Synth reporting

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Contents

1 Setting up data

Data from Human Mortality Database and Human Fertility Database was used to calculate birth rates. This was tidied to give Under-18 rates:

Code	Country	Year	rate	GDPperCap	MF_ratio	MobilePhones	UrbanPop
5	Denmark	1990	2.94	26891.44	1.04	2.88	84.84
5	Denmark	1991	2.65	27011.39	1.04	3.41	84.87
5	Denmark	1992	3.08	29569.65	1.04	4.08	84.90
5	Denmark	1993	2.90	27597.97	1.04	6.89	84.92
5	Denmark	1994	2.71	29995.57	1.05	9.66	84.95
5	Denmark	1995	2.19	35351.38	1.05	15.71	84.98

Abortion estimates were added to give Under-20 rates:

Code	Country	Year	pRate	rate	GDPperCap	MF_ratio	MobilePhones	UrbanPop
4	Denmark	1990	26.51	9.20	26891.44	1.05	2.88	84.84
4	Denmark	1991	25.33	9.00	27011.39	1.04	3.41	84.87
4	Denmark	1992	25.43	9.70	29569.65	1.04	4.08	84.90
4	Denmark	1993	24.81	9.14	27597.97	1.05	6.89	84.92
4	Denmark	1994	24.07	9.21	29995.57	1.05	9.66	84.95
4	Denmark	1995	23.08	8.72	35351.38	1.05	15.71	84.98

1.1 Removing non-fitting countries

Several countries were removed (detail added later).

2 Iterating through year combinations

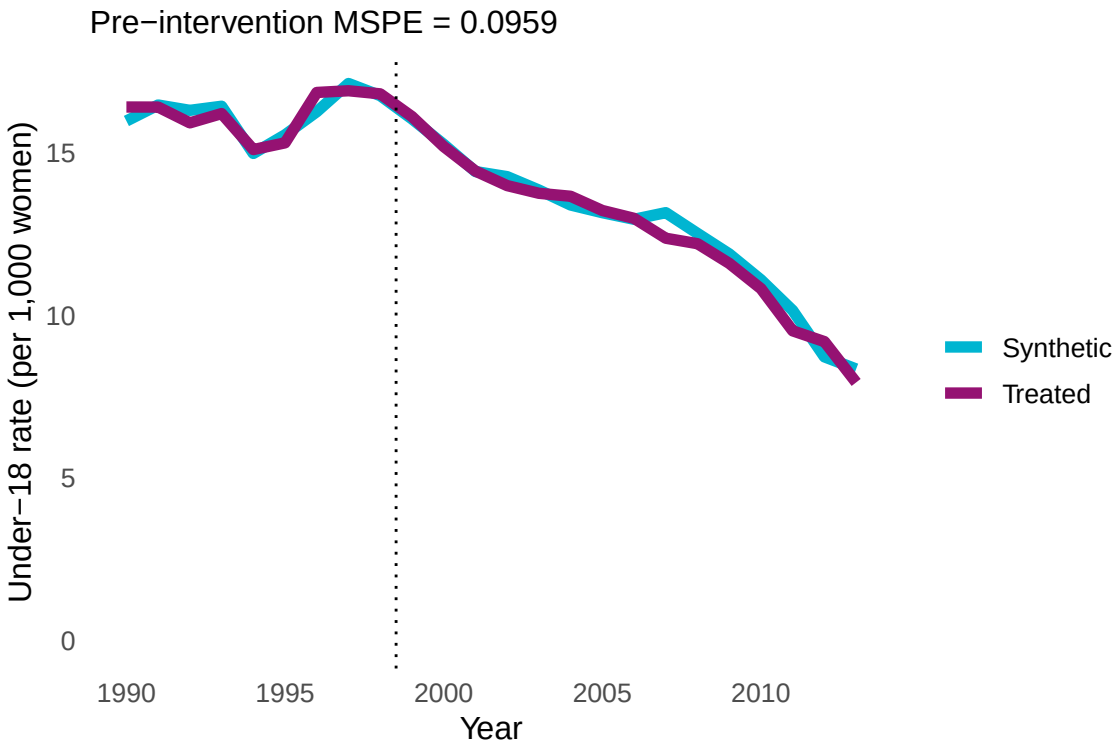
For each comparison, I iterated through all combinations of years as special predictors to minimise MSPE (whilst prioritising fewest groupings). For example, for the under-18 basic model with years as special predictors:

```
it_u18_sp <- testSynthIterations(
  yrs = 1990:1998,
  pred = "rate",
  data = synthData_u18[,1:4],
  ccodes = u_18_ccodes,
  n = 4,
  predictors = NULL,
  time.optimise = 1985:1998
) %>%
  arrange(groups, mspe)
```

3 Generating Synthetic Control models for all Under-18 comparisons

3.1 Model 1: Rate only as predictor

3.1.1 England vs Synthetic Control



3.1.2 Weights and balance

Table 3: Country weights

Country	Weight
Netherlands	0.677
Sweden	0.295
United States of America	0.025
Denmark	0.000
Finland	0.000
France	0.000
Germany	0.000
Iceland	0.000
Italy	0.000
Norway	0.000
Portugal	0.000
Scotland	0.000
Spain	0.000
Switzerland	0.000

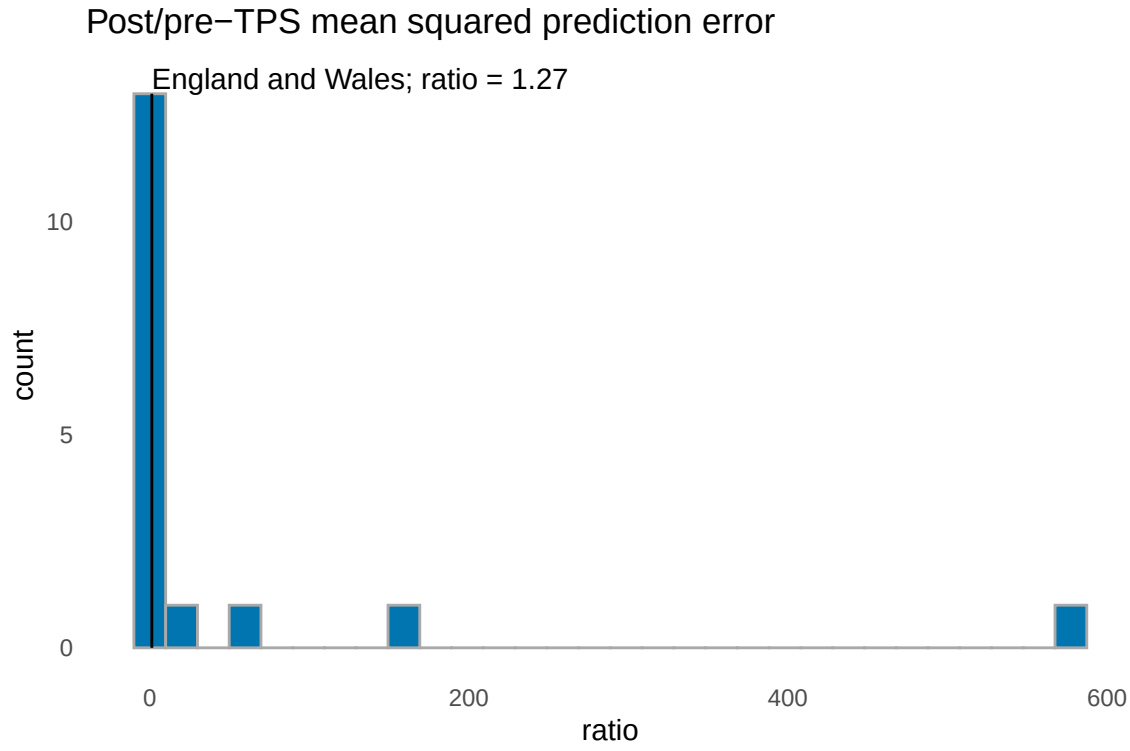
Table 4: Predictor weights

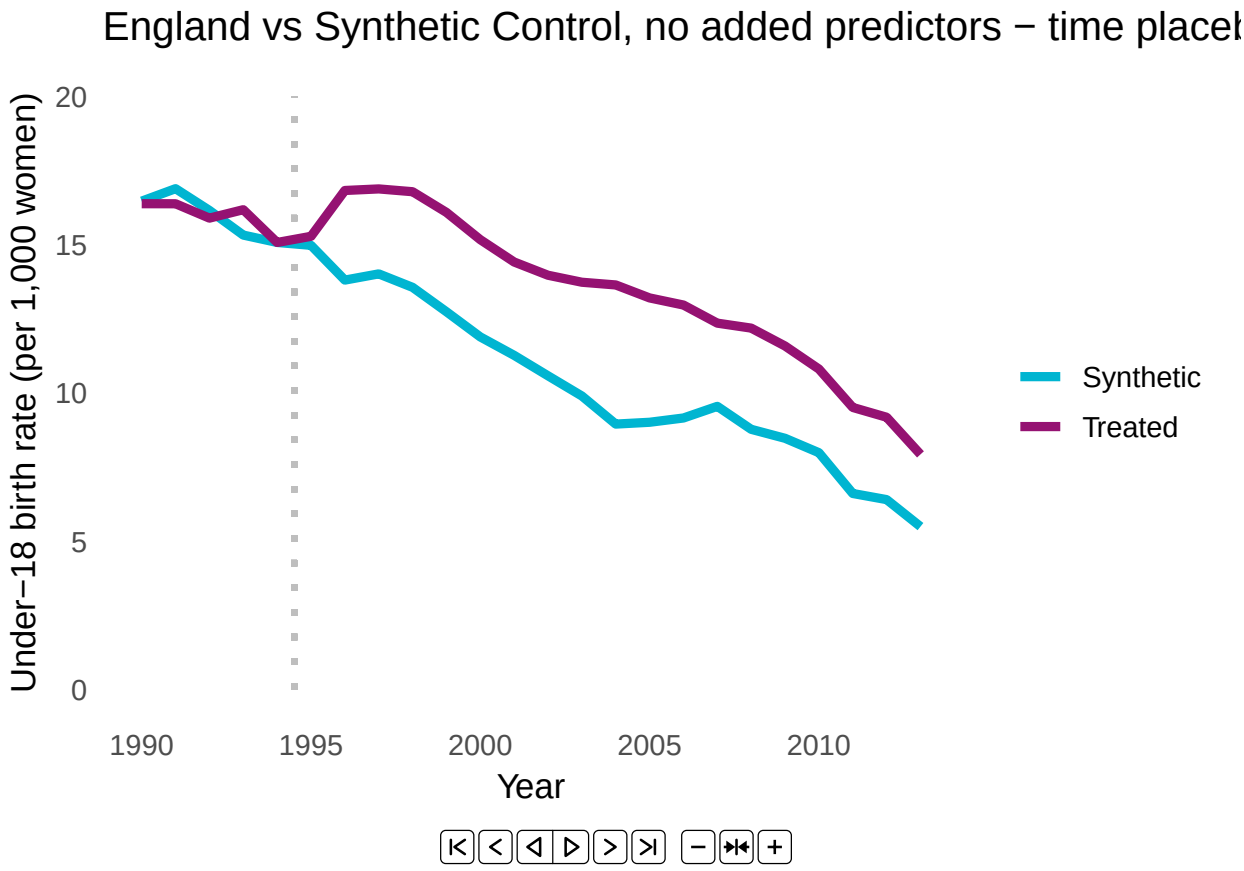
	v.weights
special.rate.1990.1993	0.332
special.rate.1994	0.318
special.rate.1995	0.17
special.rate.1996.1998	0.18

Table 5: Predictor balance between synthetic and treated units

	Treated	Synthetic	Sample Mean
special.rate.1990.1993	16.214	16.274	8.664
special.rate.1994	15.078	14.960	7.912
special.rate.1995	15.285	15.530	7.787
special.rate.1996.1998	16.836	16.695	7.535

3.1.3 Placebo testing by country and time

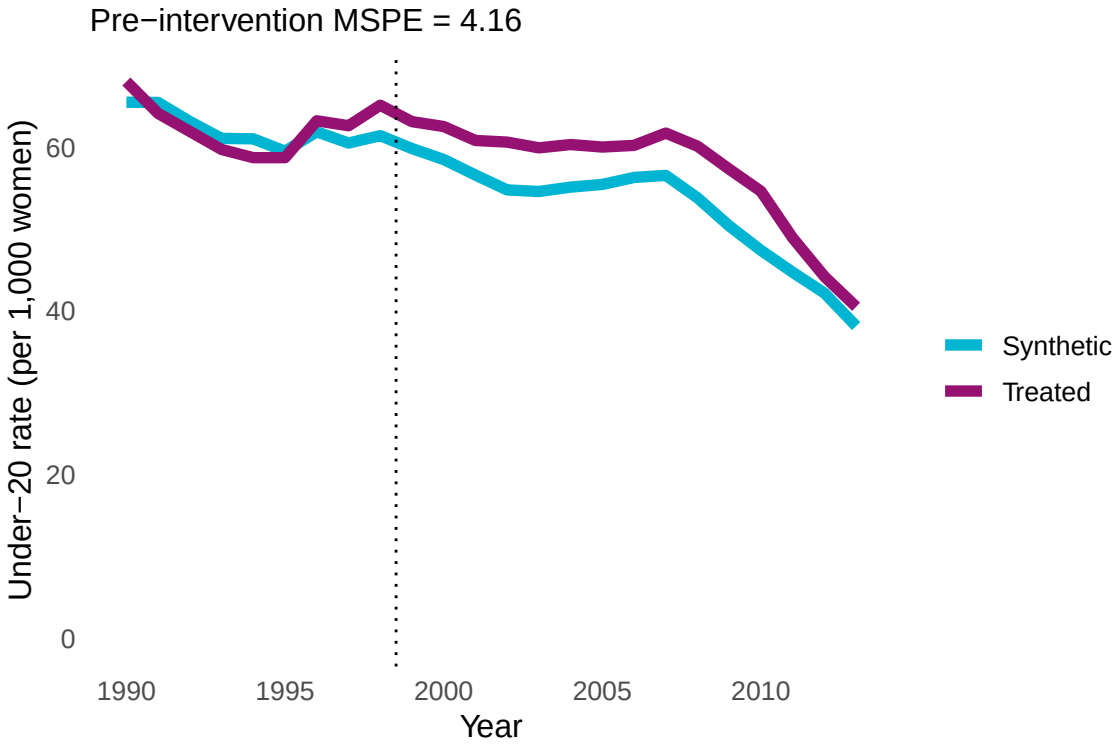



England vs Synthetic Control, no added predictors − time placel
Under−18 birth rate (per 1,000 women)
20
15
10
5
0
1990
1995
2000
2005
2010
Year
Synthetic
Treated

4 Generating Synthetic Control models for all Under-20 comparisons

4.1 Model 2: England vs Synthetic Control

4.1.1 England vs Synthetic Control



4.1.2 Weights and balance

Table 6: Country weights

Country	Weight
Netherlands	0.724
United States of America	0.211
Norway	0.065
Denmark	0.000
Finland	0.000
France	0.000
Germany	0.000
Iceland	0.000
Italy	0.000
Portugal	0.000
Scotland	0.000
Spain	0.000
Sweden	0.000
Switzerland	0.000

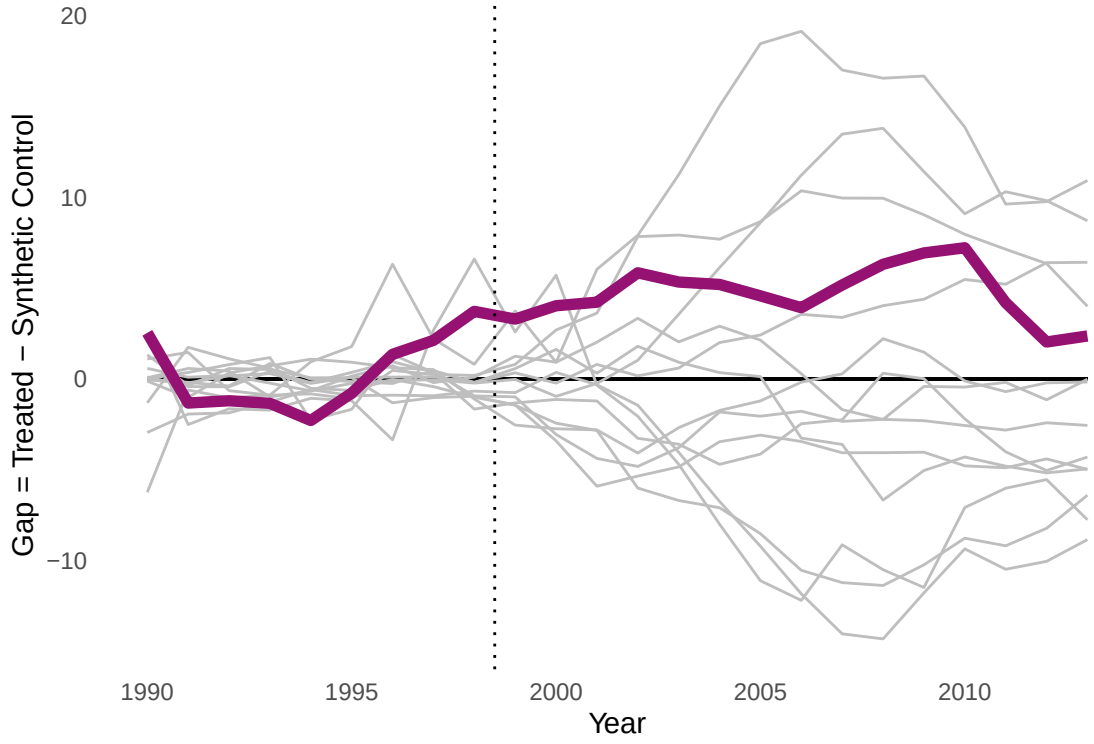
Table 7: Predictor weights

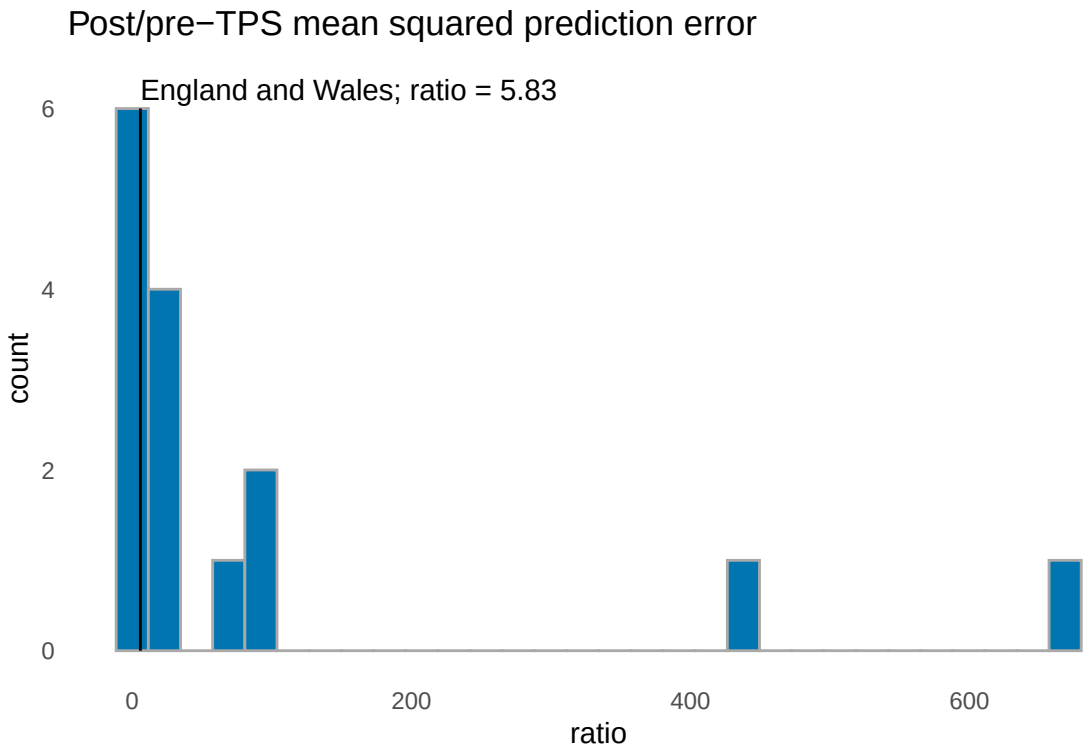
	v.weights
special.pRate.1990	0.162
special.pRate.1991.1995	0.581
special.pRate.1996.1998	0.257

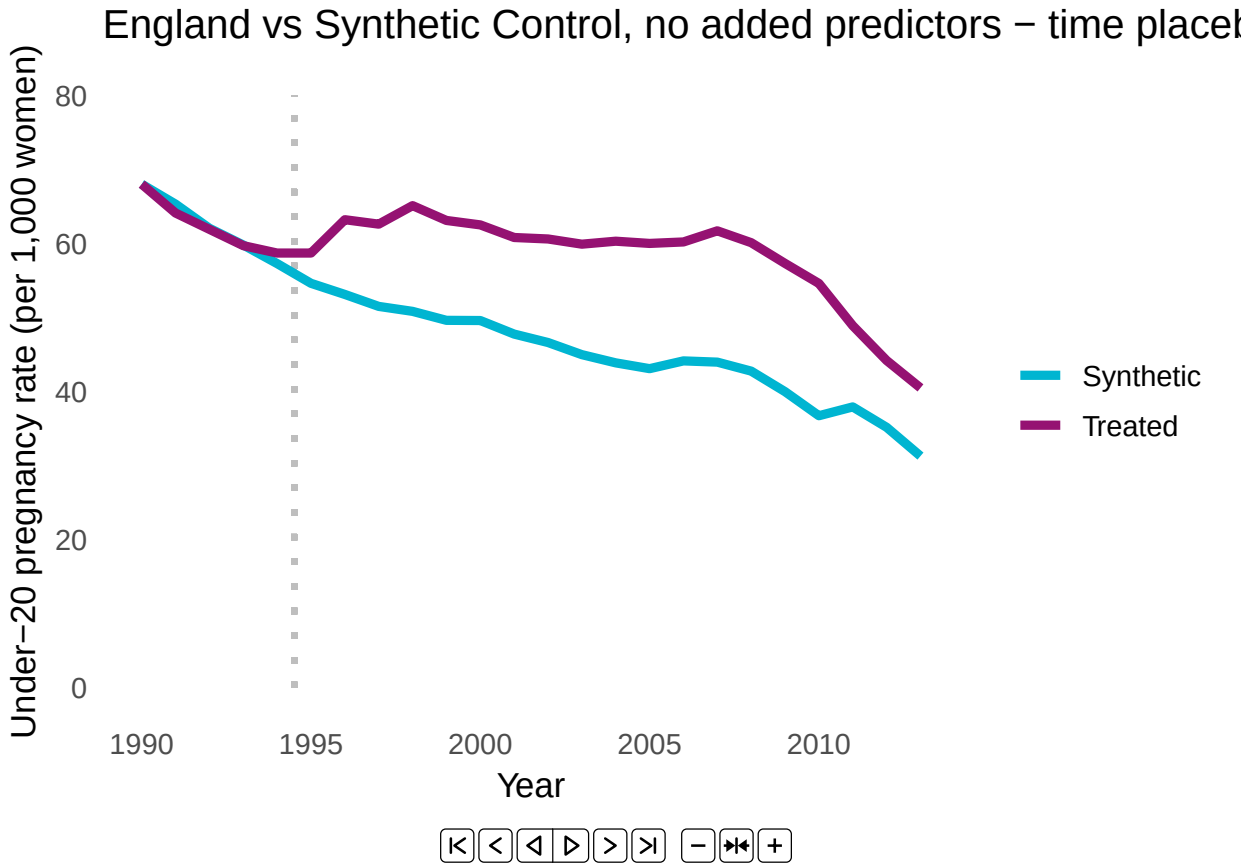
Table 8: Predictor balance between synthetic and treated units

	Treated	Synthetic	Sample Mean
special.pRate.1990	68.000	65.469	34.692
special.pRate.1991.1995	60.620	62.018	30.806
special.pRate.1996.1998	63.633	61.243	29.083

4.1.3 Placebo testing by country and time




Post/pre−TPS mean squared prediction error
England and Wales; ratio = 5.83
count
ratio
0
2
4
6
0
200
400
600


England vs Synthetic Control, no added predictors − time placeł
Under−20 pregnancy rate (per 1,000 women)
Year
Synthetic
Treated
0
20
40
60
80
1990
1995
2000
2005
2010