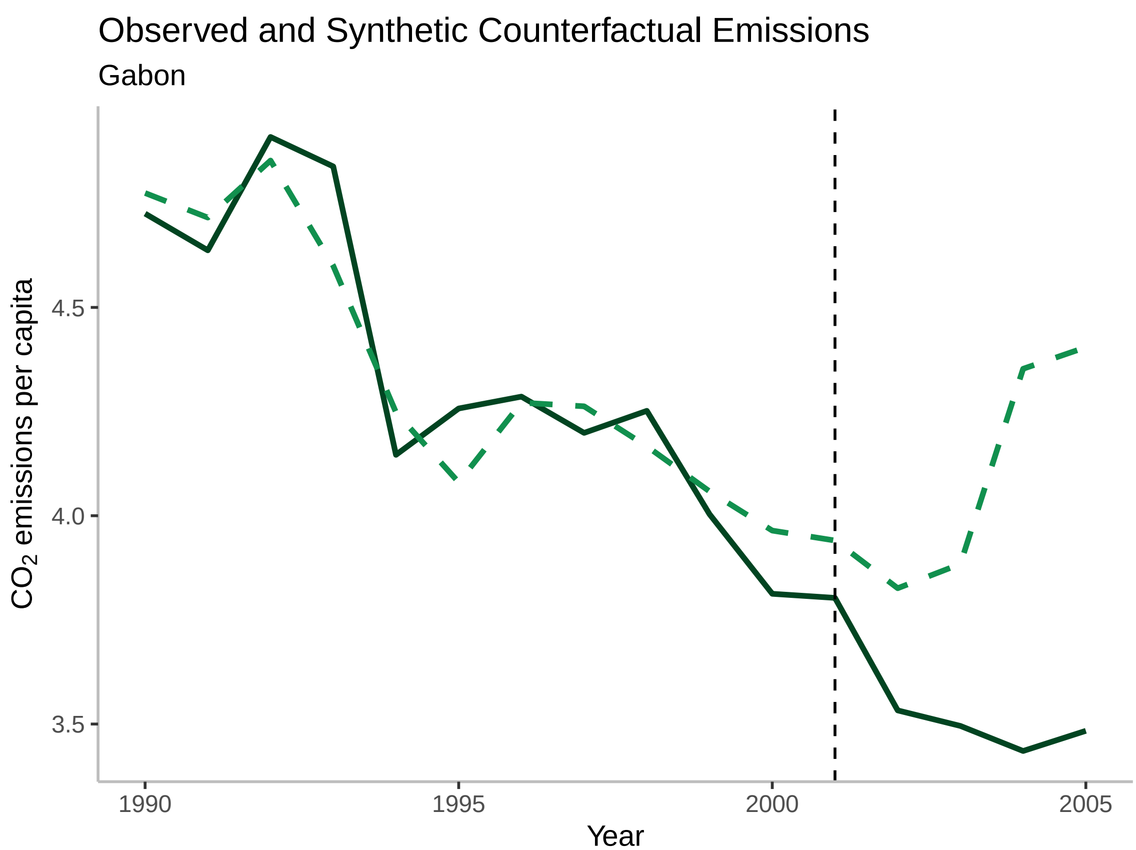


Figure S24: Observed and synthetic counterfactual emissions for placebo country Gabon.

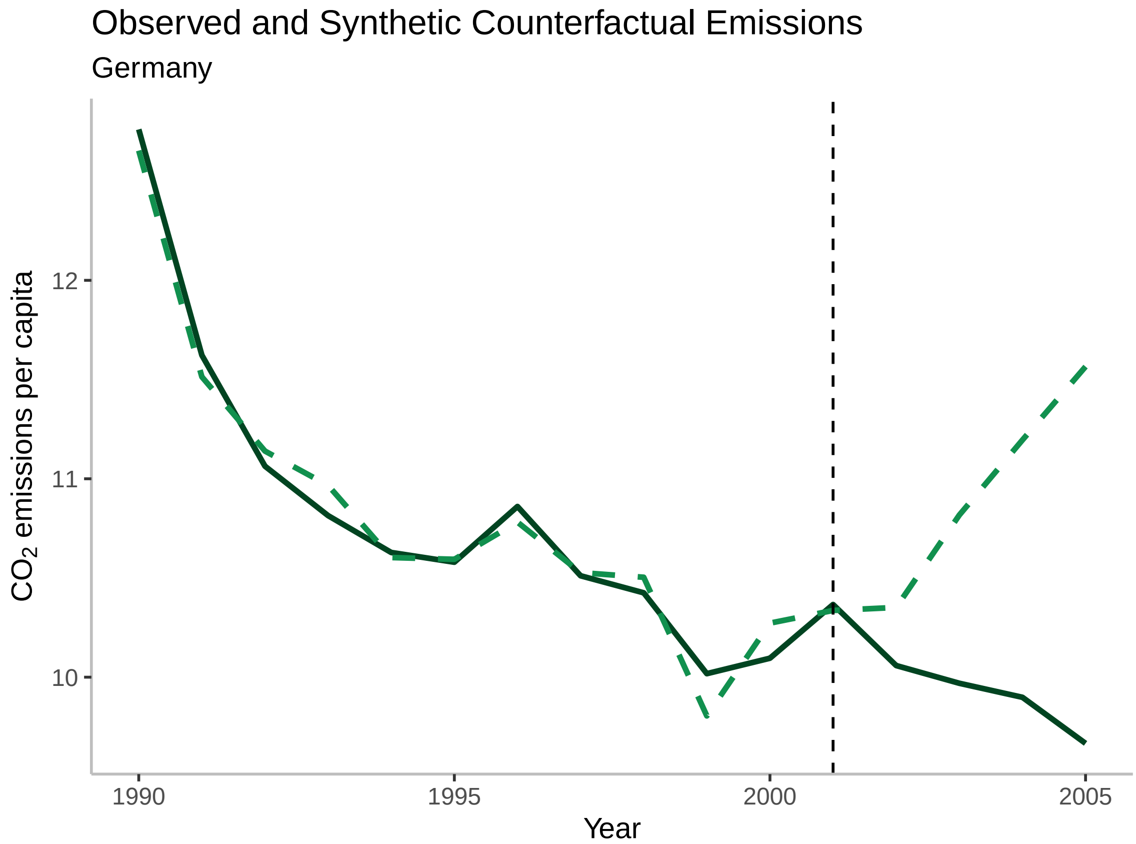


Figure S25: Observed and synthetic counterfactual emissions for placebo country Germany.

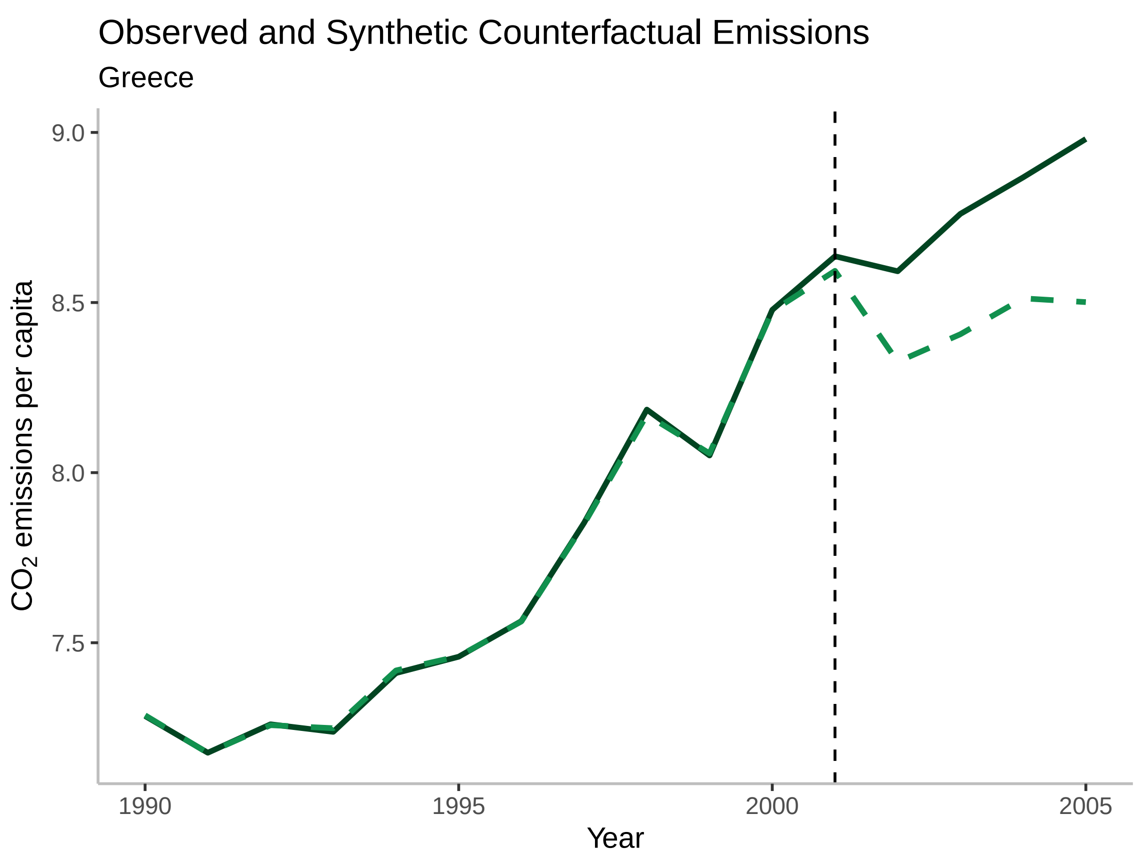


Figure S26: Observed and synthetic counterfactual emissions for placebo country Greece.

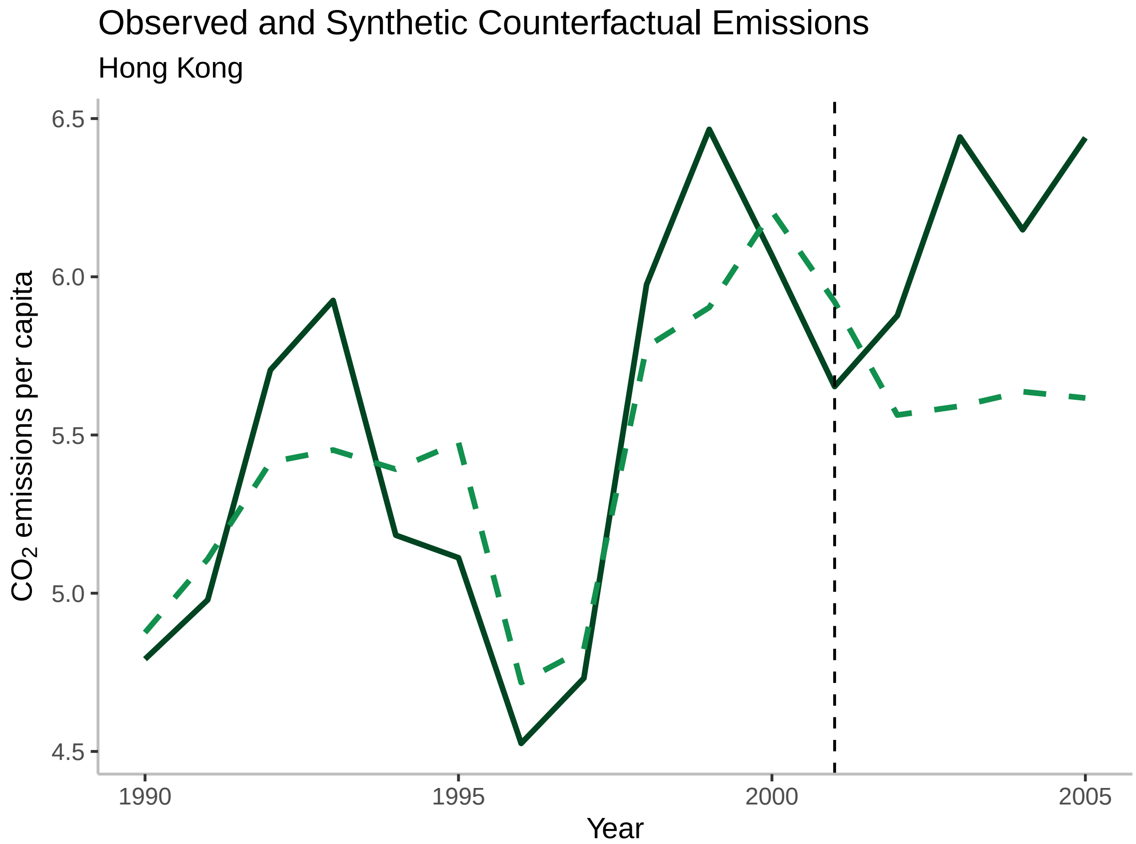


Figure S27: Observed and synthetic counterfactual emissions for placebo country Hong Kong.

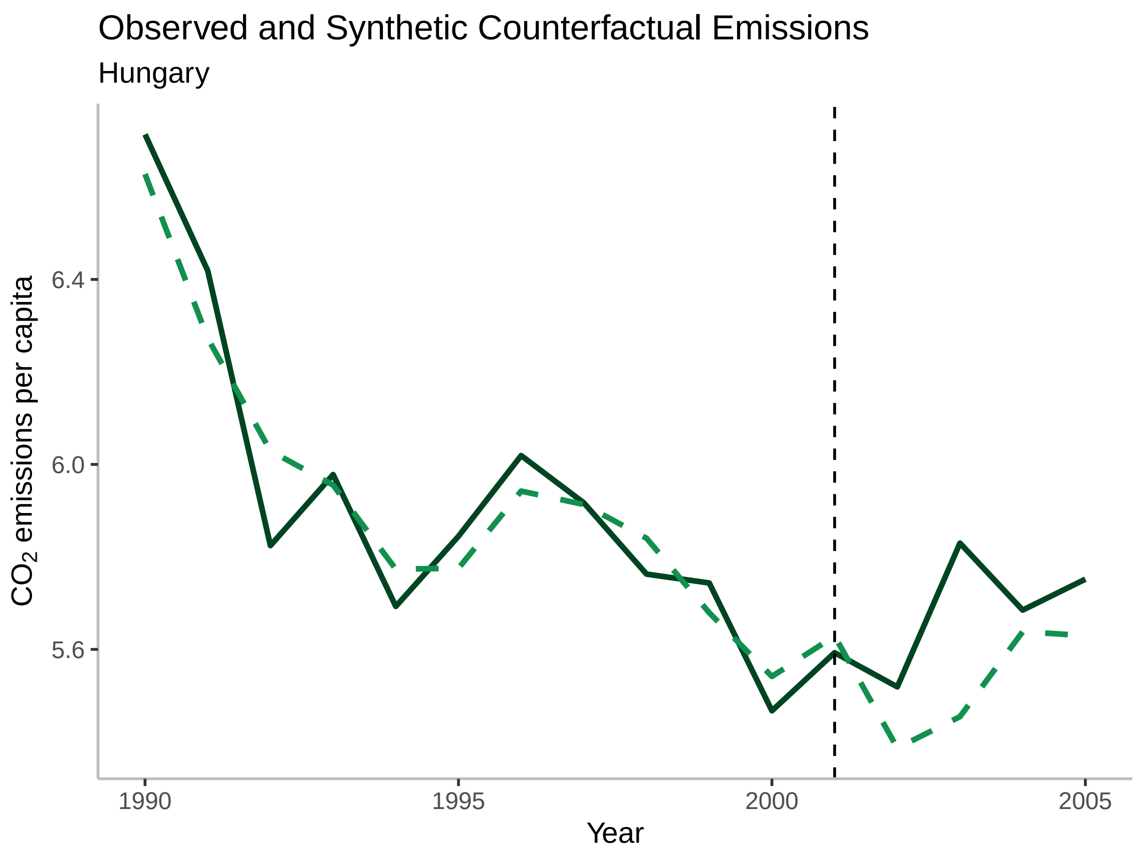


Figure S28: Observed and synthetic counterfactual emissions for placebo country Hungary.

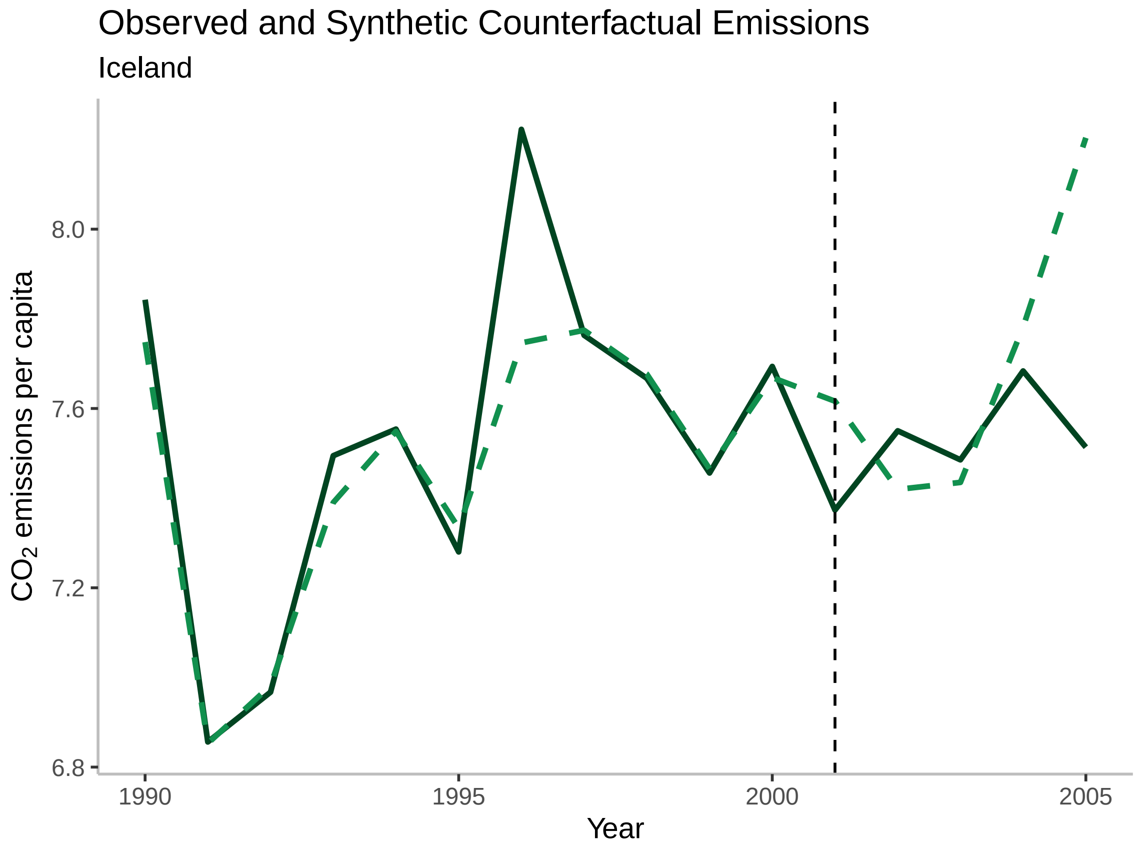


Figure S29: Observed and synthetic counterfactual emissions for placebo country Iceland.

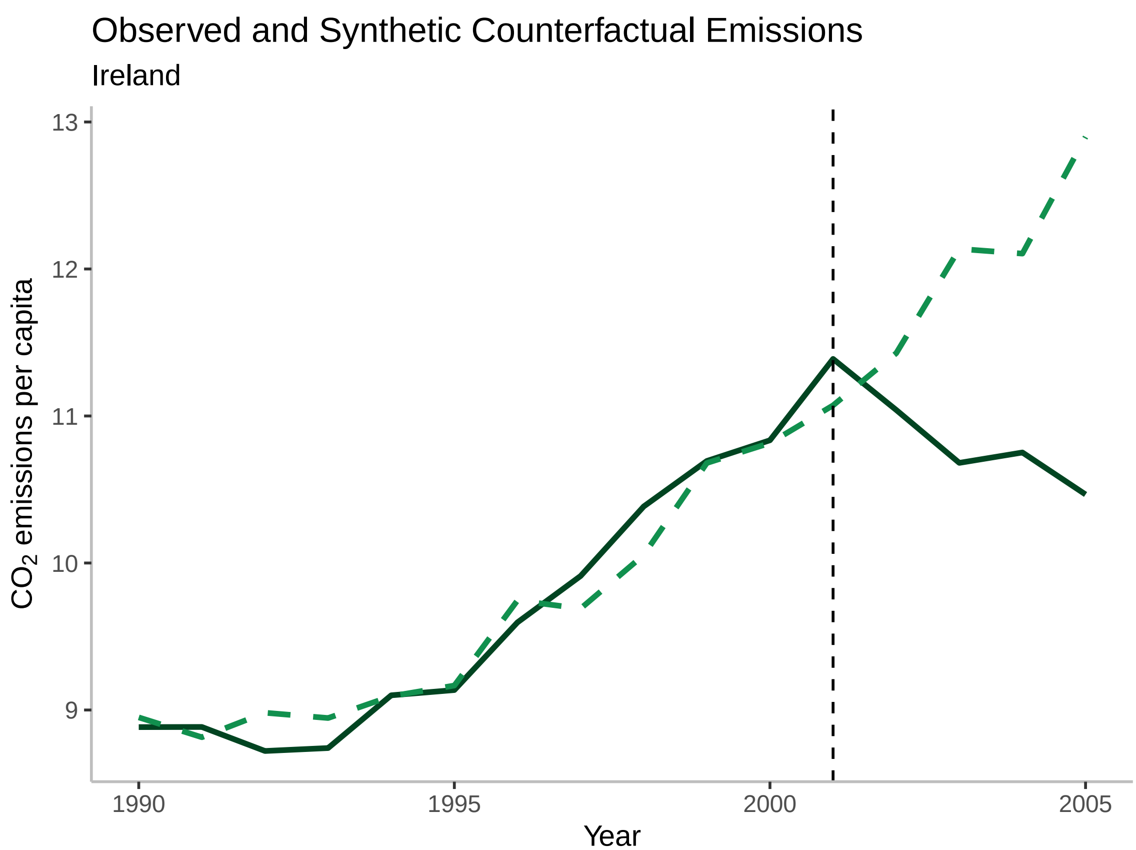


Figure S30: Observed and synthetic counterfactual emissions for placebo country Ireland.

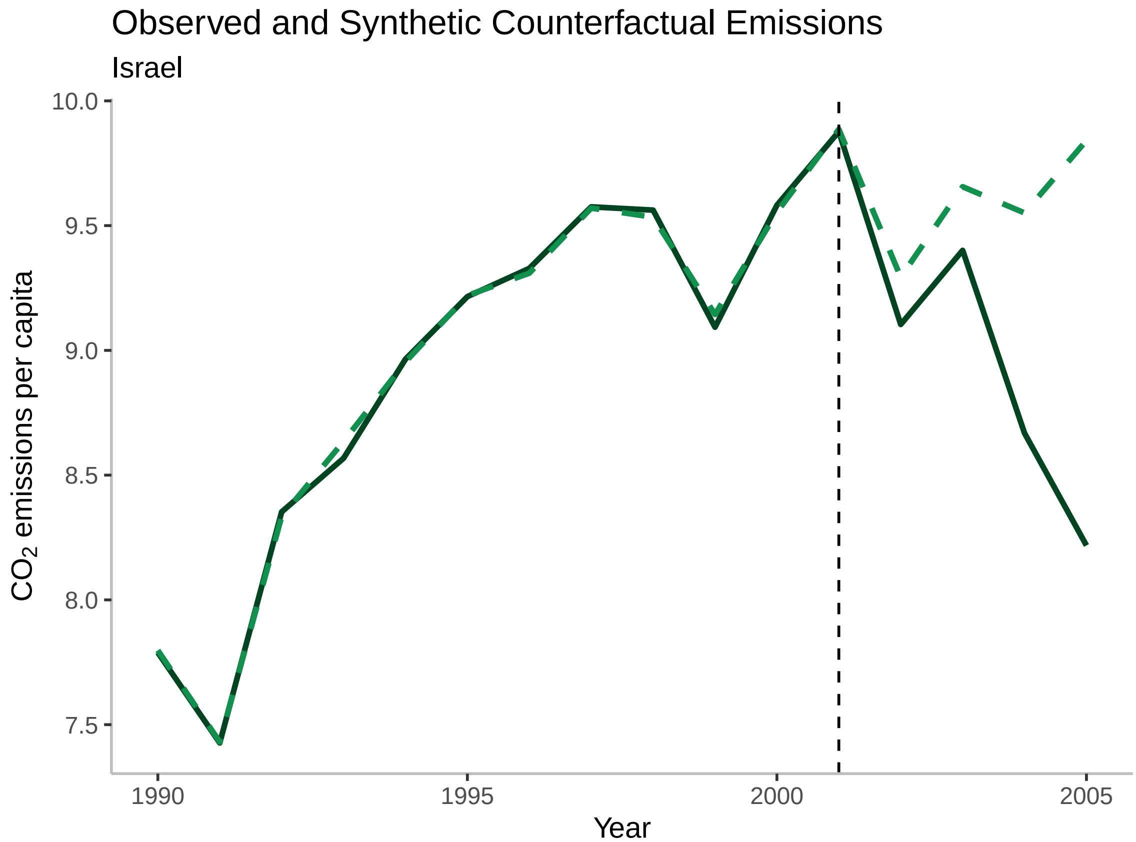


Figure S31: Observed and synthetic counterfactual emissions for placebo country Israel.

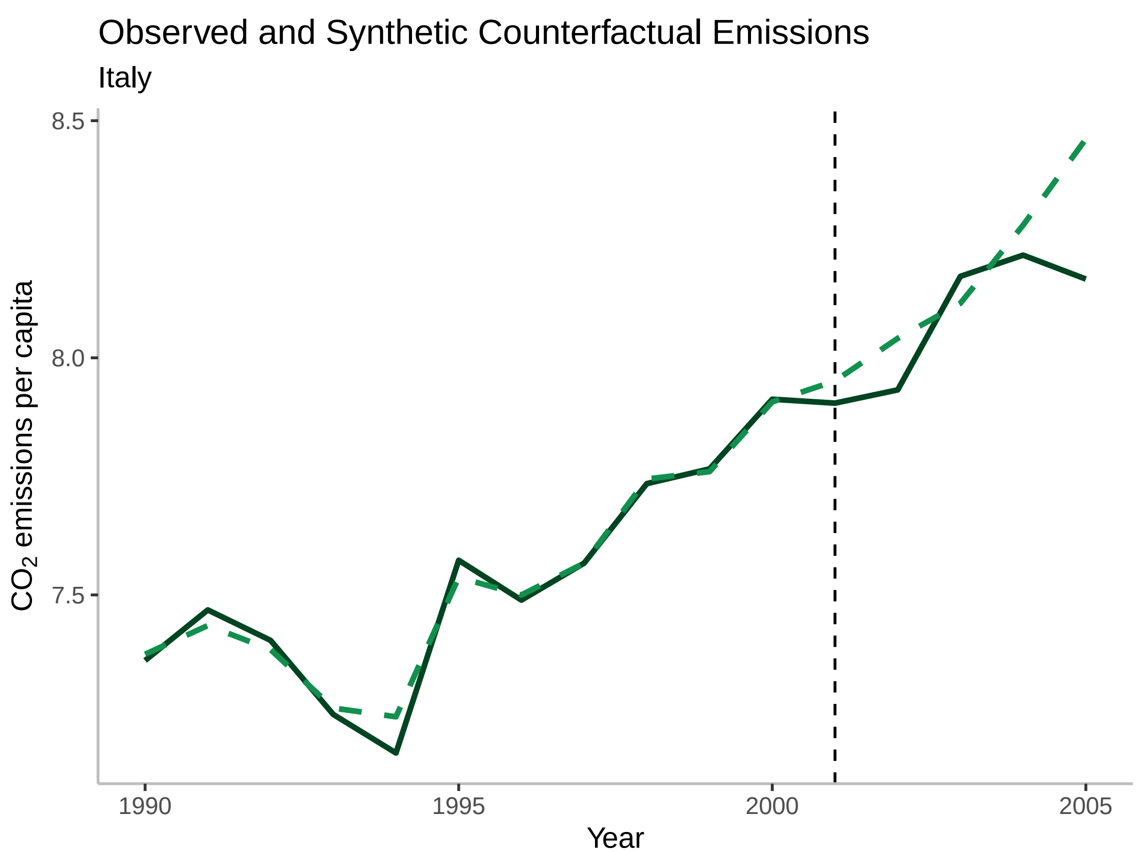


Figure S32: Observed and synthetic counterfactual emissions for placebo country Italy.

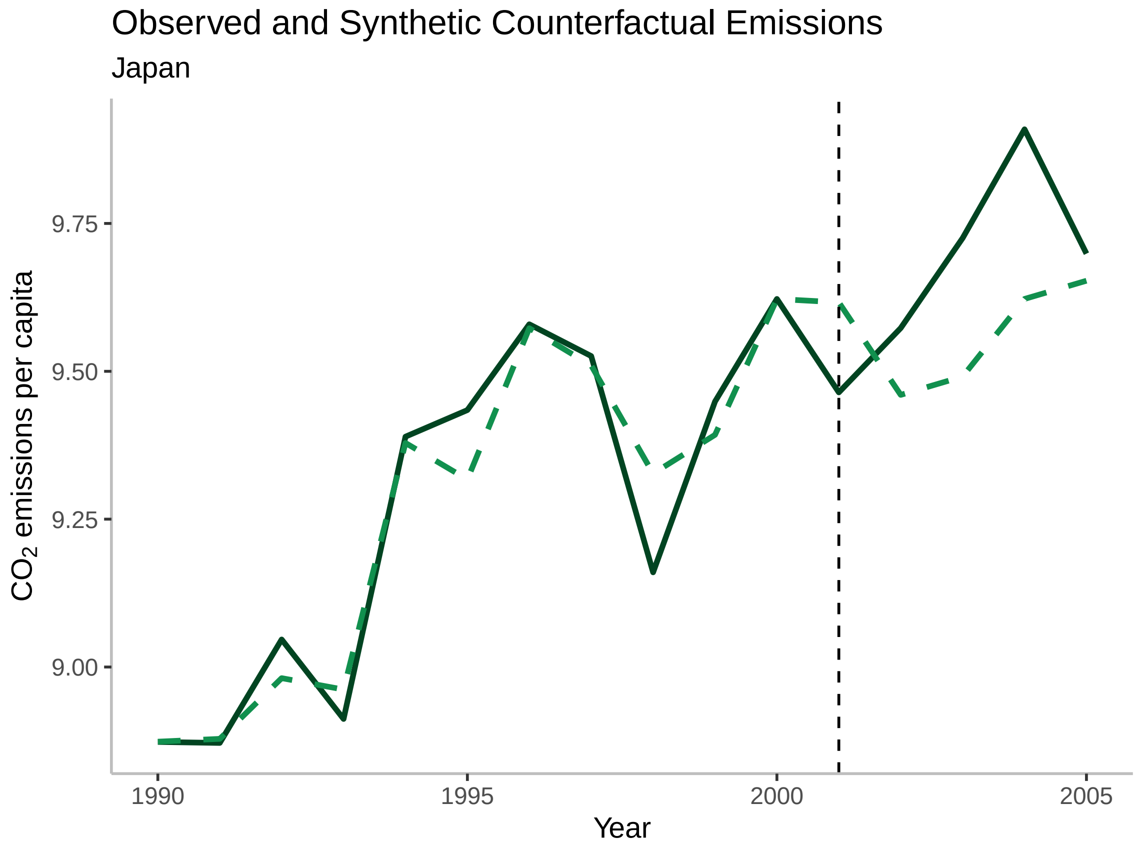


Figure S33: Observed and synthetic counterfactual emissions for placebo country Japan.

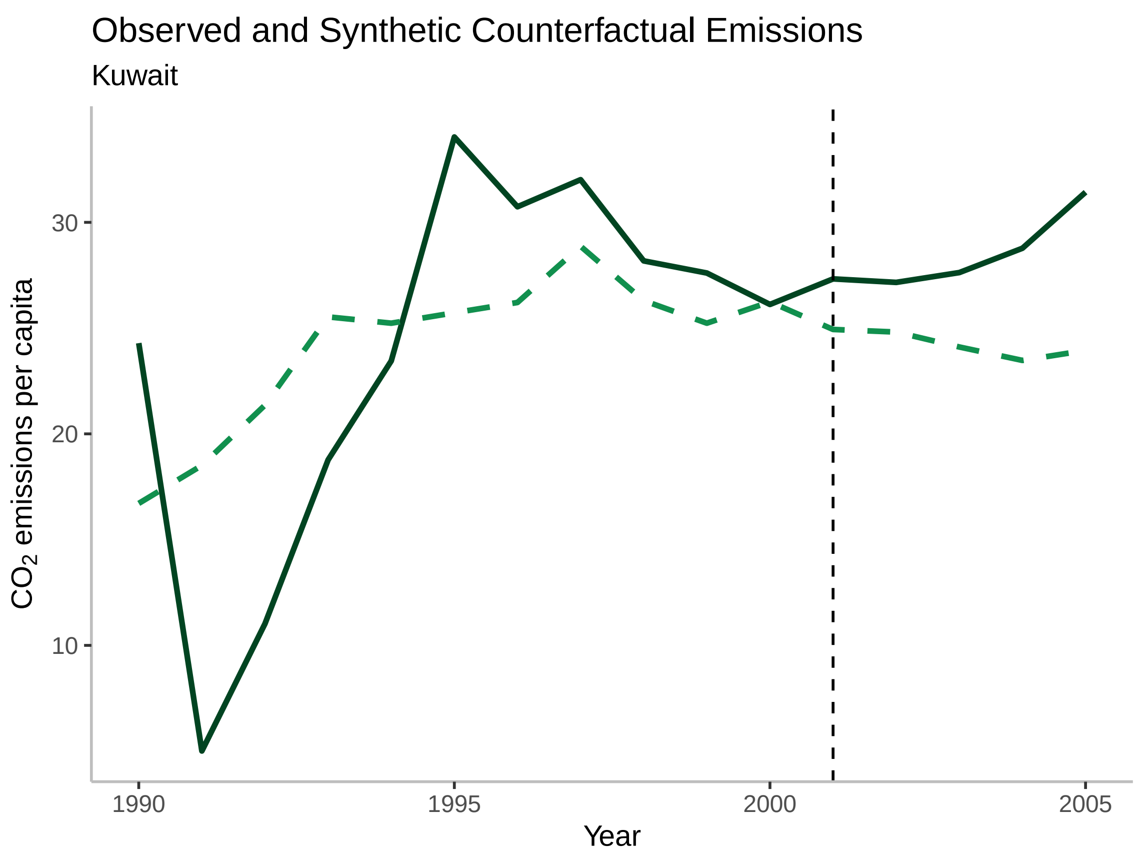


Figure S34: Observed and synthetic counterfactual emissions for placebo country Kuwait.

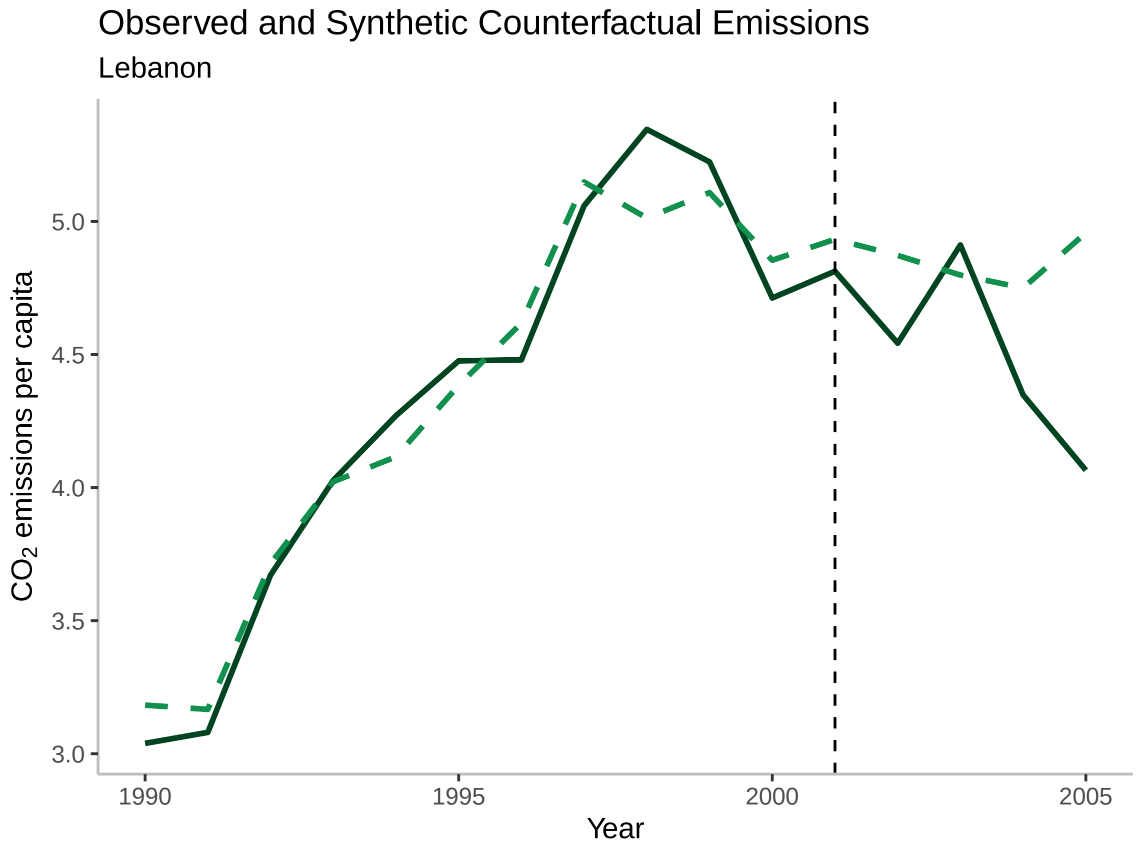


Figure S35: Observed and synthetic counterfactual emissions for placebo country Lebanon.

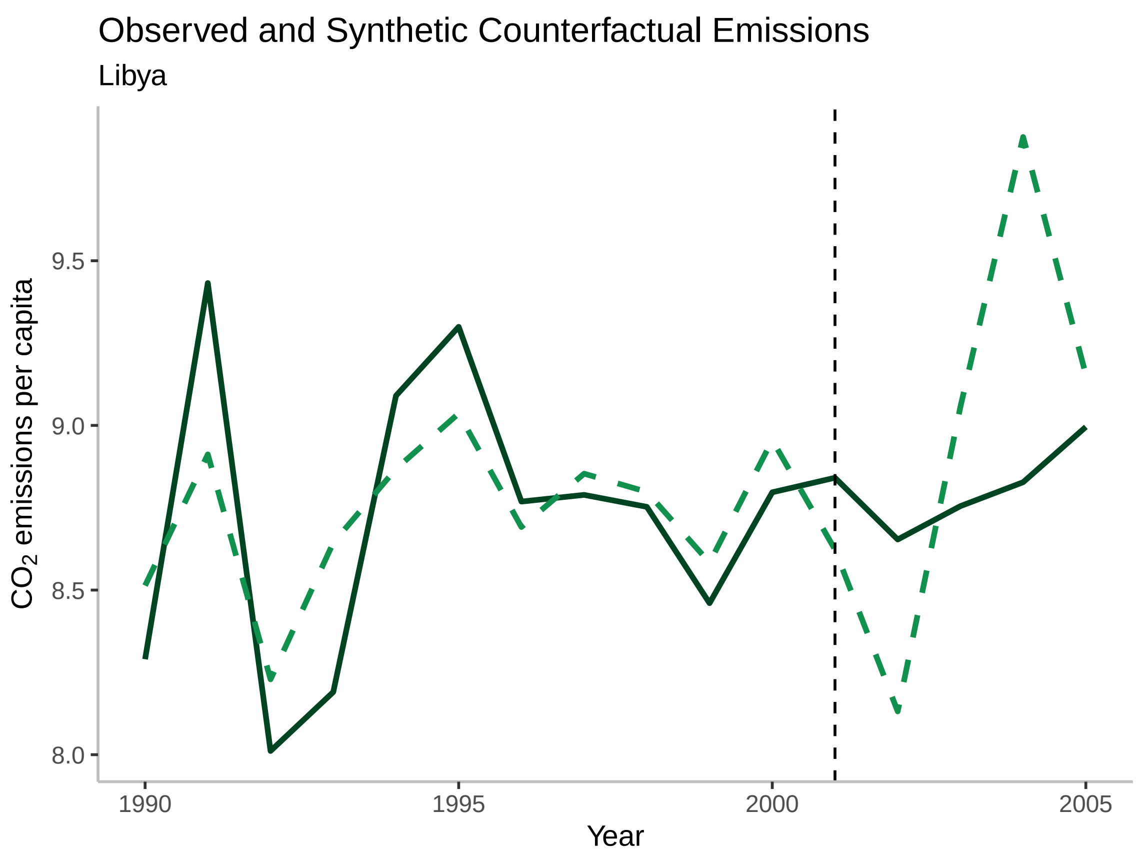


Figure S36: Observed and synthetic counterfactual emissions for placebo country Libya.

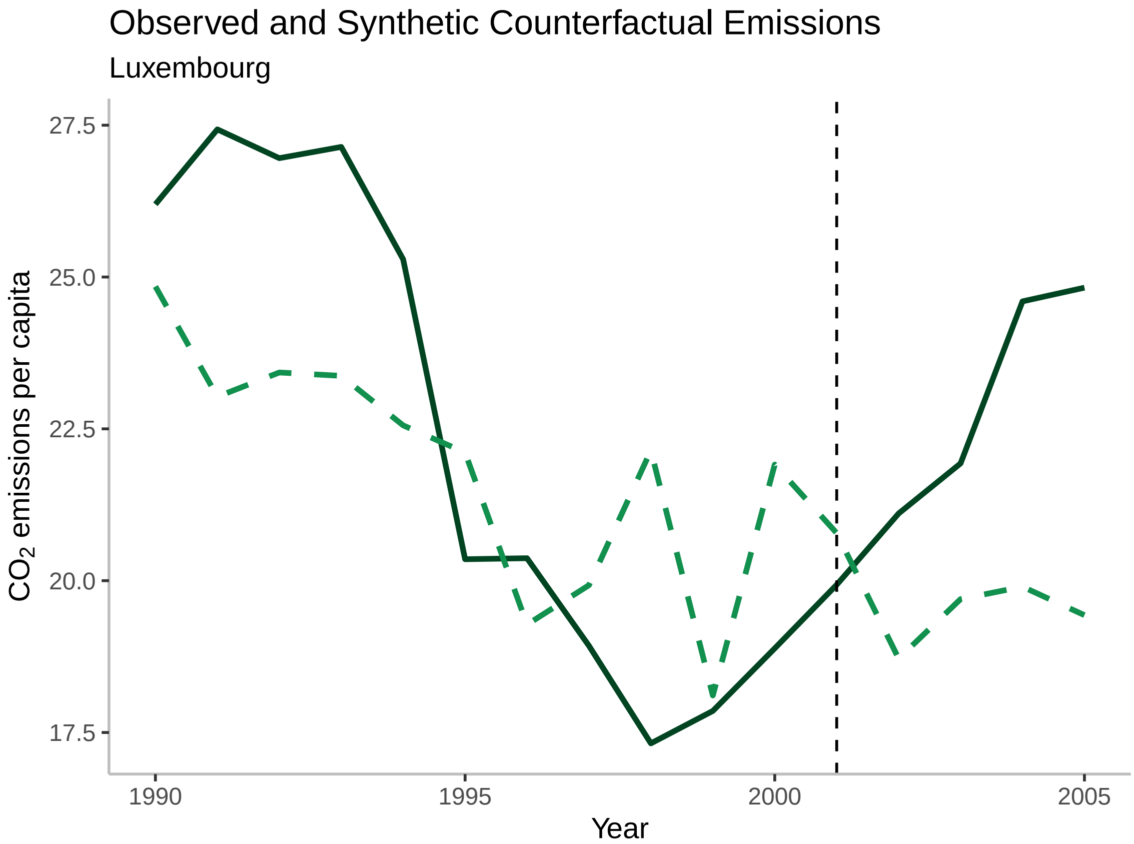


Figure S37: Observed and synthetic counterfactual emissions for placebo country Luxembourg.

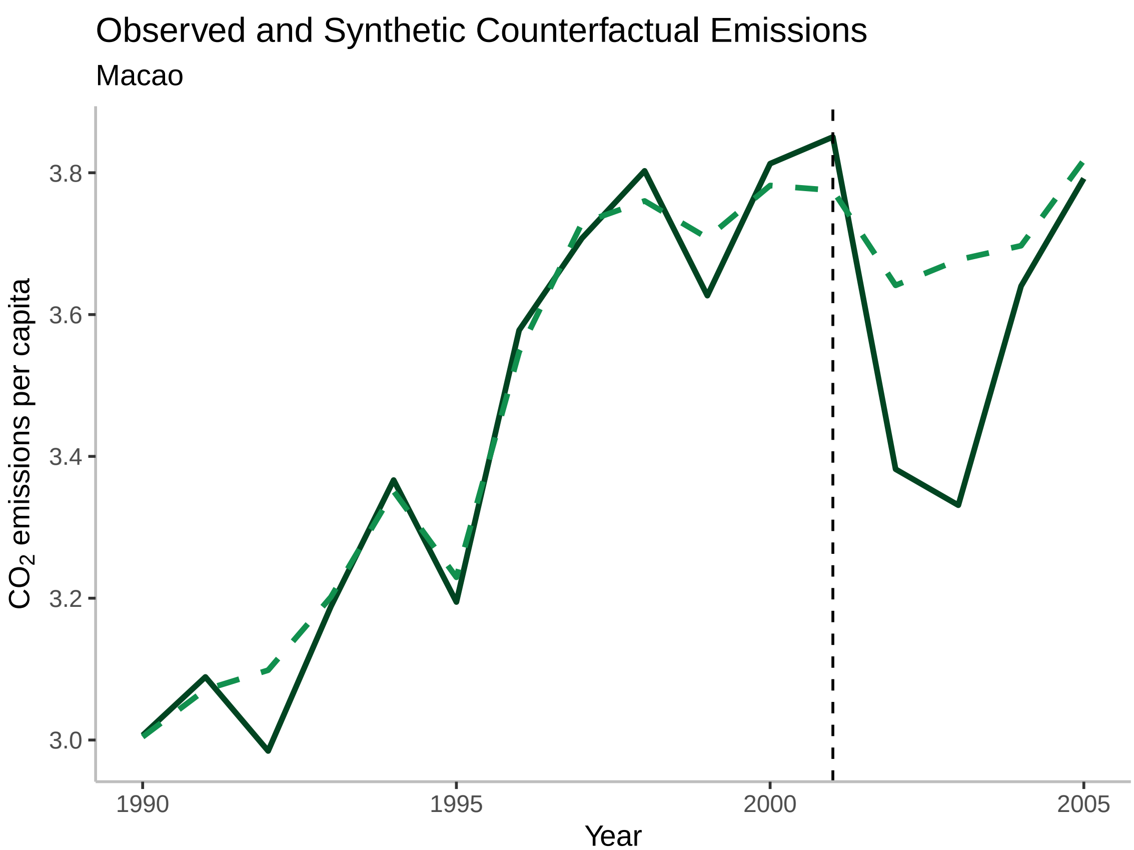


Figure S38: Observed and synthetic counterfactual emissions for placebo country Macao.

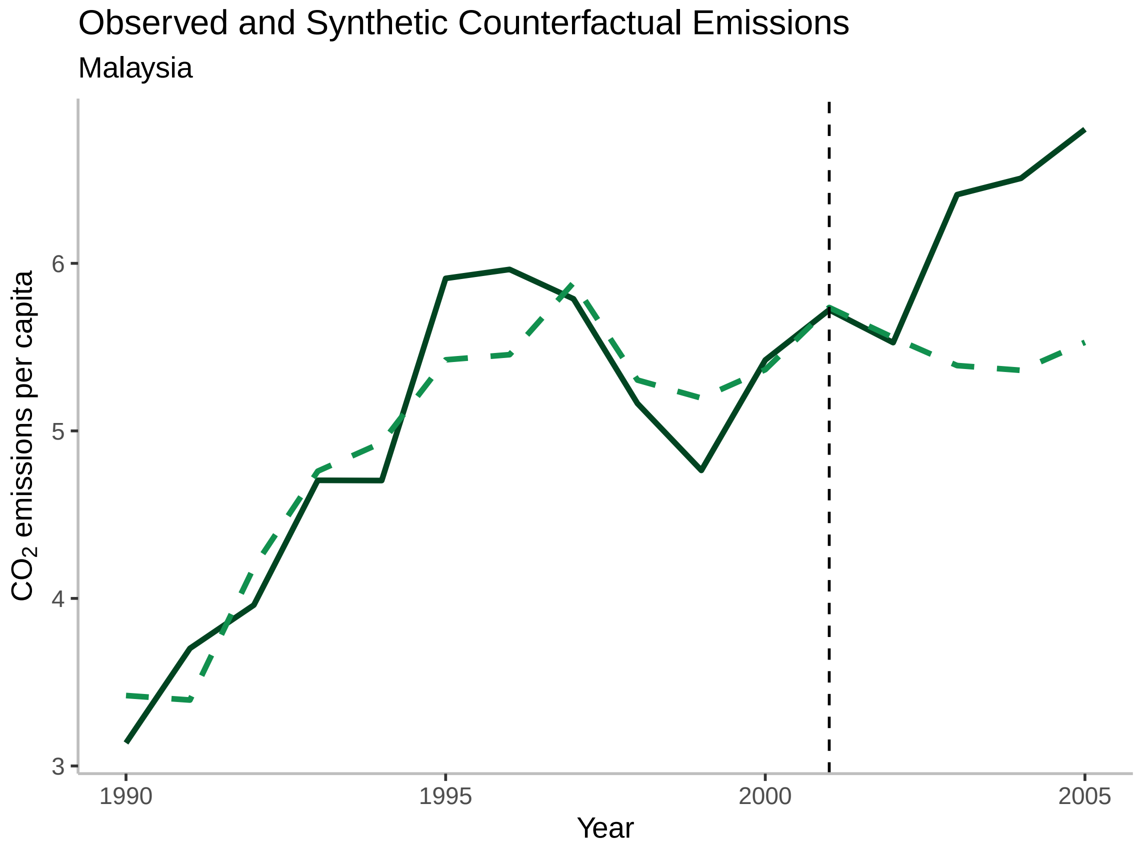


Figure S39: Observed and synthetic counterfactual emissions for placebo country Malaysia.

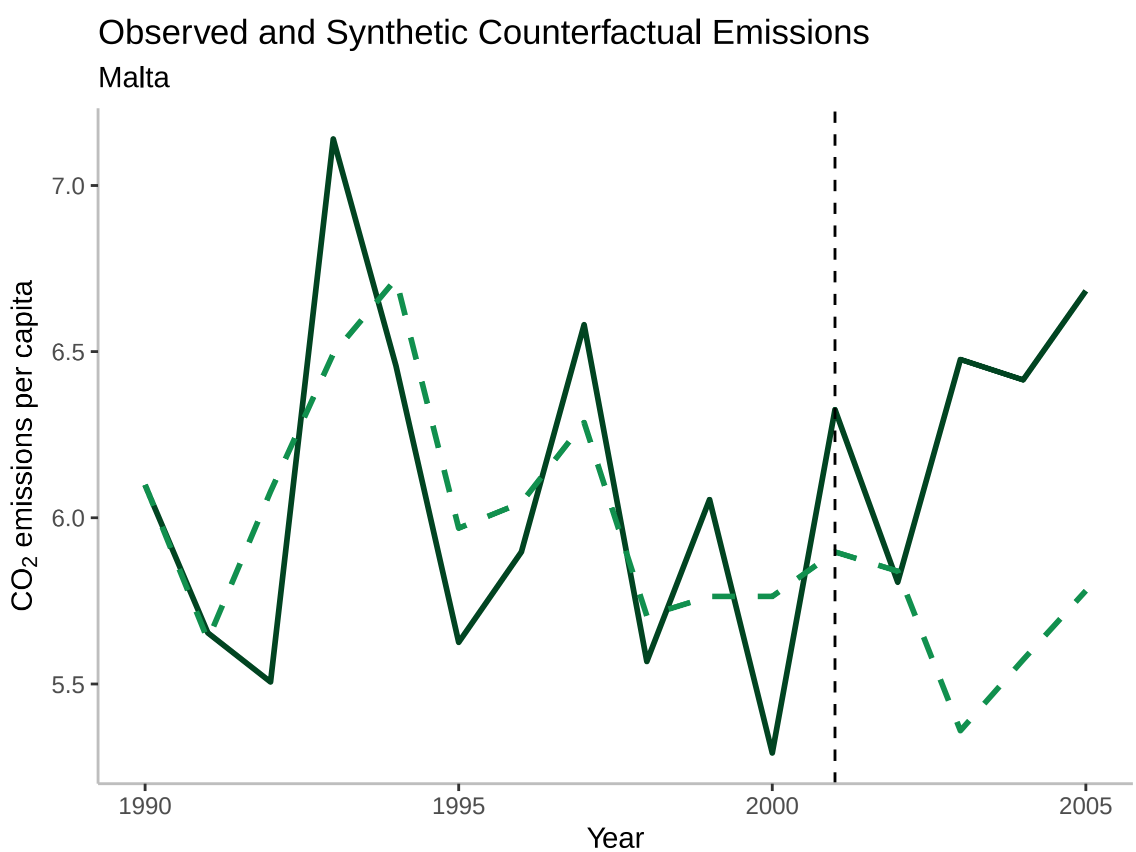


Figure S40: Observed and synthetic counterfactual emissions for placebo country Malta.

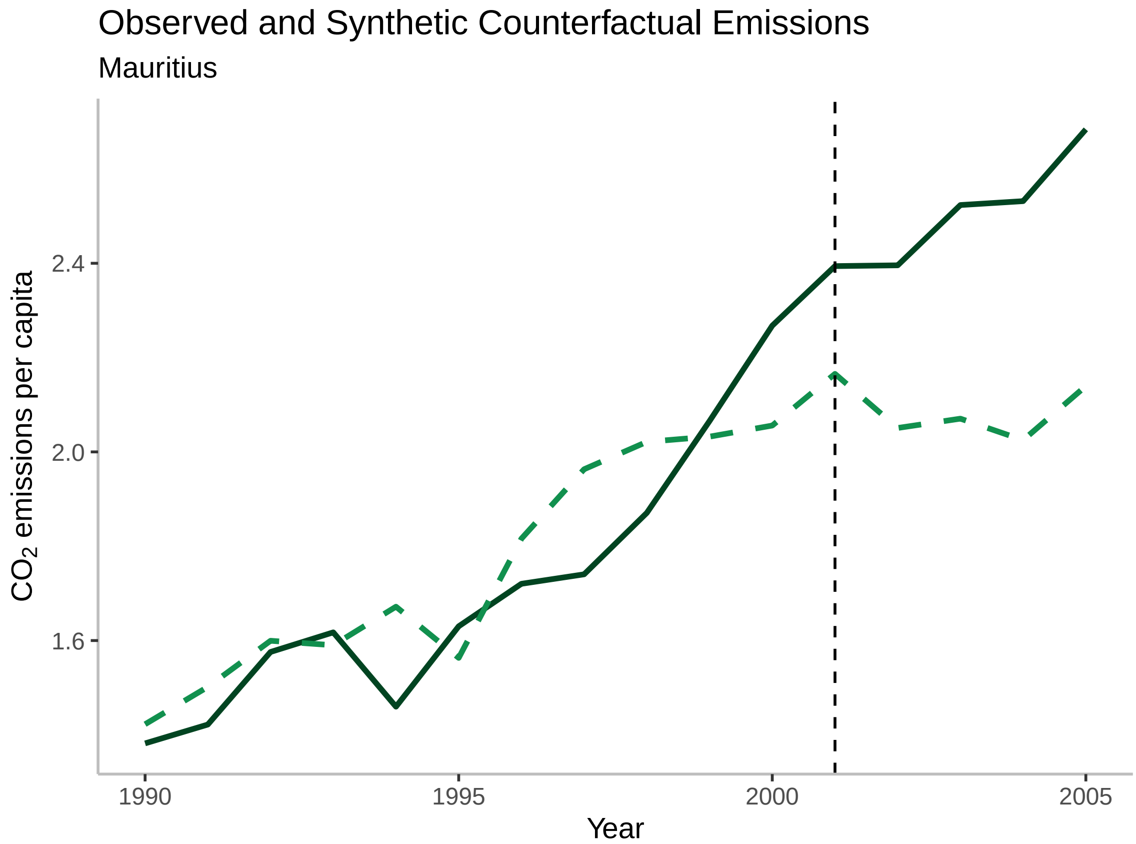


Figure S41: Observed and synthetic counterfactual emissions for placebo country Mauritius.

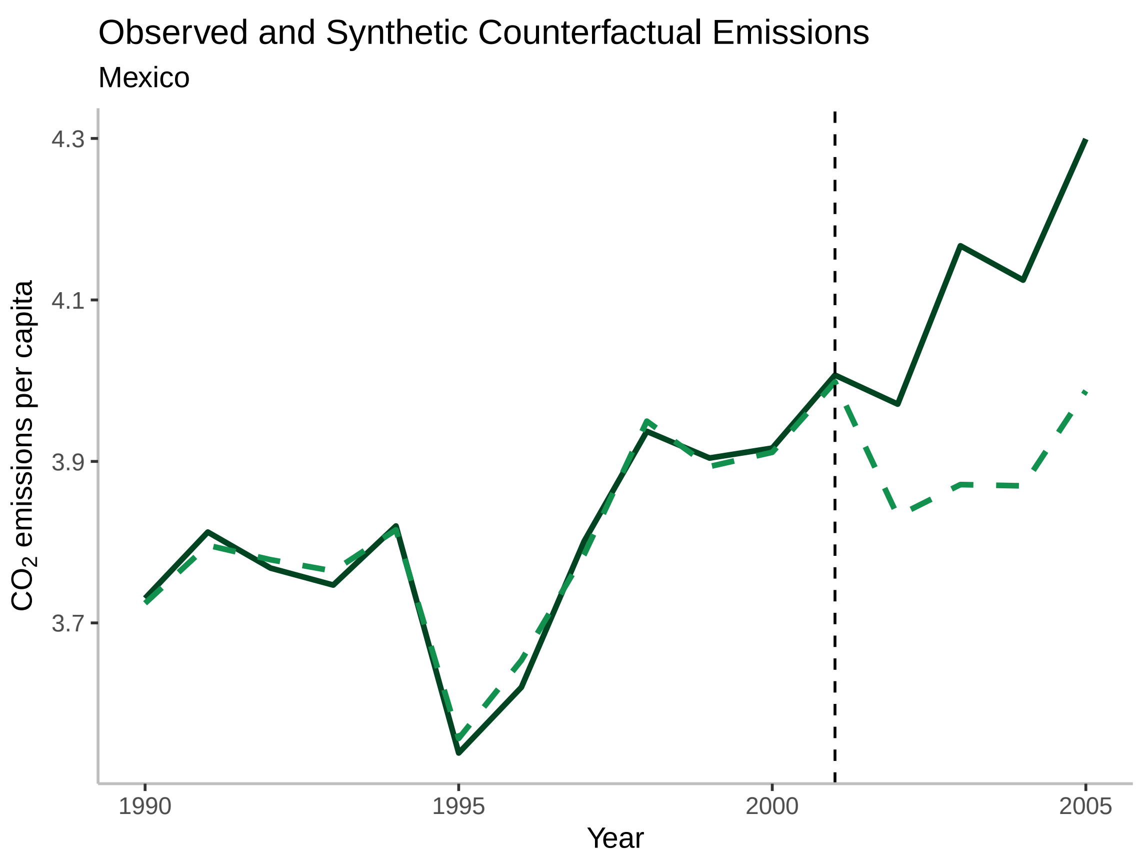


Figure S42: Observed and synthetic counterfactual emissions for placebo country Mexico.

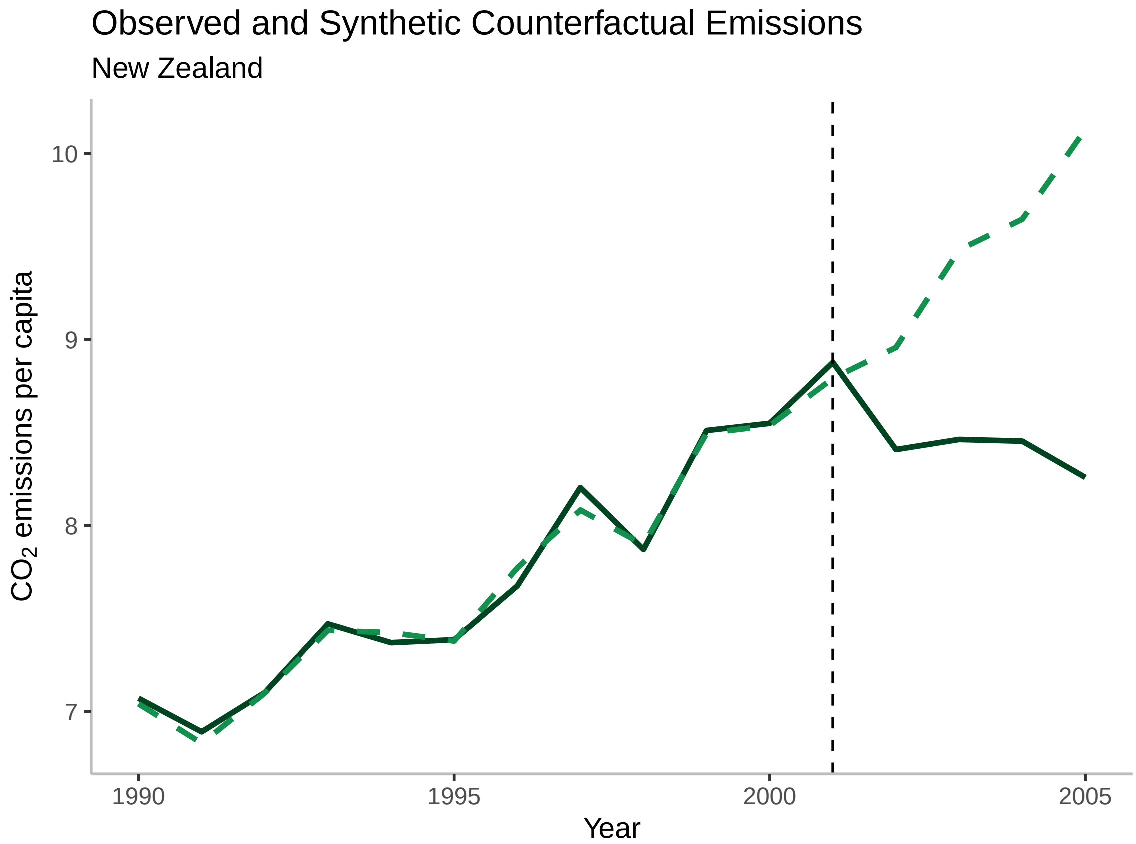


Figure S43: Observed and synthetic counterfactual emissions for placebo country New Zealand.

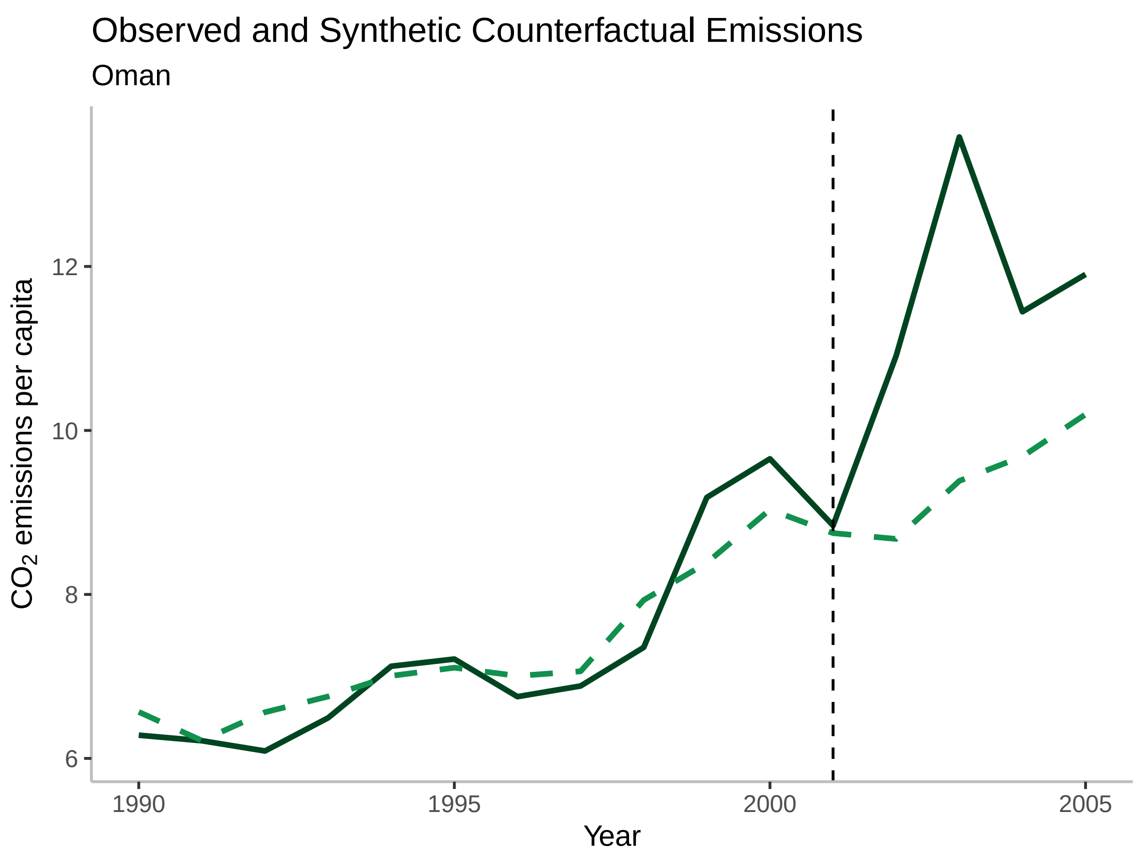


Figure S44: Observed and synthetic counterfactual emissions for placebo country Oman.

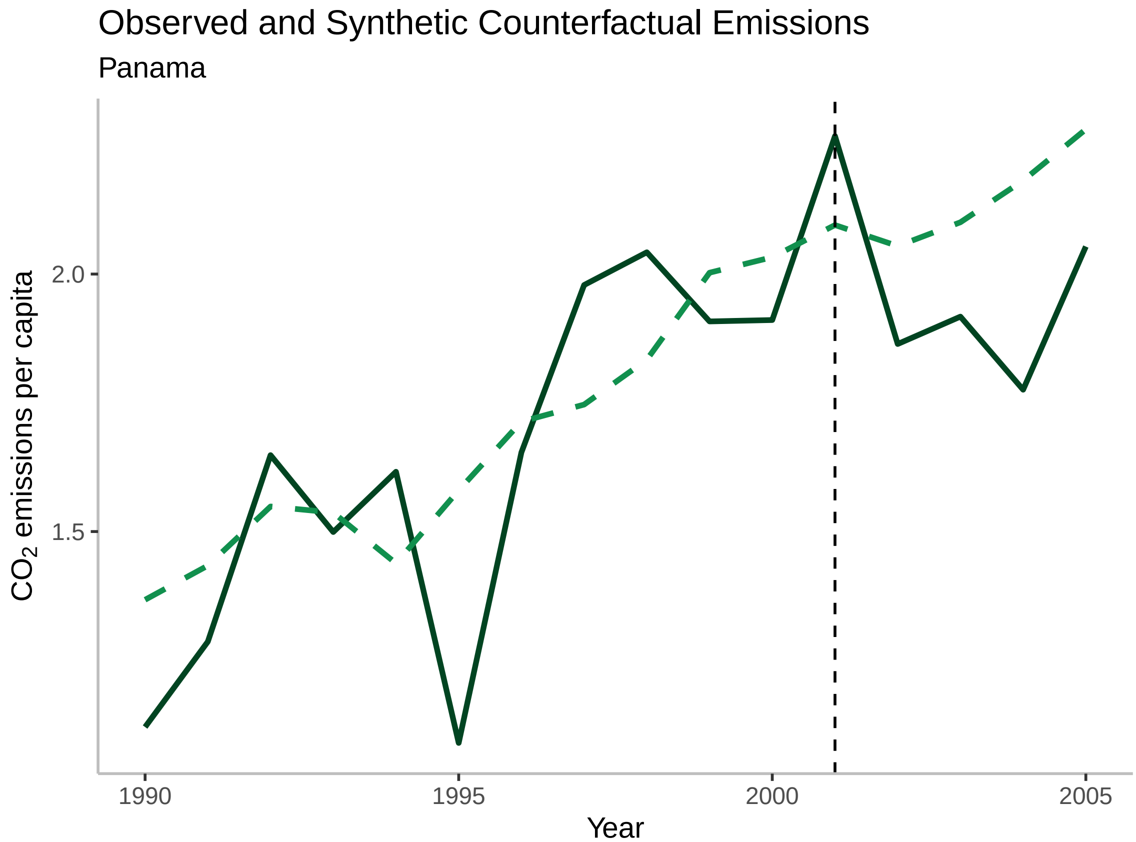


Figure S45: Observed and synthetic counterfactual emissions for placebo country Panama.

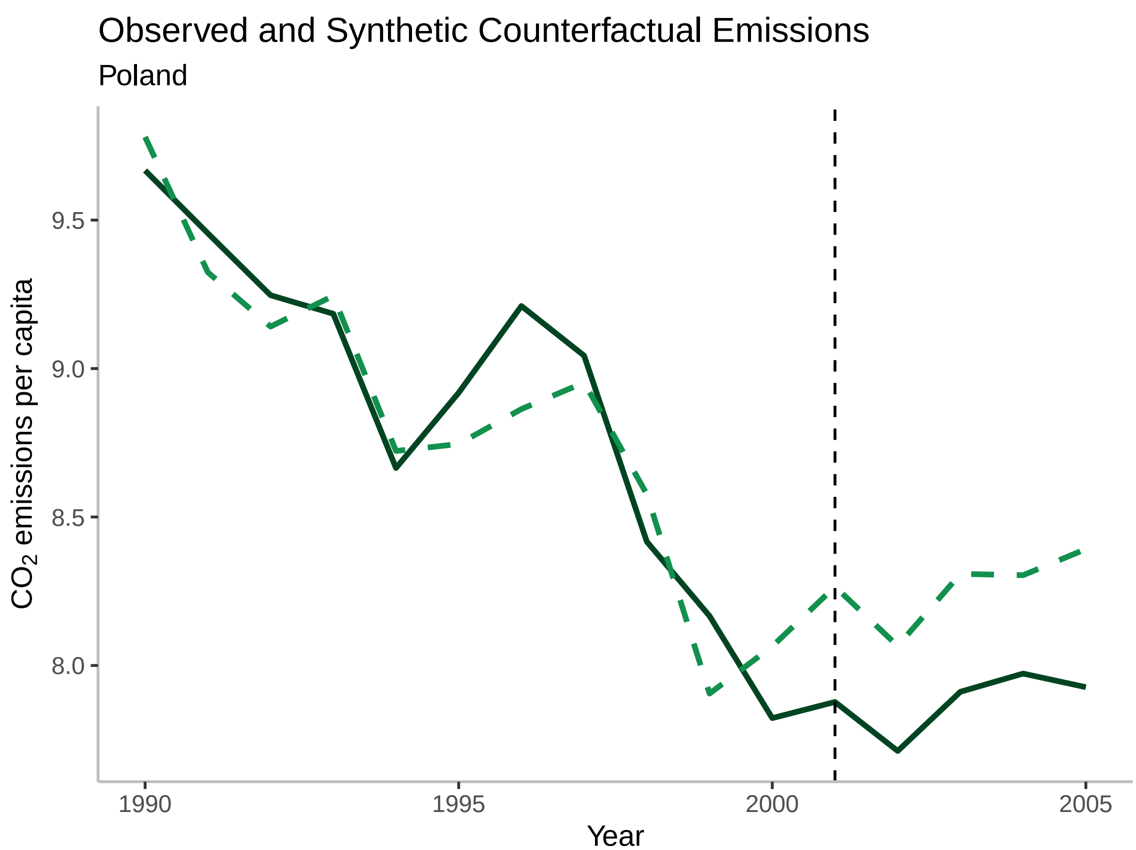


Figure S46: Observed and synthetic counterfactual emissions for placebo country Poland.

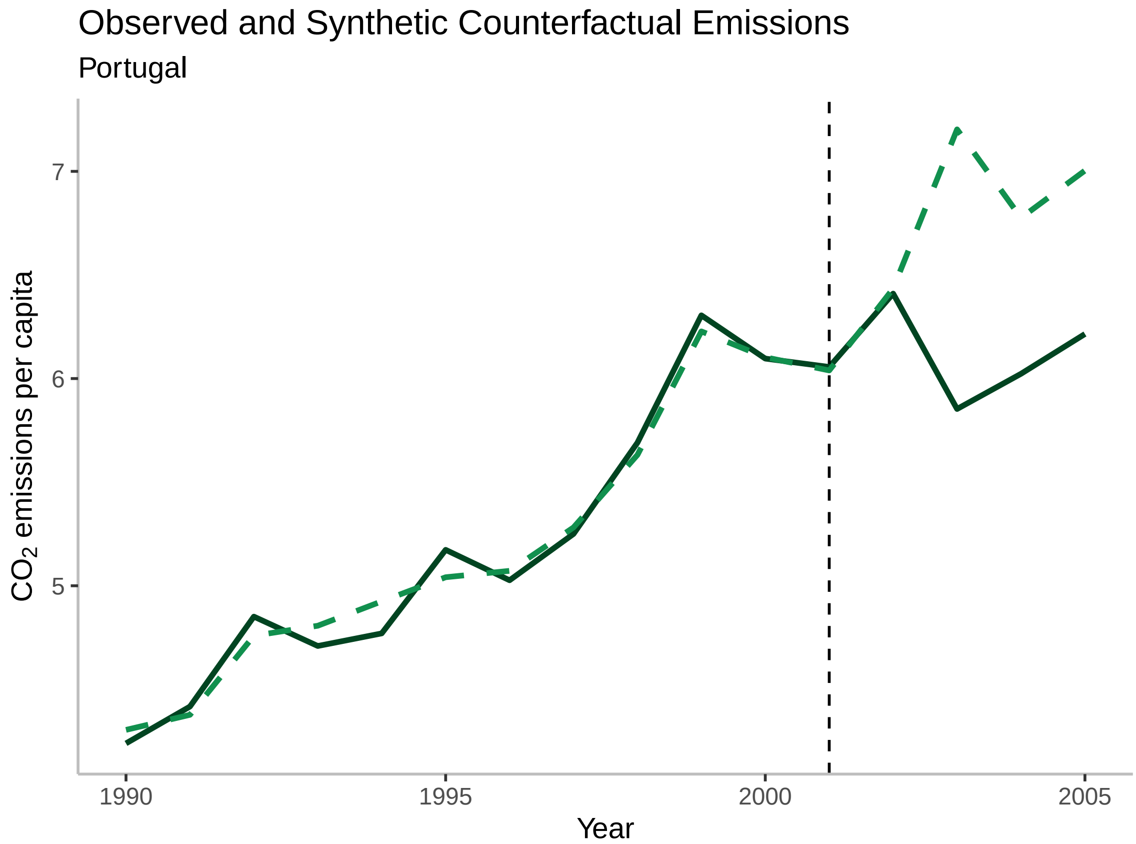


Figure S47: Observed and synthetic counterfactual emissions for placebo country Portugal.

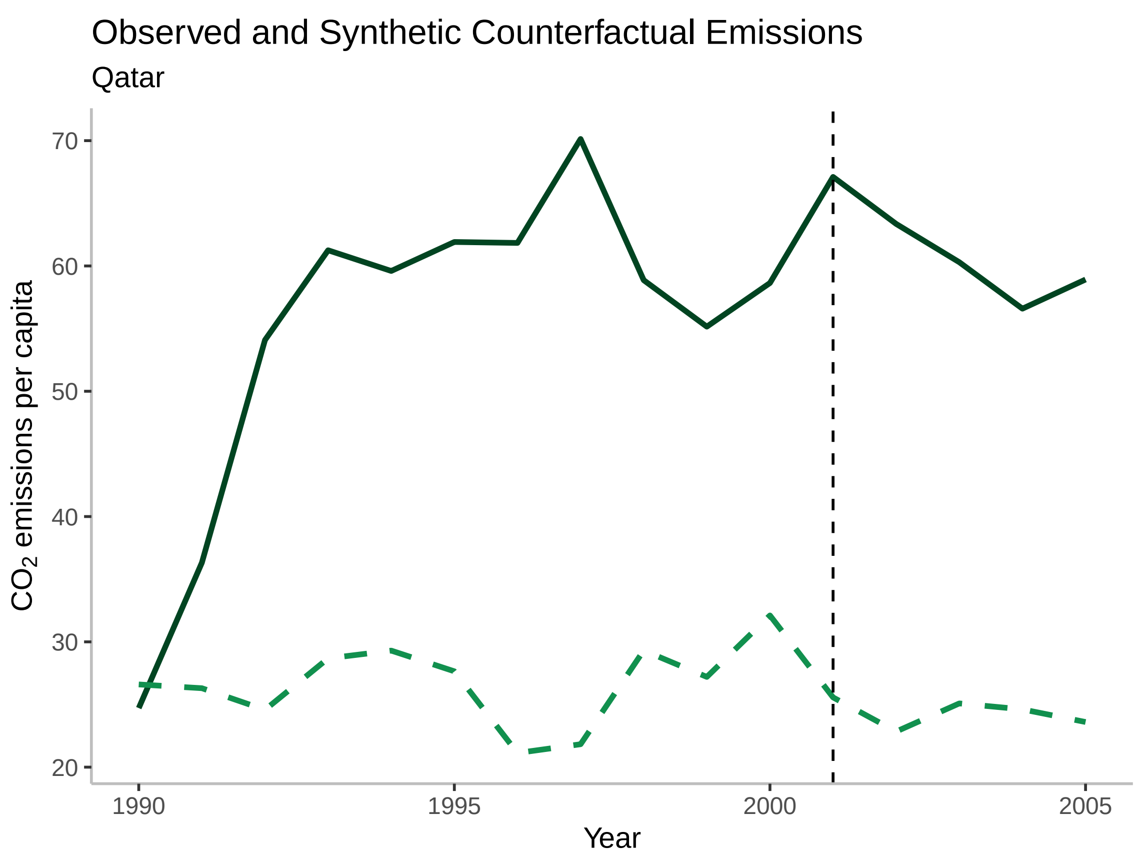


Figure S48: Observed and synthetic counterfactual emissions for placebo country Qatar.

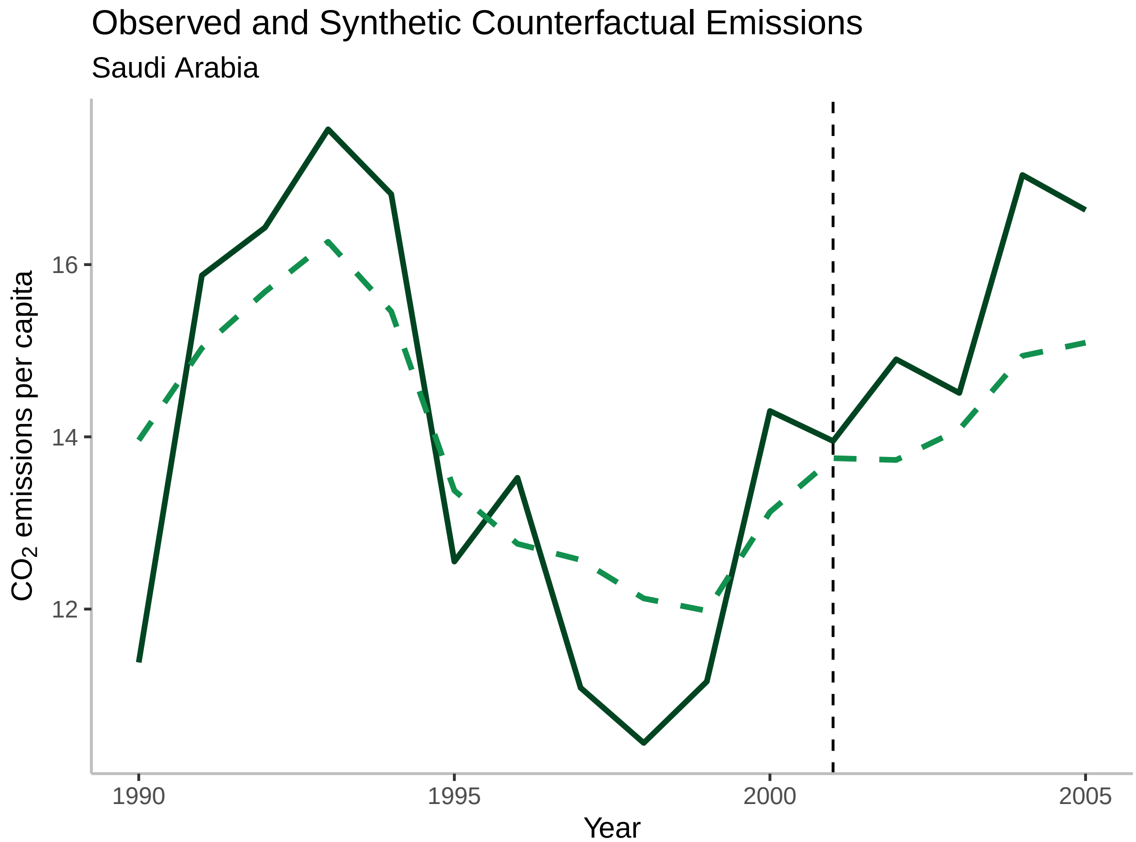


Figure S49: Observed and synthetic counterfactual emissions for placebo country Saudi Arabia.

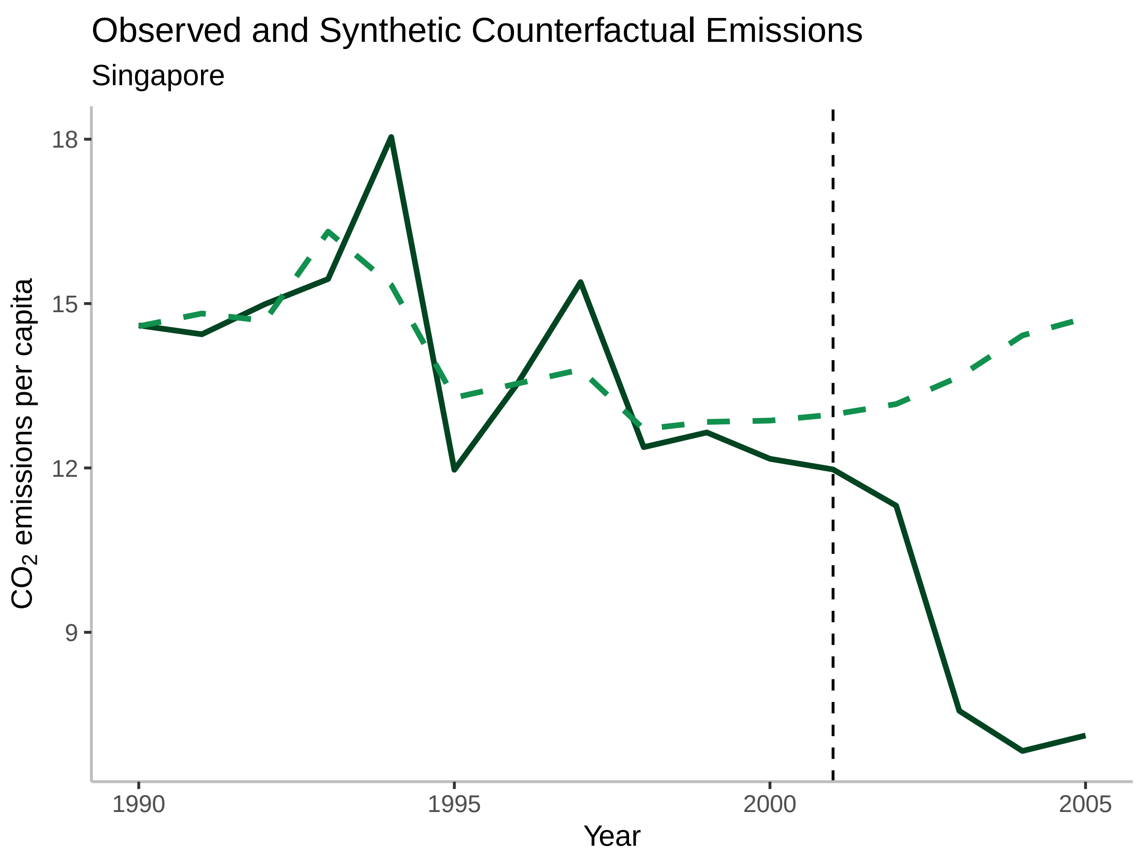


Figure S50: Observed and synthetic counterfactual emissions for placebo country Singapore.

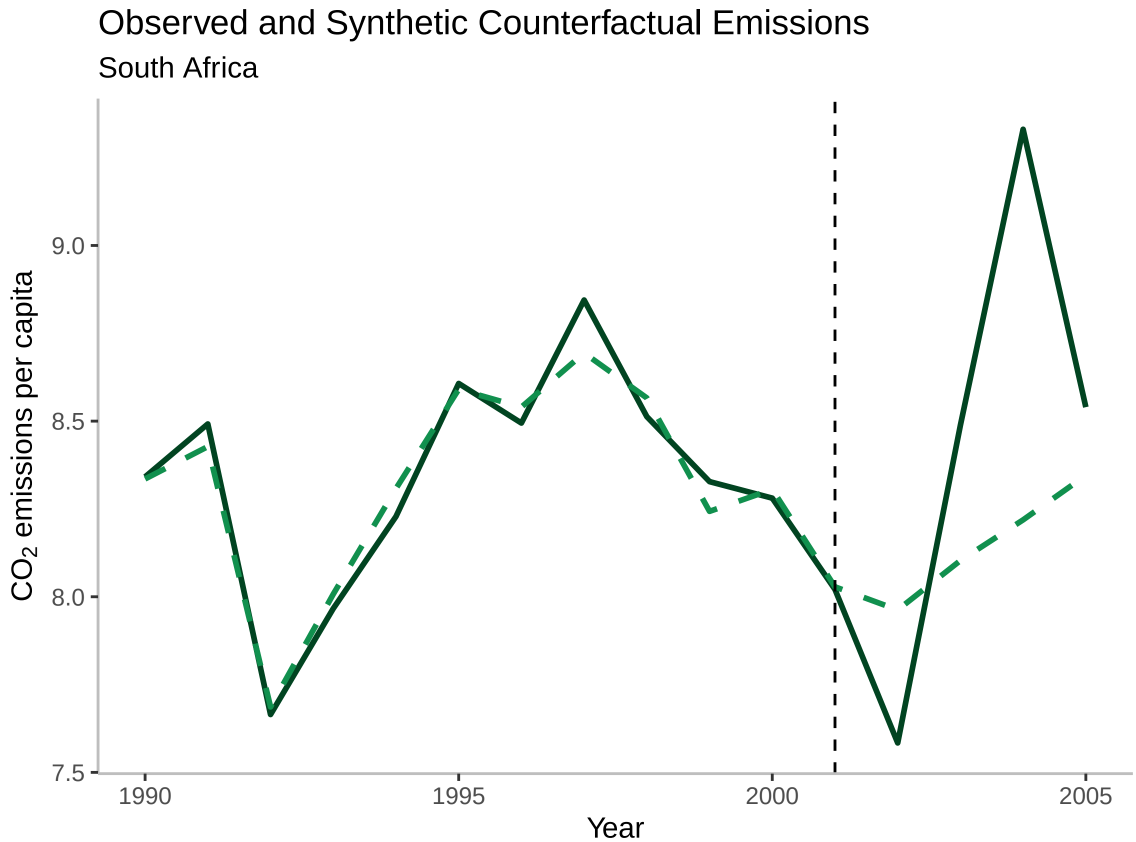


Figure S51: Observed and synthetic counterfactual emissions for placebo country South Africa.

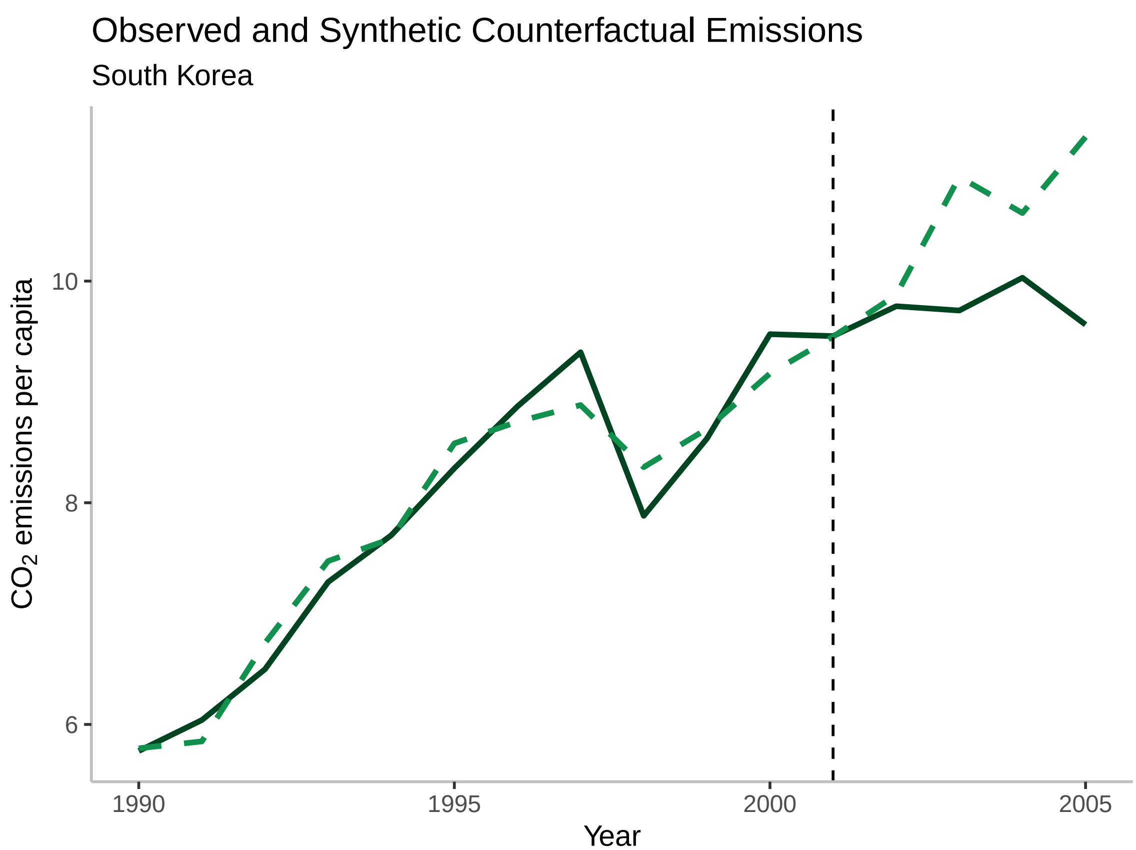


Figure S52: Observed and synthetic counterfactual emissions for placebo country South Korea.

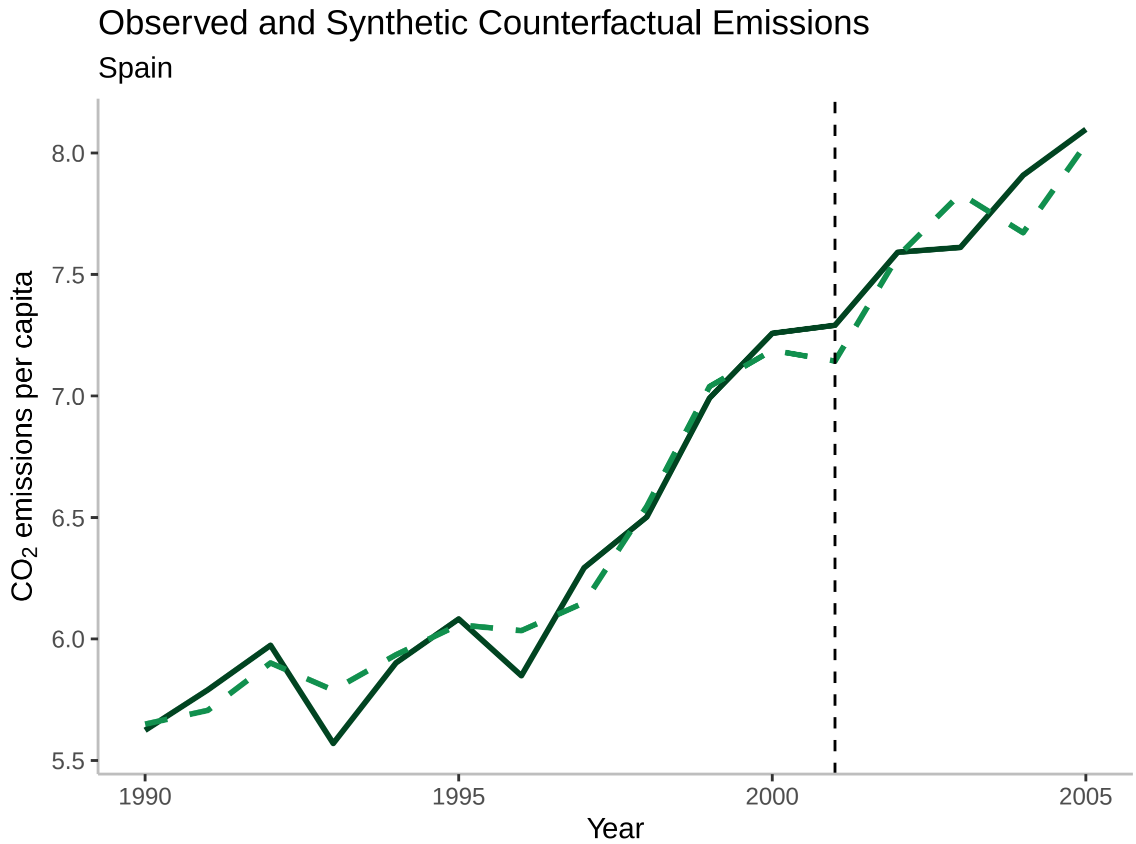


Figure S53: Observed and synthetic counterfactual emissions for placebo country Spain.

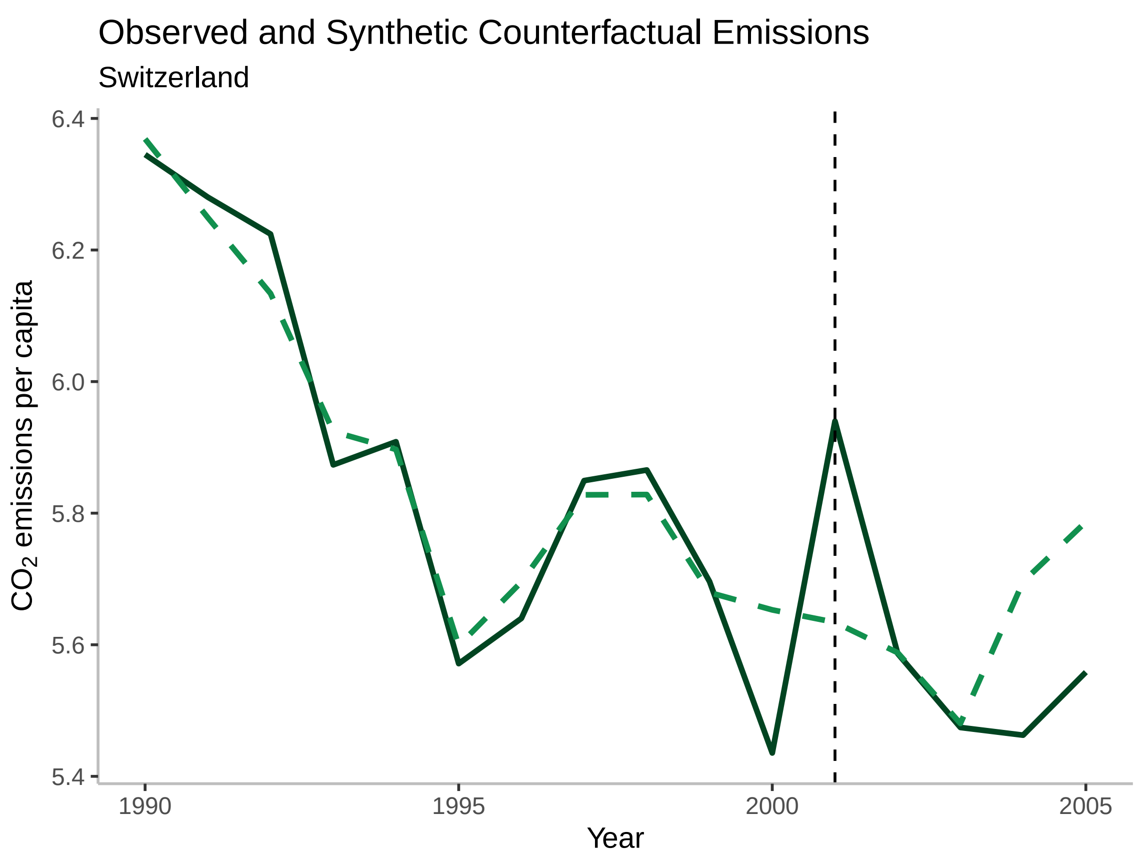


Figure S54: Observed and synthetic counterfactual emissions for placebo country Switzerland.

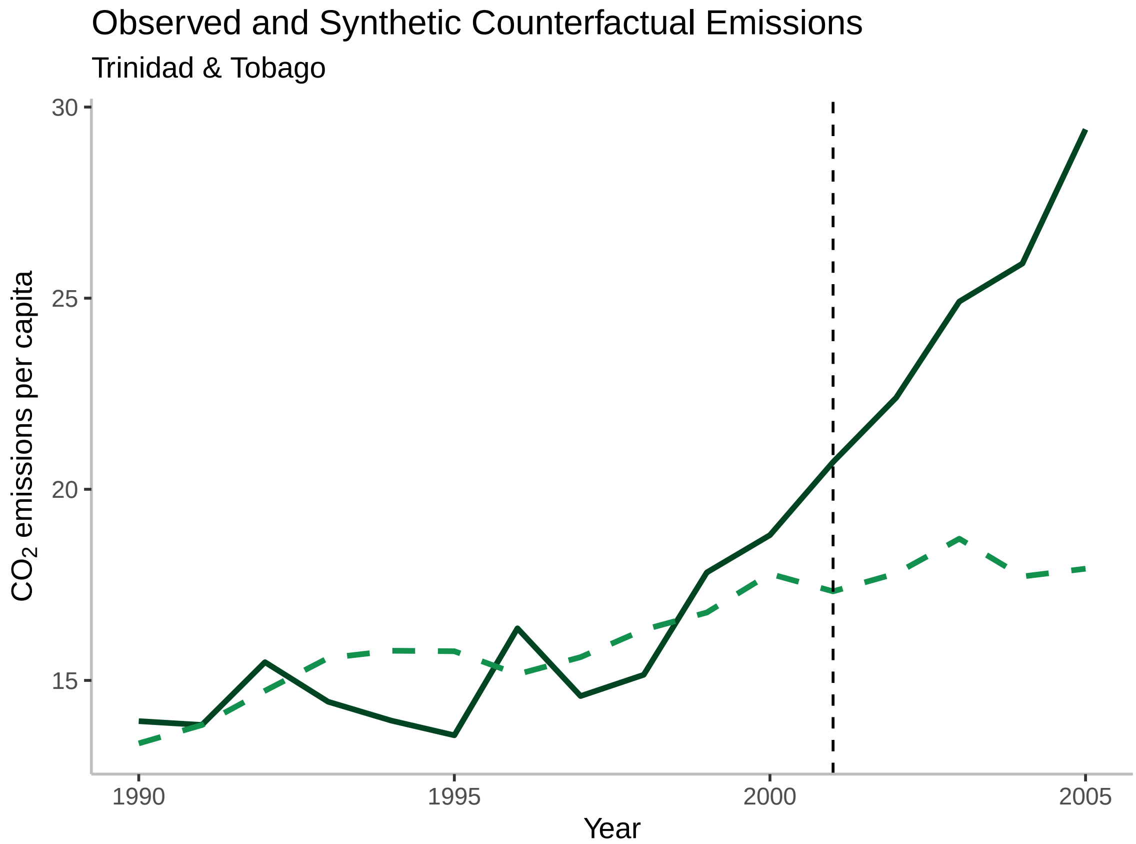


Figure S55: Observed and synthetic counterfactual emissions for placebo country Trinidad and Tobago.

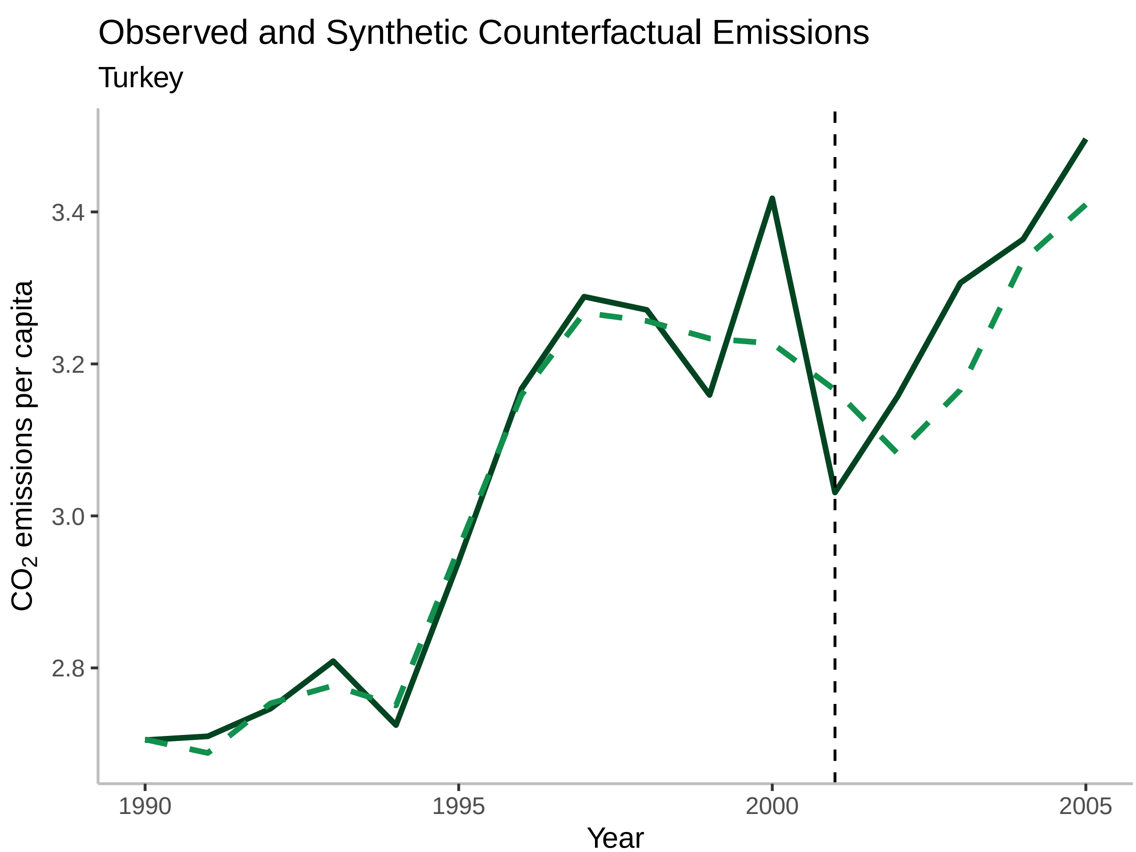


Figure S56: Observed and synthetic counterfactual emissions for placebo country Turkey.

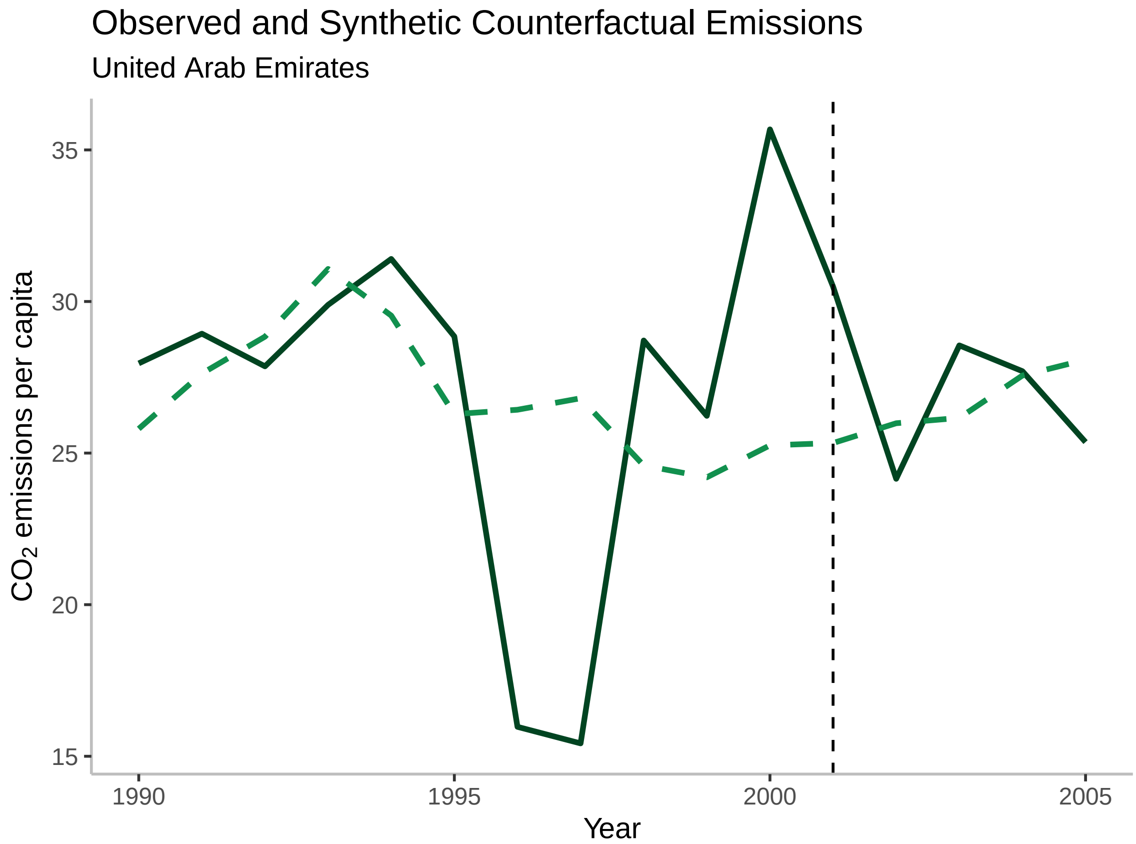


Figure S57: Observed and synthetic counterfactual emissions for placebo country United Arab Emirates.

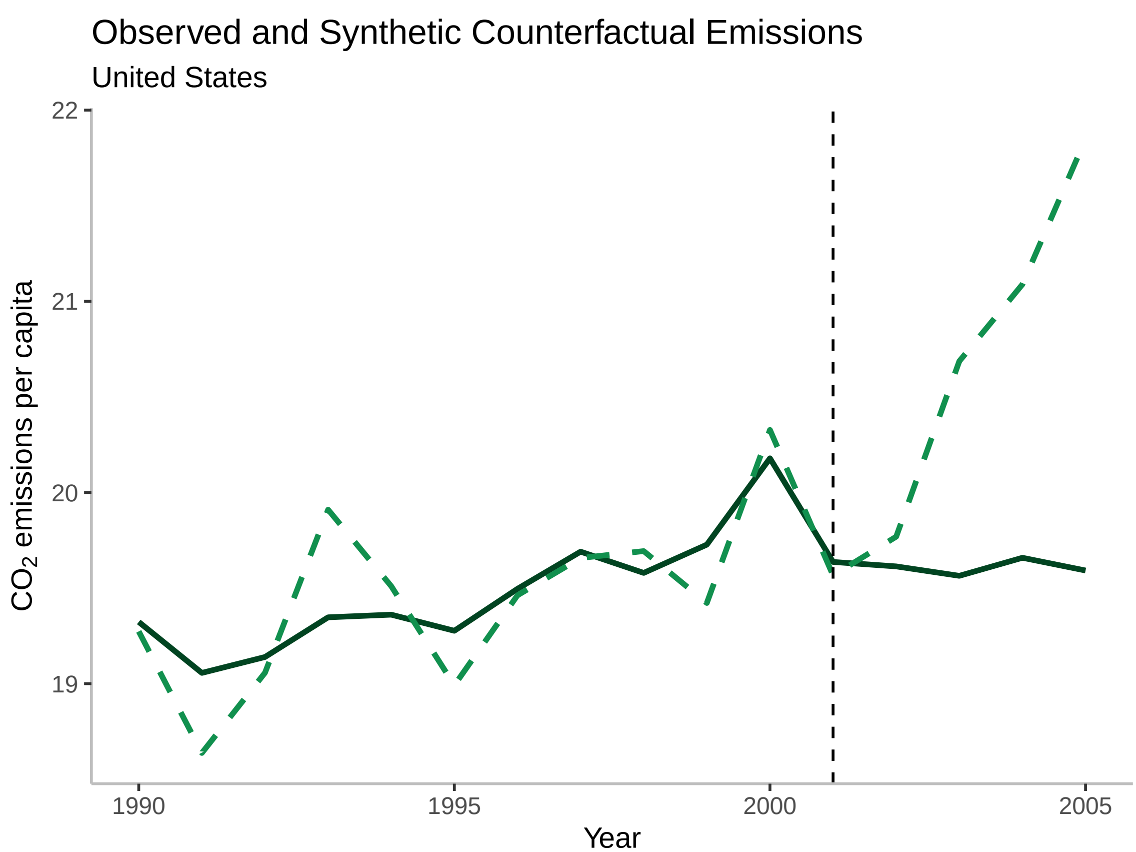


Figure S58: Observed and synthetic counterfactual emissions for placebo country United States.

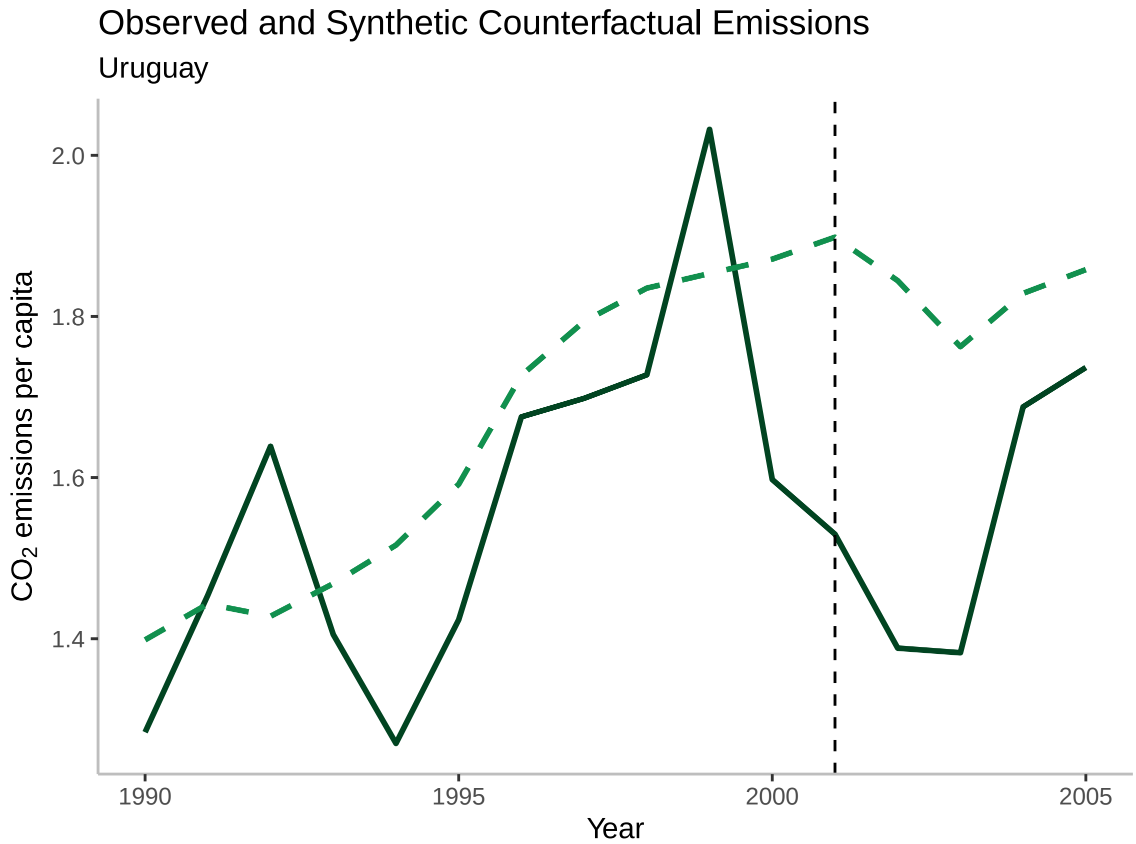


Figure S59: Observed and synthetic counterfactual emissions for placebo country Uruguay.

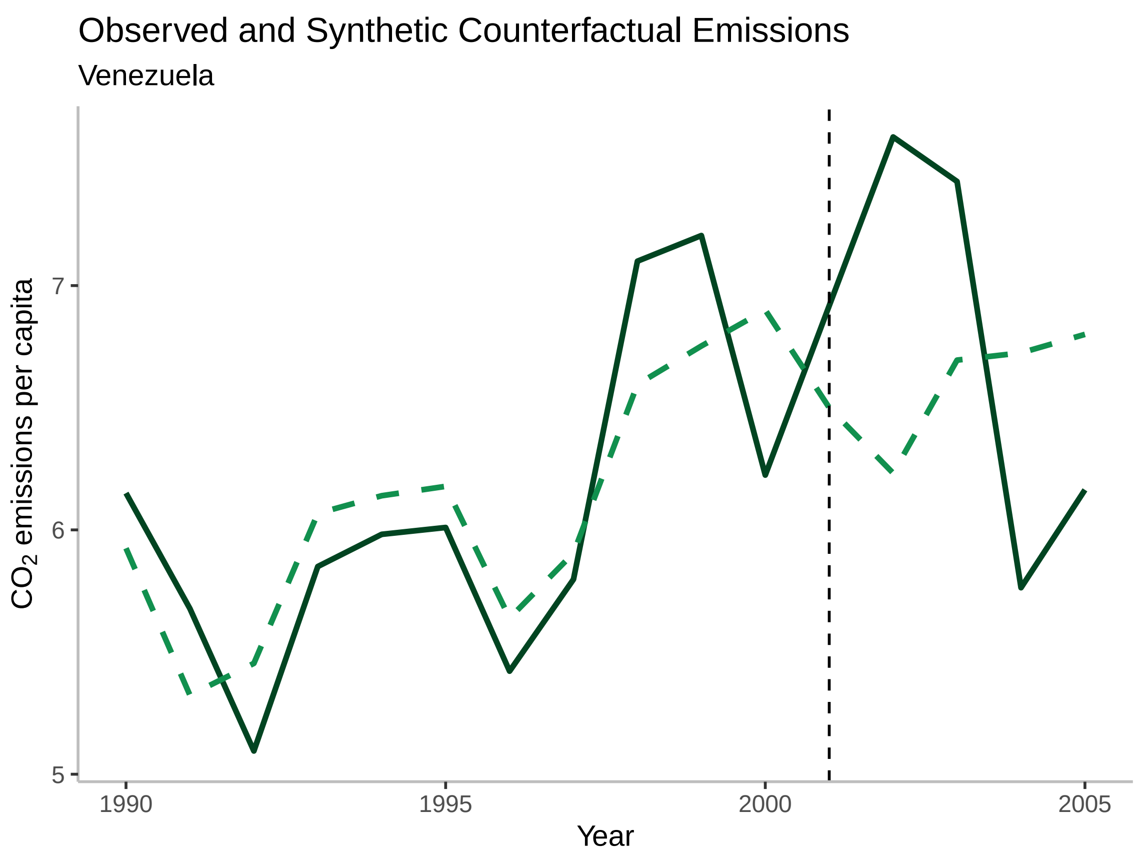


Figure S60: Observed and synthetic counterfactual emissions for placebo country Venezuela.

# G Alternative specifications

## G.1 Summary of all specifications

Table S3 displays the weights applied to each country in the donor pool for the alternate specifications. A "-" denotes that the particular country is not included in the donor pool because it does not meet the criteria for inclusion (e.g. being a high income country in 2001), while a "NA" denotes that data is missing for a particular country. The latter case applies only to specification 2 which uses other covariates.

Full results for the alternate specifications 2-11 are provided in sections G.2-G.11. For these alternate specifications, we report: the donor weights, estimated treatment effects, statistical inference, and robustness checks.

Figures S63, S69, S75, S81, S87, S93, S99, S105, S111, and S117 display the results of the placebo test where treatment is iteratively re-assigned to each country in the donor pool. The thick purple line represents the gaps in emissions between the UK and its synthetic control (as estimated by the alternate specification). The thin grey lines represent the gaps in emissions between placebo countries and their corresponding synthetic counterpart. Only the countries where the pre-treatment MSPE for each placebo is less than 5 times greater than the pre-treatment MSPE of the UK are displayed to avoid graphing unnecessary noise. In each case, the line representing the gaps for the UK is unusually large relative to the gaps of the placebo countries.

Figures S64, S70, S76, S82, S88, S94, S100, S106, S112, and S118 display the results of the "leave-one-out" robustness check for each alternate specification 2-11. When iteratively dropping one country from the donor pool used to estimate each alternate specification, we see that the magnitude and sign of the gap in emissions between the UK and its counterpart remains large and negative.

As we did for the main specification, we also look at the empirical distribution of the ratio of post- to pre-treatment MSPE in the UK and in placebo countries in order to test the statistical significance of our findings. We conduct both a two-sided and a one-sided test, where the alternative hypotheses are that the CCP had a non-zero effect on emissions per capita, and that the CCP led to a decrease in emissions per capita, respectively. Given that the stated intention of a climate policy is to reduce emissions, a directional hypothesis is sometimes appropriate, and we thus also report a one-sided test. When we randomly re-assign treatment to all countries in the sample, and restrict our attention to those countries that have a negative treatment effect (i.e., where treatment resulted in a decrease in emissions), we find that the UK has the largest ratio statistic in every alternate specification from 2 to 11. Figures S65, S71, S77, S83, S89, S95, S101, S107, S113, and S119 display the empirical distribution of this ratio statistic.

Figures S66, S72, S78, S84, S90, S96, S102, S108, S114, and S120 display the ratio of the post- to pre-treatment MSPE for the UK and all placebo countries for alternate specifications 2-11.

We also compute pseudo p-values by dividing the number of countries for which we observe a ratio statistic at least as large as the UK's by the total number of countries in the sample. We computed a ratio statistic for the UK, and also for each country in the donor pool where a placebo test was run. We should not expect this ratio to be large in the placebo countries (other than by chance alone). Therefore, these non-parametric p-values represent the probability of observing an effect as large as the UK's if the null distribution were true. This probability is less than 0.05 in alternate specifications 4-11, and is barely larger in specifications 2 ($p = 0.053$) and 3 ($p = 0.058$).

Tables S4, S6, S8, S10, S12, S14, S16, S18, S20, and S22 display summary statistics and the weights applied to the pre-treatment covariates included in alternate specifications 2-11. The covariates included as predictors of the synthetic UK vary with each specification in order to test the robustness of our results. In those tables, column 2 ("Treated UK") displays the observed values of the predictors in the UK prior to treatment in 2001. These pre-treatment means in the UK are significantly different than those of the unweighted sample of donor countries considered for each specification, shown in column 4 ("Sample Mean"). Thus, using an unweighted sample of donor countries as a counterfactual for the pre-CCP emissions of the UK would not identify the causal effect of the treatment. Therefore, we apply the weights given in column 5 ("Weight") in order to yield a trajectory of carbon emissions for the synthetic control. The pre-treatment means of the covariates for the synthetic control are given in column 3 ("Synthetic UK"). Examining these tables makes it clear that the pre-treatment means of the covariates are remarkably similar between those observed in the UK and those simulated by the synthetic UK.

We test this impression formally by conducting a set of statistical balance tests, reported in tables S5, S7, S9, S11, S13, S15, S17, S19, S21, and S23, for each alternate specification 2-11. Those tables report the balance statistics between the pre-treatment values of the dependent variable (which varies according to specification, i.e., $CO_2$ emissions per capita, $CO_2$ emissions rescaled to a 1990, or to a 2000 baseline, in order to assess the robustness of our findings). The first two rows report the p-values for a two-sample t-test of equality of means, and for a Kolmogorov-Smirnov (KS) test for equality of probability distributions, respectively. In both cases, the way to interpret these statistics is to look for a statistically *insignificant* result. That is, we want to fail to reject the null hypothesis that the means of the outcome variable in the UK and the synthetic UK are equal (t-test) or the null hypothesis that the two distributions are equal (KS test). In every alternate specification, the p-values are large, which increases our confidence that the emissions trajectory for the UK and its synthetic control (prior to treatment) are the same, and thus that the algorithm generates an appropriate counterfactual to estimate the causal effect of the CCP.

| Donor country | Spec 1 | Spec 2 | Spec 3 | Spec 4 | Spec 5 | Spec 6 | Spec 7 | Spec 8 | Spec 9 | Spec 10 | Spec 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Argentina | 0.0050 | 0.0087 | 2e-04 | - | - | 3e-04 | - | - | 4e-04 | - | - |
| Australia | 0.0018 | 3e-04 | 0.0867 | 0.001 | 7e-04 | 2e-04 | 2e-04 | 5e-05 | 2e-04 | 3e-04 | 2e-05 |
| Austria | 0.0044 | 1e-06 | 0.0033 | 0.2742 | 9e-04 | 0.0011 | 0.2256 | 6e-05 | 6e-04 | 0.2409 | 1e-04 |
| Bahamas | 0.1811 | NA | 1e-05 | 0.2055 | - | 0.1493 | 0.1732 | - | 0.1419 | 0.155 | - |
| Bahrain | 0.0005 | NA | 4e-06 | - | - | 5e-05 | - | - | 6e-05 | - | - |
| Barbados | 0.0009 | NA | 1e-04 | - | - | 8e-05 | - | - | 1e-04 | - | - |
| Belgium | 0.1641 | 0.1394 | 2e-04 | 0.1628 | 0.1232 | 0.1325 | 0.0966 | 0.1557 | 0.1298 | 0.0442 | 0.1406 |
| Botswana | 0.0013 | 0.0024 | 2e-04 | - | - | 9e-05 | - | - | 1e-04 | - | - |
| Brazil | 0.0020 | 7e-04 | 2e-04 | - | - | 1e-04 | - | - | 1e-04 | - | - |
| Brunei | 0.0143 | NA | 0.0015 | 6e-04 | - | 0.0303 | 0.0133 | - | 0.046 | 0.0248 | - |
| Canada | 0.0026 | 3e-04 | 5e-05 | 0.0016 | 0.0013 | 2e-04 | 3e-04 | 5e-05 | 2e-04 | 5e-04 | 2e-05 |
| Chile | 0.0017 | 2e-04 | 1e-04 | - | - | 8e-05 | - | - | 9e-05 | - | - |
| Cyprus | 0.0022 | 4e-04 | 0.0107 | 5e-04 | - | 1e-04 | 2e-04 | - | 1e-04 | 2e-04 | - |
| France | 0.0011 | 0.2373 | 2e-04 | 0.0072 | 0.3528 | 0.0381 | 0.0019 | 0.192 | 0.0169 | 0.0042 | 0.1726 |
| Gabon | 0.0030 | 8e-04 | 6e-05 | - | - | 2e-04 | - | - | 1e-04 | - | - |
| Germany | 0.0030 | 0.2073 | 0.2156 | 0.0015 | 0.0991 | 0.0501 | 4e-09 | 0.174 | 0.0188 | 0.0011 | 0.155 |
| Greece | 0.0026 | 3e-04 | 0.0016 | 8e-04 | 0.0012 | 2e-04 | 4e-04 | 4e-05 | 3e-04 | 5e-04 | 2e-05 |
| Hong Kong | 0.0014 | NA | 0.0834 | 3e-04 | - | 8e-05 | 1e-04 | - | 9e-05 | 2e-04 | - |
| Hungary | 0.0020 | NA | 1e-04 | 2e-04 | 3e-05 | 7e-06 | 4e-05 | 1e-07 | 4e-07 | 3e-04 | 2e-08 |
| Iceland | 0.0014 | NA | 6e-05 | 4e-04 | 3e-05 | 1e-04 | 2e-04 | 5e-05 | 1e-04 | 1e-04 | 2e-05 |
| Ireland | 0.0023 | 2e-04 | 0.001 | 8e-04 | 9e-04 | 2e-04 | 3e-04 | 4e-05 | 2e-04 | 3e-04 | 2e-05 |
| Israel | 0.0025 | 4e-04 | 4e-04 | 0.001 | - | 1e-04 | 2e-04 | - | 1e-04 | 3e-04 | - |
| Italy | 0.0060 | 0.1025 | 0.0023 | 0.0056 | 0.0181 | 0.0012 | 0.0139 | 0.0672 | 0.0021 | 0.0081 | 0.1313 |
| Japan | 0.0092 | 0.1785 | 1e-04 | 0.1988 | 0.3293 | 8e-04 | 0.181 | 0.2193 | 0.0014 | 0.2908 | 0.2424 |
| Kuwait | 0.0006 | NA | 1e-05 | 5e-04 | - | 5e-05 | 7e-05 | - | 1e-05 | 9e-05 | - |
| Lebanon | 0.0016 | 4e-04 | 1e-04 | - | - | 5e-05 | - | - | 6e-05 | - | - |
| Libya | 0.1874 | NA | 0.2342 | - | - | 0.1394 | - | - | 0.2024 | - | - |
| Luxembourg | 0.0419 | 0.0354 | 0.0479 | 0.0678 | 0.0659 | 0.1735 | 0.1902 | 0.1896 | 0.1452 | 0.1589 | 0.1577 |
| Macao | 0.0017 | NA | 0.1777 | 5e-05 | - | 1e-04 | 1e-04 | - | 1e-04 | 1e-04 | - |
| Malaysia | 0.0052 | 0.0044 | 3e-04 | - | - | 8e-05 | - | - | 3e-07 | - | - |
| Malta | 0.0008 | NA | 9e-05 | - | - | 6e-05 | - | - | 4e-05 | - | - |
| Mauritius | 0.0021 | 8e-04 | 3e-04 | - | - | 1e-04 | - | - | 1e-04 | - | - |
| Mexico | 0.0021 | 8e-04 | 0.0014 | 3e-05 | 1e-05 | 2e-04 | 2e-04 | 4e-05 | 2e-04 | 3e-04 | 2e-05 |
| New Zealand | 0.0020 | 2e-04 | 2e-06 | 6e-04 | 4e-04 | 1e-04 | 2e-04 | 2e-05 | 2e-04 | 3e-04 | 1e-05 |
| Oman | 0.0022 | NA | 5e-05 | - | - | 1e-04 | - | - | 1e-04 | - | - |
| Panama | 0.0016 | 2e-04 | 2e-04 | - | - | 7e-05 | - | - | 1e-04 | - | - |
| Poland | 0.1917 | 0.0026 | 0.0967 | 0.04 | 1e-04 | 0.207 | 0.094 | 0.0015 | 0.1742 | 0.0629 | 2e-05 |
| Portugal | 0.0034 | 0.0059 | 0.0016 | 7e-04 | 0.0021 | 2e-04 | 3e-04 | 1e-04 | 2e-04 | 6e-04 | 2e-05 |
| Qatar | 0.0013 | NA | 8e-06 | 8e-04 | - | 3e-05 | 6e-05 | - | 8e-05 | 5e-04 | - |
| Saudi Arabia | 0.0096 | 0.039 | 0.023 | - | - | 2e-04 | - | - | 8e-04 | - | - |
| Singapore | 0.0012 | 2e-04 | 3e-05 | 2e-05 | - | 1e-04 | 1e-04 | - | 1e-04 | 4e-05 | - |
| South Africa | 0.0029 | 0.0201 | 7e-05 | - | - | 2e-04 | - | - | 2e-04 | - | - |
| South Korea | 0.0034 | 2e-04 | 9e-05 | 0.0215 | 8e-05 | 1e-04 | 3e-04 | 1e-06 | 8e-05 | 6e-06 | 2e-05 |
| Spain | 0.0070 | 8e-04 | 3e-04 | 0.0015 | 0.0027 | 0.0137 | 0.0053 | 4e-06 | 0.0119 | 0.0025 | 4e-05 |
| Switzerland | 0.0043 | 3e-04 | 3e-04 | 7e-05 | 2e-05 | 9e-04 | 5e-04 | 7e-05 | 0.001 | 4e-04 | 1e-05 |
| Trinidad & Tobago | 0.0577 | 3e-04 | 0.0067 | - | - | 0.0454 | - | - | 0.0801 | - | - |
| Turkey | 0.0025 | 3e-04 | 5e-04 | 1e-04 | 4e-09 | 2e-04 | 3e-04 | 2e-05 | 2e-04 | 8e-04 | 2e-05 |
| United Arab Emirates | 0.0006 | NA | 5e-08 | 0.0014 | - | 9e-05 | 3e-04 | - | 1e-04 | 3e-04 | - |
| United States | 0.0025 | 4e-04 | 9e-05 | 0.0021 | 0.0013 | 2e-04 | 4e-04 | 6e-05 | 2e-04 | 5e-04 | 3e-05 |
| Uruguay | 0.0452 | 0.0019 | 3e-04 | - | - | 0.0121 | - | - | 0.0224 | - | - |
| Venezuela | 0.0009 | 0.0065 | 7e-05 | - | - | 6e-05 | - | - | 5e-05 | - | - |

Table S3: Weights applied to countries in the donor pool in all specifications.

## G.2 Specification 2

**Outcome variable:** $CO_2$ emissions per capita

**Donor pool:** OECD, high, and upper middle income countries in 2001, $n = 37$

**Covariates:** Yes

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| GDP per capita (constant 2010 US$) | 31560.917 | 35379.844 | 22297.98 | 0 |
| Renewable energy consumption (% of total) | 0.894 | 5.613 | 15.96 | 0 |
| Fossil fuel energy consumption (% of total) | 88.158 | 77.424 | 80.924 | 0 |
| Energy use (kg of oil equivalent per capita) | 3745.566 | 4134.615 | 3109.721 | 0 |
| 1990 emissions per capita | 9.711 | 9.722 | 7.66 | 0.095 |
| 1991 emissions per capita | 9.871 | 9.842 | 7.794 | 0.101 |
| 1992 emissions per capita | 9.661 | 9.641 | 7.907 | 0.092 |
| 1993 emissions per capita | 9.455 | 9.517 | 7.983 | 0.106 |
| 1994 emissions per capita | 9.448 | 9.433 | 8.011 | 0.089 |
| 1995 emissions per capita | 9.275 | 9.184 | 7.698 | 0.075 |
| 1996 emissions per capita | 9.48 | 9.47 | 8.01 | 0.087 |
| 1997 emissions per capita | 9.043 | 9.121 | 8.018 | 0.075 |
| 1998 emissions per capita | 9.094 | 9.109 | 7.944 | 0.069 |
| 1999 emissions per capita | 9.048 | 9.026 | 8.079 | 0.081 |
| 2000 emissions per capita | 9.2 | 9.213 | 8.263 | 0.129 |

Table S4: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9668475 |
| p-value Kolmogorov Smirnov test | 0.9984853 |
| Mean difference in QQ plots | 0.0486111 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.1666667 |

Table S5: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- 94 Mt $CO_2$ abated between 2002-2005
- 0.39 tons of $CO_2$ per capita abated between 2002-2005
- -4.4% in 2005 compared to what emissions would have been *without* the CCP

**Statistical significance:**

- Two-sided test: $2/38 \approx 0.053$
- One-sided test: $1/26 \approx 0.038$

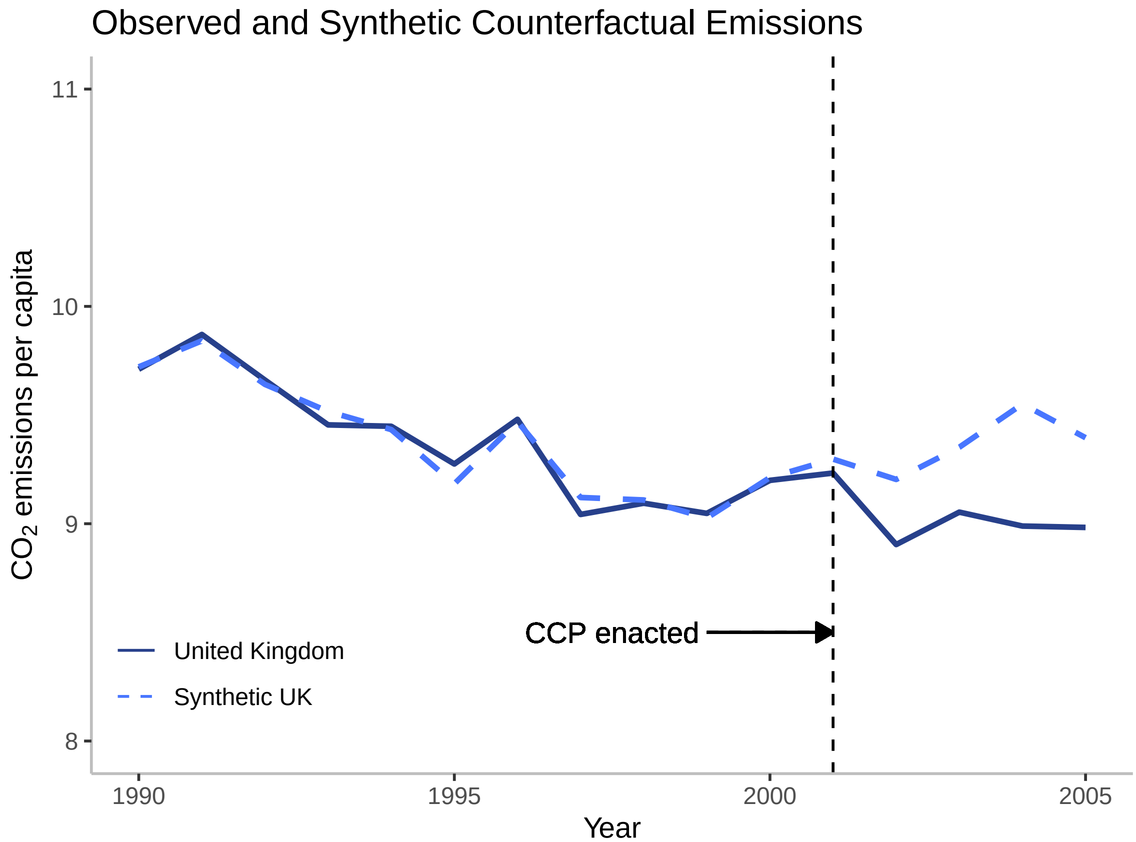


Figure S61: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 2.

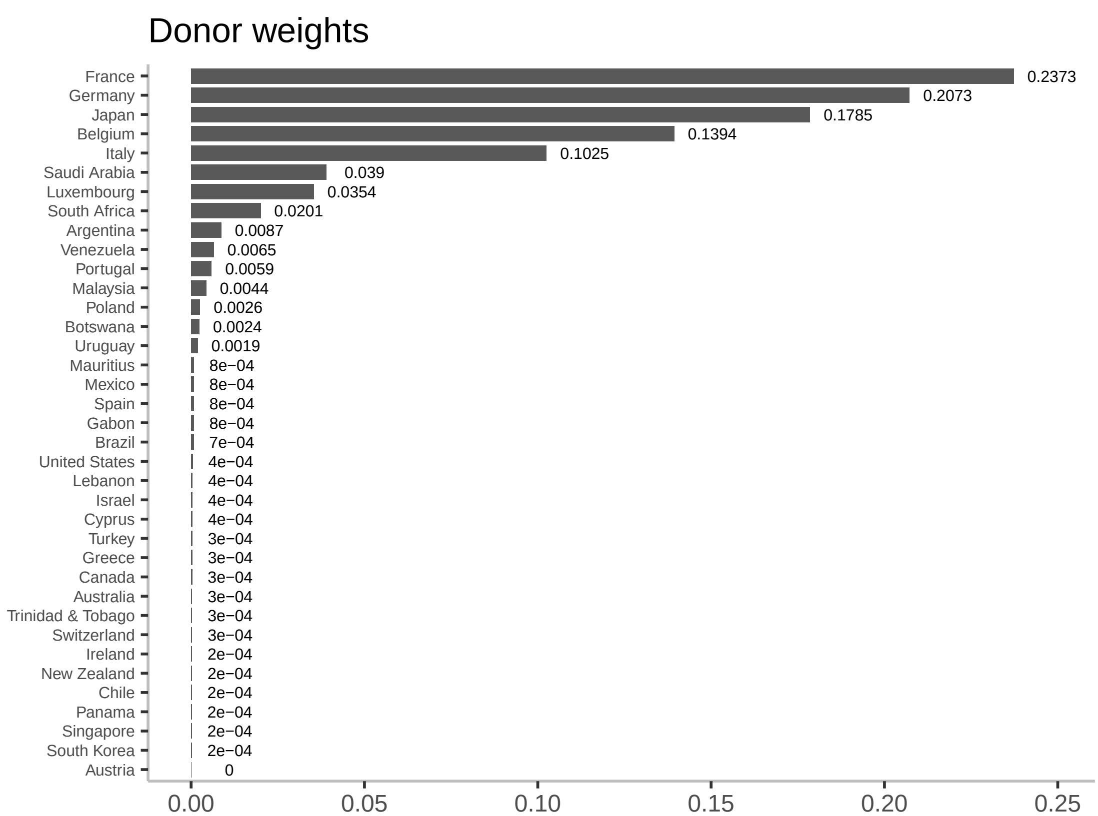


Figure S62: Weights applied to donor countries in Specification 2.

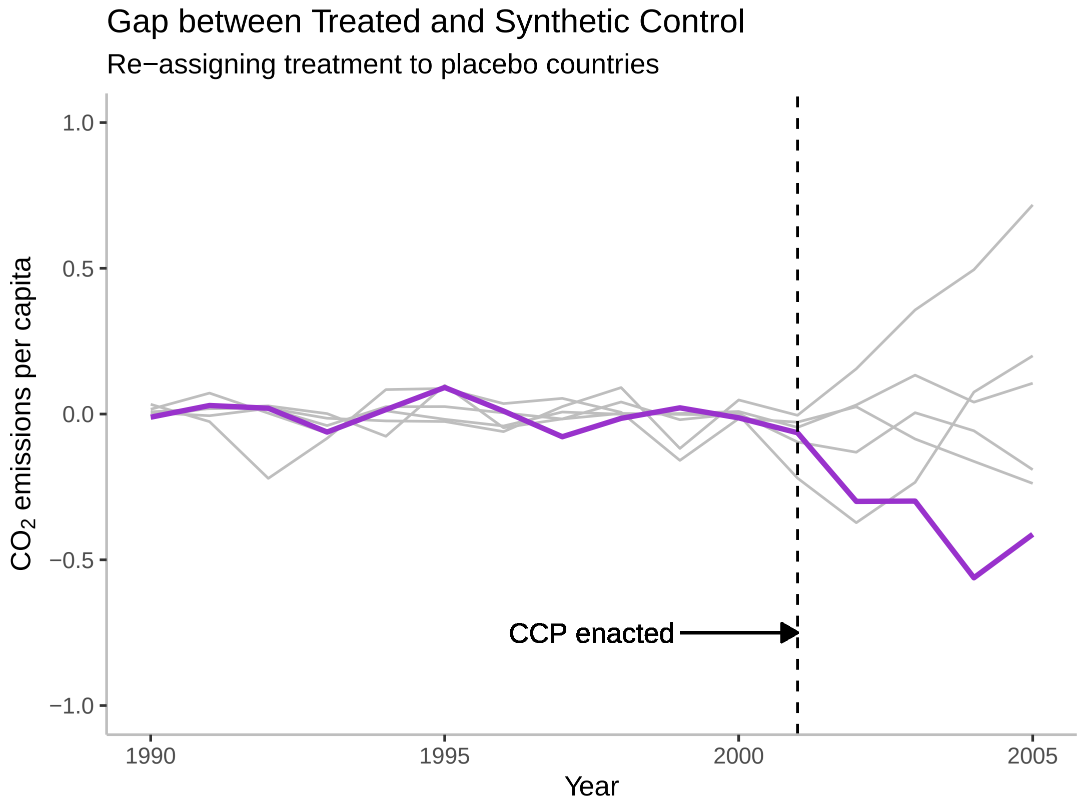


Figure S63: Gaps in emissions per capita between the treated unit and its synthetic counterpart as estimated by Specification 2. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

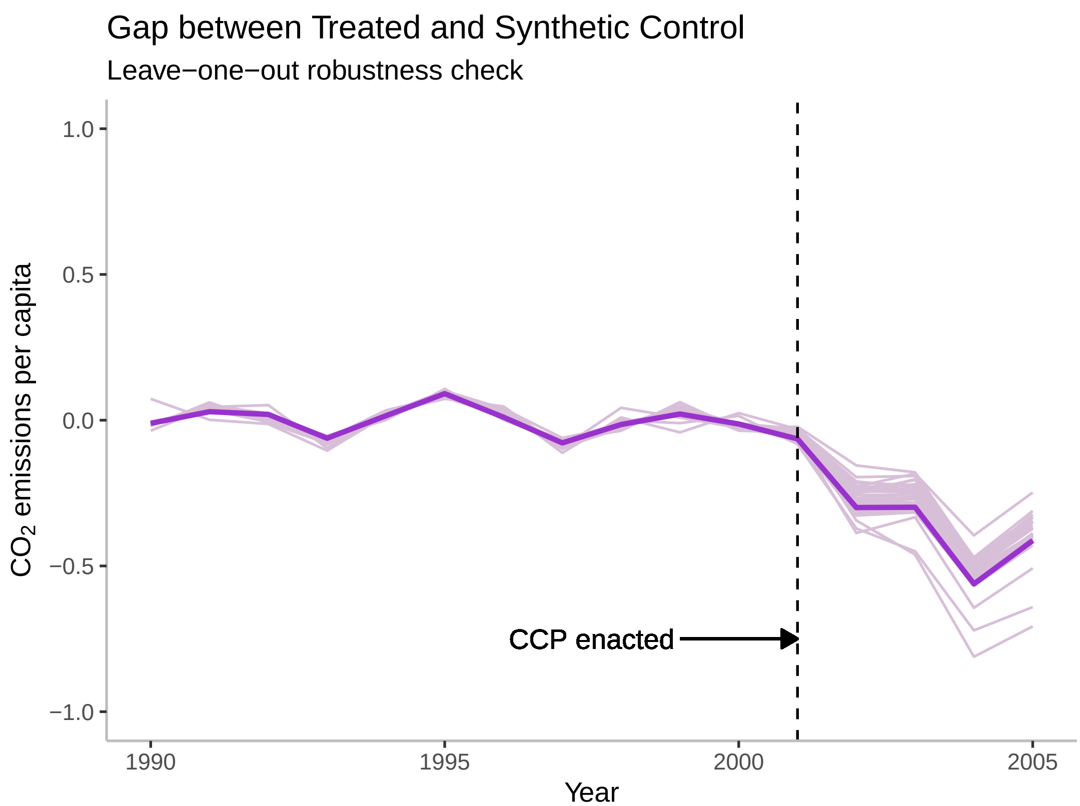


Figure S64: Gaps between the UK and the synthetic UK in Specification 2. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (37 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

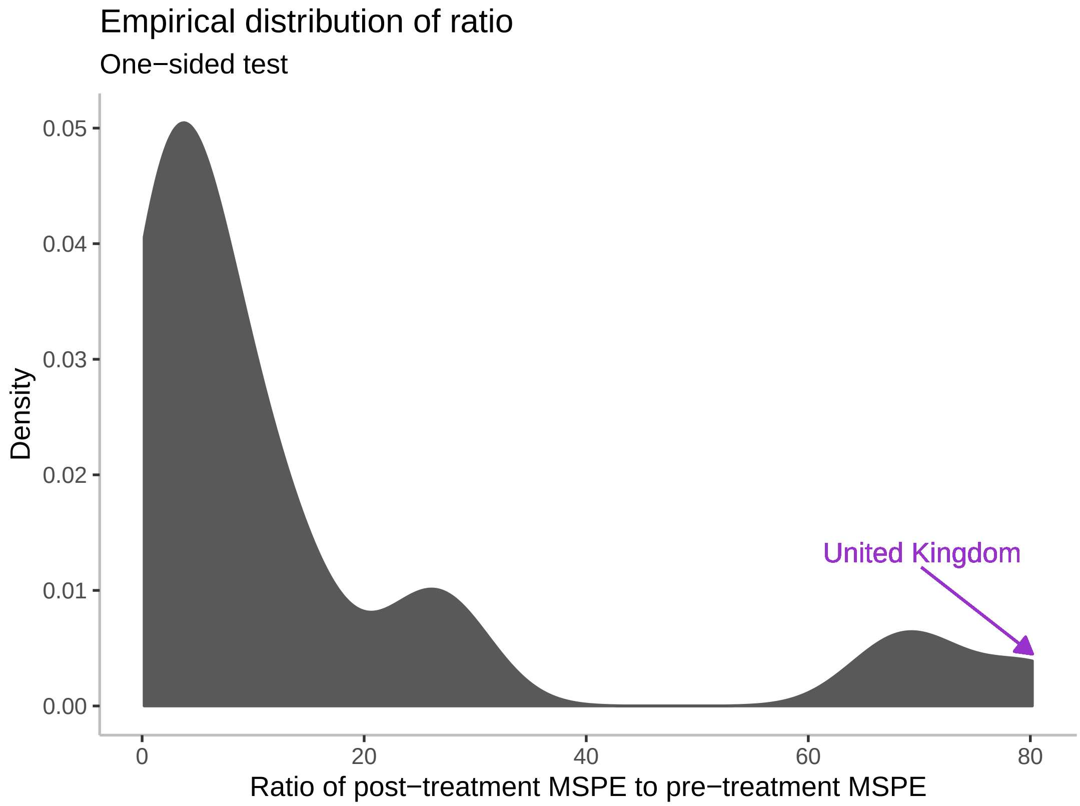


Figure S65: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

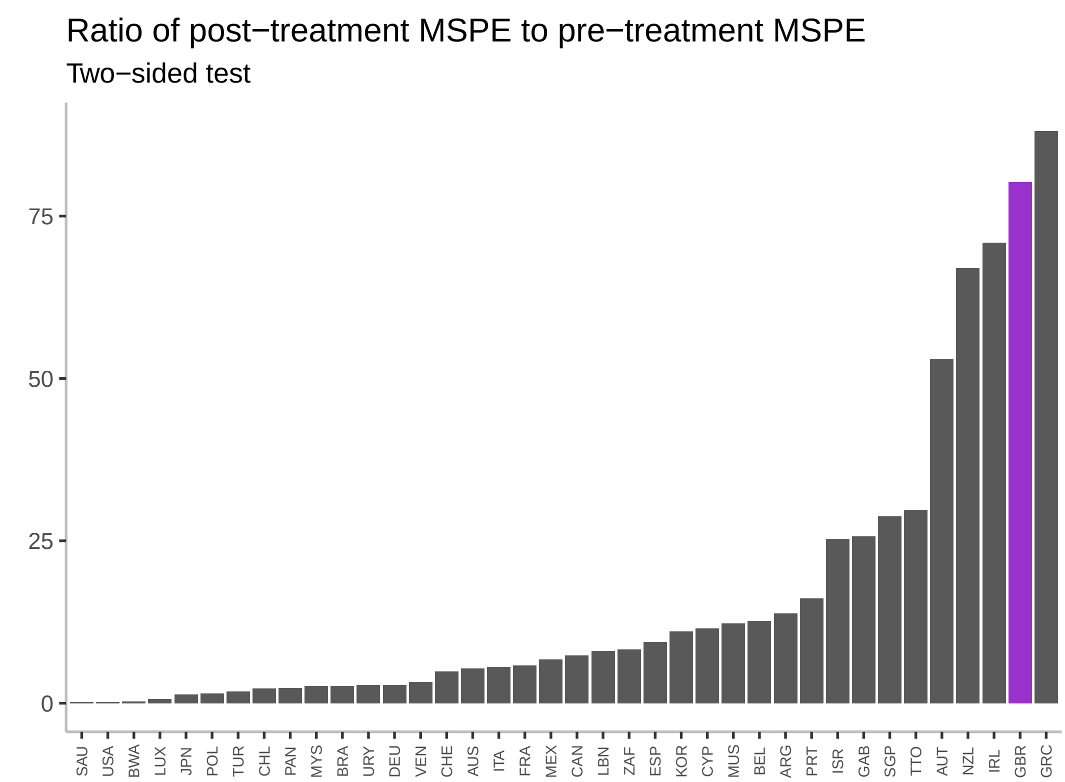


Figure S66: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

### G.3 Specification 3

**Outcome variable:** $CO_2$ emissions per capita
**Donor pool:** OECD, high, and upper middle income countries in 2001, $n = 51$
**Covariates:** No
**Optimization period:** 1980-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1980 emissions per capita | 10.287 | 10.375 | 10.654 | 0.059 |
| 1981 emissions per capita | 9.955 | 9.919 | 9.158 | 0.055 |
| 1982 emissions per capita | 9.74 | 9.743 | 8.829 | 0.063 |
| 1983 emissions per capita | 9.688 | 9.599 | 8.411 | 0.038 |
| 1984 emissions per capita | 9.382 | 9.563 | 8.656 | 0.044 |
| 1985 emissions per capita | 9.9 | 9.874 | 8.775 | 0.046 |
| 1986 emissions per capita | 10.035 | 10.063 | 8.746 | 0.054 |
| 1987 emissions per capita | 10.068 | 9.962 | 8.642 | 0.045 |
| 1988 emissions per capita | 10.021 | 10.077 | 8.904 | 0.057 |
| 1989 emissions per capita | 10.192 | 10.12 | 9.257 | 0.052 |
| 1990 emissions per capita | 9.711 | 9.706 | 9.101 | 0.05 |
| 1991 emissions per capita | 9.871 | 9.871 | 8.94 | 0.049 |
| 1992 emissions per capita | 9.661 | 9.459 | 9.353 | 0.033 |
| 1993 emissions per capita | 9.455 | 9.557 | 9.905 | 0.06 |
| 1994 emissions per capita | 9.448 | 9.527 | 9.949 | 0.02 |
| 1995 emissions per capita | 9.275 | 9.216 | 9.897 | 0.046 |
| 1996 emissions per capita | 9.48 | 9.328 | 9.818 | 0.028 |
| 1997 emissions per capita | 9.043 | 9.145 | 10.041 | 0.051 |
| 1998 emissions per capita | 9.094 | 9.135 | 10.022 | 0.04 |
| 1999 emissions per capita | 9.048 | 9.038 | 9.91 | 0.045 |
| 2000 emissions per capita | 9.2 | 9.238 | 10.297 | 0.067 |

Table S6: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9915562 |
| p-value Kolmogorov Smirnov test | 0.999998 |
| Mean difference in QQ plots | 0.0309917 |
| Median difference in QQ plots | 0.0454545 |
| Maximum difference in QQ plots | 0.0909091 |

Table S7: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- 111 Mt $CO_2$ abated between 2002-2005
- 0.46 tons of $CO_2$ per capita abated between 2002-2005
- -6.8% in 2005 compared to what emissions would have been *without* the CCP

**Statistical significance:**

- Two-sided test: $3/52 \approx 0.058$
- One-sided test: $1/27 \approx 0.037$

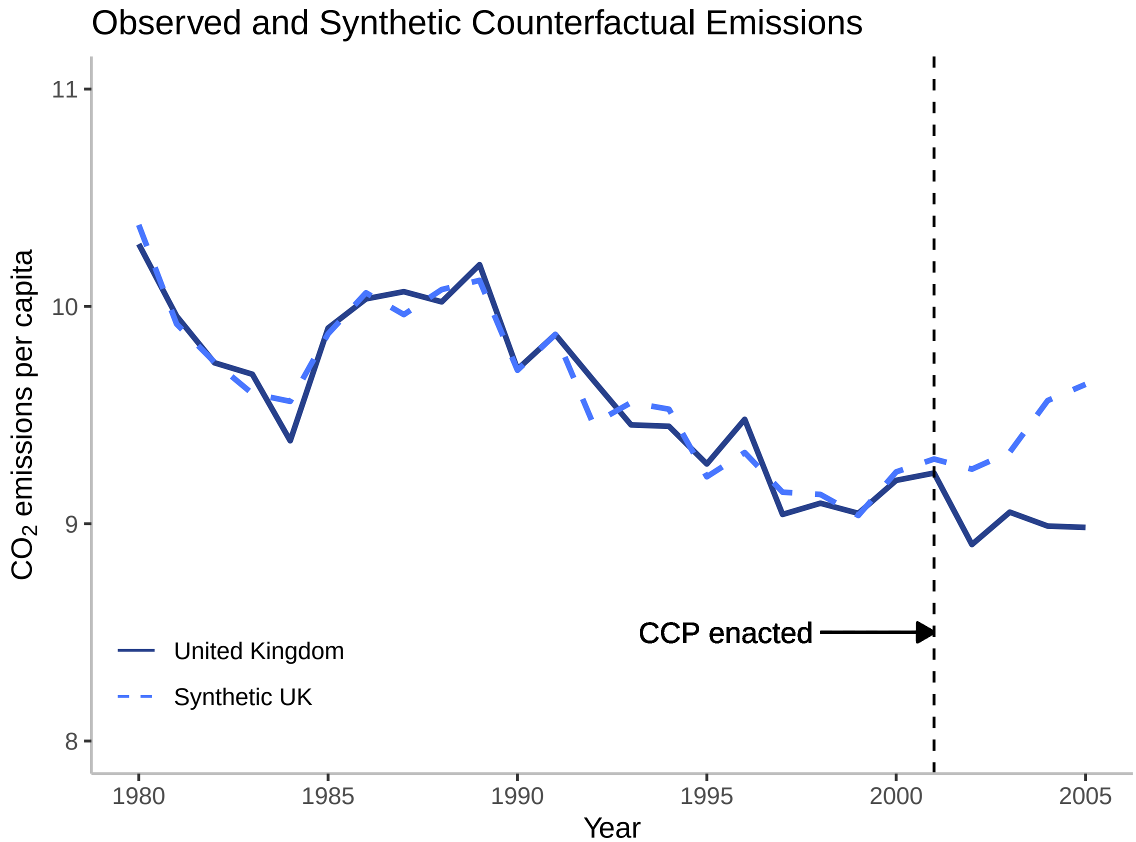


Figure S67: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 3.

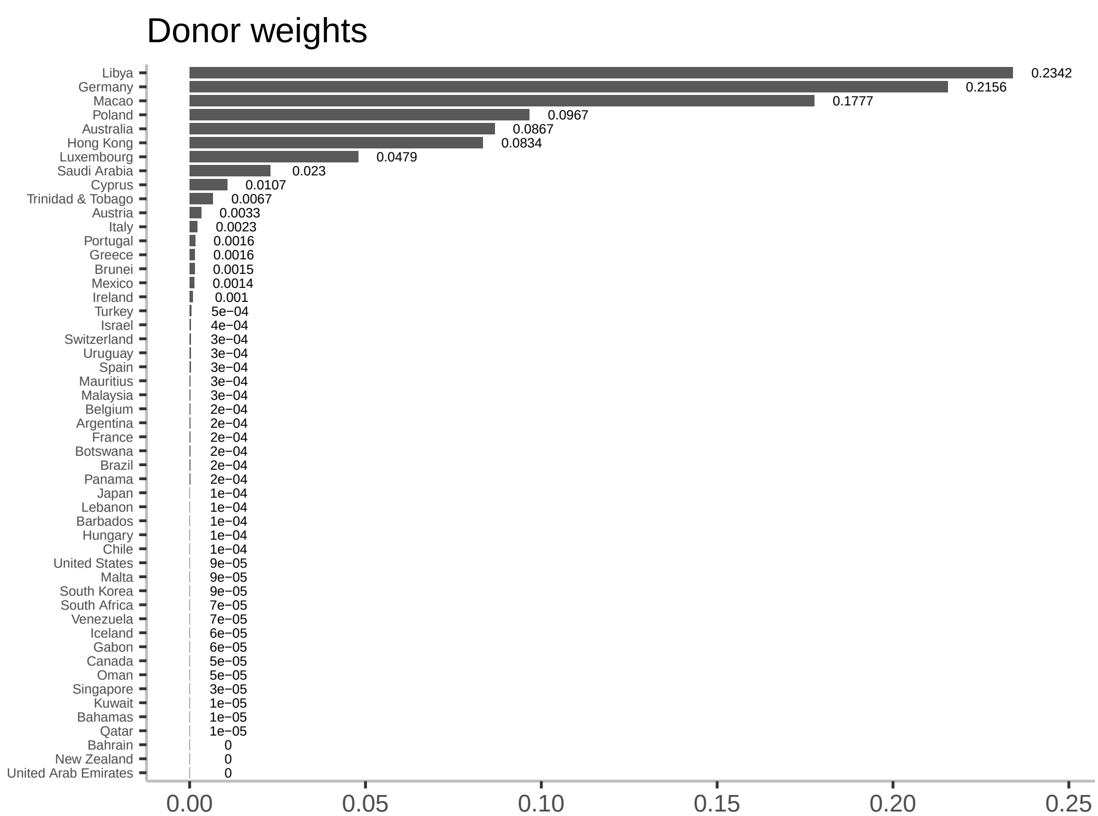


Figure S68: Weights applied to donor countries in Specification 3.

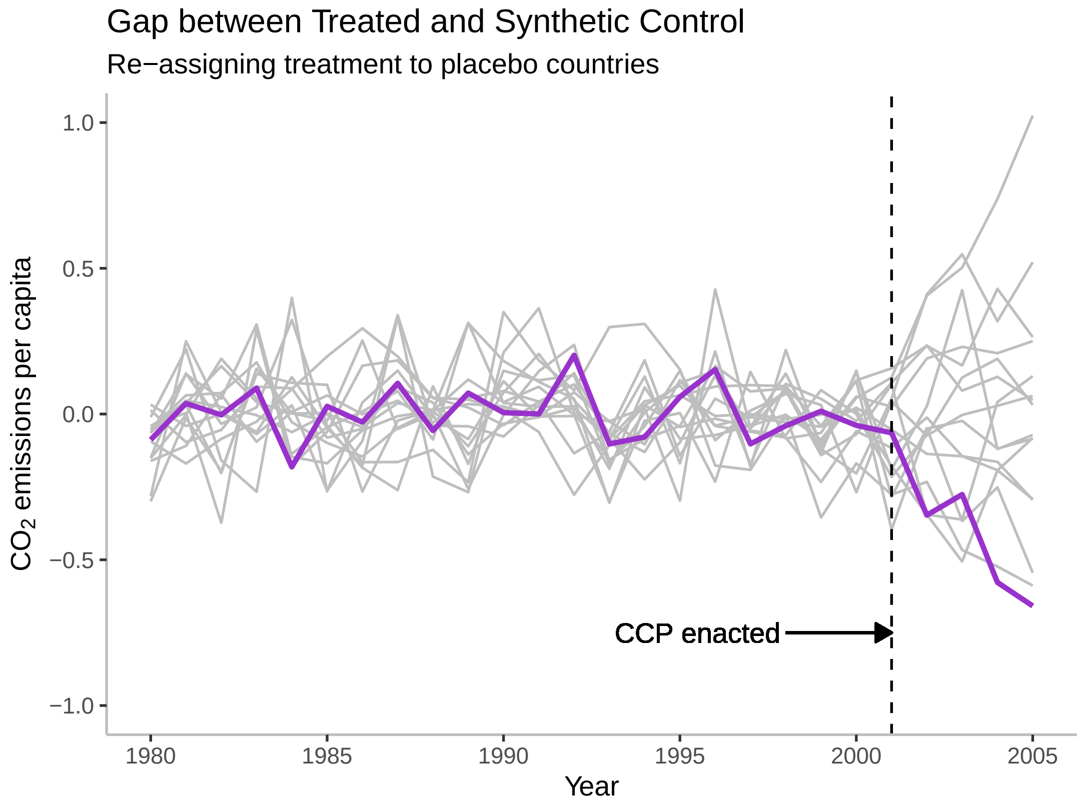


Figure S69: Gaps in emissions per capita between the treated unit and its synthetic counterpart as estimated by Specification 3. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

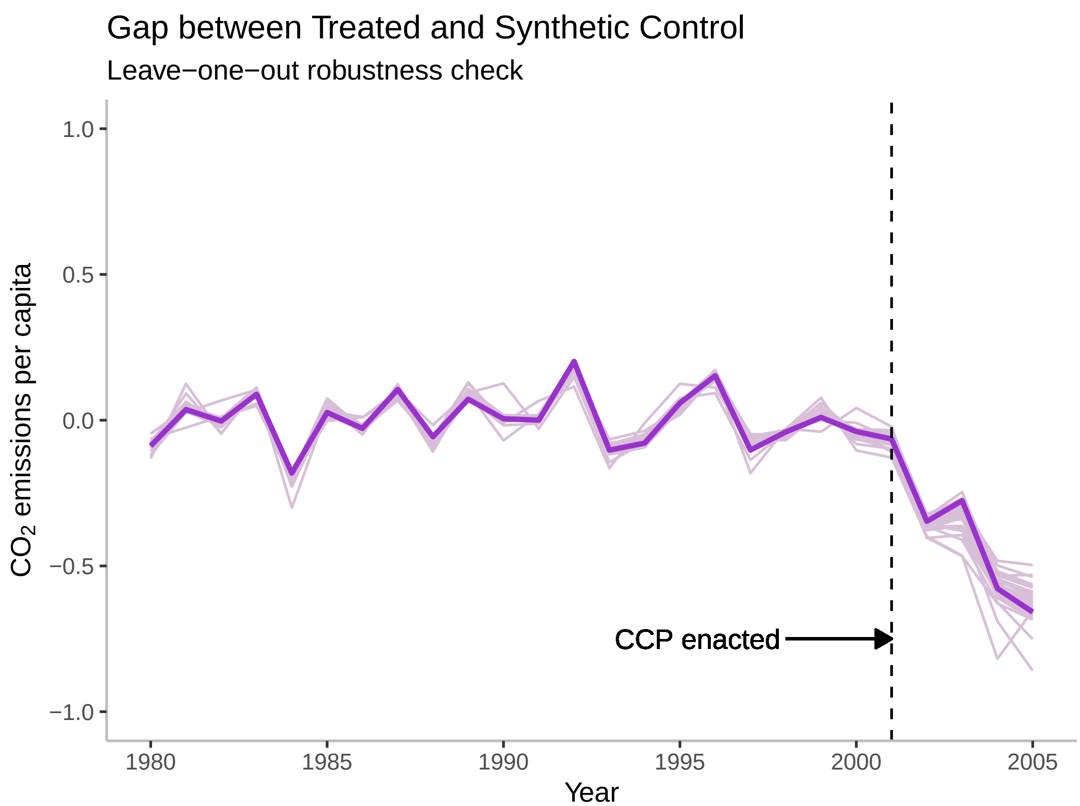


Figure S70: Gaps between the UK and the synthetic UK in Specification 3. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (51 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

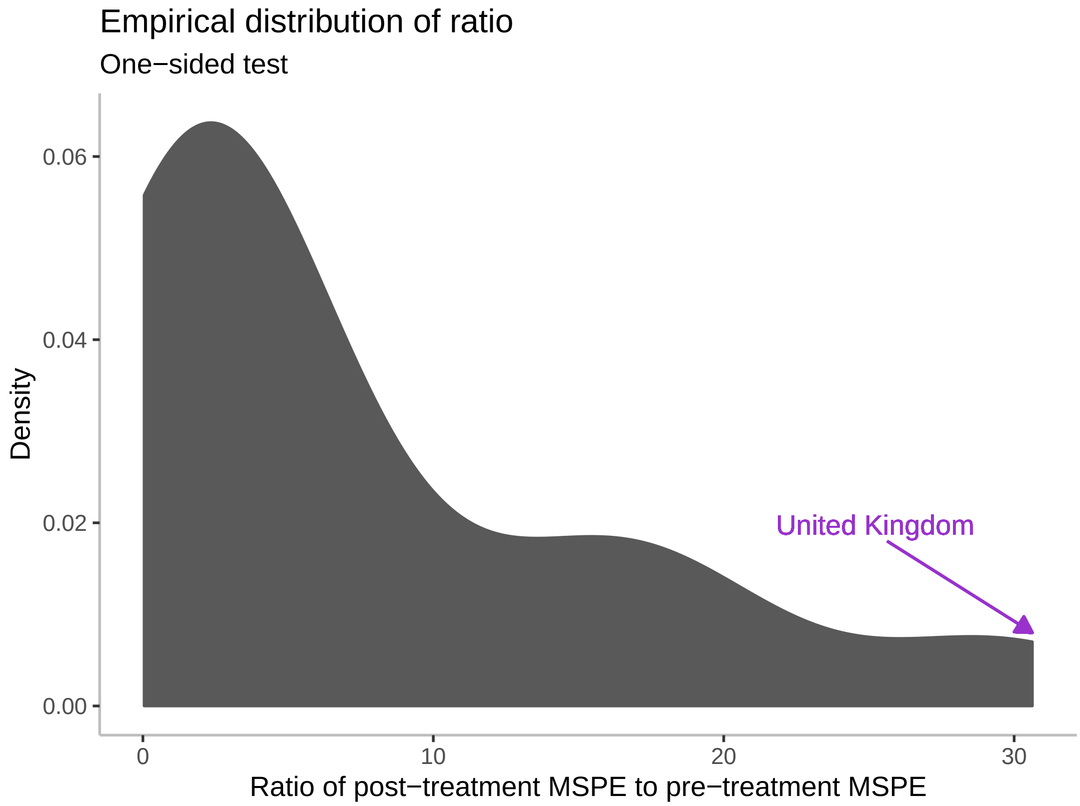


Figure S71: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

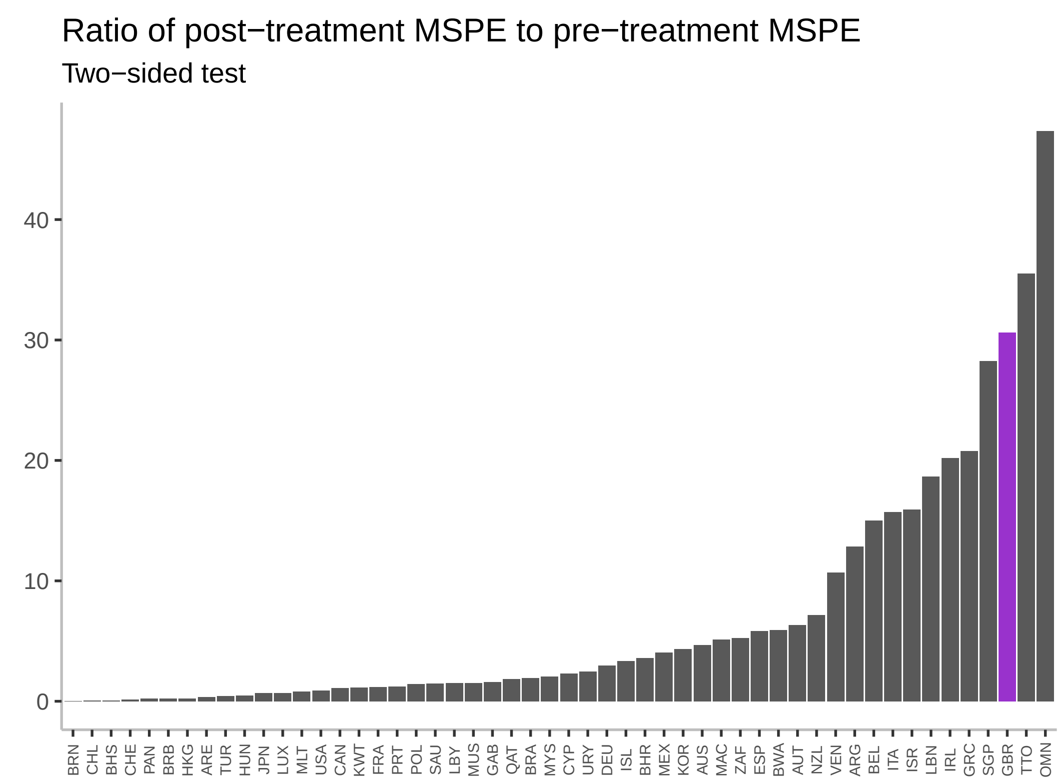


Figure S72: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

## G.4 Specification 4

**Outcome variable:** $CO_2$ emissions per capita

**Donor pool:** OECD and high income countries in 2001, $n = 32$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1990 emissions per capita | 9.711 | 9.727 | 10.952 | 0.049 |
| 1991 emissions per capita | 9.871 | 9.836 | 10.566 | 0.045 |
| 1992 emissions per capita | 9.661 | 9.647 | 11.294 | 0.094 |
| 1993 emissions per capita | 9.455 | 9.485 | 11.822 | 0.104 |
| 1994 emissions per capita | 9.448 | 9.471 | 11.963 | 0.09 |
| 1995 emissions per capita | 9.275 | 9.241 | 11.986 | 0.134 |
| 1996 emissions per capita | 9.48 | 9.456 | 11.717 | 0.094 |
| 1997 emissions per capita | 9.043 | 9.058 | 12.043 | 0.122 |
| 1998 emissions per capita | 9.094 | 9.123 | 11.938 | 0.092 |
| 1999 emissions per capita | 9.048 | 9.06 | 11.643 | 0.065 |
| 2000 emissions per capita | 9.2 | 9.187 | 12.183 | 0.111 |

Table S8: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.990644 |
| p-value Kolmogorov Smirnov test | 0.9984853 |
| Mean difference in QQ plots | 0.0555556 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.1666667 |

Table S9: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- 139 Mt $CO_2$ abated between 2002-2005
- 0.58 tons of $CO_2$ per capita abated between 2002-2005
- -7.7% in 2005 compared to what emissions would have been *without* the CCP

**Statistical significance:**

- Two-sided test: $1/33 \approx 0.030$
- One-sided test: $1/19 \approx 0.053$

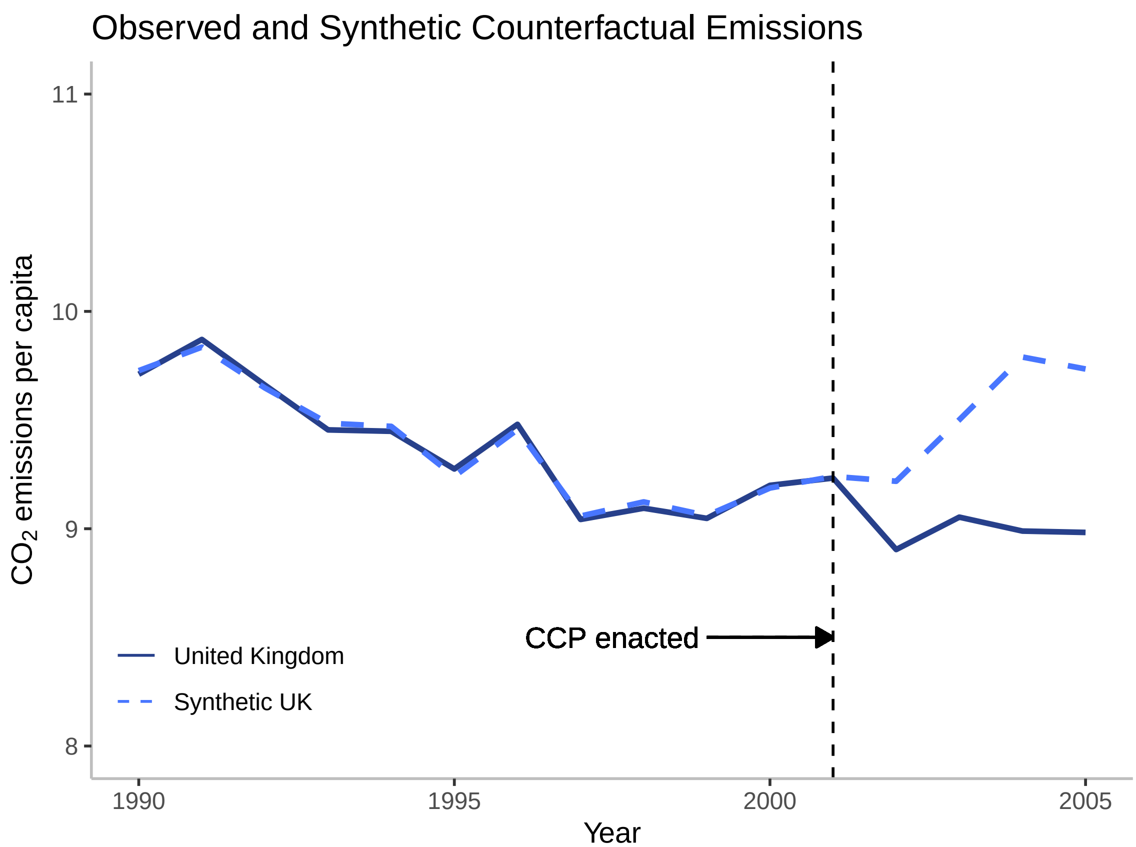


Figure S73: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 4.

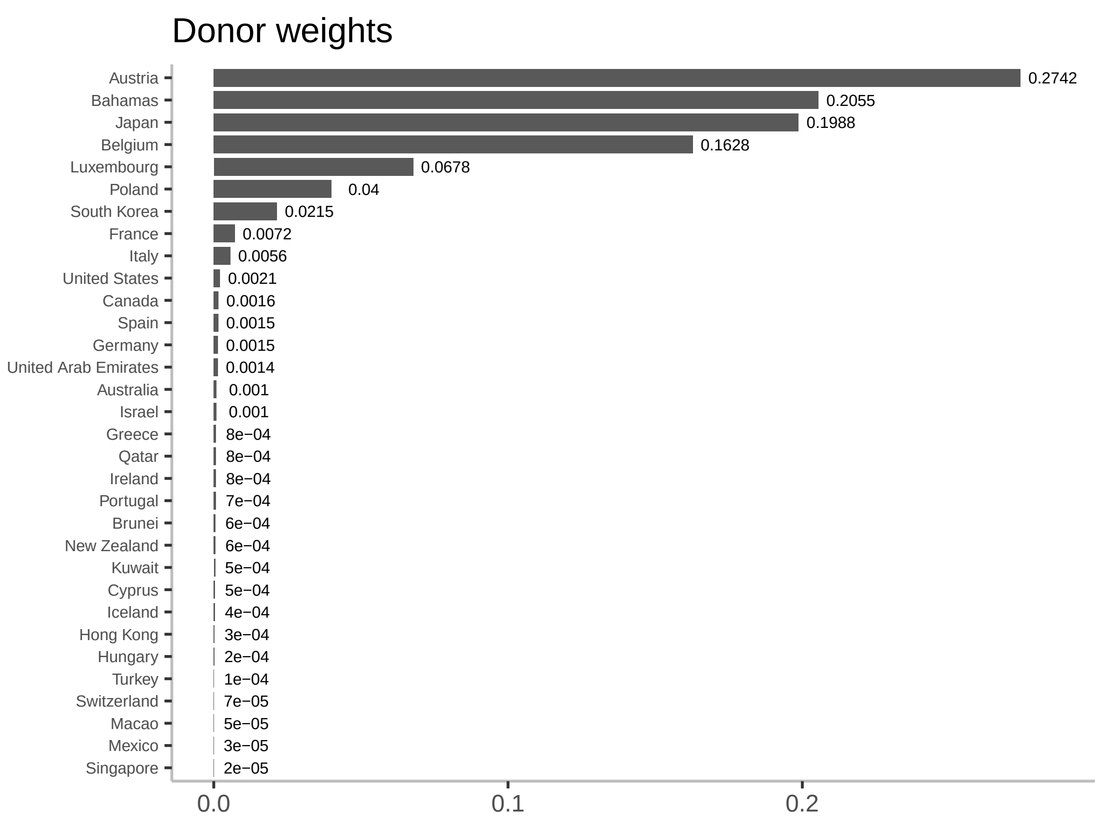


Figure S74: Weights applied to donor countries in Specification 4.

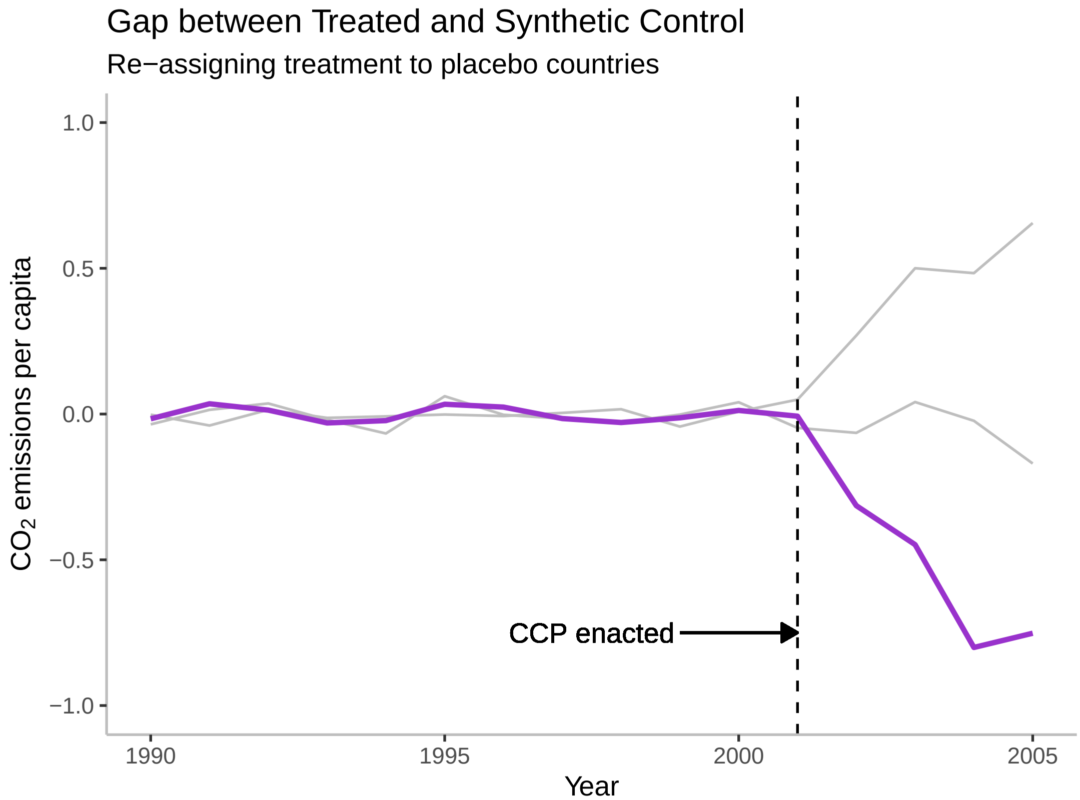


Figure S75: Gaps in emissions per capita between the treated unit and its synthetic counterpart as estimated by Specification 4. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

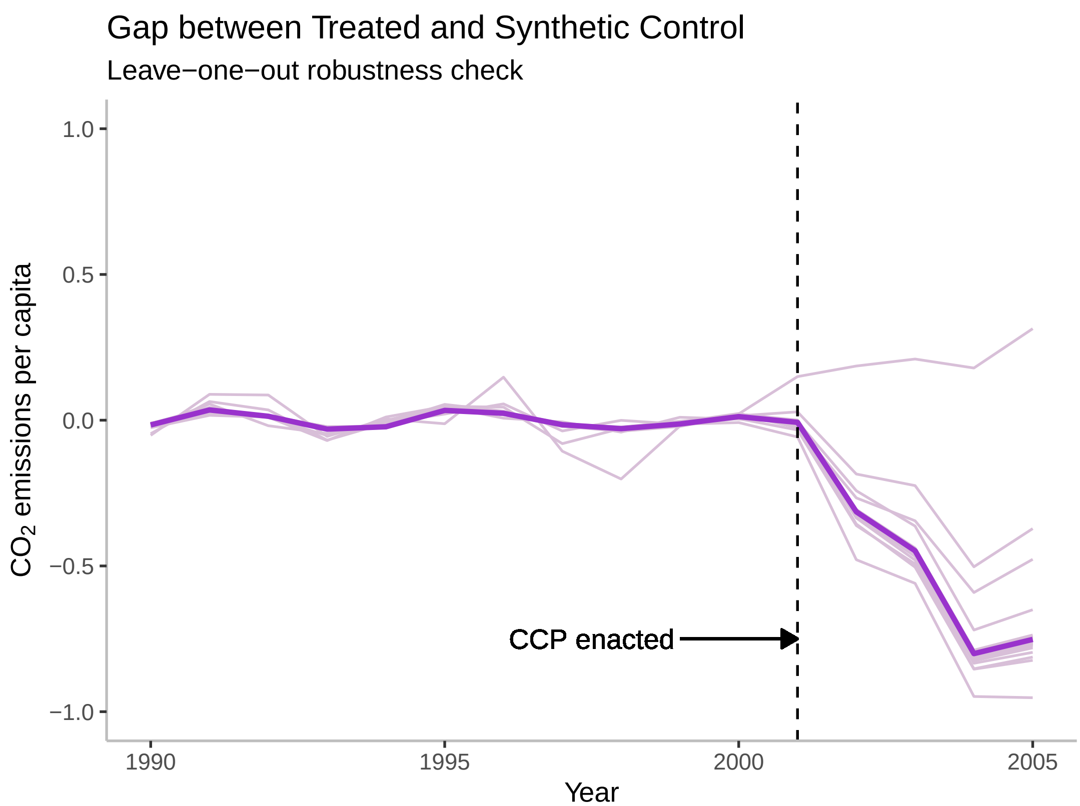


Figure S76: Gaps between the UK and the synthetic UK in Specification 4. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (32 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

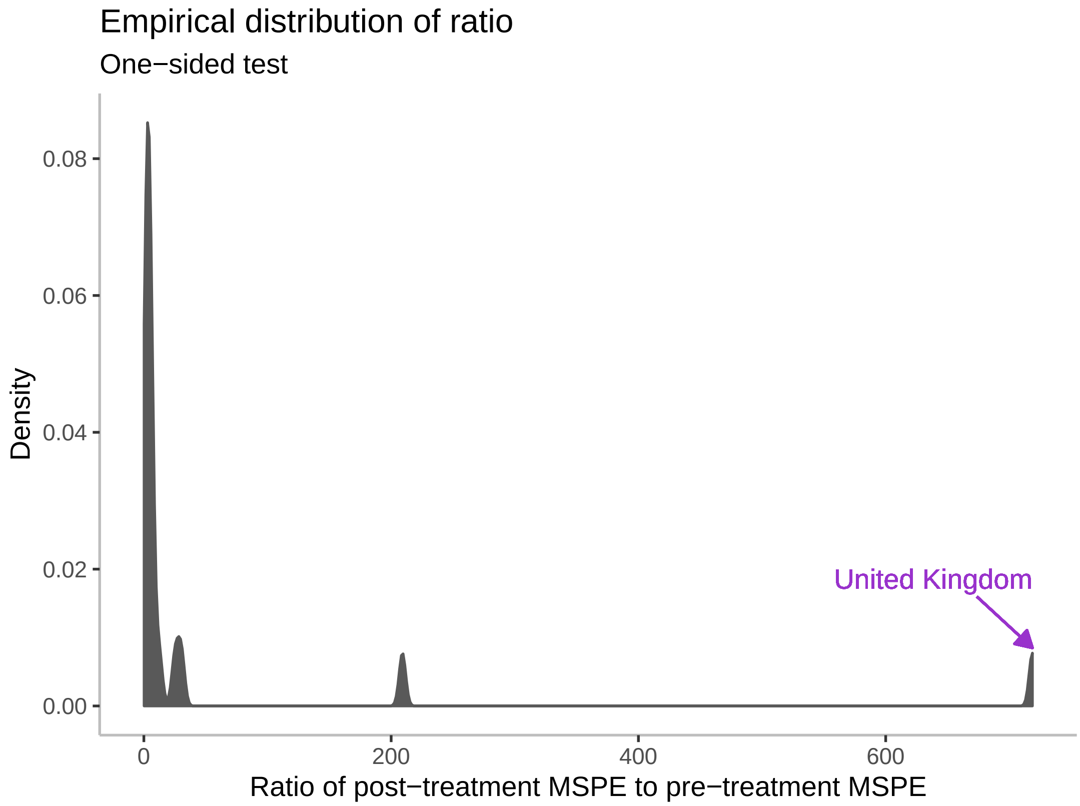


Figure S77: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

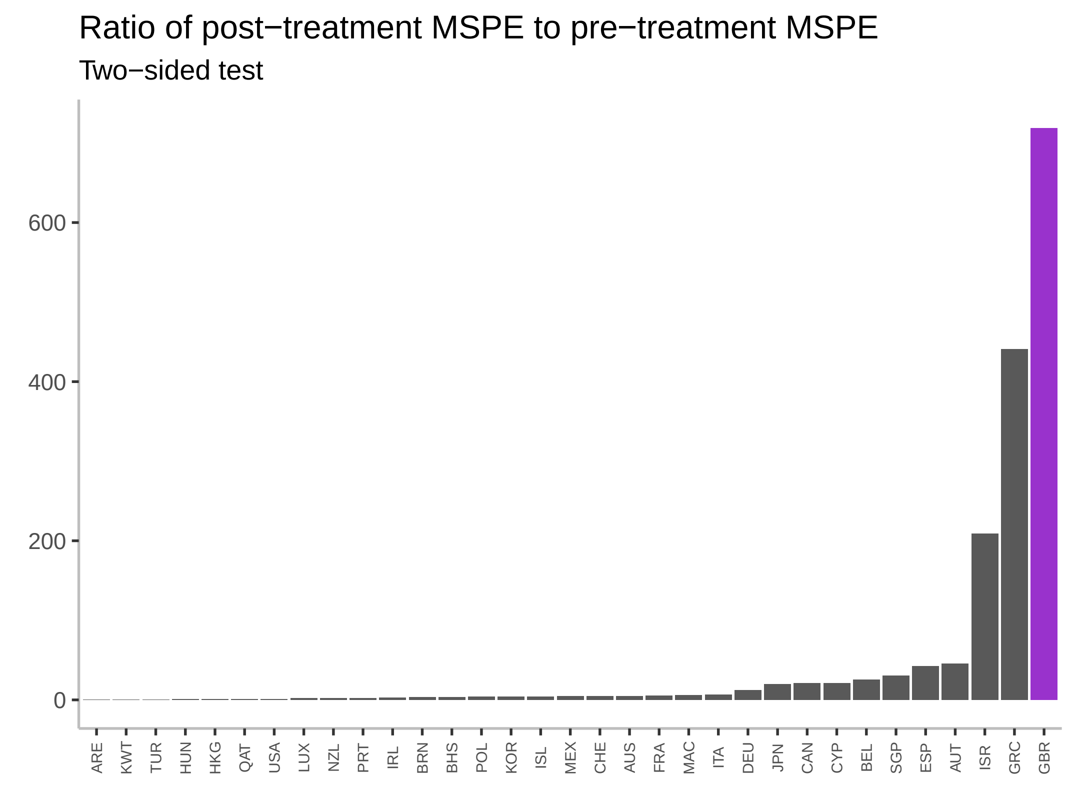


Figure S78: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

## G.5 Specification 5

**Outcome variable:** $CO_2$ emissions per capita

**Donor pool:** OECD in 2001, $n = 22$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1990 emissions per capita | 9.711 | 9.728 | 9.367 | 0.068 |
| 1991 emissions per capita | 9.871 | 9.842 | 9.326 | 0.103 |
| 1992 emissions per capita | 9.661 | 9.66 | 9.28 | 0.087 |
| 1993 emissions per capita | 9.455 | 9.496 | 9.305 | 0.145 |
| 1994 emissions per capita | 9.448 | 9.429 | 9.26 | 0.095 |
| 1995 emissions per capita | 9.275 | 9.178 | 9.13 | 0.087 |
| 1996 emissions per capita | 9.48 | 9.468 | 9.398 | 0.118 |
| 1997 emissions per capita | 9.043 | 9.142 | 9.402 | 0.074 |
| 1998 emissions per capita | 9.094 | 9.09 | 9.327 | 0.104 |
| 1999 emissions per capita | 9.048 | 9.07 | 9.417 | 0.096 |
| 2000 emissions per capita | 9.2 | 9.161 | 9.577 | 0.025 |

Table S10: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.99347 |
| p-value Kolmogorov Smirnov test | 0.9984853 |
| Mean difference in QQ plots | 0.0555556 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.1666667 |

Table S11: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- 108 Mt $CO_2$ abated between 2002-2005
- 0.45 tons of $CO_2$ per capita abated between 2002-2005
- -5.3% in 2005 compared to what emissions would have been *without* the CCP

**Statistical significance:**

- Two-sided test: $1/23 \approx 0.043$
- One-sided test: $1/15 \approx 0.067$

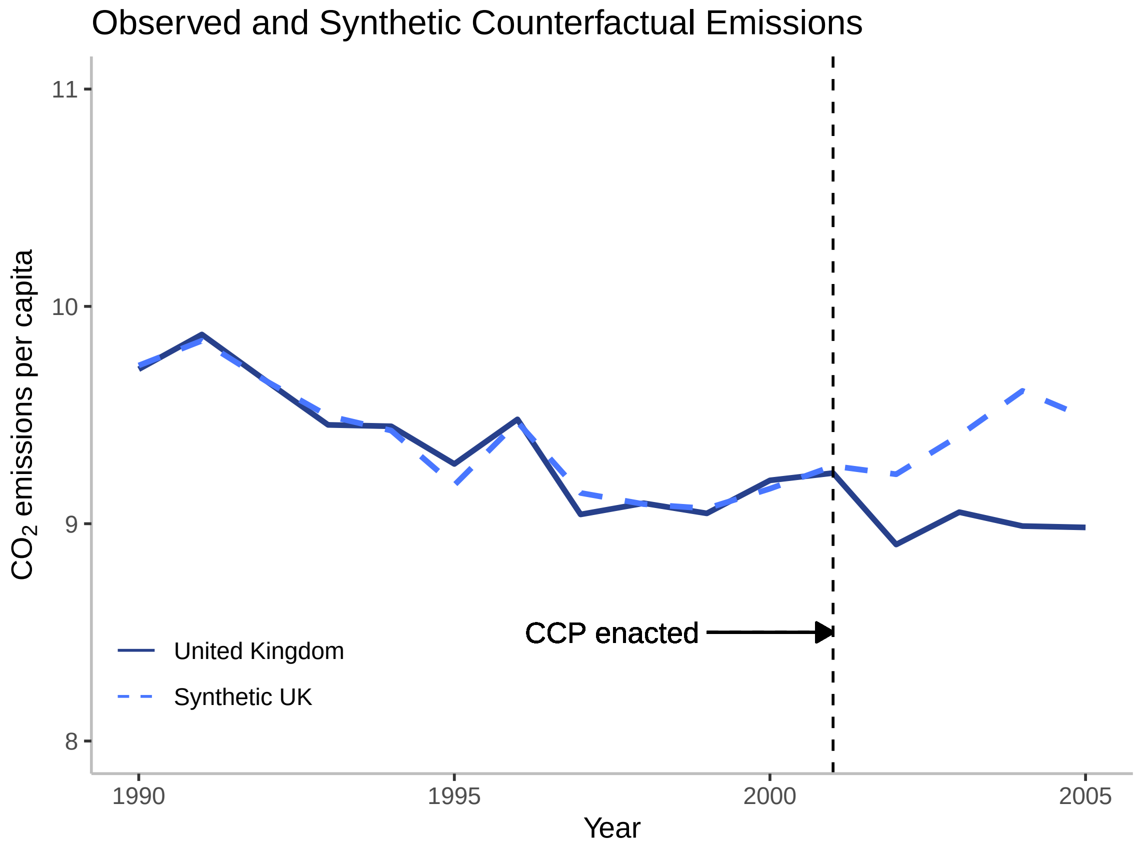


Figure S79: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 5.

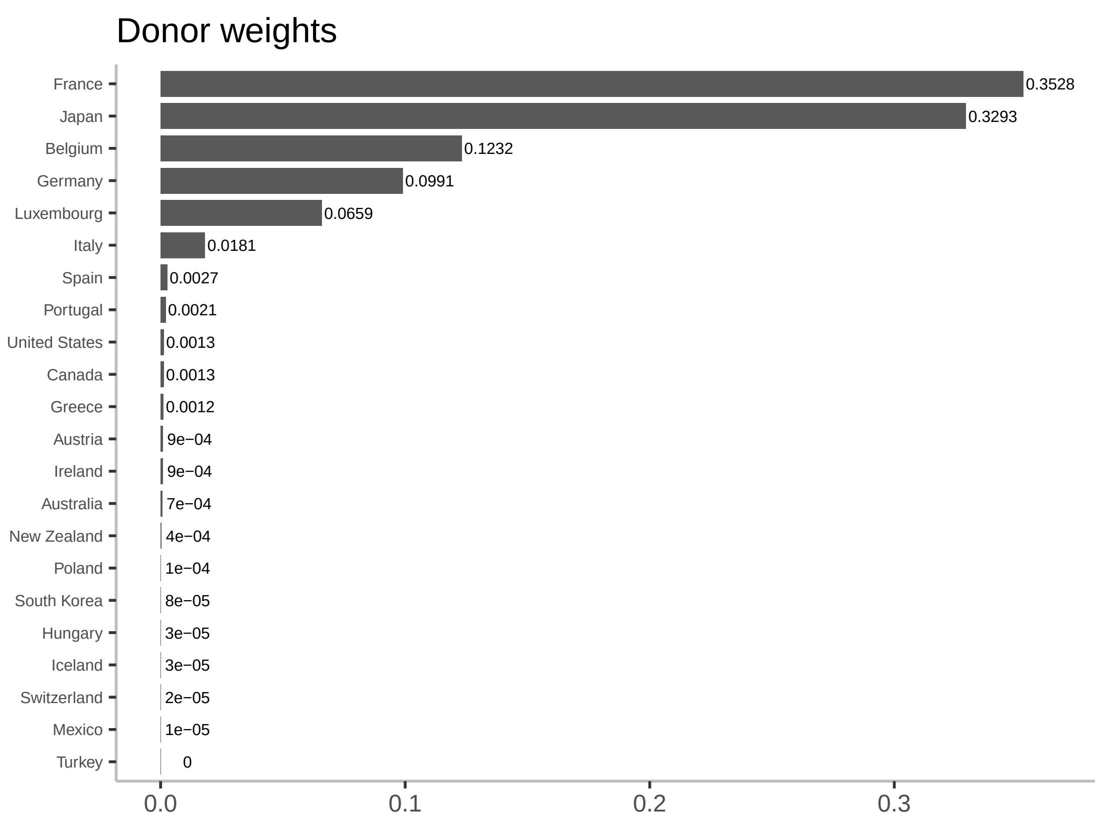


Figure S80: Weights applied to donor countries in Specification 5.

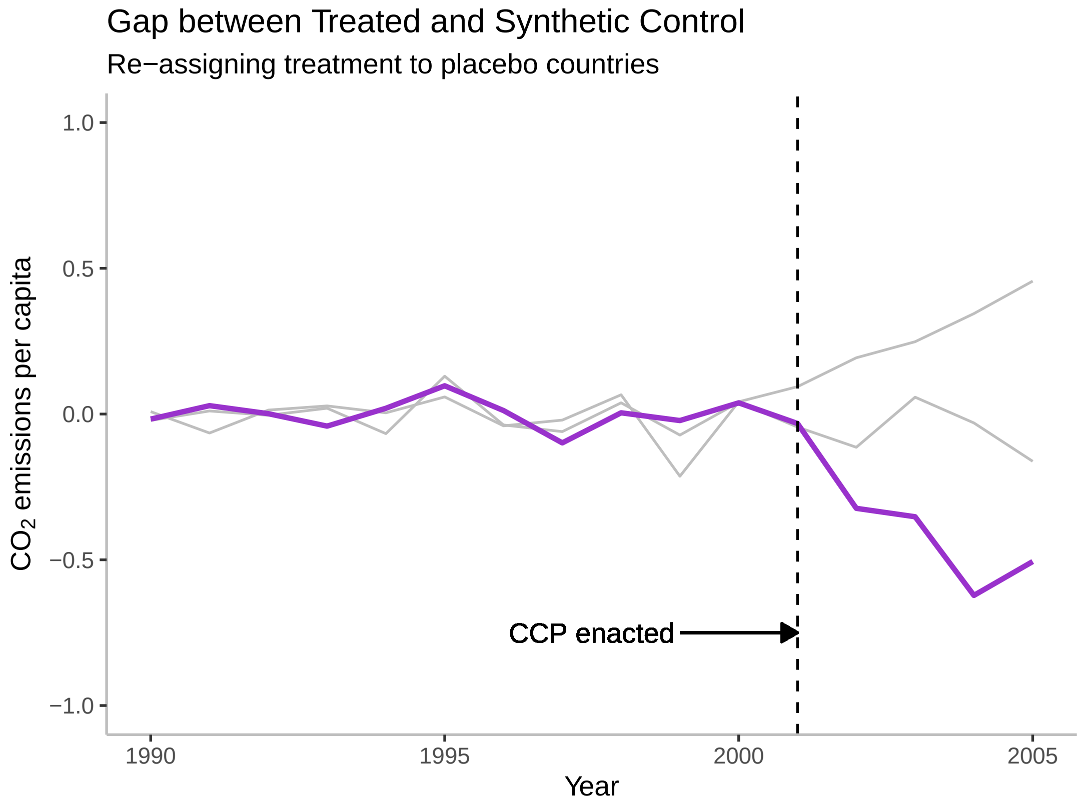


Figure S81: Gaps in emissions per capita between the treated unit and its synthetic counterpart as estimated by Specification 5. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

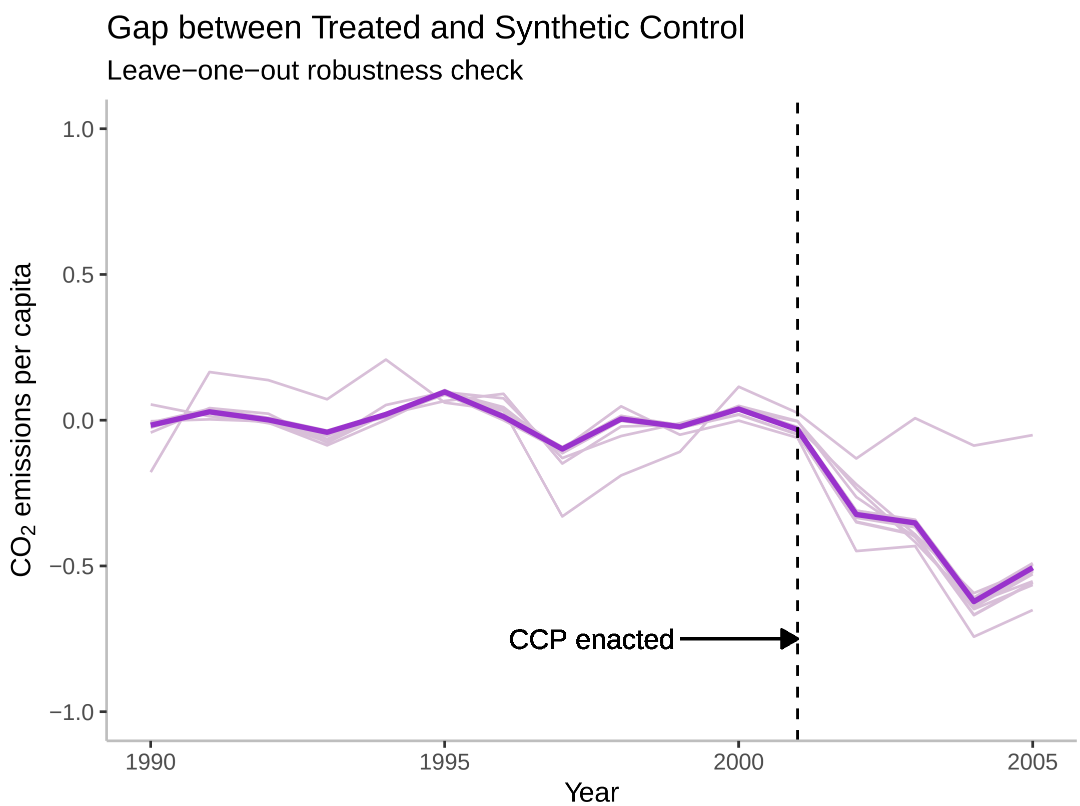


Figure S82: Gaps between the UK and the synthetic UK in Specification 5. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (22 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

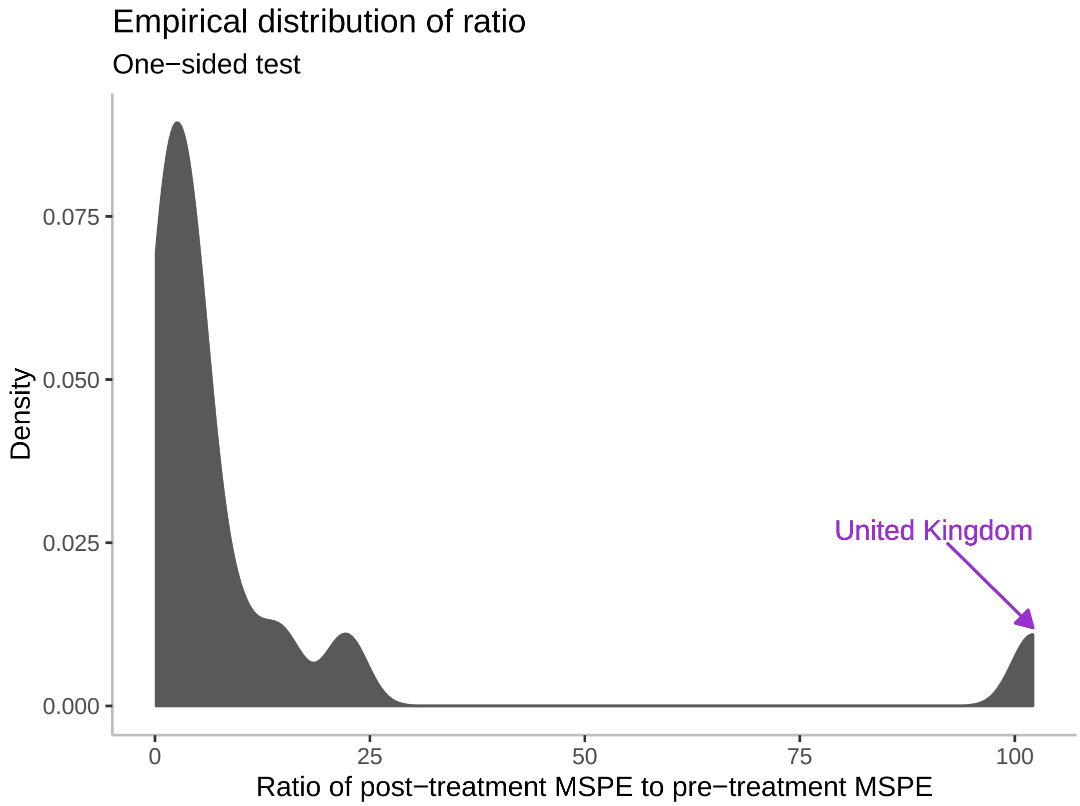


Figure S83: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

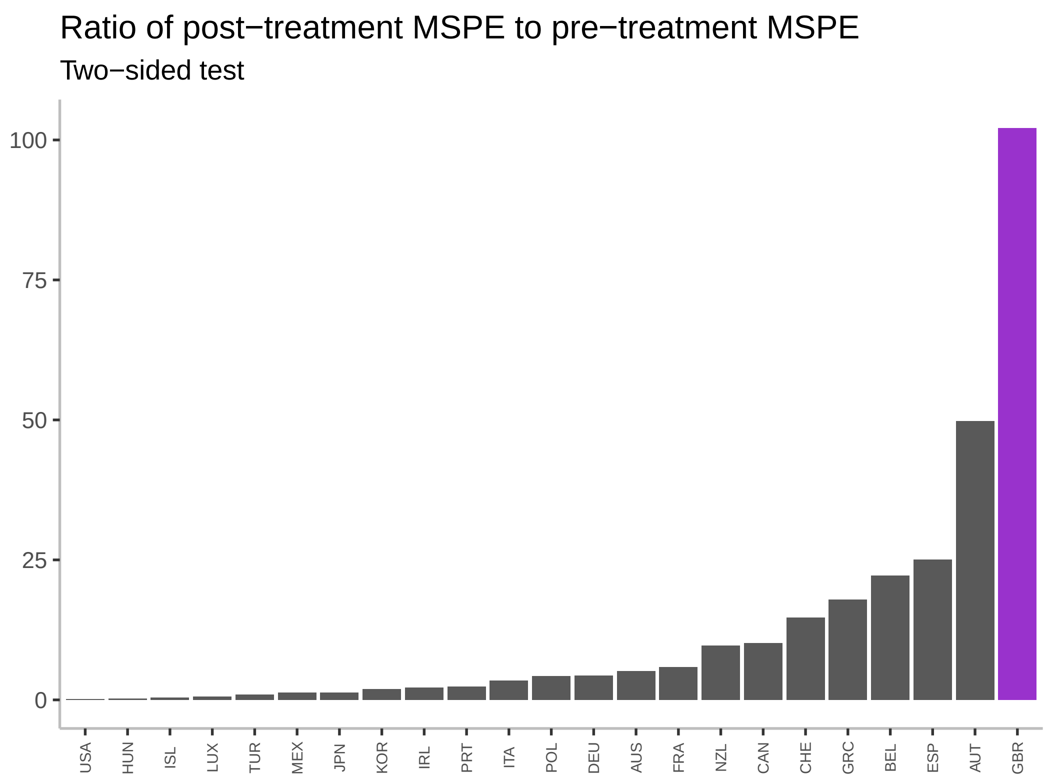


Figure S84: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

### G.6 Specification 6

**Outcome variable:** Emissions rescaled to 1990 baseline

**Donor pool:** OECD, high, and upper middle income countries in 2001, $n = 51$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1991 emissions rescaled to 1990 | 1.02 | 1.019 | 1.024 | 0.091 |
| 1992 emissions rescaled to 1990 | 1.001 | 0.998 | 1.073 | 0.115 |
| 1993 emissions rescaled to 1990 | 0.982 | 0.987 | 1.129 | 0.118 |
| 1994 emissions rescaled to 1990 | 0.983 | 0.984 | 1.143 | 0.101 |
| 1995 emissions rescaled to 1990 | 0.968 | 0.967 | 1.155 | 0.122 |
| 1996 emissions rescaled to 1990 | 0.992 | 0.99 | 1.201 | 0.092 |
| 1997 emissions rescaled to 1990 | 0.949 | 0.948 | 1.249 | 0.082 |
| 1998 emissions rescaled to 1990 | 0.957 | 0.96 | 1.286 | 0.11 |
| 1999 emissions rescaled to 1990 | 0.955 | 0.957 | 1.312 | 0.105 |
| 2000 emissions rescaled to 1990 | 0.975 | 0.971 | 1.36 | 0.064 |

Table S12: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9749674 |
| p-value Kolmogorov Smirnov test | 0.8689817 |
| Mean difference in QQ plots | 0.0625 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.25 |

Table S13: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- Emissions in 2005 were 11.7% lower relative to a 1990 baseline compared to emissions *without* the CCP

**Statistical significance:**

- Two-sided test: $2/52 \approx 0.038$

- One-sided test: $1/34 \approx 0.029$

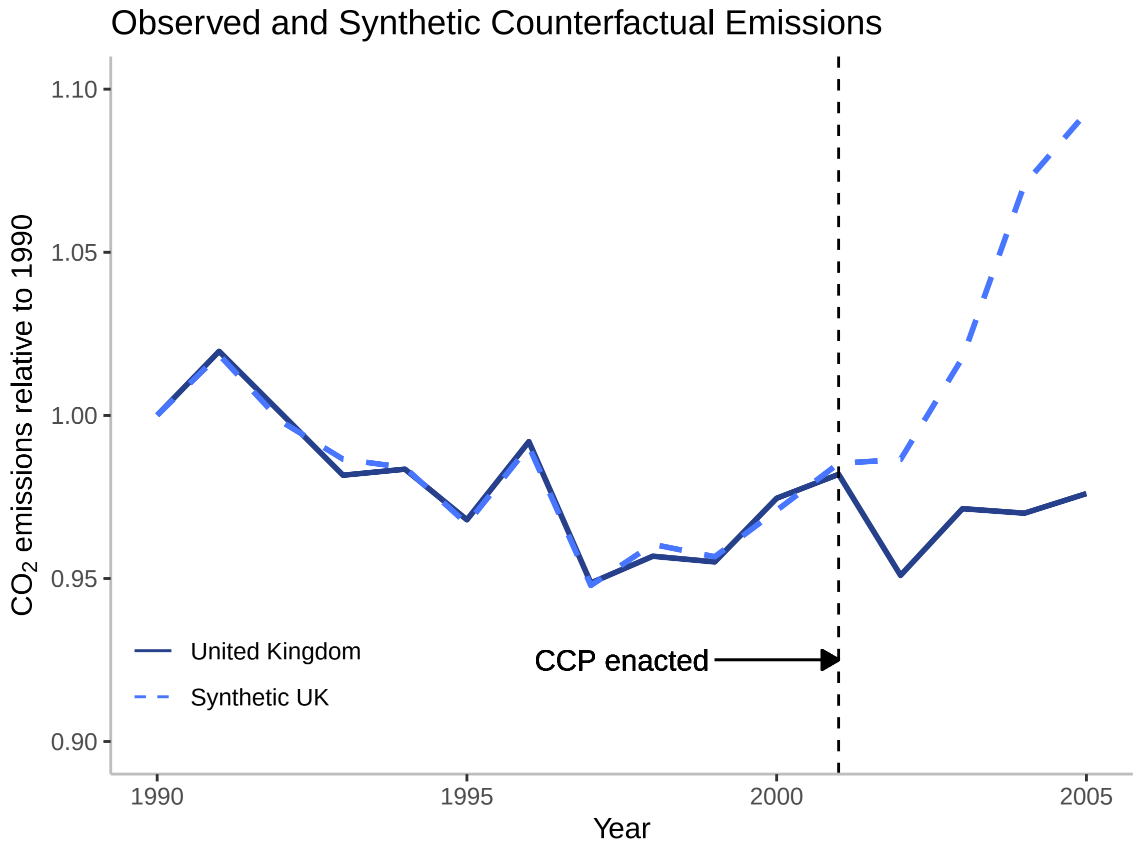


Figure S85: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 6.

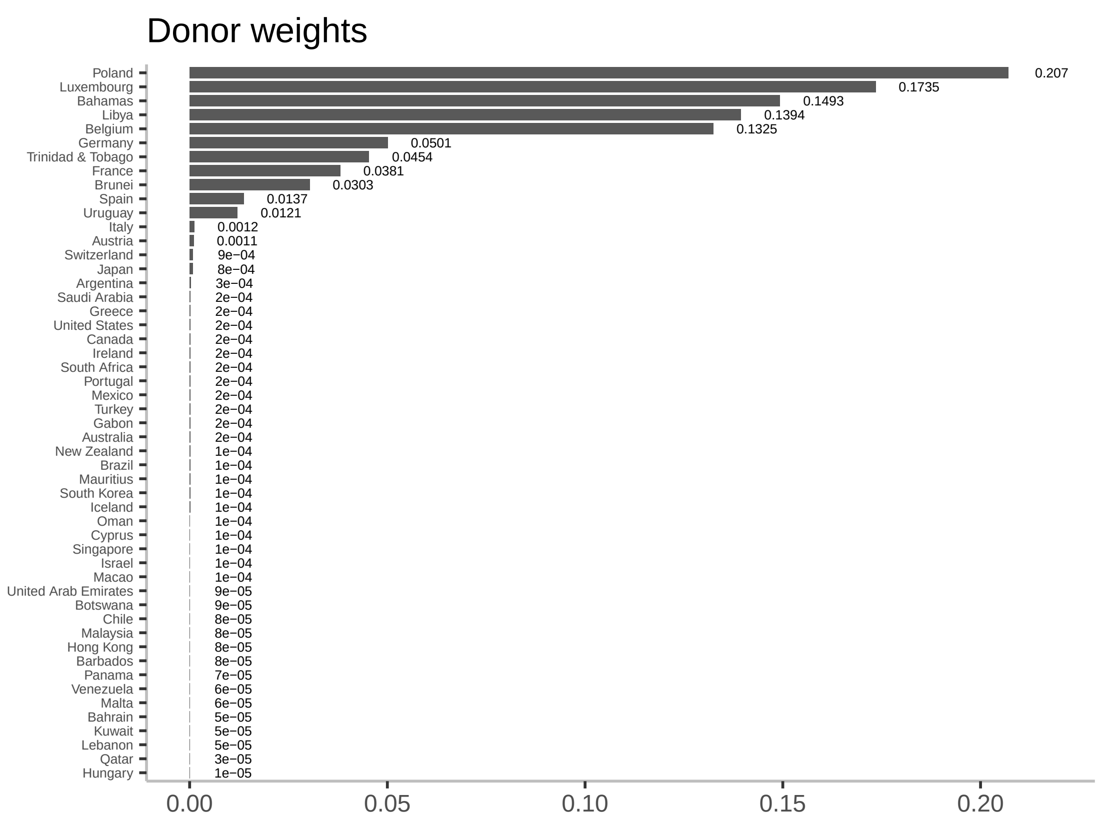


Figure S86: Weights applied to donor countries in Specification 6.

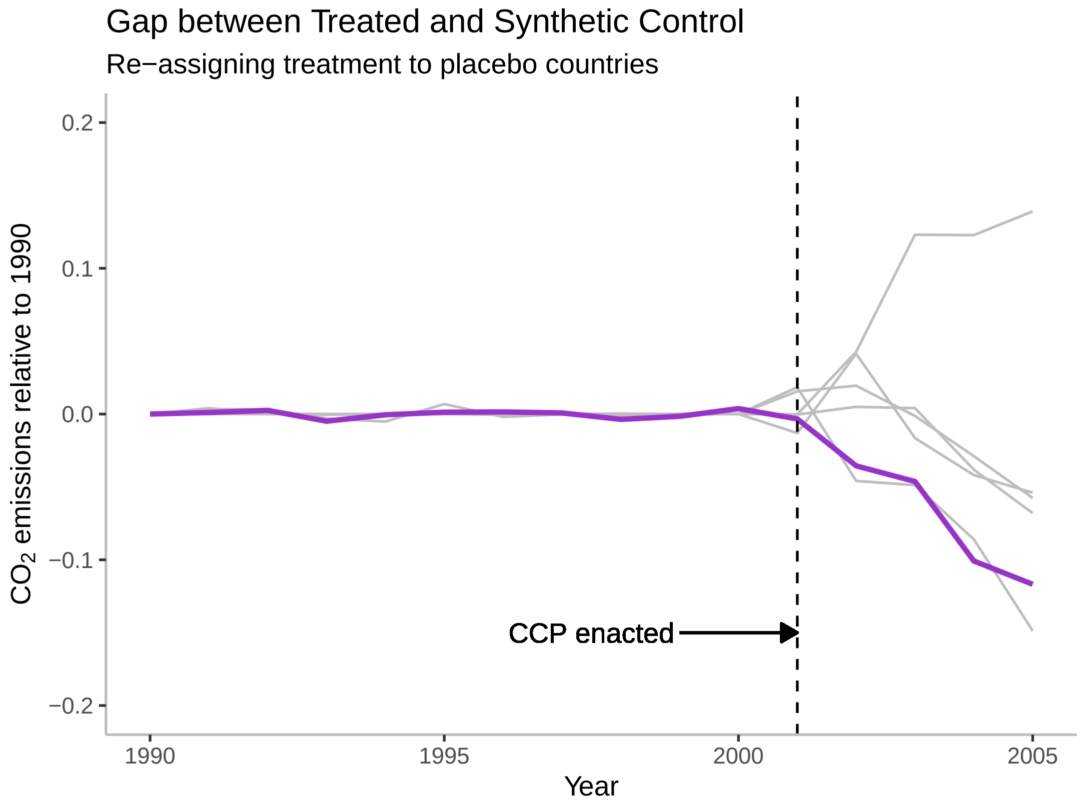


Figure S87: Gaps in emissions (rescaled to 1990 baseline) between the treated unit and its synthetic counterpart as estimated by Specification 6. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

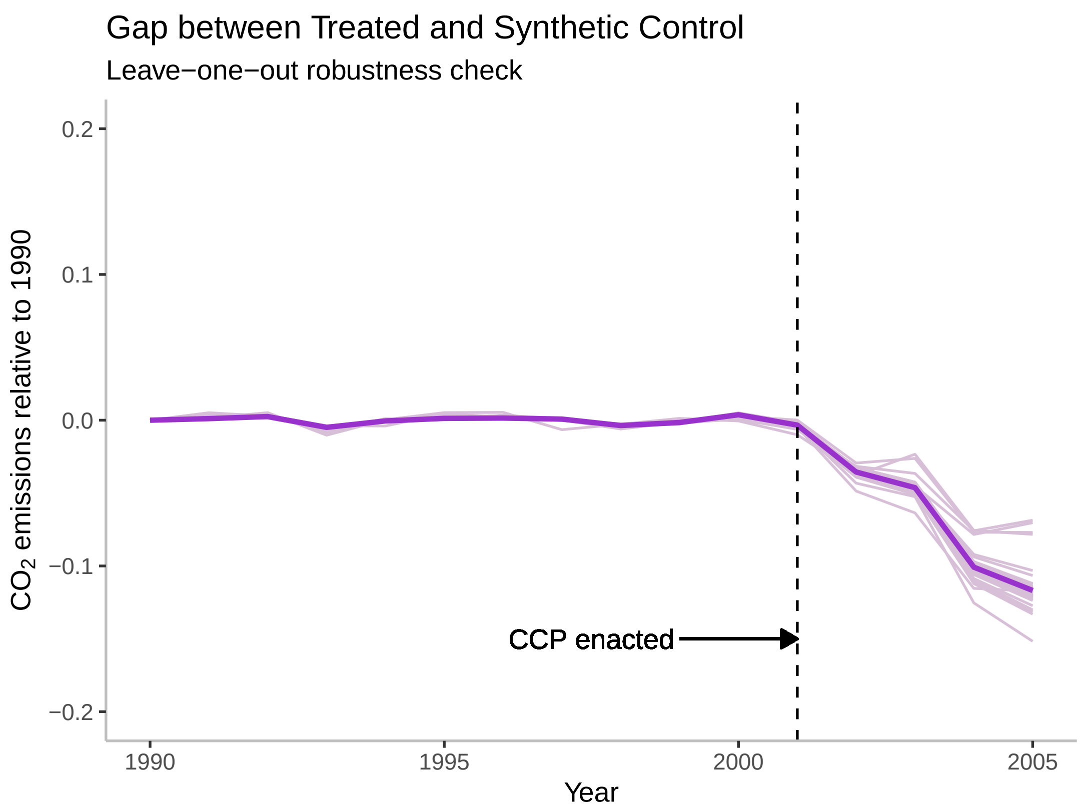


Figure S88: Gaps between the UK and the synthetic UK in Specification 6. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (51 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

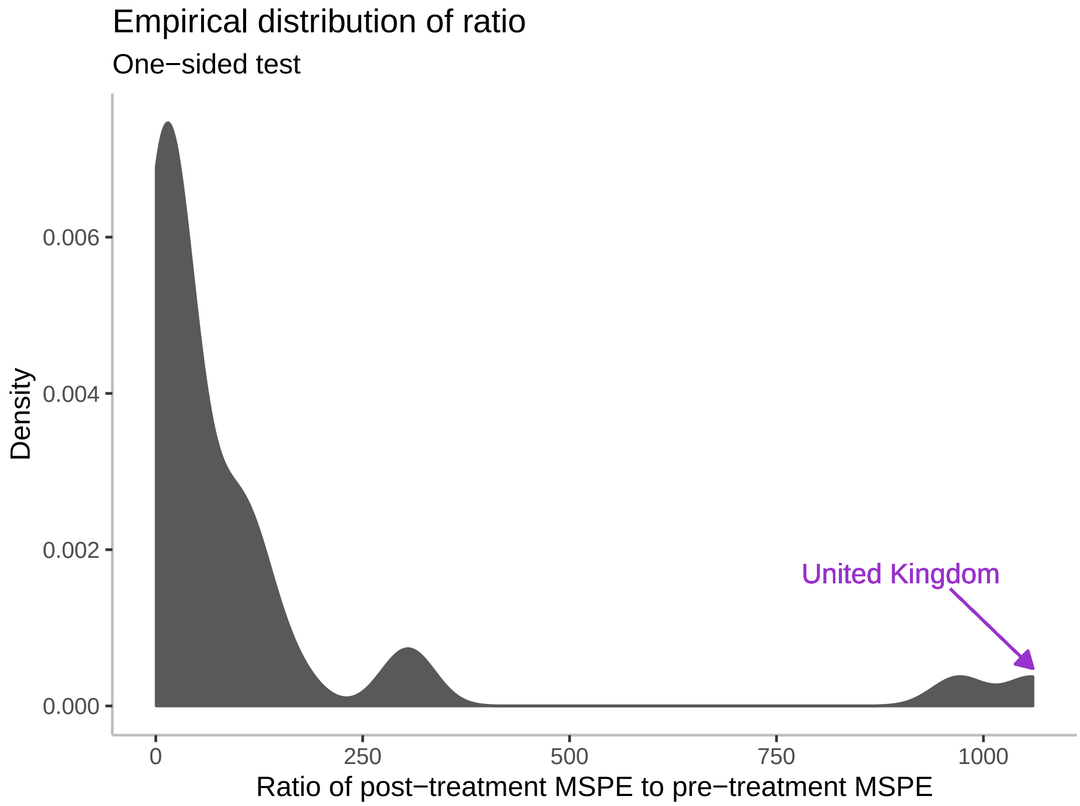


Figure S89: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

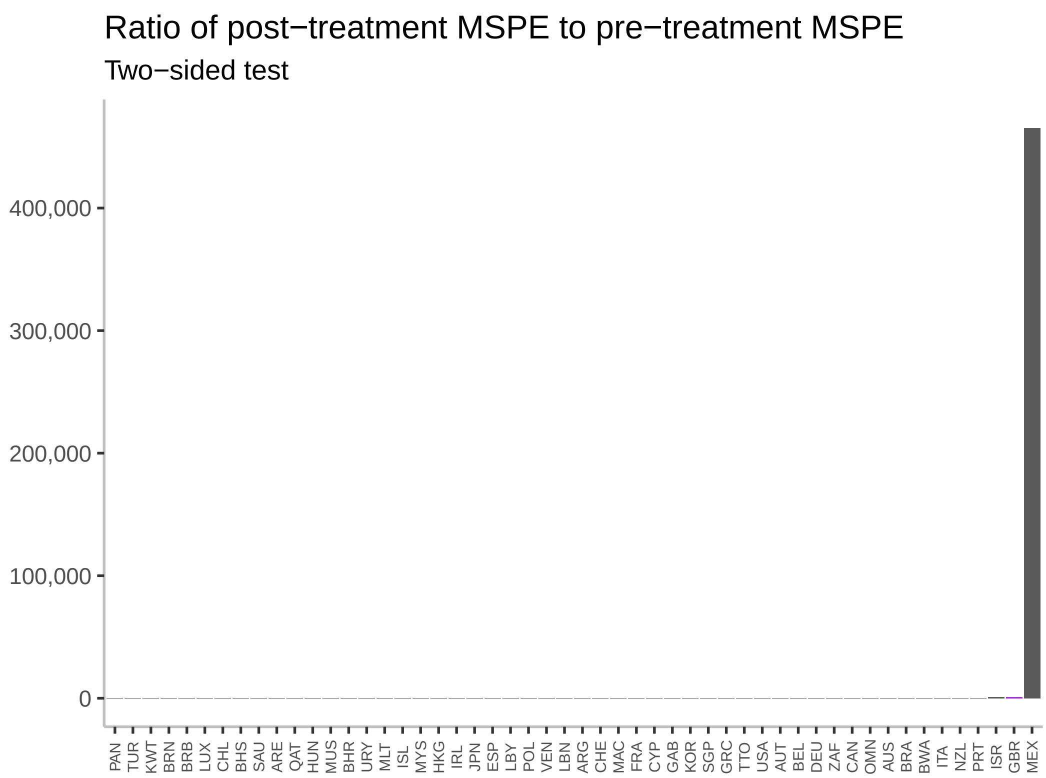


Figure S90: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

### G.7 Specification 7

**Outcome variable:** Emissions rescaled to 1990 baseline

**Donor pool:** OECD and high income countries in 2001, $n = 32$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1991 emissions rescaled to 1990 baseline | 1.02 | 1.014 | 0.998 | 0.019 |
| 1992 emissions rescaled to 1990 baseline | 1.001 | 0.998 | 1.05 | 0.073 |
| 1993 emissions rescaled to 1990 baseline | 0.982 | 0.988 | 1.088 | 0.082 |
| 1994 emissions rescaled to 1990 baseline | 0.983 | 0.985 | 1.109 | 0.071 |
| 1995 emissions rescaled to 1990 baseline | 0.968 | 0.965 | 1.118 | 0.108 |
| 1996 emissions rescaled to 1990 baseline | 0.992 | 0.991 | 1.14 | 0.122 |
| 1997 emissions rescaled to 1990 baseline | 0.949 | 0.949 | 1.18 | 0.161 |
| 1998 emissions rescaled to 1990 baseline | 0.957 | 0.961 | 1.206 | 0.094 |
| 1999 emissions rescaled to 1990 baseline | 0.955 | 0.957 | 1.214 | 0.117 |
| 2000 emissions rescaled to 1990 baseline | 0.975 | 0.972 | 1.273 | 0.154 |

Table S14: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9845835 |
| p-value Kolmogorov Smirnov test | 0.8689817 |
| Mean difference in QQ plots | 0.0694444 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.25 |

Table S15: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- Emissions in 2005 were 11.3% lower relative to a 1990 baseline compared to emissions *without* the CCP

**Statistical significance:**

- Two-sided test: $1/33 \approx 0.030$
- One-sided test: $1/18 \approx 0.056$

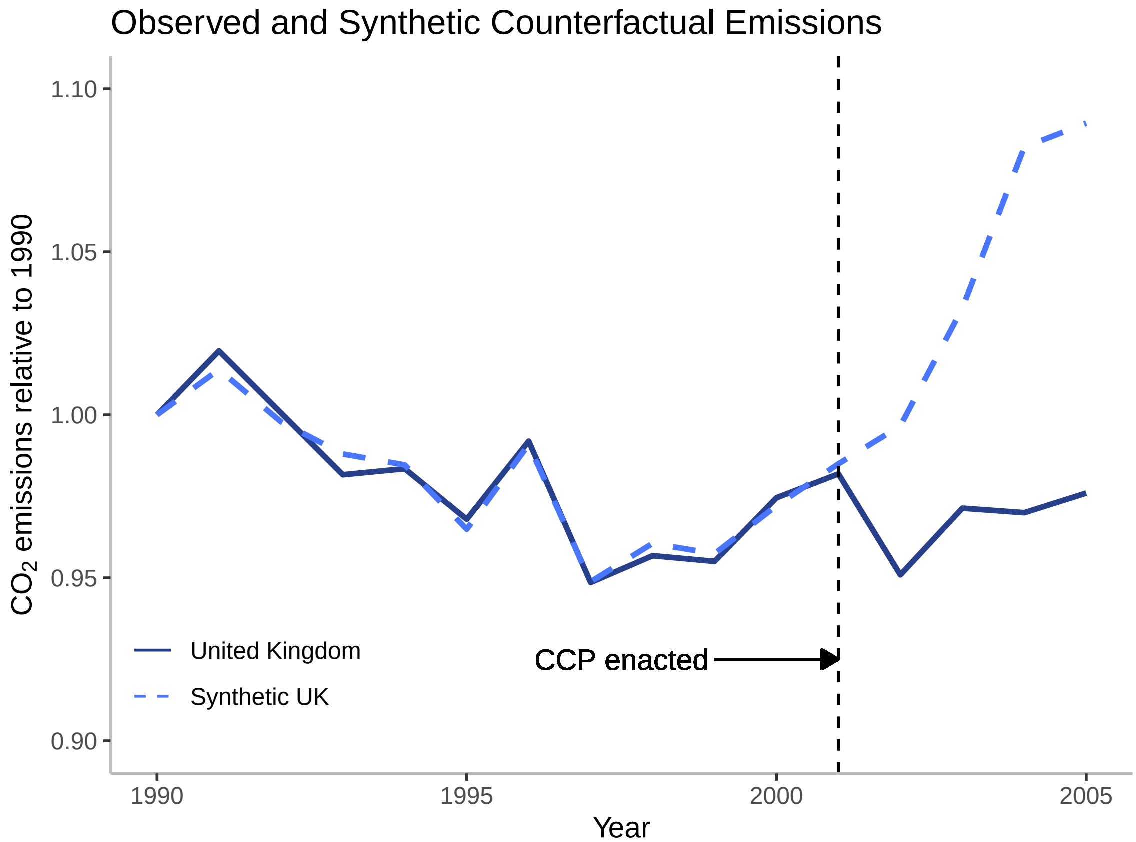


Figure S91: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 7.

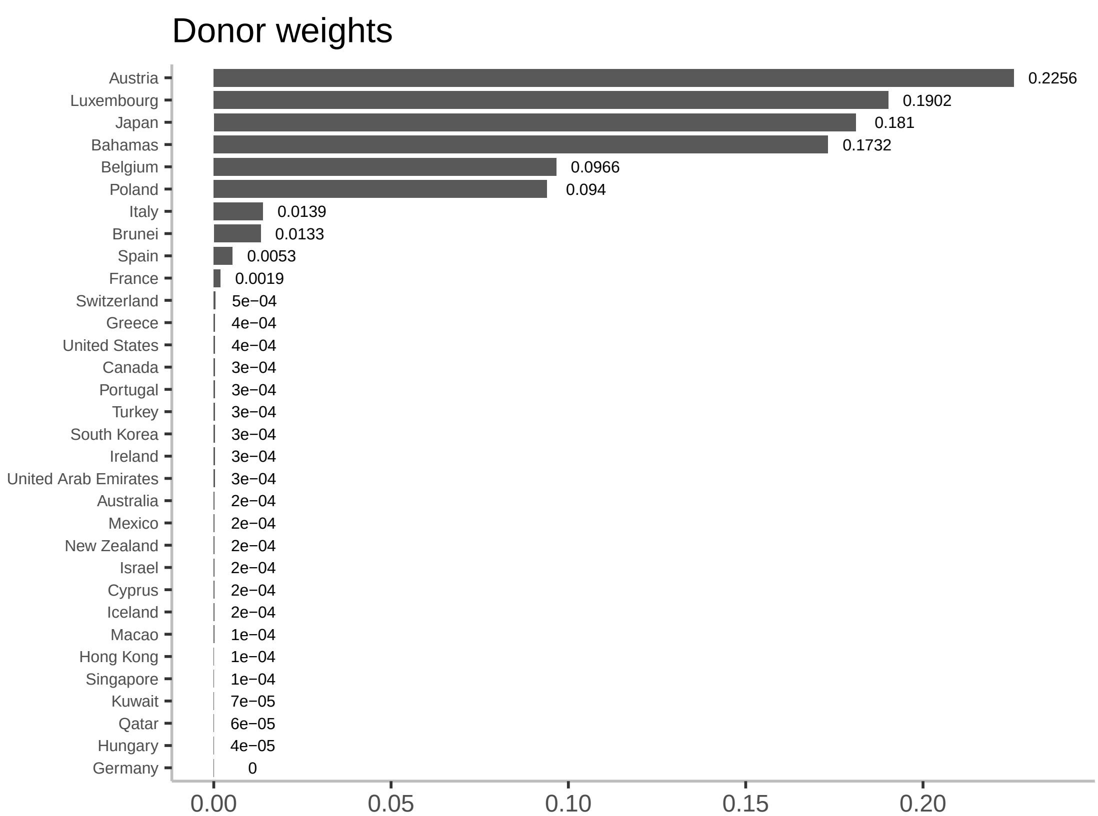


Figure S92: Weights applied to donor countries in Specification 7.

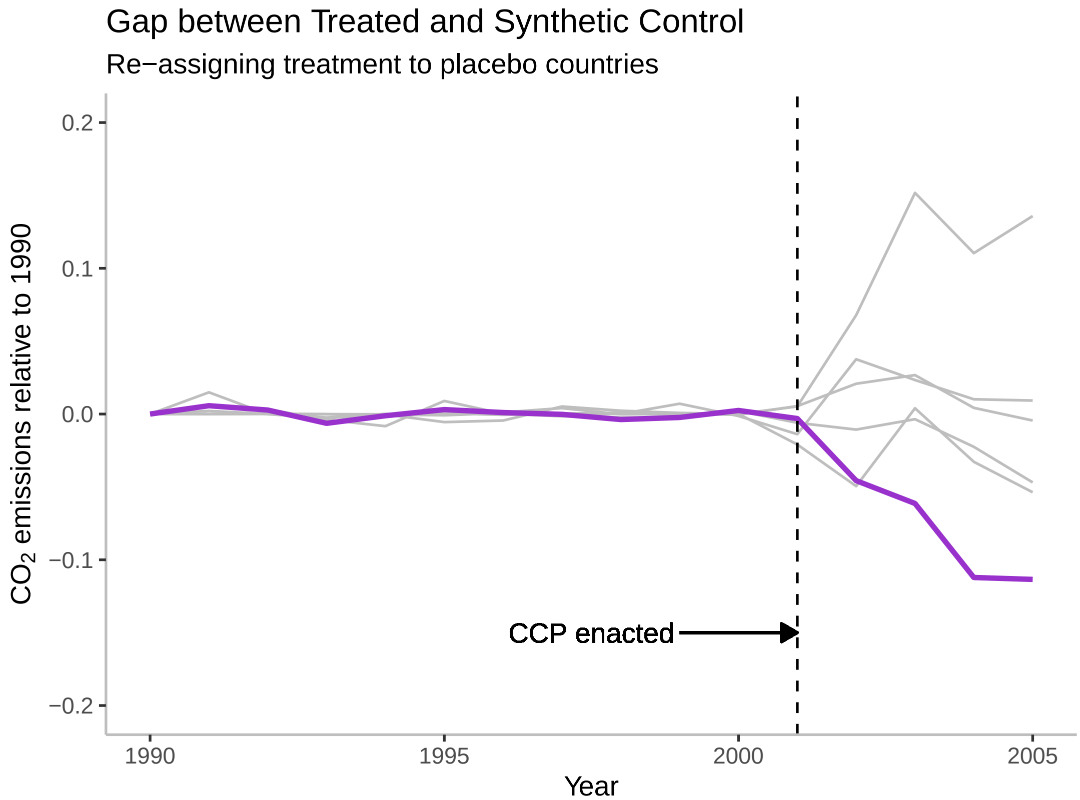


Figure S93: Gaps in emissions (rescaled to 1990 baseline) between the treated unit and its synthetic counterpart as estimated by Specification 7. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

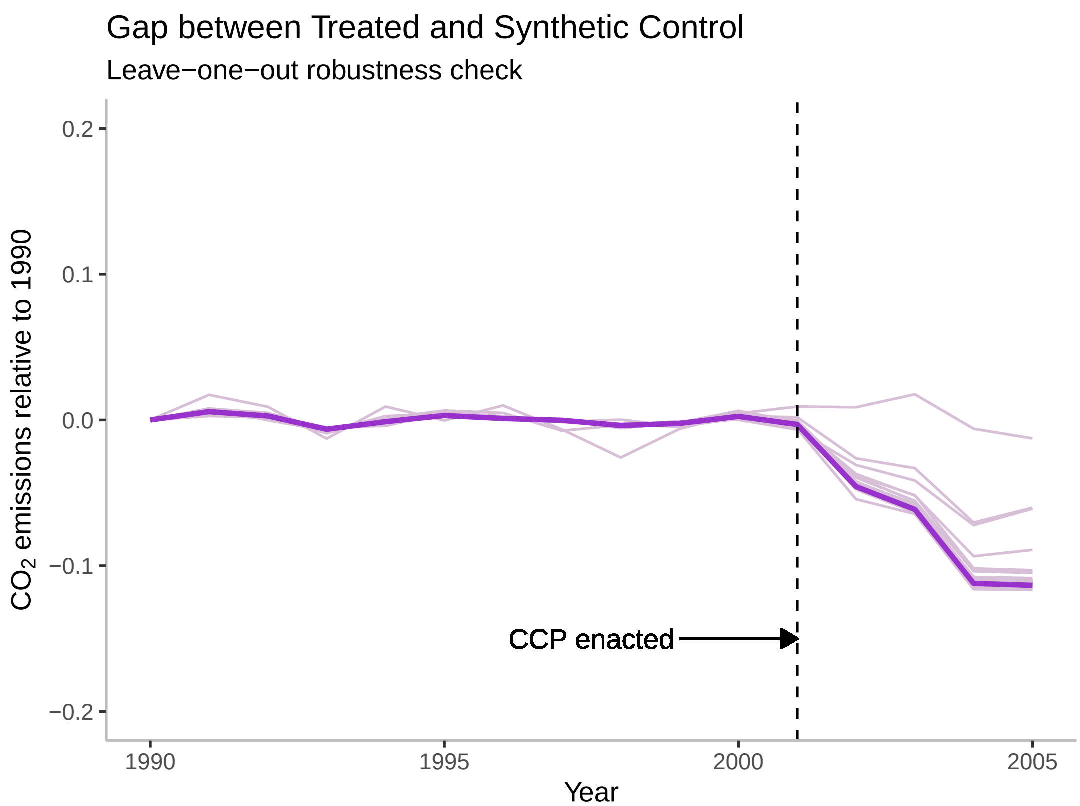


Figure S94: Gaps between the UK and the synthetic UK in Specification 7. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (32 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

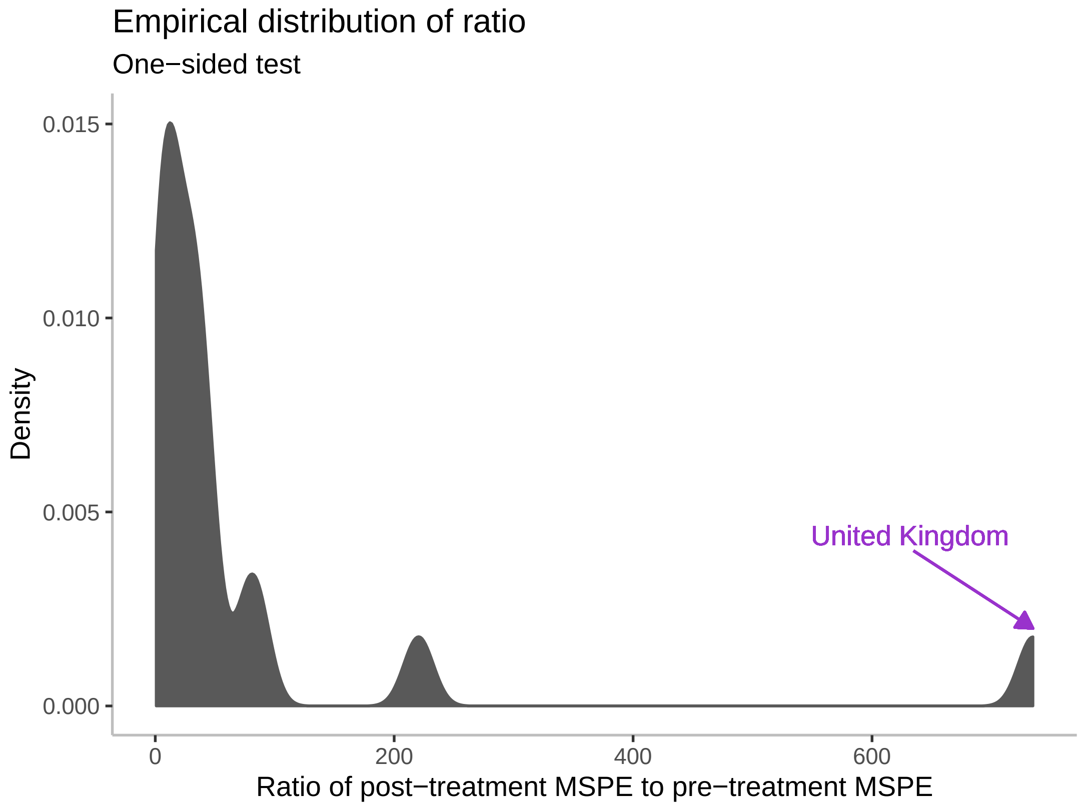


Figure S95: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

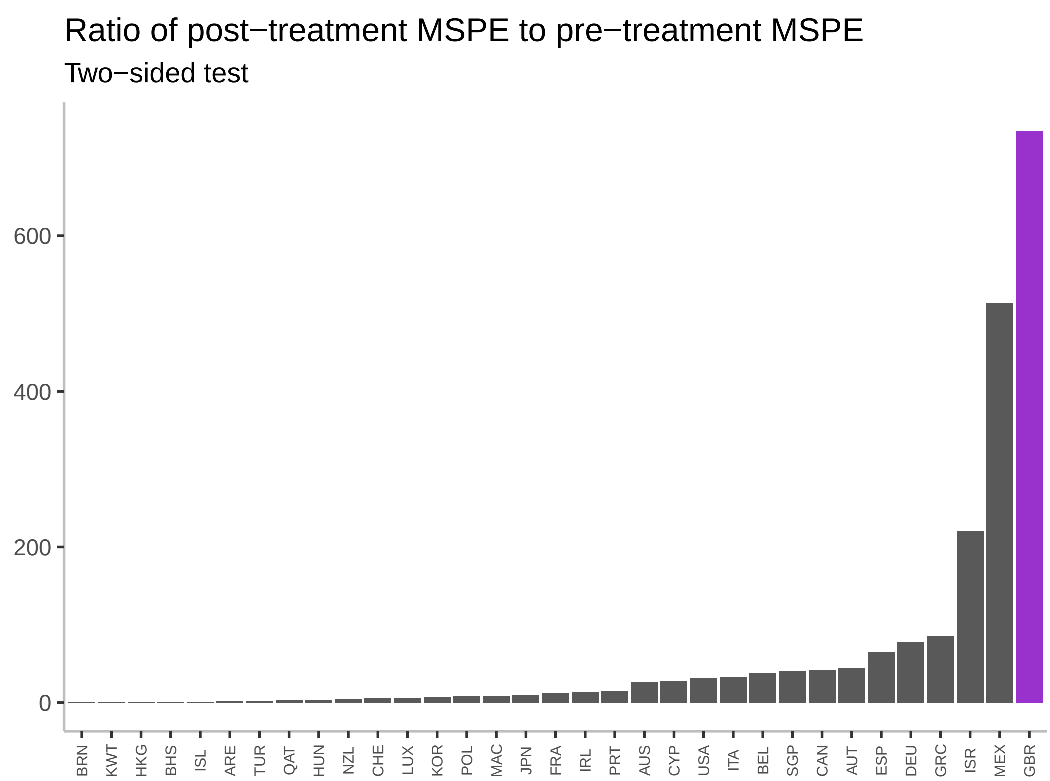


Figure S96: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

## G.8 Specification 8

**Outcome variable:** Emissions rescaled to 1990 baseline

**Donor pool:** OECD income countries in 2001, $n = 22$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1991 emissions rescaled to 1990 baseline | 1.02 | 1.014 | 1.007 | 0.003 |
| 1992 emissions rescaled to 1990 baseline | 1.001 | 1 | 1.014 | 0.046 |
| 1993 emissions rescaled to 1990 baseline | 0.982 | 0.988 | 1.025 | 0.034 |
| 1994 emissions rescaled to 1990 baseline | 0.983 | 0.982 | 1.034 | 0.04 |
| 1995 emissions rescaled to 1990 baseline | 0.968 | 0.958 | 1.048 | 0.071 |
| 1996 emissions rescaled to 1990 baseline | 0.992 | 0.99 | 1.09 | 0.119 |
| 1997 emissions rescaled to 1990 baseline | 0.949 | 0.959 | 1.11 | 0.146 |
| 1998 emissions rescaled to 1990 baseline | 0.957 | 0.958 | 1.113 | 0.15 |
| 1999 emissions rescaled to 1990 baseline | 0.955 | 0.956 | 1.135 | 0.284 |
| 2000 emissions rescaled to 1990 baseline | 0.975 | 0.972 | 1.162 | 0.108 |

Table S16: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9886529 |
| p-value Kolmogorov Smirnov test | 0.9984853 |
| Mean difference in QQ plots | 0.0694444 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.1666667 |

Table S17: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- Emissions in 2005 were 6.2% lower relative to a 1990 baseline compared to emissions *without* the CCP

**Statistical significance:**

- Two-sided test: $1/23 \approx 0.043$
- One-sided test: $1/14 \approx 0.071$

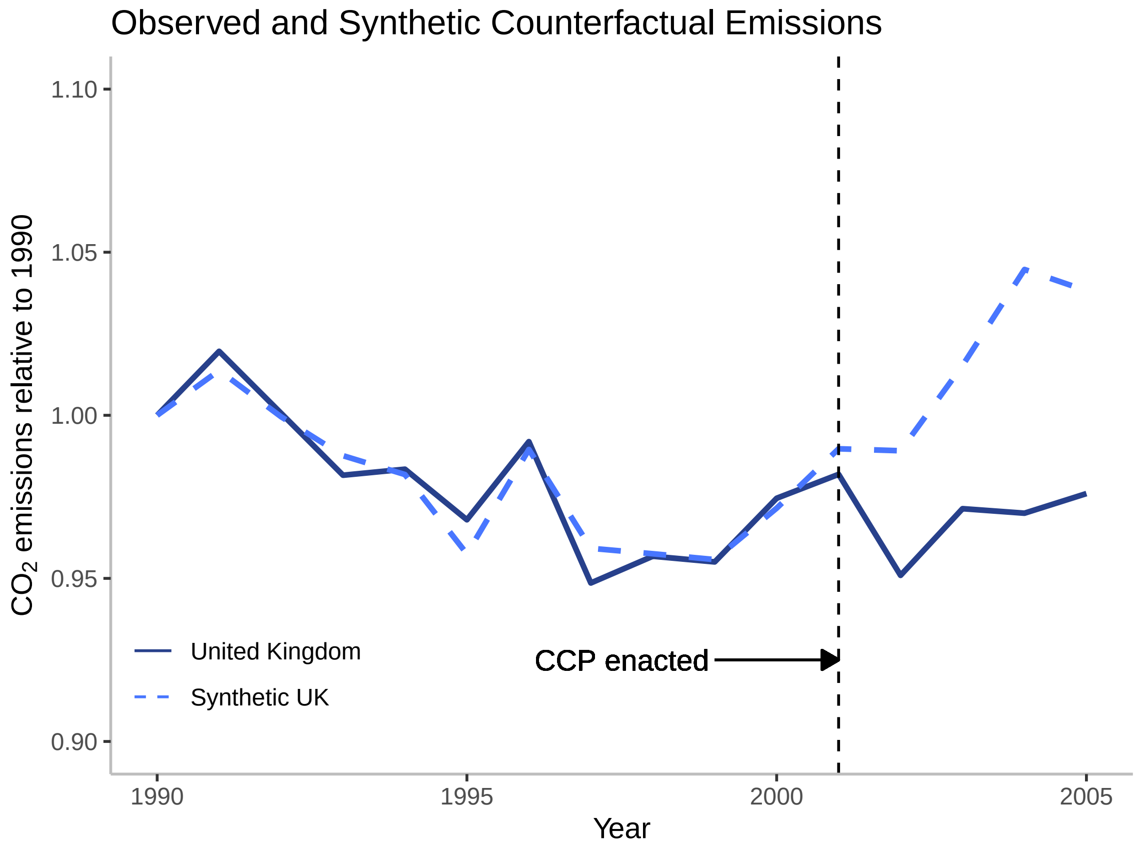


Figure S97: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 8.

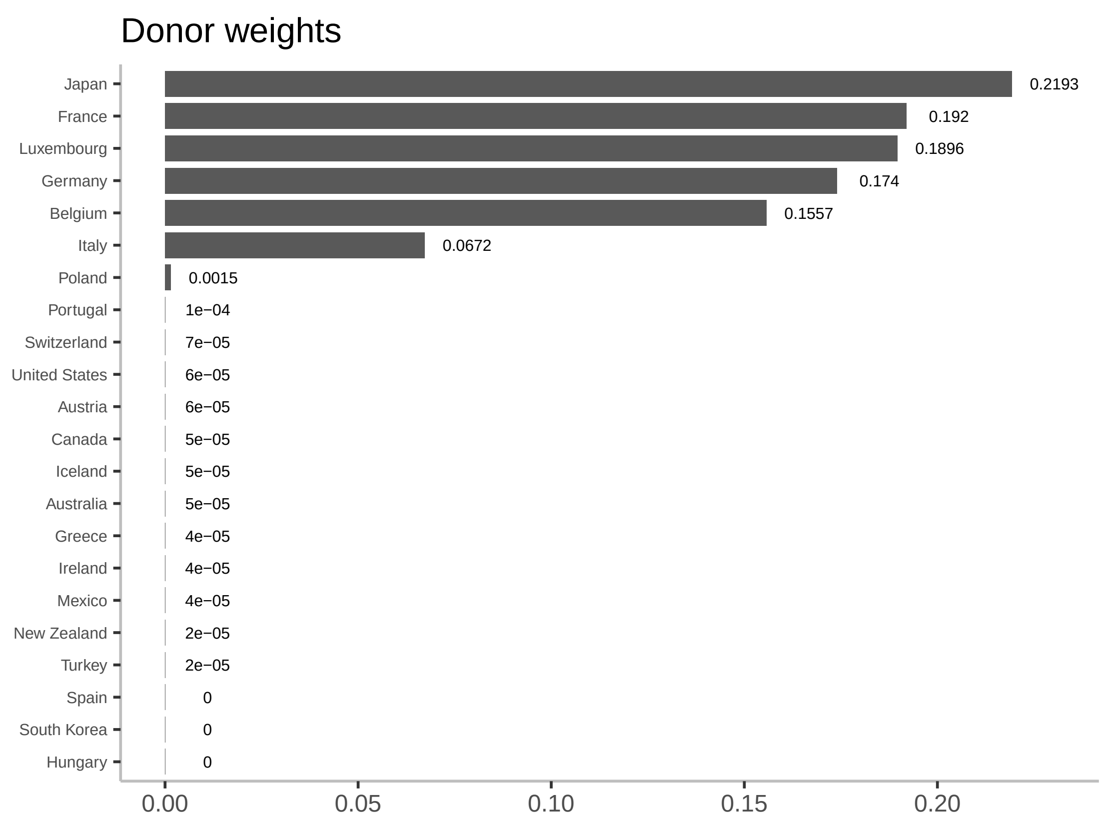


Figure S98: Weights applied to donor countries in Specification 8.

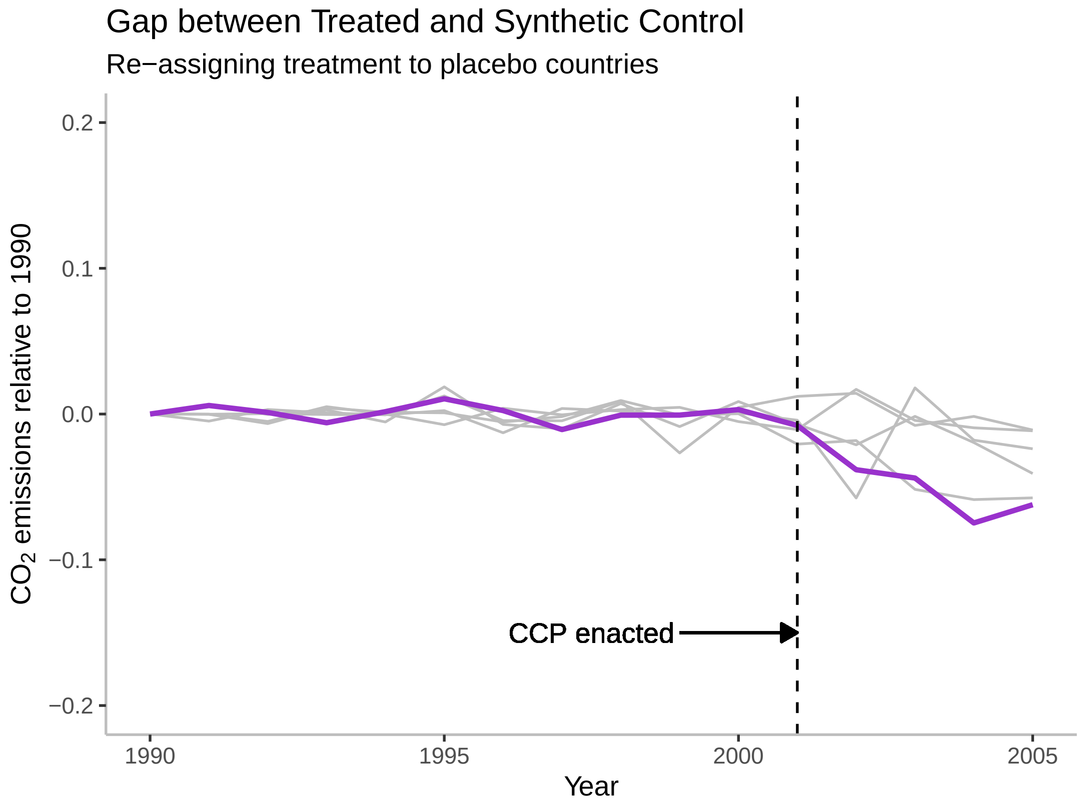


Figure S99: Gaps in emissions (rescaled to 1990 baseline) between the treated unit and its synthetic counterpart as estimated by Specification 8. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

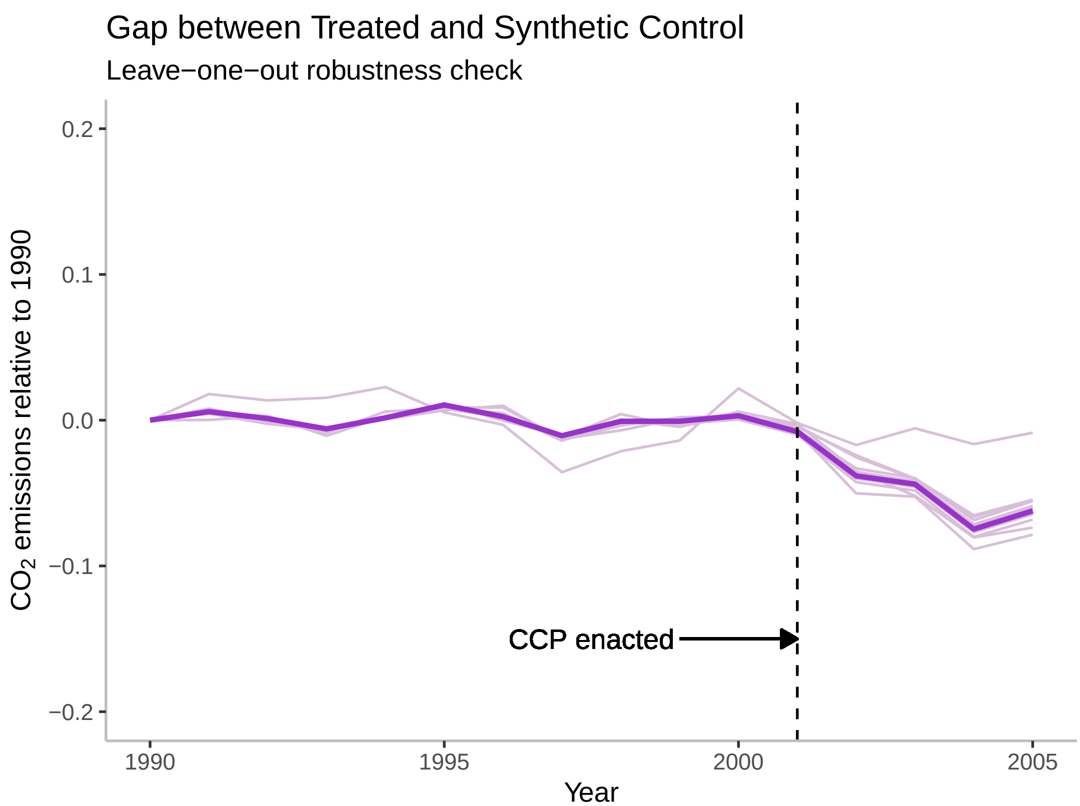


Figure S100: Gaps between the UK and the synthetic UK in Specification 8. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (22 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

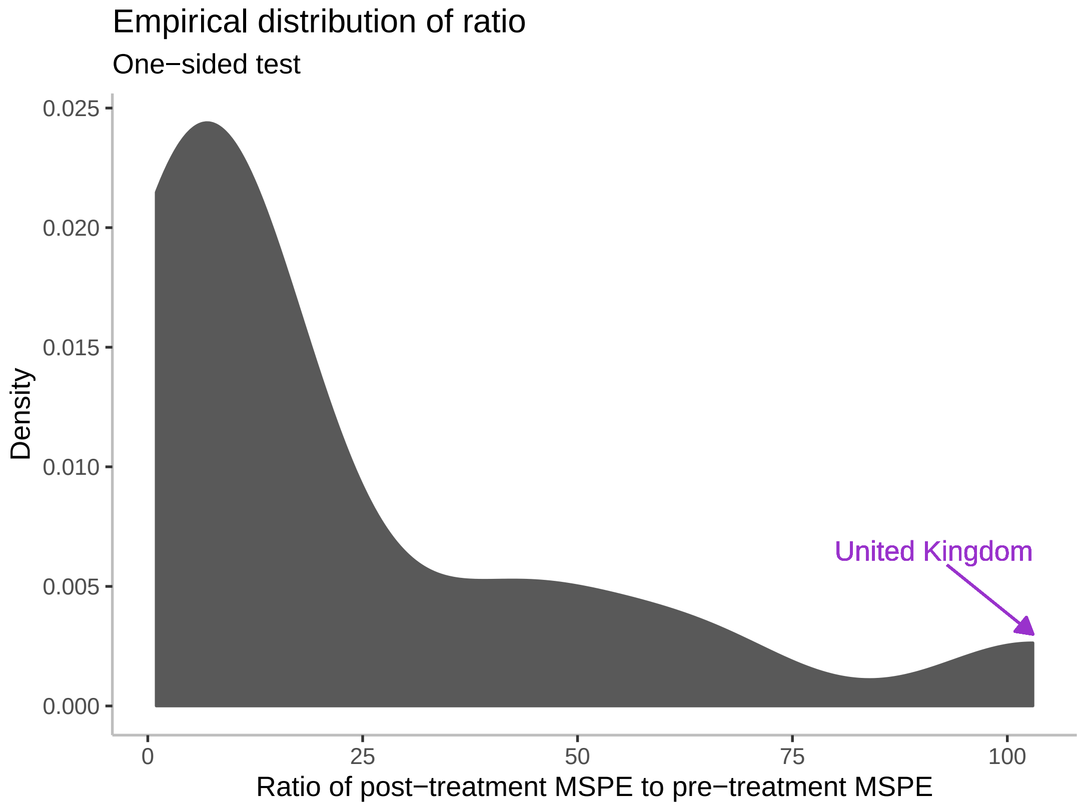


Figure S101: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

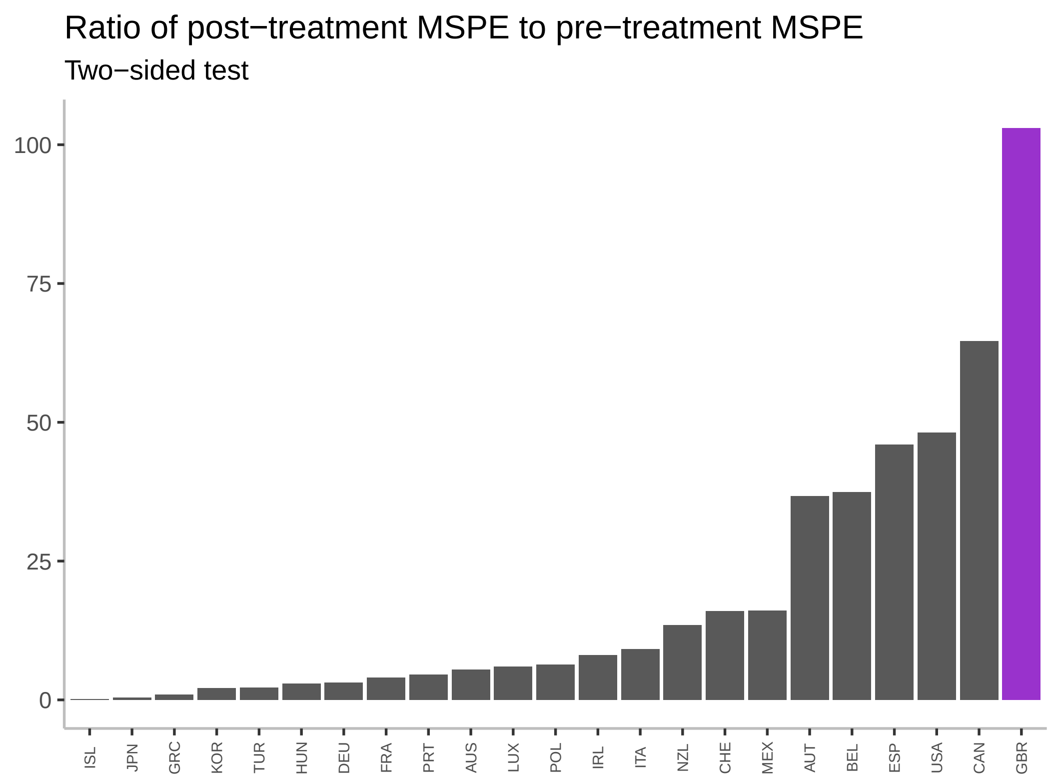


Figure S102: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

### G.9 Specification 9

**Outcome variable:** Emissions rescaled to 2000 baseline

**Donor pool:** OECD, high, and upper middle income countries in 2001, $n = 51$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1990 emissions rescaled to 2000 baseline | 1.026 | 1.027 | 0.801 | 0.208 |
| 1991 emissions rescaled to 2000 baseline | 1.046 | 1.044 | 0.804 | 0.184 |
| 1992 emissions rescaled to 2000 baseline | 1.027 | 1.025 | 0.827 | 0.169 |
| 1993 emissions rescaled to 2000 baseline | 1.007 | 1.012 | 0.863 | 0.106 |
| 1994 emissions rescaled to 2000 baseline | 1.009 | 1.009 | 0.867 | 0.11 |
| 1995 emissions rescaled to 2000 baseline | 0.993 | 0.993 | 0.873 | 0.093 |
| 1996 emissions rescaled to 2000 baseline | 1.018 | 1.017 | 0.906 | 0.046 |
| 1997 emissions rescaled to 2000 baseline | 0.973 | 0.973 | 0.934 | 0.064 |
| 1998 emissions rescaled to 2000 baseline | 0.982 | 0.988 | 0.959 | 0.009 |
| 1999 emissions rescaled to 2000 baseline | 0.98 | 0.982 | 0.975 | 0.011 |

Table S18: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9041184 |
| p-value Kolmogorov Smirnov test | 0.8689817 |
| Mean difference in QQ plots | 0.0694444 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.25 |

Table S19: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- Emissions in 2005 were 13.6% lower relative to a 2000 baseline compared to emissions *without* the CCP

**Statistical significance:**

- Two-sided test: $2/52 \approx 0.038$

- One-sided test: $1/33 \approx 0.030$

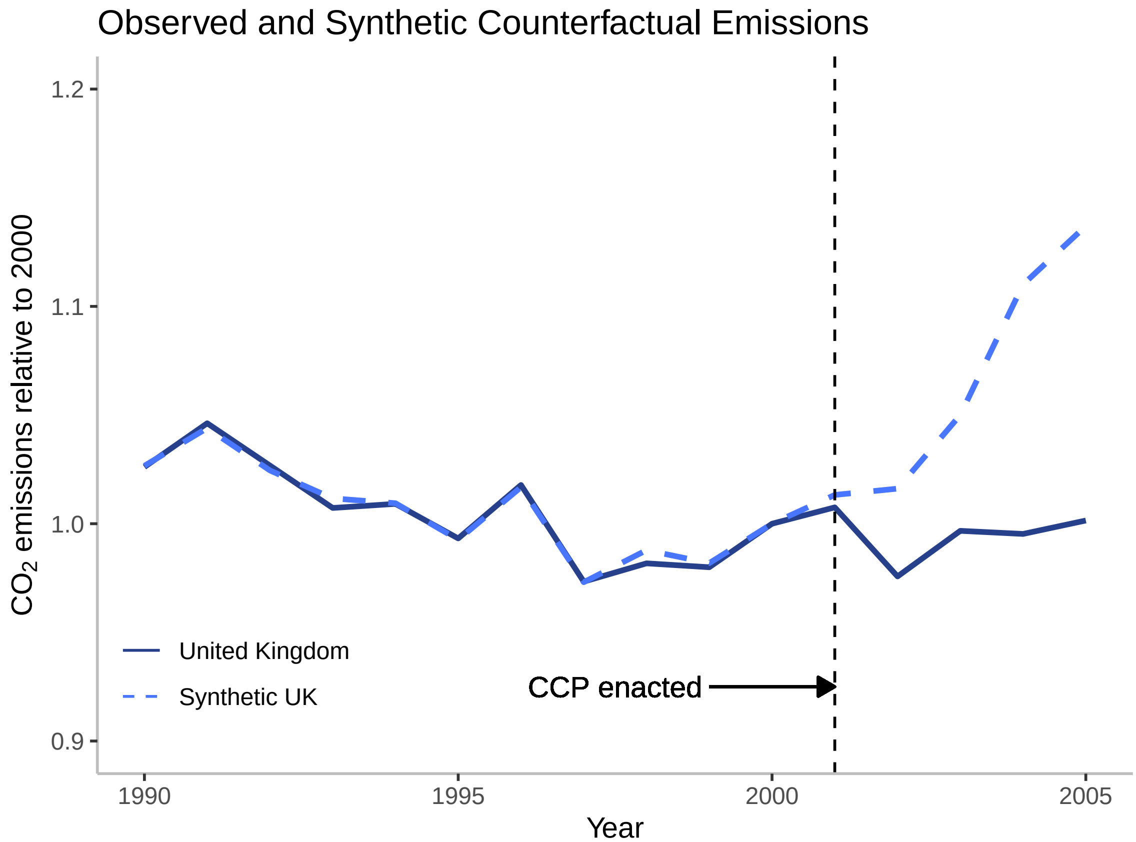


Figure S103: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 9.

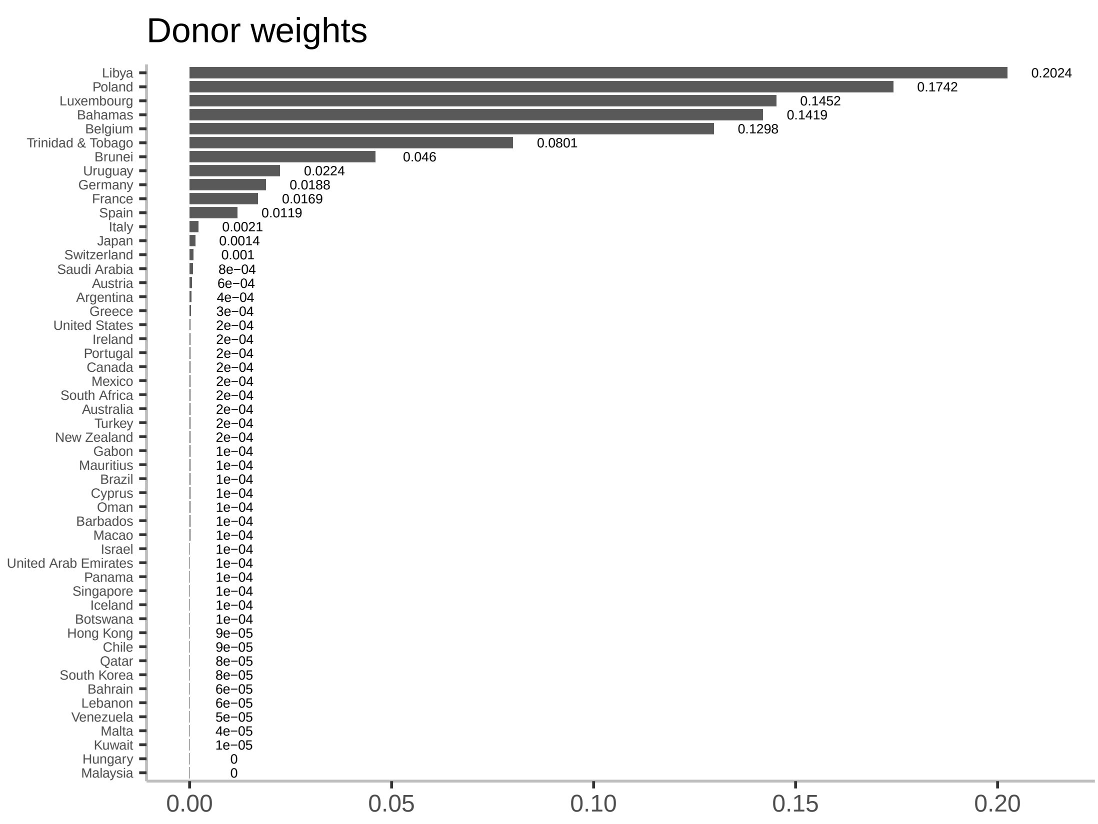


Figure S104: Weights applied to donor countries in Specification 9.

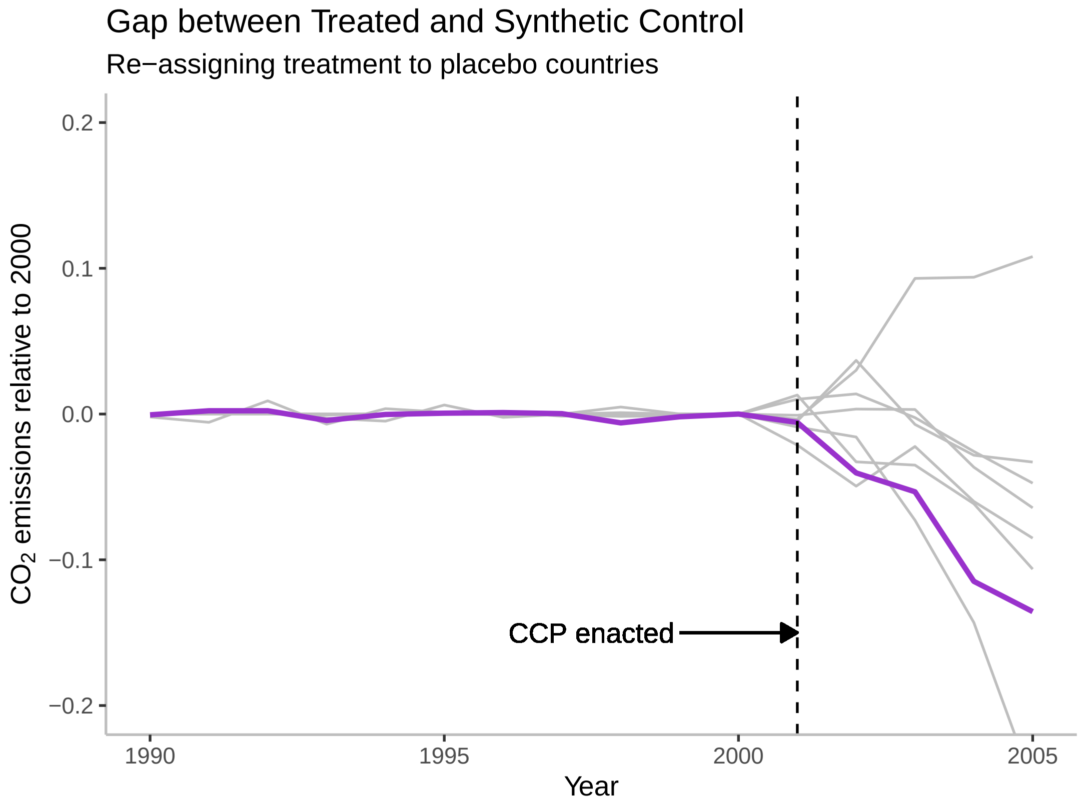


Figure S105: Gaps in emissions (rescaled to 2000 baseline) between the treated unit and its synthetic counterpart as estimated by Specification 9. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

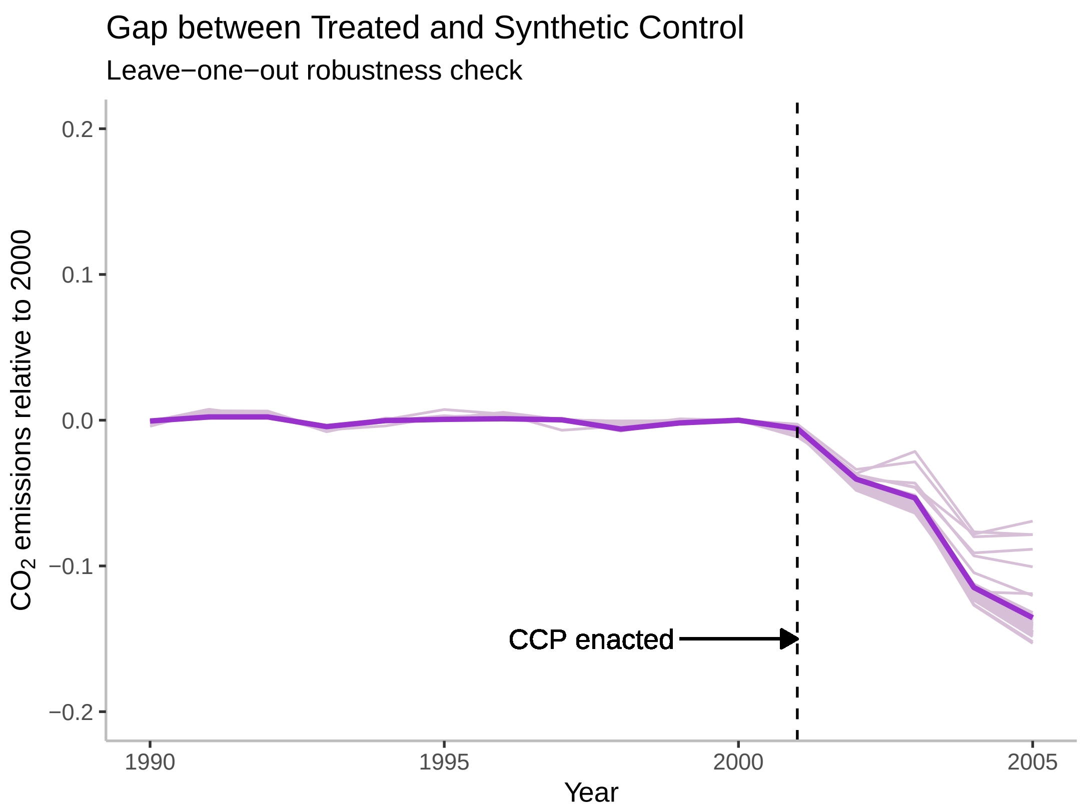


Figure S106: Gaps between the UK and the synthetic UK in Specification 9. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (51 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

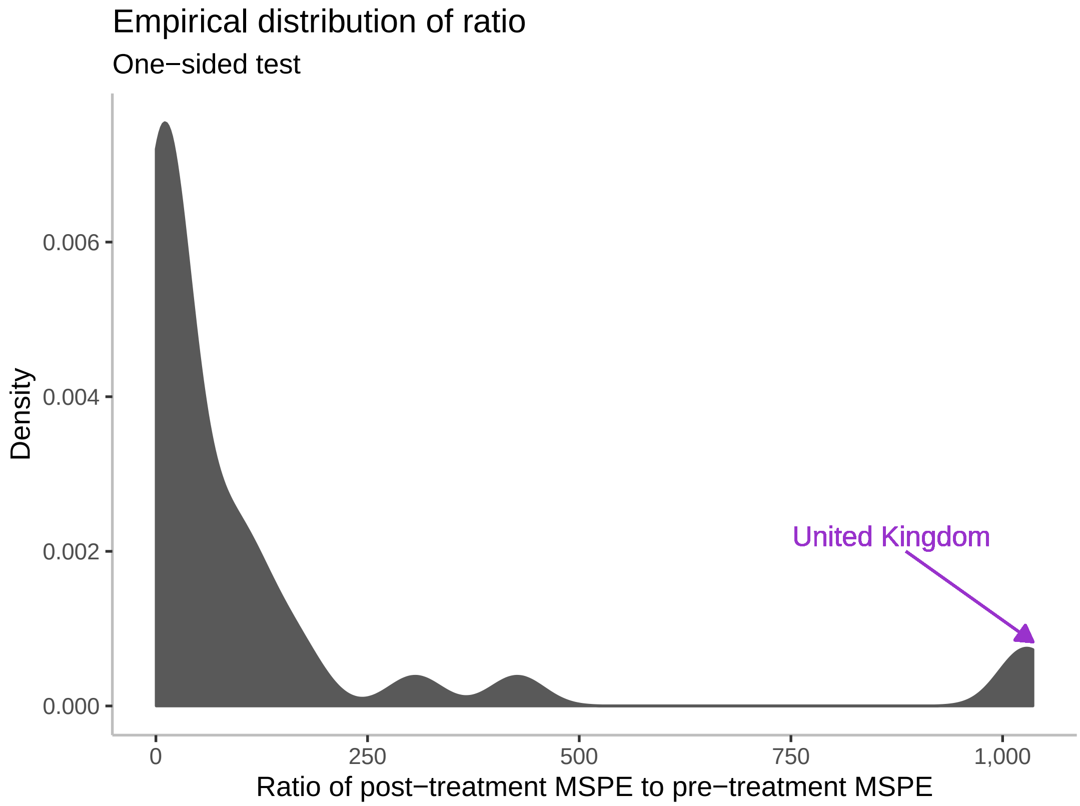


Figure S107: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

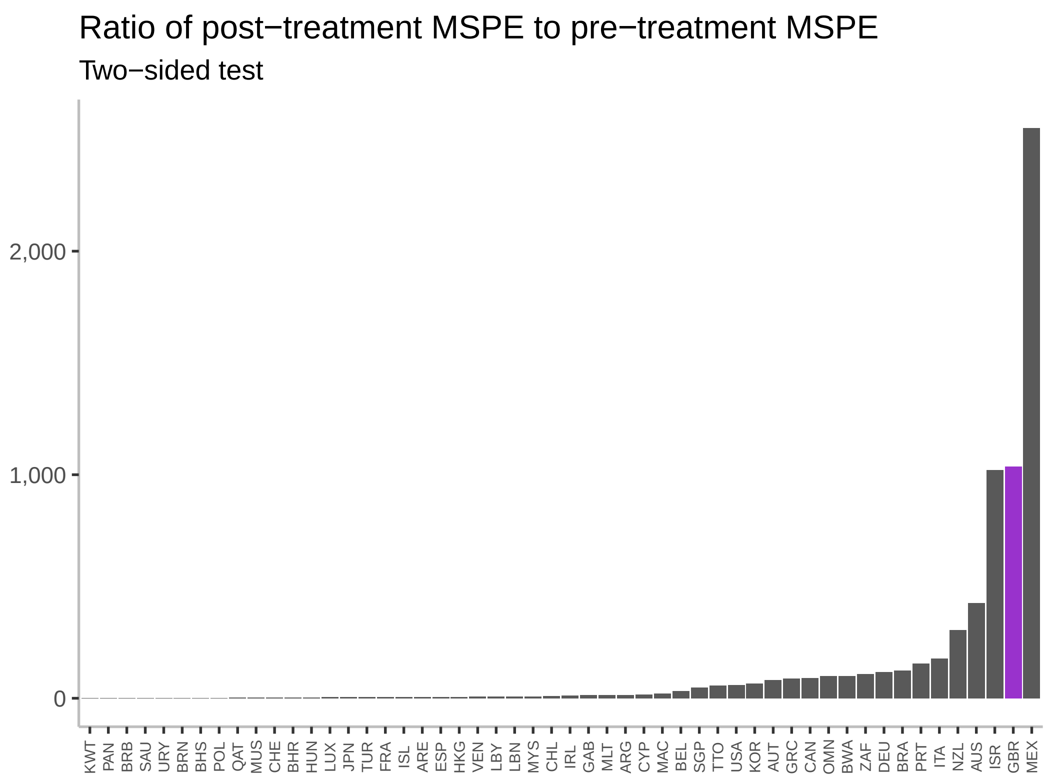


Figure S108: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

## G.10 Specification 10

**Outcome variable:** Emissions rescaled to 2000 baseline

**Donor pool:** OECD and high income countries in 2001, $n = 32$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1990 emissions rescaled to 2000 baseline | 1.026 | 1.029 | 0.86 | 0.154 |
| 1991 emissions rescaled to 2000 baseline | 1.046 | 1.037 | 0.84 | 0.091 |
| 1992 emissions rescaled to 2000 baseline | 1.027 | 1.023 | 0.865 | 0.116 |
| 1993 emissions rescaled to 2000 baseline | 1.007 | 1.013 | 0.887 | 0.087 |
| 1994 emissions rescaled to 2000 baseline | 1.009 | 1.011 | 0.9 | 0.071 |
| 1995 emissions rescaled to 2000 baseline | 0.993 | 0.991 | 0.902 | 0.101 |
| 1996 emissions rescaled to 2000 baseline | 1.018 | 1.016 | 0.926 | 0.1 |
| 1997 emissions rescaled to 2000 baseline | 0.973 | 0.974 | 0.946 | 0.174 |
| 1998 emissions rescaled to 2000 baseline | 0.982 | 0.983 | 0.964 | 0.042 |
| 1999 emissions rescaled to 2000 baseline | 0.98 | 0.981 | 0.965 | 0.064 |

Table S20: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.9931237 |
| p-value Kolmogorov Smirnov test | 0.8689817 |
| Mean difference in QQ plots | 0.0625 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.25 |

Table S21: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- Emissions in 2005 were 12.1% lower relative to a 2000 baseline compared to emissions *without* the CCP

**Statistical significance:**

- Two-sided test: $1/33 \approx 0.030$
- One-sided test: $1/18 \approx 0.056$

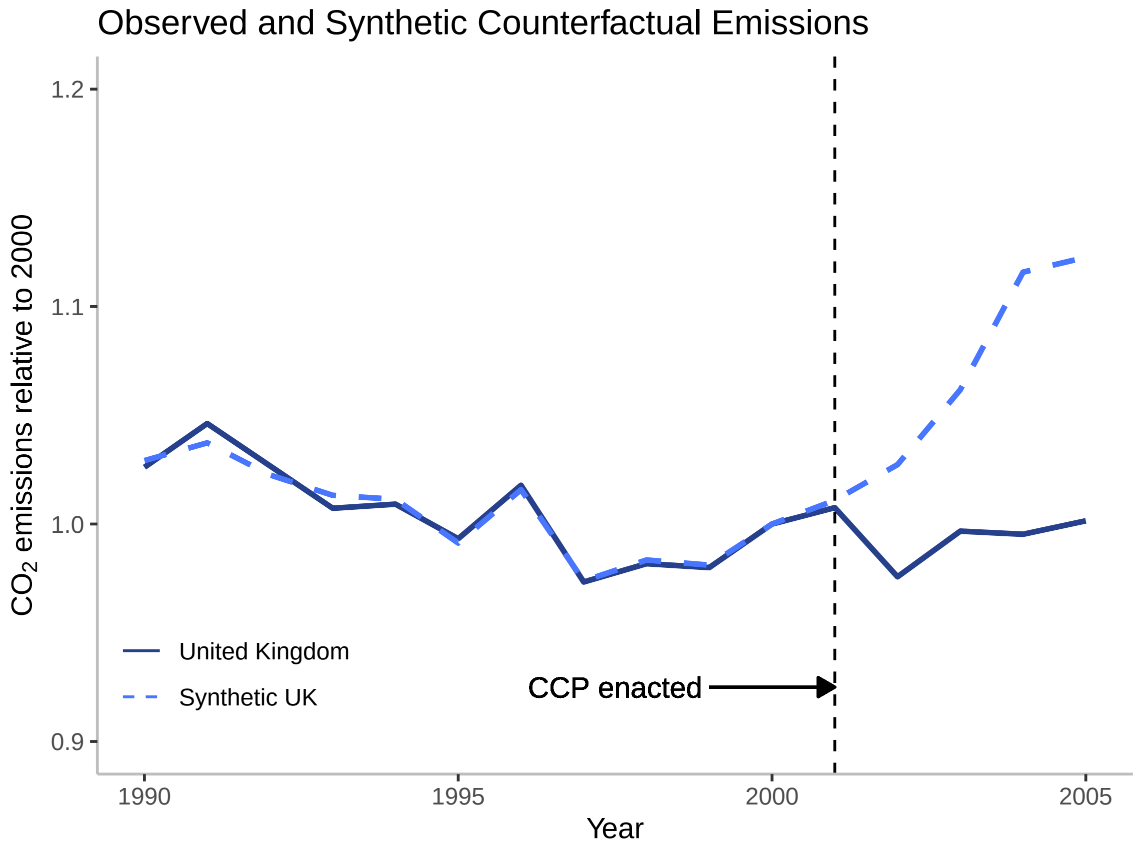


Figure S109: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 10.

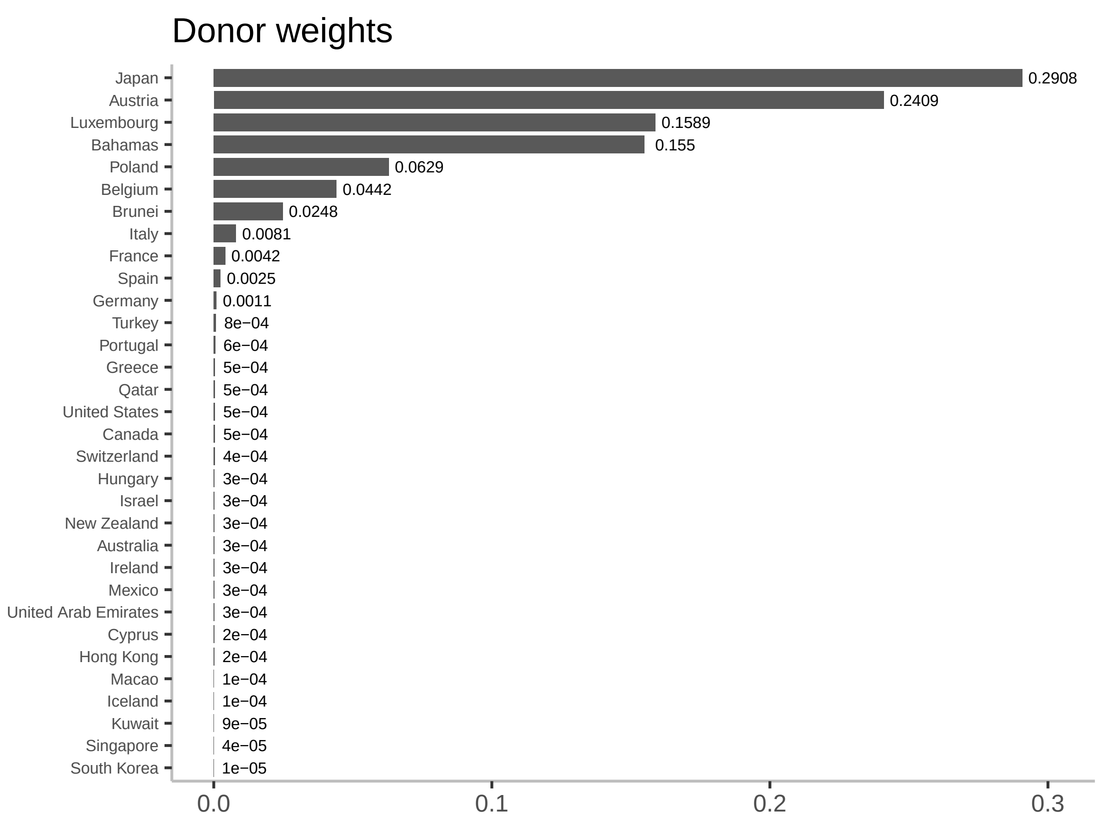


Figure S110: Weights applied to donor countries in Specification 10.

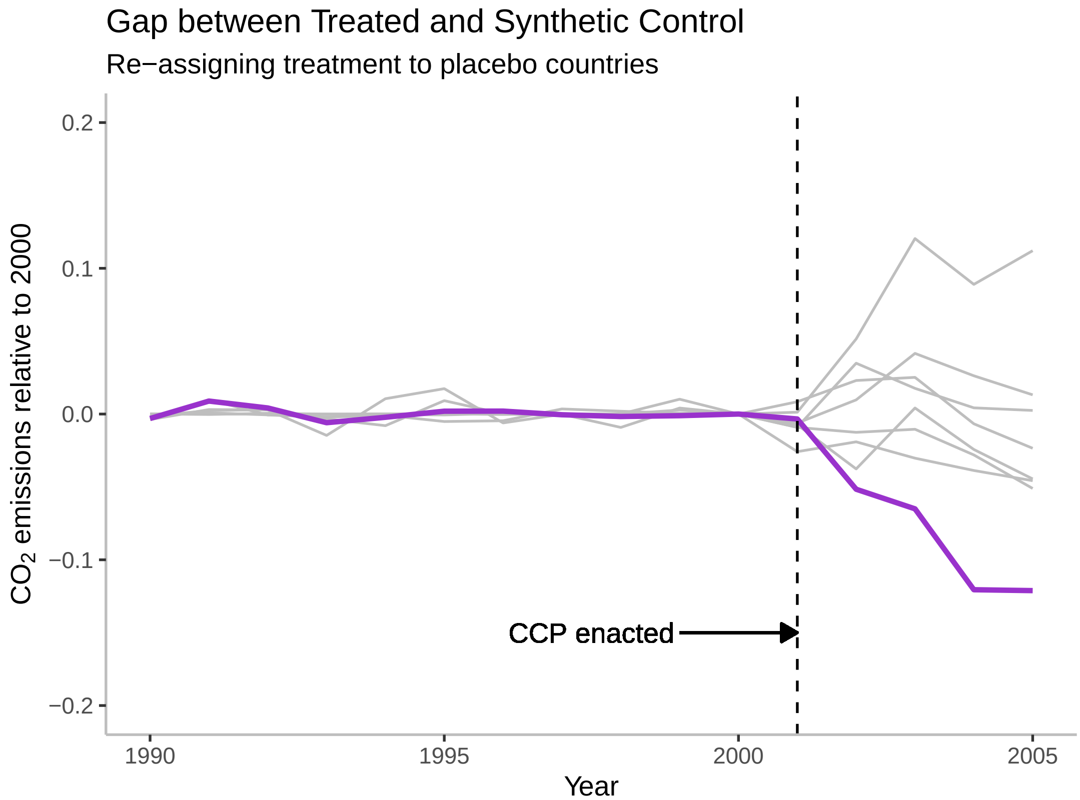


Figure S111: Gaps in emissions (rescaled to 2000 baseline) between the treated unit and its synthetic counterpart as estimated by Specification 10. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

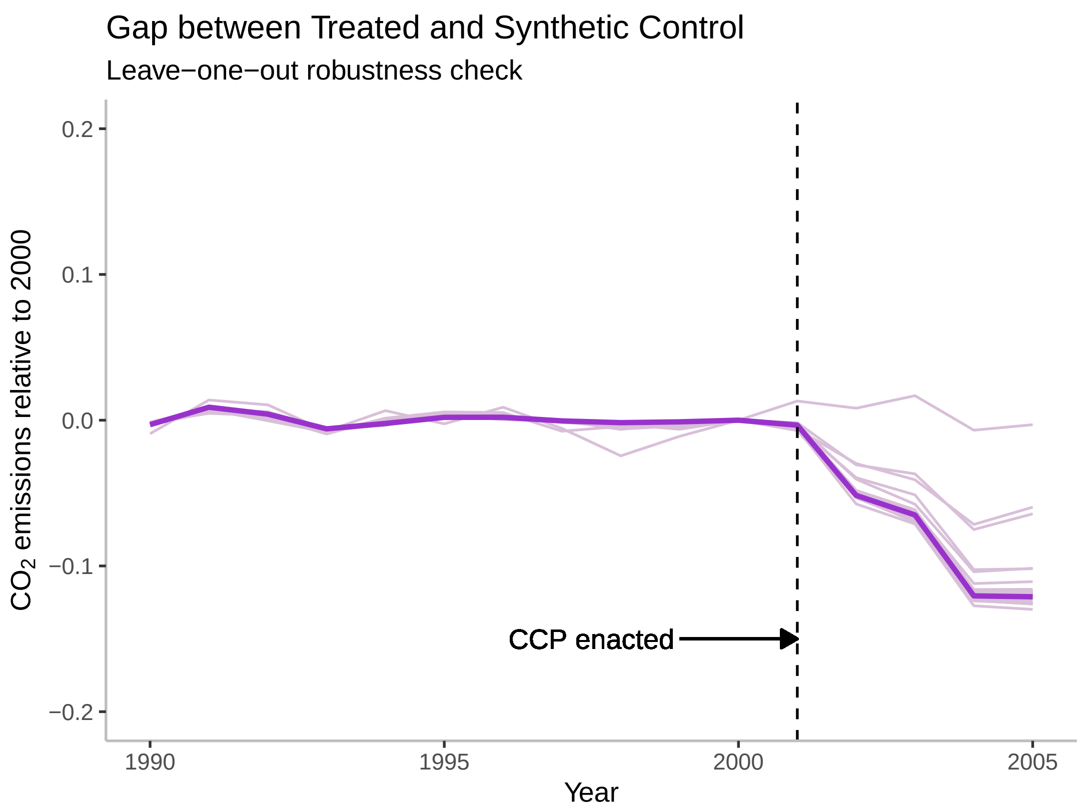


Figure S112: Gaps between the UK and the synthetic UK in Specification 10. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (32 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

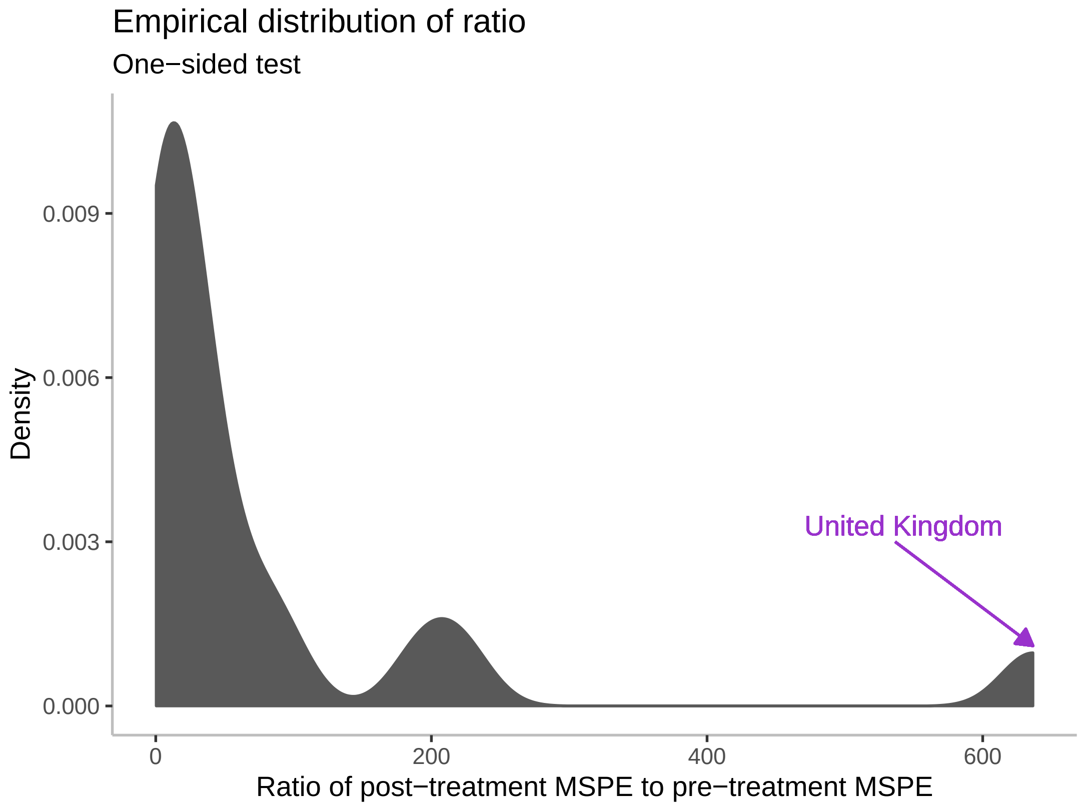


Figure S113: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

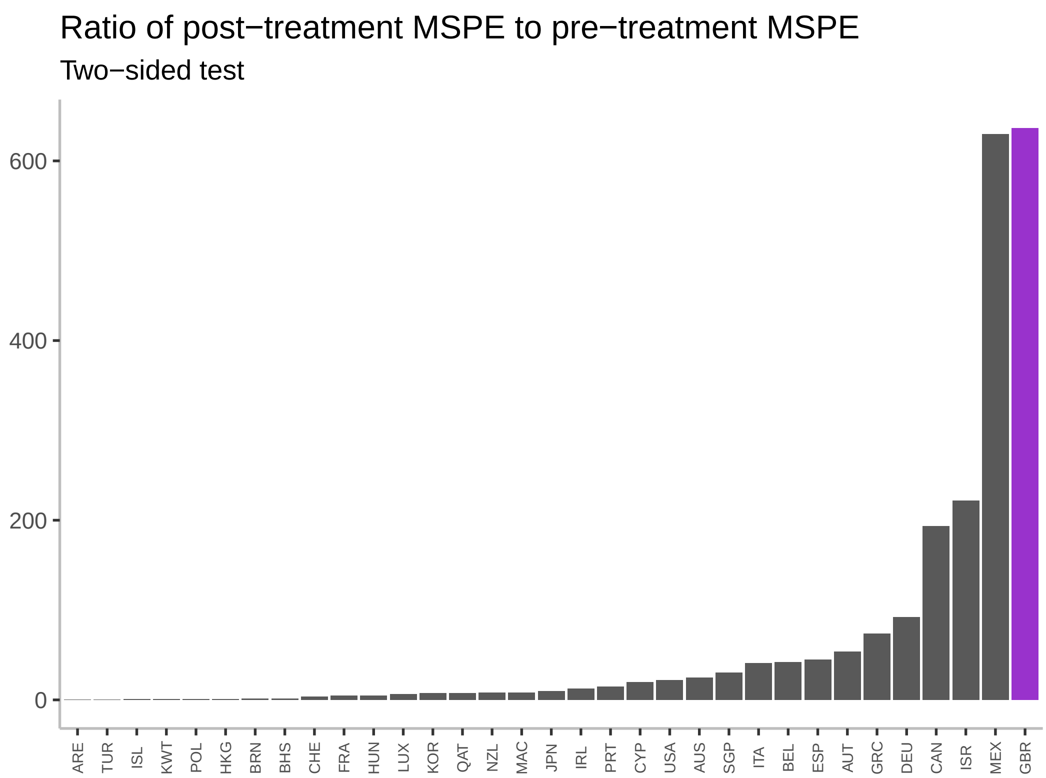


Figure S114: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

## G.11 Specification 11

**Outcome variable:** Emissions rescaled to 2000 baseline

**Donor pool:** OECD countries in 2001, $n = 22$

**Covariates:** No

**Optimization period:** 1990-2001

| Predictor | Treated UK | Synthetic UK | Sample Mean | Weight |
|---|---|---|---|---|
| 1990 emissions rescaled to 2000 baseline | 1.026 | 1.029 | 0.901 | 0.189 |
| 1991 emissions rescaled to 2000 baseline | 1.046 | 1.041 | 0.905 | 0.215 |
| 1992 emissions rescaled to 2000 baseline | 1.027 | 1.026 | 0.904 | 0.13 |
| 1993 emissions rescaled to 2000 baseline | 1.007 | 1.014 | 0.911 | 0.163 |
| 1994 emissions rescaled to 2000 baseline | 1.009 | 1.007 | 0.914 | 0.092 |
| 1995 emissions rescaled to 2000 baseline | 0.993 | 0.985 | 0.92 | 0.103 |
| 1996 emissions rescaled to 2000 baseline | 1.018 | 1.014 | 0.955 | 0.051 |
| 1997 emissions rescaled to 2000 baseline | 0.973 | 0.986 | 0.966 | 0.033 |
| 1998 emissions rescaled to 2000 baseline | 0.982 | 0.984 | 0.969 | 0.016 |
| 1999 emissions rescaled to 2000 baseline | 0.98 | 0.983 | 0.982 | 0.007 |

Table S22: Pre-treatment values of the predictor variables in the UK (column 2), its synthetic control (column 3), and in the unweighted sample (column 4); and weights applied to those predictor variables (column 5).

| Balance statistic | |
|---|---|
| p-value two sample t-test | 0.863521 |
| p-value Kolmogorov Smirnov test | 0.8689817 |
| Mean difference in QQ plots | 0.0694444 |
| Median difference in QQ plots | 0.0833333 |
| Maximum difference in QQ plots | 0.25 |

Table S23: Balance statistics between pre-treatment values of the dependent variable in the UK and its synthetic counterpart. p-values are reported for a two sample t-test for a difference in means and for a Kolmogorov-Smirnov test for whether the samples come from different distributions. QQ statistics are reported for the empirical CDF of both samples.

**Treatment effect:**

- Emissions in 2005 were 6.9% lower relative to a 2000 baseline compared to emissions *without* the CCP

**Statistical significance:**

- Two-sided test: $1/23 \approx 0.043$

- One-sided test: $1/15 \approx 0.067$

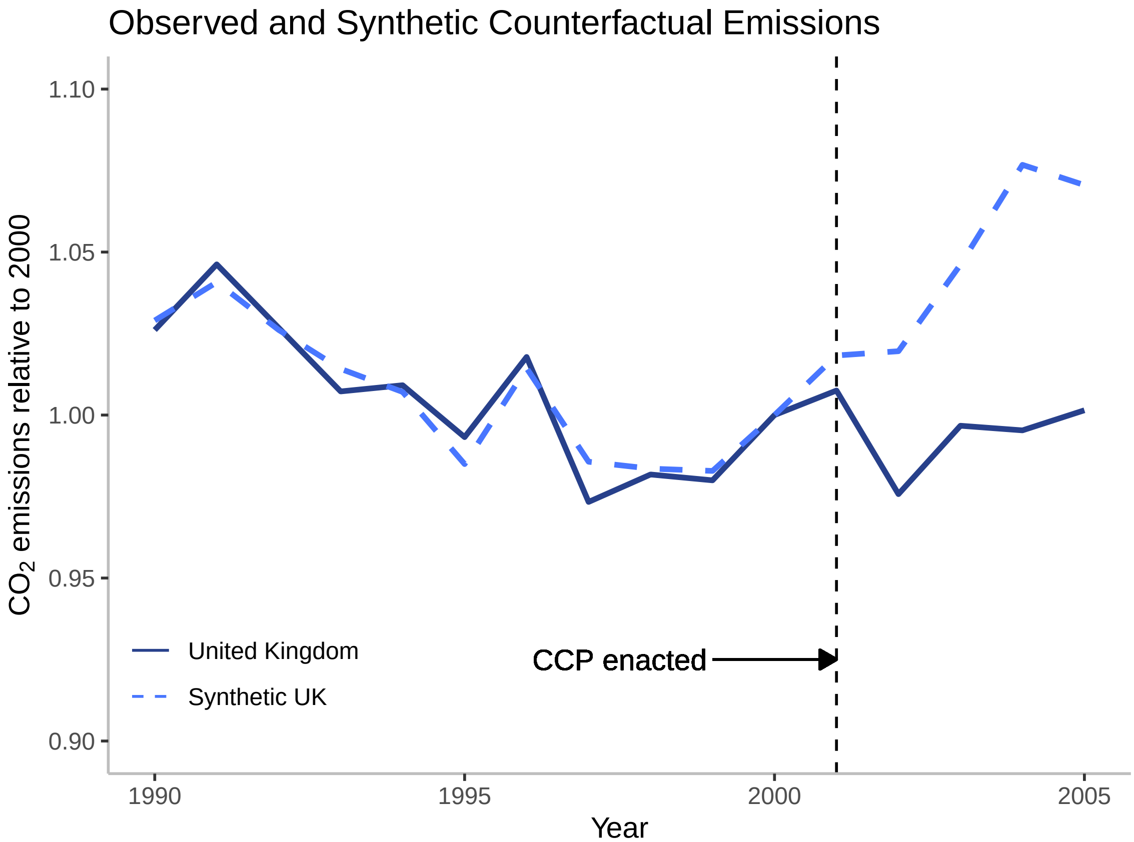


Figure S115: Observed and synthetic counterfactual emissions for the UK. The dashed line represents the emissions trajectory of a synthetic UK as estimated by Specification 11.

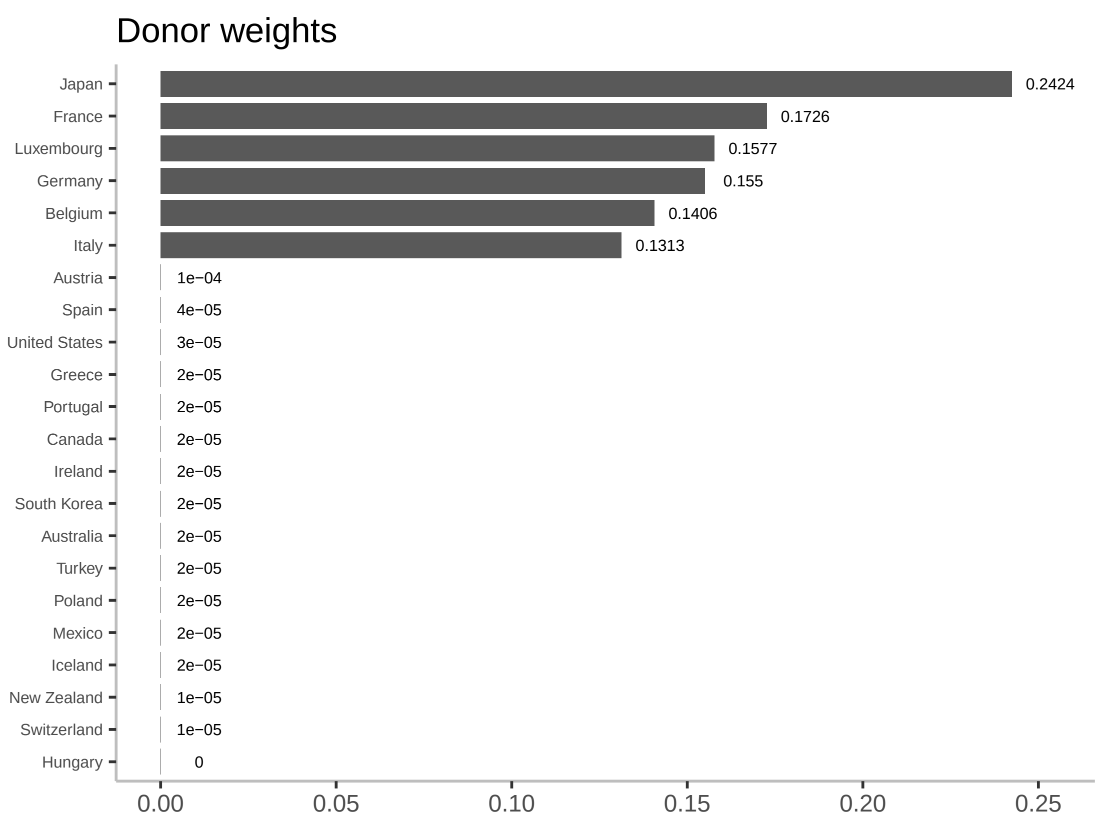


Figure S116: Weights applied to donor countries in Specification 11.

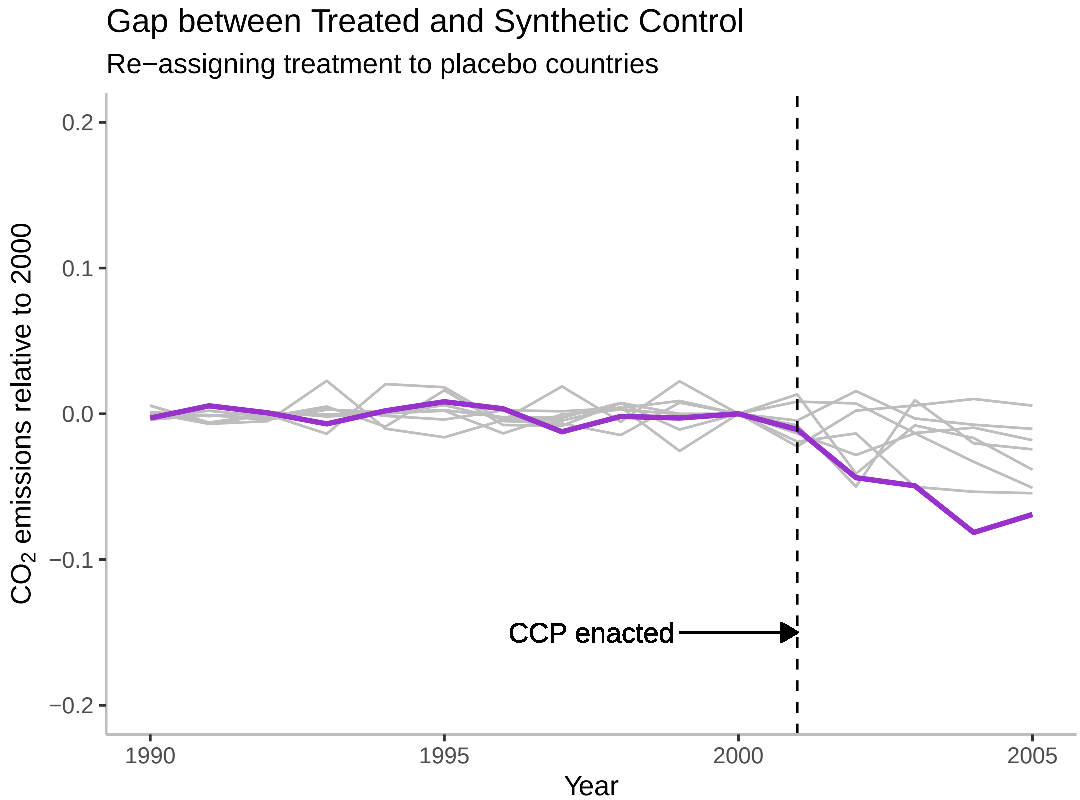


Figure S117: Gaps in emissions (rescaled to 2000 baseline) between the treated unit and its synthetic counterpart as estimated by Specification 11. The grey lines represent the gaps in emissions for placebo countries. Countries with a pre-treatment MSPE greater than 5 times that of the UK have been excluded.

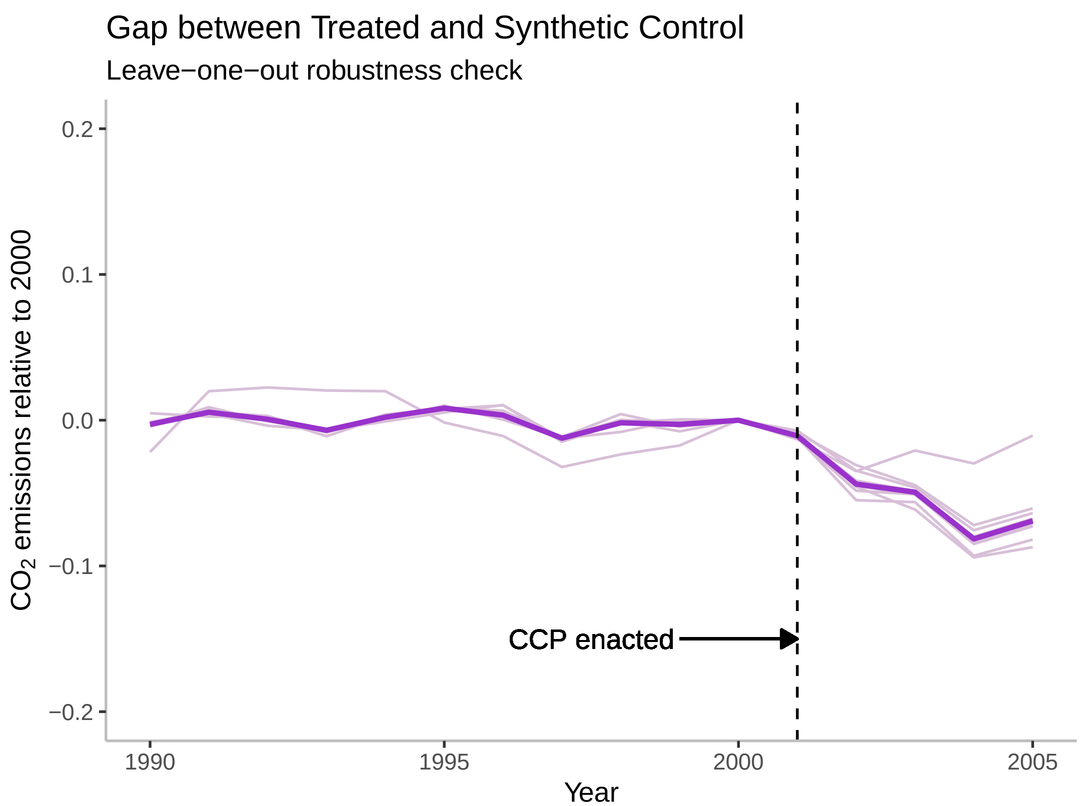


Figure S118: Gaps between the UK and the synthetic UK in Specification 11. The thick purple line represents the gaps when the synthetic UK is constructed using all countries in the donor pool (22 countries). Each thin purple line represents the gaps when one country is dropped from the donor pool.

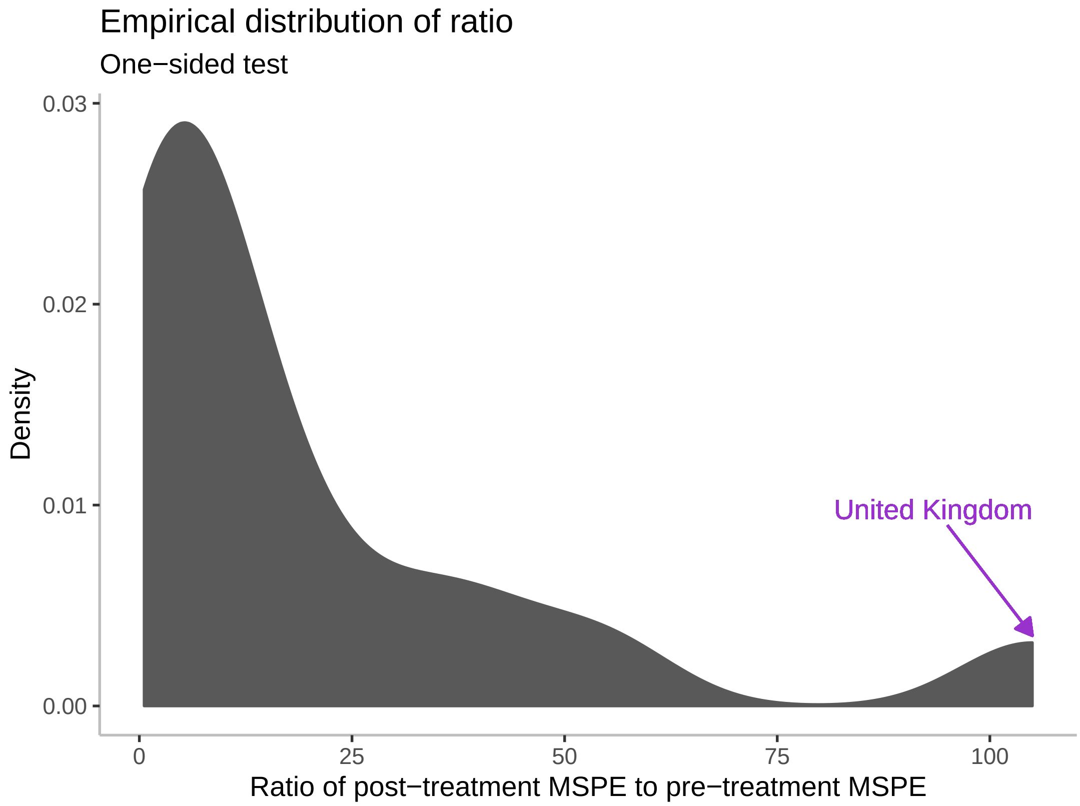


Figure S119: Non-parametric null distribution for a one-sided test. The density represents the empirical distribution of the ratio statistic (computed as the ratio of post- to pre-treatment Mean Square Prediction Error) for all countries in the sample where the effect of the treatment is estimated to reduce emissions.

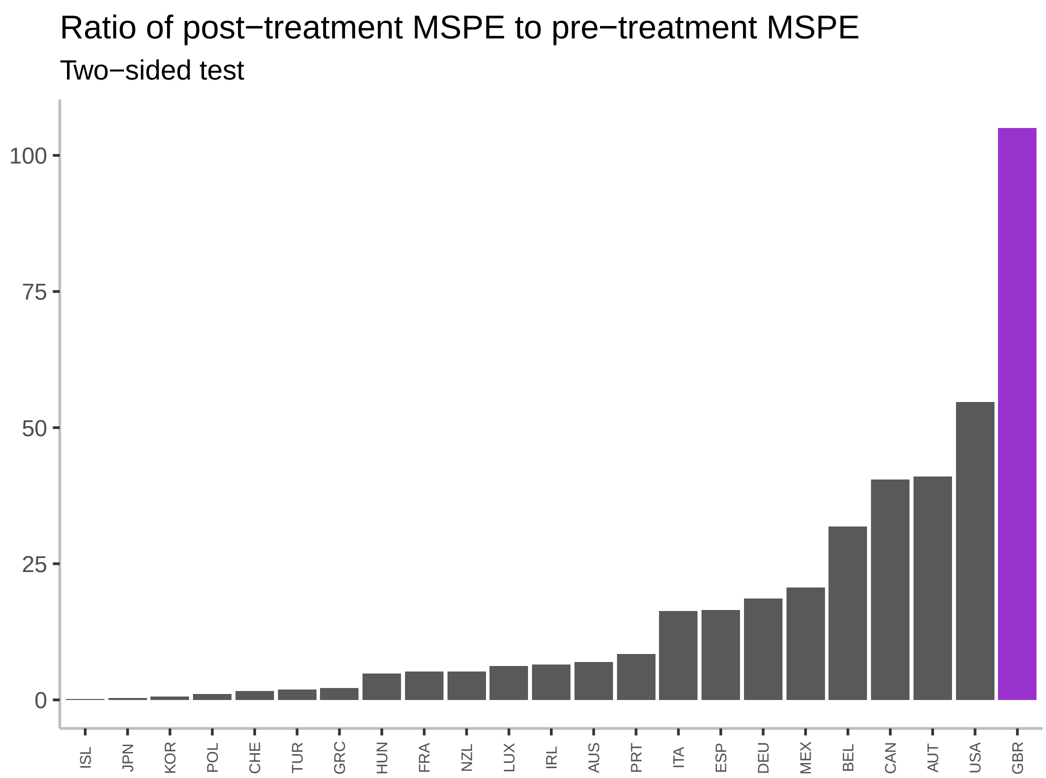


Figure S120: Ratio of post-treatment Mean Square Prediction Error (MSPE) to pre-treatment MSPE for all countries in the sample.

# H The landscape of the UK's climate change policies, 1988-2015

Climate change emerged onto the British policy-making agenda in the late 1980s years during Margaret Thatcher's Conservative government. Thatcher herself surprised observers by personally advocating for climate action and supporting such global institutions as the Intergovernmental Panel on Climate Change (IPCC)[1]. Thatcher's climate motives have been the subject of substantial debate; some suggest her science degree predisposed her to trust climate scientists while others suggest she embraced the climate file to boost her international profile (Oshitani, 2006). Whatever the reason, her efforts legitimized climate change on the British political agenda, and led to funding for new climate science research. Under Thatcher, the UK also set its first carbon pollution reduction target: carbon pollution stabilization at 1990 levels by 2005.

In 1995, under Major, Environment Minister John Gummer eventually got cabinet approval for the more ambitious target of 5-10% reduction below 1990 levels by 2010; cabinet target support was apparently a function of promises that the targets would meet themselves without policy interventions (Oshitani, 2006). Despite these targets – and contemporaneous declines in British carbon pollution – Conservative governments across the 1990s enacted few deliberate climate policies. While open to climate science, Thatcher remained wary of climate mitigation measures. Post-government, she would take a skeptical tone and criticize climate policy instruments as costly agents of socialism (Thatcher, 2002, 449-451). Nonetheless, as in other advanced economies, carbon taxation emerged onto the British policy-making agenda during the early 1990s, pushed forward by then Environment Minister Christopher Patten and his senior advisor David Pearce[2]. Reform efforts were backed from outside government by the environmental lobby, including Friends of the Earth. However, carbon-dependent economic actors inside and outside government stymied serious consideration of the idea. Within government, officials from the Treasury, the Department of Trade and Industry and the Department of Energy all expressed reservations. Similarly, British officials opposed EU-level consideration of a carbon tax at the time, a function both of sectoral interests and skepticism of EU-level policy-making on the issue (Oshitani, 2006; Skjærseth and Wettestad, 2008). During this time, both business communities, through the Confederation of British Industry (CBI) *and* the labor community, through the Trade Unions Congress, opposed any carbon tax as a function of its potential economic and job impacts (Oshitani, 2006).

Labour took power in 1997 under Prime Minister Tony Blair. Blair immediately offered strong rhetorical commitment to climate policy-making, particularly within British foreign policy. Blair was quick to criticize

[1] For instance, see Thatcher's General Assembly address on 8 November 1989: https://www.theguardian.com/environment/2005/jun/30/climatechange.climatechangeenvironment1.

[2] Environmental taxes more broadly had emerged onto the agenda into the late 1980s after media attention to a Department of Energy report on the topic; the topic was then described in the Conservative government's 1992 environment White Paper (Jordan et al., 2003).

American counterparts for being climate laggards, both during his first US visit for the Denver G-7 meeting and in his July 2003 address to Congress. Under Blair, the UK also upped its carbon pollution target to 20% below 1990 levels by 2010. However, Labour domestic reforms were generally more modest and centered on the Blair government's 2001 British Climate Change Programme (BCP) report of climate policy-making priorities. (The BCP was later updated in 2006). The BCP itself was partly inspired by the government-commissioned Marshall report, led by a former head of the CBI, that explored prospects for market-oriented instruments in environmental policy-making (Darkin, 2006).

Blair's Labour government embraced market-based policy instruments in a way previous Conservative administrations had not (Jordan et al., 2003). This BCP thus set the stage for such climate policy-making instruments as the UK Renewables Obligation (RO) in 2002 (a hybrid policy that combined a renewable mandate with tradeable compliance certificates) and an Energy Efficiency Commitment (a regulation directed at energy suppliers' home energy provisions). However, the most contentious policy measure was Labour's Climate Change Levy. The policy's structure and components is described in the main text.

Even with its flexible provisions, industry mobilized against the CCL. For instance, business lobbies and environmental groups clashed over the policy's projected impacts. A report by the Engineering Employers' Federation, the UK Steel Association and the Chemical Industries Association suggested the policy would kill 95,000 manufacturing jobs. By contrast, environmental groups forecasted net employment gains of 12,000 by 2002. The intensity of this business opposition apparently tempered Gordon Brown's (then British Chancellor) enthusiasm for climate policy-making over the following decade, including during his subsequent term as Prime Minister (Carter, 2014)[3]. Moreover, partly responding to dramatic fuel price protests in September 2000, Labour leaders were also acutely concerned about the consumer costs of their policies; the real yield of consumer fuel taxes including the CCL actually decreased by 4% from 2000 to 2007 (McLean, 2008).

In fact, the UK ETS itself emerged out of an effort by British industry, beginning early in Blair's first term to unsuccessfully pre-empt a then-proposed CCL. In 1998, business actors in consultation with government agreed to explore emissions trading through the Advisory Committee on Business and the Environment (Skjærseth and Wettestad, 2008). British business associations then formed an emissions trading group (ETG) in 1999 to design the architecture for a CCL alternative, backed by such companies as BP with existing in-house carbon prices and financial interests in London who wanted to exploit new market opportunities associated with Kyoto Protocol carbon markets (Jordan et al., 2003). The emergence of explicit business community splits on climate policy continued to surface throughout the early 2000s. For instance, a number

[3] Labour actors also felt they had received insufficient backing from green groups during the CCL debate (Carter, 2008).

of major British corporations founded the Corporate Leaders Group on Climate Change to advance business interests related to climate risk mitigation, from Lloyds to Shell to Tesco (Carter, 2014). The group's communications appear to have increased Blair's interest in undertaking climate reforms, partly because the emergence of pro-climate business interests genuinely surprised him (Carter, 2008). Splits in British business interests were also reflected within older lobby groups. For instance, CBI set up a task-force in 2005 to work through cross-cutting cleavages within the British business community on the basis of divergent climate reform interests (Lockwood, 2013).

Domestic climate policy-making under Blair proceeded in parallel to EU-level efforts to negotiate a common climate policy. Unlike Germany, the British government was one of the strongest backers of emissions trading within the EU beginning in the late 1990s when other major actors were skeptical of EU-level action. British positioning on this issue was particularly salient given the country's previous hard opposition to EU-level carbon taxation (Skjærseth and Wettestad, 2008). British preferences may have been driven by a desire to pre-empt tax instruments and by growing domestic interest in emissions trading by business actors hoping to pre-empt carbon taxation domestically (Skjærseth and Wettestad, 2008). However, despite this idea leadership, British political officials imagined a far less ambitious EU proposal than would eventually emerge; they viewed EU-level carbon pricing as best organized through coordination of domestic systems rather than centralized policy. Accordingly, the UK lobbied the EU to design the EU ETS using a weak and voluntary architecture similar to its domestic scheme, not the substantially more ambitious scheme that would eventually emerge (Jordan et al., 2003; Skjærseth and Wettestad, 2008). In this way, the simple fact of British leadership in pushing EU emissions trading confounds the unambitious content of potential policies. Like Germany, the UK was forced into the EU ETS, and shut down its domestic ETS in 2006 after the EU-level policy superseded it. By 2009, the EU ETS covered almost half of British carbon emissions (Bowen and Rydge, 2011). At the same time, partly because of British policy learning during its domestic emissions trading experiment, the UK was a European leader in managing EU ETS implementation (Skjærseth and Wettestad, 2008).

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