The Opportunity Cost of Conflict: Statistically Comparing Israel and Synthetic Israel

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**ONLINE APPENDICES**

**A1. Placebo Studies and Robustness Test**

To assess the significance of the estimated treatment effect, we conducted two types of placebo studies suggested by Abadie, Diamond and Hainmueller (2010; 2014). The first type is what they call an “in-space” placebo study. Specifically, we applied the synthetic control method to estimate the effect of an intervention in 2000 to every other country in the donor pool listed in Table 1. That is, for each country, we created a synthetic control using the same set of predictors and examined whether the trajectories of per capita GDP diverged between the factual and counterfactual cases from 2000.

The results are shown in Figure A1. The vertical axis on the left panel measures the difference in per capita GDP between the factual case and the counterfactual (synthetic control) case. The grey lines denote the gaps for all countries except Israel, while the black line denotes the gap for Israel. For a couple of countries, our model fails to make a reasonable synthetic control. These cases are indicated by a very large deviation from the horizontal line at 0 (i.e., no gap between the factual and counterfactual) in both pre-treatment and post-treatment periods. Putting aside these unique cases, the graph shows that the (negative) gap during the post-treatment period tends to be particularly large for Israel, as compared to other countries.

The large post-treatment gap for Israel, however, may not necessarily indicate that the effect of an intervention in 2000 is large, since the pre-treatment gap may also be large. This is indeed the case for those countries with a very large deviation in both pre- and post-treatment periods. For these countries, we failed to make good synthetic controls. To assess the relative magnitude of the gap for Israel, as compared to that of other countries in the donor pool, we followed Abadie, Diamond, and Hainmueller (2010; 2014) and calculated the logged ratios of post/pre-treatment mean squared prediction error (MSPE). The results are presented in the right panel of Figure A1. Israel’s score is the largest among all 22 countries.[[1]](#footnote-2) If we were to select a country at random, the probability that its post-versus-pre-treatment MSPE ratio would be the largest out of the 22 countries is 1/22 = 0.045, which is smaller than 5%.

Figure A2 shows the results of another placebo test called an “in-sample” placebo study. In this analysis, the treatment is counterfactually assumed to have happened in 1993, the year of the signing of the Oslo I Accord, which did not intensify the Israeli-Palestinian conflict. There may be reason to believe that the signing helped Israel’s economy (e.g., by promoting consumption and more aggressive investment), but we found no existing study suggesting such positive effects on economic growth. Therefore, the gap in per capita GDP between Israel and the synthetic Israel should not diverge after 1993. The figure indeed shows that the trajectories are indeed similar during both the pre-treatment period (1980-1992) and the post-treatment period (1993-2000).

The final check of our analysis is a robustness test suggested by Abadie, Diamond, and Hainmueller (2014). In this test, we iteratively dropped one of the five countries that constitute the synthetic control (i.e., New Zealand, South Korea, Belgium, Greece, and Australia, in the order of weight assigned) and re-estimated the effect using the same period and the same set of predictors. The objective of this “leave-one-out” sensitivity test is to make sure that a particular country does not drive the results of our analysis. The results are presented in Figure A3. This shows that the results of our main model (the upper-left panel) are fairly robust. Even after excluding one of the countries given a positive weight, the results are similar: The trajectories of per capita GDP are similar between Israel and the synthetic Israel until 2000, but they started to diverge after the onset of the Second Intifada.

**A2 A Longer-Term Effect**

Having acknowledged the problem of using a longer post-treatment period, which we discussed in the main text, we extended the post-treatment period until 2010 and compared the growth trajectories of Israel and the synthetic Israel. The results displayed in Figure A4 suggest that, after the end of the Second Intifada in 2005, the speed of Israel’s post-conflict economic growth is similar to that of the synthetic Israel. Because Israel did not necessarily experience a substantially faster growth path after the Second Intifada, its per capita GDP continued to lag behind the synthetic Israel’s. In other words, our empirical findings do not support the argument that, in the aftermath of armed conflict, Israel “starts up” and experiences miraculous growth to make up for the economic damage caused by the heightened conflict itself.

**A3. A List of Variables**

A list of variables used in our analysis, their codes in the Quality of Government Dataset, and the original sources are shown in Table A1.

**Figure A1**: In-Space Placebos

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*Note*: The dark line on the left panel shows the difference in per capita GDP between Israel and the synthetic Israel. The grey lines show the results of placebo tests in which the treatment was assigned to each of the other countries in the donor pool. On the right panel, each dot shows the log ratio of pre-2000 (exclusive) mean squared prediction error (MSPE) and post-2000 (inclusive) MSPE.

**Figure A2**: In-Time Placebos

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*Note*: The dark and gray lines show the growth trajectories of Israel and the synthetic Israel, respectively.

**Figure A3**: Leave-One-Out Robustness Test

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*Note*: The dark and gray lines show the growth trajectories of Israel and the synthetic Israel, respectively.

**Figure A4**: Comparing Israel and Synthetic Israel, Until 2010

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*Note*: The dark and gray lines show the growth trajectories of Israel and the synthetic Israel, respectively.

**Table A1**: A list of variables

|  |  |  |
| --- | --- | --- |
| Predictors | Code | Source |
| Exports (% of GDP) | wdi\_exp | World Bank (2013) |
| Imports (% of GDP) | wdi\_imp | World Bank (2013) |
| Openness to Trade | pwt\_openk | Heston, Summers and Aten (2012) |
| Consumption Share of GDP (%) | pwt\_csg | Heston, Summers and Aten (2012) |
| Investment Share of GDP (%) | pwt\_isg | Heston, Summers and Aten (2012) |
| Average Years of Schooling | bl\_asy15mf | Barro and Lee (2010) |
| GDP per Capita, PPP | wdi\_gdpc | World Bank (2013) |

*Note:* All values are averages for the pre-treatment period of 1980-1999. The data were taken from the Quality of Government Standard Dataset, Version December 20, 2013 (Teorell et al. 2013).

1. Even after discarding those countries with the very large MSPE during the pre-treatment period, Israel is ranked as the first. [↑](#footnote-ref-2)