Revolutions and Property Rights for Women

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Abstract

This paper empirically examines the effects of violent and nonviolent revolutions on property rights for women. Using data from the Varieties of Democracy (V-Dem) and Nonviolent and Violent Campaigns and Outcomes (NAVCO) data, this study provides a comparative analysis of how property rights for women change after transitions brought about through violent revolt versus nonviolent civil resistance across countries over 120 years. The findings reveal modest and positive effects on women's property rights after nonviolent transitions, while violent revolutions have no statistically significant effects in the best model. Case studies of nonviolent revolutions in India and Poland explore the political economy of these effects further. This research demonstrates how nonviolent movements can advance rights for historically marginalized groups.

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1   Introduction

The relationship between political upheaval and economic rights has long captivated economists and political scientists alike. While popular narratives promote violent revolution as a path to democratization, empirical evidence on the efficacy of such movements points in the other direction (Chenoweth, 2023). This study investigates how transitions driven by nonviolent civil resistance versus violent revolt deferentially impact property rights for women, given the economic significance but a shortage of research on this dimension.

Using data from the Varieties of Democracy (V-Dem) (Coppedge et al., 2021) and Nonviolent and Violent Campaigns and Outcomes (NAVCO) projects (Chenoweth and Shay, 2020), this paper implements comparative case studies, synthetic control methods, and fixed effects counterfactual estimators to evaluate shifts in women's property rights regimes following nonviolent and violent revolutions. Our findings reveal that countries undergoing nonviolent transitions experience a positive impact on women's economic rights. By contrast, nations undergoing violent revolutions exhibit small and inconclusive changes in women's property protections after revolutions.

This impact is important for several reasons. First, secure private property rights incentivize investments in physical and human capital by ensuring investors reap the fruits of their efforts (Johnson et al., 2002; Galiani and Schargrodsky, 2010). Without protections against arbitrary expropriation, individuals under-invest due to the high risks. Strong rights also facilitate financial sector development and credit access that can further catalyze growth (Hazan et al., 2019). Additionally, constraints on rent-seeking and corruption that strong property rights systems impose allocate talent towards more productive entrepreneurship over unproductive but privileged positions (Acemoglu and Verdier, 1998). Secure rights also prevent costly conflicts that destroy wealth (Fetzer and Marden, 2017). There are self-reinforcing dynamics where capable states invest in rights protections that expand the tax base for further public good provisions (Besley and Persson, 2009; Teng, 2000). More broadly, secure property rights institutions constitute a

fundamental driver of prosperity and development (Acemoglu and Johnson, 2005; North, 1993)

While existing research extensively explores connections between political transitions and economic performance (Acemoglu et al., 2001; Giavazzi and Tabellini, 2005), less attention focuses on distributional consequences and rights for disadvantaged groups. More specifically, the focus on female economic empowerment aligns with the growing recognition that gender inclusivity propels development (Esteve-Volart, 2004). Research highlights how strengthening women's property rights and economic standing fosters positive development outcomes, including improved health, education, and poverty alleviation (Duflo, 2012; Agarwal, 1994; Allendorf, 2007; Grier, 2023). At the macroeconomic level, reducing gender inequality has been linked to higher GDP growth (Klasen, 2002). Research finds that durable shifts in marginalization require changes across multiple socioeconomic dimensions simultaneously (Rao and Kelleher, 2005).

The study also contributes to research on the institutional impacts of nonviolent resistance versus violent campaigns (Ammons, 2023). Research shows nonviolent revolutions are better for sovereign bond markets than violent revolutions, pointing to the relative benefits of nonviolent methods for direct foreign investment and economic development (Biglaiser et al., 2023). While existing work has compared these movements' abilities to achieve broader political change (Stephan and Chenoweth, 2008; Chenoweth and Lewis, 2013), less attention has been paid to property rights or distributional outcomes.

This paper commences by delineating the theoretical framework connecting the revolution type with impacts on women's private property rights in Section 2. The empirical methods used in the paper are discussed in Section 3. Measurement of the variables is subsequently operationalized in Section 4, including the measurement of women's property rights protections and the categorization of violent versus nonviolent revolutions. Then the paper describes the covariates incorporated in the synthetic controls to isolate the effects of the revolution type in Section 5. A figure of trends is provided as an overview of the assembled dataset. Synthetic control methods (Section 6.1) are then

leveraged to estimate post-revolution shifts in women's economic rights across violent (Section 6.2) and nonviolent cases (Section 6.3). Aggregate effects are presented in Section 6.4. Then robustness checks are each reported in Section 6.5. To probe the intricate dynamics further, case studies (Section 7) are presented for two archetypal nonviolent revolutions, India (Section 4) and Poland (Section 5), exhibiting divergence in women's rights trajectories. Finally, we conclude in Section 8.

2   Theory

The emergence of property rights can often be traced to conflicts over control of valuable resources. Property rights can arise from conflicts between individuals competing to possess scarce goods (Hafer, 2006). Through repeated conflicts modeled as wars of attrition, a population can divide into distinct groups with stable and unequal control over resources. Strulik (2008) similarly models conflicts between social groups over resource appropriation, showing how the incentives for peaceful or violent approaches depend on factors like group power and fractionalization. These power relations impact the benefits citizens receive from innovation and the character of technology (Johnson and Acemoglu, 2023).

Property rights formulation often interacts with the incentives of autocratic governments and leaders. An autocrat's capacity and incentives for property rights enforcement are tied to the state's capacity for taxation and revenue generation more broadly (Teng, 2000). Guriev and Sonin (2009) model the strategic calculations of oligarchs and dictators, highlighting the challenges autocrats face in protecting elites' property rights while avoiding excessive limitations on their power. The result is often regimes that do not fully curtail rent-seeking in favor of secure property rights, despite the potential Pareto improvements of doing so. More generally, changing property allocations in modern autocracies over time are shaped by government efforts to balance elite privileges with maintaining popular legitimacy (Cao and Lagunoff, 2023; North et al., 2009).

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As countries develop and fertility declines, tensions rise between mens' interests as husbands benefiting from women's exclusion versus their interests as fathers seeking to pass property to their daughters (Fernández, 2014). Reforms favoring women's property rights thus sometimes emerge as families pivot towards inheritance concerns. However, increasing women's rights can also increase conflict within households in the short term as existing status quo arrangements are challenged (Anderson and Genicot, 2015). Macro-level evidence suggests that terrorism and violent extremism are associated with the subordination of women (Hudson and Hodgson, 2022)

Historically, restrictions on married women's property rights helped autocrats in many states maintain political alliances with male elites (Hazan et al., 2019). For example, strengthening women's land inheritance rights in one Indian state increased pressure towards having male heirs retain land control (Bhalotra et al., 2019). In this way, autocrats must balance broader rights with preserving existing hierarchies.

Conflicts that topple autocratic governments may open space for broader reform agendas, though new regimes also must balance populism with stabilizing elite privileges (Cao and Lagunoff, 2023). Violent movements also directly target and contest land control, as Fetzer and Marden (2017) show in the context of land conflicts in the Brazilian Amazon. Such "land to the tiller"-style movements put pressure towards redistribution, though dominant groups also erect barriers limiting mobility when threatened.

At the same time, higher levels of general violence can deter investments needed to build the state capacity necessary for enforcing property laws and contracts. Besley and Persson (2009) argue that episodes of external wars can help consolidate state fiscal and legal capacity if they promote common cause nation-building. However, persistent internal unrest and civil conflict undermine that process. Areas with endemic land violence are thus less likely to develop enduring formalized systems, instead seeing the persistence of "dual regime" systems with uneven rights and autonomy (Conning and Robinson, 2007; Fergusson, 2013).

In contrast, nonviolent movements maintain moral high ground (Dahlum et al., 2023),

avoid pretext for crackdowns, and build broad-based participation cutting across social divides (Acemoglu and Robinson, 2006). For example, women's suffrage movements won hard-fought political rights essential to defending private economic rights (Palen, 2024). Chenoweth and Stephan (2011) find nonviolent civil resistance succeeds more often than armed struggles, partly because these movements engender greater participation from women. Furthermore, property rights can be created through polycentric processes and how top-down efforts to create private property rights through war tend to fail at securing property rights and succeed at centralizing power (Murtazashvili and Murtazashvili, 2021; Cai et al., 2020). The methods and motivations of movements have long-term institutional impacts.

3   Methods

3.1   Synthetic Control

The synthetic control method seeks to estimate the effect of an intervention (in this case, a revolution) by comparing the treated unit (a country) to a synthetic control unit. The synthetic control is a weighted average of other units (countries) that did not experience the intervention. The weights are chosen such that the synthetic control best reproduces the values of the outcome variable (women's property rights) and other predictor variables (covariates discussed in the next section) for the treated unit before the intervention.

After constructing the synthetic control, its trajectory on the outcome variable is compared to the treated unit after the intervention. The difference is the estimated effect. This approach avoids manually selecting a country as a valid comparison, instead creating a bespoke synthetic comparator from a pool of untreated countries. The paper implements specifications outlined by (Abadie et al., 2015) to analyze the effects of violent and nonviolent revolutions across multiple countries.

This model allows us to quantify the effect of revolutions on women's property rights

while controlling for many confounding variables. If a country had one attempted nonviolent or violent revolution, it is excluded from the synthetic control group. Additionally, countries that did not maintain consistent data between 1900 and 2021 were excluded from the donor pool. This was important for maintaining balanced synthetic controls across all the countries analyzed [1]. Many countries with revolutions analyzed in the study would undoubtedly increase their fit and significance with a larger pool of countries for synthetic control. However, it was important for the study's integrity to exclude results with missing data and eliminate any suspicion of sampling bias in the synthetic control group.

3.2 Fixed Effects

First, violent and nonviolent revolutions are analyzed using an estimator for linear regression models with multiple high-dimensional fixed effects. It works by first residualizing the outcome (female property rights) and predictor variables (successful revolutions) against each of the fixed effects (country and year) separately. This removes the influence of the fixed effects from each variable individually. Then it runs a normal linear regression on the residualized variables. By residualizing in a divide-and-conquer approach, Correia et al. (2016) avoids having to include high-dimensional dummy variables for the fixed effects. This linear model estimates female property rights regimes emerging from violent and nonviolent regimes while controlling for country and year-fixed effects.

Then the two-way fixed-effect counterfactual (TWFE) method uses a two-way fixed effects model estimated only on the untreated observations to predict counterfactual outcomes for the treated observations. By comparing the actual and predicted outcomes, it estimates the treatment effect without assuming it is the same for all units.

The interactive fixed-effect counterfactual (IFE) method allows for potential unobserved factors that change over time and affect units differently. It uses time and unit-

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[1]These two criteria left Australia, Barbados, Belgium, Bhutan, Botswana, Canada, Cape Verde, Equatorial Guinea, Jamaica, Kuwait, Luxembourg, Malta, Mauritius, Netherlands, New Zealand, Qatar, Sao Tome and Principe, Singapore, Solomon Islands, Sweden, Switzerland, Gambia, Trinidad and Tobago, and Zanzibar.

specific effects and latent factors estimated from untreated data to predict counterfactuals more accurately. This relaxes assumptions compared to standard fixed effects models.

Finally, the most sophisticated model, the matrix completion generalized synthetic control (MCGSC) method, directly estimates the matrix of potential untreated outcomes for all units and times. It approximates this matrix by a low-rank matrix to account for interactions between units and times. Counterfactuals are obtained by completing the matrix for treated observations. Like IFE, MC does not require strict exogeneity but handles regularization through a tuning parameter rather than several factors.

In essence, IFE and MCGSC build on FE to better address violations of the parallel trends assumption while preserving simplicity. The choice depends on their performance in diagnostic testing and the specific structure of unobserved confounding, when present. In our analysis, the MCGSC held the strongest predictive power. citeliu2024practical further explains TWFE, IFE, and MCGSC.

4   Measurement

Data examining the efficacy of nonviolent action has proliferated over the past two decades, following the introduction of empirical analyses of the success of such tactics (Chenoweth and Cunningham, 2013; Chenoweth et al., 2019, 2018). Even though this research program faces critiques (Anisin, 2020, 2021), Erica Chenoweth (Chenoweth, 2023) claims the criticisms are overstated. However, the binary coding of violent and nonviolent revolutions poses complications since many real-world civil resistance campaigns contain at least some level of violence or radical flanks (Chenoweth and Schock, 2015; Muñoz and Anduiza, 2019).

The data on revolutions in this paper is taken from NAVCO 1.3 (Chenoweth and Shay, 2020). This dataset comprises 622 maximalist campaigns initiated between 1900 and 2019, and the first country examined in this paper was Germany in 1924. We confine our cases to countries experiencing one successful violent or nonviolent revolution. Success

is measured by observing the achievement of the movement's goal of regime change, territorial independence, or anti-colonial rule. Success does not denote that the movement was normatively desirable or resulted in positive institutional effects.

Varieties of Democracy (V-Dem) is a research project and dataset that measures the state of democracy in countries worldwide. It is one of the largest and most detailed datasets on democracy, with millions of data points. The V-Dem dataset covers 202 countries from 1789 to the present and is updated annually (Coppedge et al., 2021).

Property rights for women (v2clprptyw), within V-Dem, measures the extent to which women in a country enjoy private property rights. The empirical values for the variable under examination exhibited extensive variation from -3.8 to 3.2. Given the limitations of the synthetic control method in managing negative numbers, a constant of four was appended to each observation to transpose the distribution into the positive domain. This affine transformation preserves the relative distances between data points while permitting the application of the synthetic control technique. It is coded in the data on a 0-8 ordinal scale based on the proportion of women with rights to acquire, possess, inherit, and sell private property, including land. A score of 0 indicates virtually no women have property rights. A score of 8 indicates virtually all women enjoy full property rights. Scores are aggregated using a Bayesian item response theory measurement model. The variable captures rights de jure and de facto, including limitations imposed by state policies, customary laws, and religious/social norms. It does not measure the relative rights of men and women or actual property ownership by women. Data covers 1789-2022, but the first instance in this study is 1904.

5 Predictor Variables

The independent variable measures a revolution (violent or nonviolent) in the treated country with a binary 1 after the treatment and countries in the donor pool with a zero. This data comes from NAVCO 1.3. The dependent variable comes from V-Dem and

Figure 1: Averages property rights for women scores over time
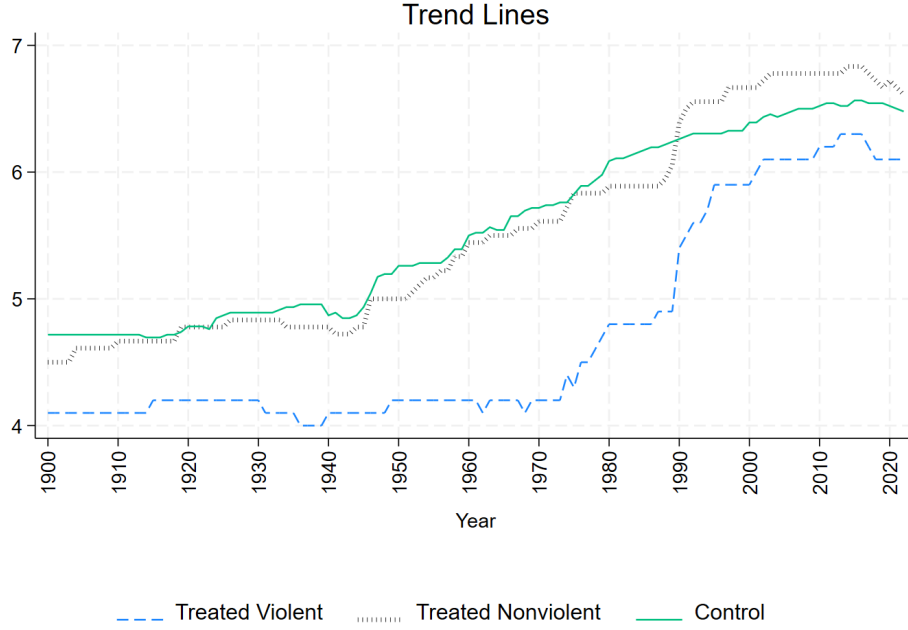
measures property rights for women.

The first covariate used is the electoral democracy index from V-Dem. The electoral democracy index synthesizes multiple indicators to measure each country's achievement of electoral democracy from 1789-2022. It aggregates freedoms of expression and association, clean elections, elected officials, and suffrage using a compromise between multiplicative and additive averaging. This allows partial compensation across subcomponents while still punishing limitations in any one area. The resulting interval measure (0-1) thus reflects countries' fulfillment of responsive leadership selection through electoral competition under inclusive participation.

Next, it examines regime corruption. The regime corruption index measures how political elites abuse public office for private or political gain from 1789-2022. It aggregates four indicators of executive embezzlement, executive bribery, legislative corruption, and judicial corruption using Bayesian factor analysis. The resulting interval scale (0-1) runs contrary to most V-Dem indices, with higher values indicating greater corruption. This captures the prevalence of patrimonial governance practices where politicians exploit their authority for personal interests. Using regime corruption as a covariate accounts for how

clean governance could independently affect both revolutions and women's rights.

GDP data comes from Fariss et al. (2021) and is stored within the V-Dem data. Log 10 is applied to the GDP data in V-Dem because GDP is known to have non-linear, diminishing marginal effects, and the log facilitates a more nuanced interpretation when GDP is used as a covariate. Income levels proxy for overall development which strongly predicts gender equality and women's socioeconomic status.

Population data also comes Fariss et al. (2021), and a log is applied for the same reason. Some scholarship indicates that larger populations may present coordination problems for mass mobilization, perhaps making revolutions less likely (e.g., Kuran (1991); Lichbach (1995)). However, large populations also provide a bigger pool of potential dissidents, making the effect ambiguous. Regarding gender norms, it is also unclear if population size strictly correlates with conservative attitudes; urbanization, education, and cultural influences complicate any linkage. Despite these ambiguities, large differentiation in population size could mean the countries were not comparable for many reasons, so the paper controls for population.

Life expectancy data comes from V-Dem and quantifies the mean lifespan anticipated for an individual at birth, should prevailing mortality trends remain constant. Controlling life expectancy helps isolate the effect of women's rights from broader modernization. Longitude measures the distance from the equator for each country. Geographic regions vary in both propensity for unrest and cultural attitudes toward women's roles, making longitude a useful control.

Table 1: Descriptive Statistics

Variable	Symbol	Mean	Std. dev.	Min	Max
Property rights for women	v2clprptyw	5.665	1.396	2	8
Electoral democracy index	v2x_polyarchy	0.373	0.317	0.013	0.913
Regime corruption	v2xnp_regcorr	0.229	0.264	0.003	0.969
Log GDP	ln_gdp	2.193	1.544	0	4.810
Log Population	ln_pop	1.563	1.101	0	3.396
Life expectancy	e_pelifeex	54.228	19.884	0	75.4
Longitude	longitude	200.473	79.998	0	354

6   Synthetic Control

6.1   Synthetic Control Fit

The selection was limited to countries with one violent or one nonviolent revolution between 1900-2002. Multiple lagged treatments require additional care within a synthetic control, and while possible to investigate, these cases are reserved for future research. There are theoretical reasons to assume that countries experiencing multiple revolutions within an abbreviated period will face tenuous property rights regimes (Boettke et al., 2008).

V-Dem data ends in 2022, so cases ending after 2002 could not be included in the study because twenty years have not passed since the revolution. These include Armenia, Burkina Faso, Iceland, Iraq, Libya, Moldova, North Macedonia, and Zimbabwe.

Several countries have missing V-Dem data during the time analyzed. This analysis uses data from 20 years before and after the revolution's end. For this reason, Belarus, Croatia, Estonia, Latvia, Lithuania, Palestine/West Bank, and Slovakia were excluded, with available data ranging from 4-30 of data out of the required 41 years.

The countries analyzed are as follows. Twelve violent revolutions are studied, including Angola, Burundi, Chad, Costa Rica, Cuba, Cyprus, Guinea-Bissau, Morocco, Mozambique, Namibia, Spain, and Uganda. Twenty-one nonviolent revolutions include Albania, Colombia, Czechia, Dominican Republic, Germany, Greece, Guyana, India, Kenya, Mali, Mongolia, Niger, Nigeria, Paraguay, Peru, Poland, Portugal, Serbia, Suriname, Taiwan, and Uruguay.

6.2   Synthetic Control: Violent Revolution Results

Angola, Burundi, Cuba, Spain, Morocco, Mozambique, and Uganda were statistically significant. Morocco and Burundi are statistically significant for all 21 years studied after the revolution, meaning p-values of less than or equal to .05. Despite having elevated levels of statistical significance on several regressions, Morrocco has an RMSPE of 5.6476720, the highest of any country in the data. The high RMSPE and the graph show that Mor-

rocco vastly differs from the donor pool countries, which recommends interpreting this data cautiously. Similarly, Burundi has a RMSPE of 3.7297320, suggesting a poor fit. Unlike Morrocco, Burundi has a .7 match with Bhutan and a .3 with Canada. Being so closely matched to one country, Bhutan, is cause for concern, and being matched to only two countries is problematic. Both countries show a negative and statistically significant relationship between violent revolution and property rights for women in synthetic control and using regressions that use the covariates for the synthetic control. The t statistic table shows that both have highly significant and negative results when examining property rights for women and violent revolution.

Mozambique is negative and significant from years 1-15. The RMSPE for Mozambique is 1.3291500, which is high, albeit much smaller than Morrocco and Burundi. Table 2 shows a negative relationship between the violent revolution in Mozambique and property rights for women. Uganda was significant from years 2-9, of which the relationship between property rights for women and the revolution was significant. The RMSPE is 1.0597960, which is the median for the countries examined. In 1996, Uganda held an election, 10 years after the revolution, and property rights significantly increased, and the violent revolution lost statistical significance in the data. The relationship is highly significant in Table 2. Angola was statistically significant from years 6-18. Predictor estimates are negative throughout the 20 years examined for Angola. However, the RMSPE for Angola is high at 2.5801960, pointing to a poor fit in the synthetic control. The relationship between property rights for women and the violent revolution in Angola is highly significant. Cuba is statistically significant in the synthetic control from 10-21 years after the revolution, and these estimates are negative throughout the time period examined. The relationship in Cuba is highly significant and negative in the t statistic table. Spain was only significant for two years after the revolution in synthetic control, but the estimates are negative throughout the data. However, Spain is identically matched to Belgium, which is the most problematic match in this study.

In the synthetic control study, Chad, Costa Rica, Cyprus, Guinea-Bissau, and Namibia

were not statistically significant. All these countries show positive yet statistically insignificant results from the revolution, and these are the only countries experiencing a violent revolution whose property rights for women improved relative to the synthetic control group. However, all but Costa Rica show modest improvements, and these estimates across all years in the synthetic control are particularly low (an average of .747) compared to the statistically significant group with an average of -2.935. When examining a t-statistic, all these are negative except Costa Rica and Cyprus. Cyprus and Guinea-Bissau are not even statistically significant in the t-test so attributing any meaning to these findings is dubious.

Costa Rica shows remarkably high positive estimates, averaging 1.915 in the synthetic control and 4.85 in the t-test. After the civil war in 1948, Costa Rica abolished their military through Constitutional reform and instituted a series of liberal reforms including women's suffrage. These policies have largely remained since the war. While still statistically insignificant, Costa Rica proves an exception to the trend in the synthetic control results that violence does not result in dramatic improvements in private property rights for women. However, a persuasive case could be made that the violence was merely a precursor to the actual cause of these improvements, abolishing the military.

Table 2: Test for Significant Mean Effect of Revolution on Property Rights for Women

Countries	Beta	t statistic	p value	Type
Angola	-0.2822323	-9.60	0.0000	Violent
Burundi	-0.4058901	-14.20	0.0000	Violent
Chad	-0.0696260	-2.2300	0.0260	Violent
Costa Rica	0.1470660	4.85	0.0000	Violent
Cuba	-0.2161011	-7.22	0.0000	Violent
Cyprus	0.0513138	1.68	0.0940	Violent
Guinea-Bissau	-0.0158910	-0.52	0.6040	Violent
Morocco	-0.3774708	-13.30	0.0000	Violent
Mozambique	-0.3146825	-10.81	0.0000	Violent
Namibia	-0.0744197	-2.43	0.0150	Violent
Spain	-0.1298812	-4.27	0.0000	Violent
Uganda	-0.1540964	-5.09	0.0000	Violent

6.3 Synthetic Control: Nonviolent Revolution Results

Columbia, Czechia, Germany, Greece, India, Mali, Mongolia, and Poland have at least one year of statistically significant results. However, Poland and Mongolia are the only countries with statistically significant results for at least 20 years, which are positive. Poland has an RMSPE of 0.2476324, the third lowest in the study, meaning a tight fit with the synthetic cohort. Mongolia is far less tightly matched with an RMSPE of 3.0988950, and it is .614 matched to Bhutan, which means the results could be overly influenced by the changes in only one country. These factors should cause some concern with over-interpreting the positive results for Mongolia. Both Poland and Mongolia have positive and significant results in the t-test.

India has negative and significant results from years 7-21, the timeline of which matches with Indira Gandhi's assassination, the Bhopal disaster, and the Sikh massacres. India has a low RMSPE of 0.3941569, signifying a tighter match with the two countries matched, Canada and Australia. The match with Canada represents 75% of the overall match, which should raise some caution about interpreting the results for India too confidently. While positive throughout the duration, Mali has significant results from years 10-21, which indicates long-term rather than short-term effects.

Additionally, Mali is matched with Equatorial Guinea at .589, which is high for one country, even though it is matched with four countries. Results for Mali are not statistically significant in the t-test. Columbia has significant negative results from 16 to 21 years after the revolution, and it is matched to Belgium at 0.931, which could unduly influence results. Columbia is negative and significant in the t-test. Greece, Czechia, and Germany have three or fewer years of statistical significance, and only Greece is statistically significant in the t-test. Greece and Czechia showed positive results for the 20 years examined after the revolution. Still, Germany was positive for the first nine years and then ran negative in 1934 when Adolf Hitler began his authoritarian and genocidal rule of Germany. Czechia and Germany are very tightly matched to one country. However, Greece and Germany have tight synthetic matches, evidenced by low RMSPE scores. All

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three have overall positive effects in the t-test.

Albania shows a neutral effect in the synthetic control and is not statistically significant in any year. It negatively affects the t statistic that is not statistically significant. The relationship in the Dominican Republic is negative for five years before turning positive in the synthetic control. These results lack statistical significance in the synthetic control, chow tests, and the t-statistic. Guyana is positive in both the synthetic control and the t-statistic but lacks statistical significance. Kenya has a negative effect in the synthetic control that is not statistically significant. Still, the t-statistic results point in the same direction and have a p-value showing highly significant results. Results for Nigeria are negative and insignificant in the synthetic control, and while pointing in the same direction, gain statistical significance in the t statistic. However, the Chow tests lack significance for Nigeria. Niger's results are negative and insignificant in the synthetic control but are negative and statistically significant in the t-statistic. Paraguay has mixed insignificant results in the synthetic control and is negative and insignificant in the t-statistic. Peru shows a negative result for 14 years before turning positive in the synthetic control, but these results are never statistically significant. The results are also negative and insignificant in the t statistic. Portugal's data is positive but lacks statistical significance in the synthetic control. It is positive and statistically significant in the t-statistic. Suriname shows positive insignificant results for 15 years before turning to mixed results in the synthetic control. While positive in the t-statistic, it lacks statistical significance. Serbia is positive and lacks statistical significance in both tests. Taiwan's statistically insignificant results are negative for four years before turning positive in the synthetic control. Taiwan is positive and insignificant in the t statistic. Uruguay is positive and lacks statistical significance in both tests.

Overall, the results from nonviolent revolutions are mixed. While more statistically significant countries show positive effects in both the synthetic control and the t-test, the results suggest that something other than nonviolent resistance determines if the revolution diminishes or increases property rights for women. This will be explored

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further in India (negative) and Poland (positive) case studies. Even though the results are lackluster, they sharply contrast with violent revolution, where significant results point towards a negative effect.

Ultimately, the synthetic control method using specific countries illuminates the varied impacts of violent and nonviolent revolutions, but they are not suited for outlining generalized results. Additionally, the analysis faced significant challenges because the control group was small, and as the trend plots illustrated, countries experiencing one nonviolent or violent revolution varied significantly from control countries. Therefore, further analysis is required and provided in the next section.

Table 3: Test for Significant Mean Effect of Revolution on Property Rights for Women (Nonviolent)

Countries	Beta	t statistic	p value	Type
Albania	-0.0537659	-1.72	0.0850	Nonviolent
Colombia	-0.0678274	-2.22	0.0270	Nonviolent
Czechia	0.0527278	1.69	0.0920	Nonviolent
Dominican Republic	-0.0065552	-0.21	0.831	Nonviolent
Germany	0.0367601	1.18	0.2400	Nonviolent
Greece	0.1839622	6.10	0.0000	Nonviolent
Guyana	0.0462384	1.51	0.131	Nonviolent
India	-0.0331100	-1.08	0.2800	Nonviolent
Kenya	-0.1887670	-6.27	0.0000	Nonviolent
Mali	0.0503039	1.64	0.1010	Nonviolent
Mongolia	0.1466469	4.74	0.0000	Nonviolent
Niger	-0.1213581	-3.91	0.0000	Nonviolent
Nigeria	-0.0989677	-3.18	0.0020	Nonviolent
Paraguay	-0.0326071	-1.06	0.2870	Nonviolent
Peru	-0.0594474	-1.94	0.0520	Nonviolent
Poland	0.1785073	5.80	0.0000	Nonviolent
Portugal	0.0883991	2.89	0.0040	Nonviolent
Serbia	0.0363280	1.19	0.2360	Nonviolent
Suriname	0.0215304	0.70	0.4830	Nonviolent
Taiwan	0.0388007	1.27	0.2060	Nonviolent
Uruguay	0.0596112	1.95	0.0520	Nonviolent

6.4 Aggregate Effects

The preceding sections articulate the effects on a country-level basis. However, this method does not clearly articulate the average changes to women's property rights caused by violent and nonviolent revolutions. In this section, difference-in-difference, two way fixed effects counterfactual (TWFE), interactive fixed effects (IFE), and Matrix Completion Generalize Synthetic Control (MCGSC) are used to unpack the aggregate impact.

Table 4 provides a simple estimate of the effects of violent revolutions on female property rights. Column one offers a simple linear estimate for violent revolutions on female property rights, showing a small and statistically significant positive impact of 0.28. Column 2 is similar, but it controls for country-fixed effects, which is important because differences between countries are large. The positive impact increases to 1.3, and it remains statistically significant. Column 3 applies fixed effects for year, which matters because property rights have been extended to women to greater degrees over time. This changes the sign to negative, and the results remain statistically significant. Column 4 combines year and country fixed effects, showing a positive effect of 0.1 at the 0.05 significance level. These results are very small, and the statistical significance decreases by the fourth model.

Next, the same analysis is conducted to elucidate the effects of nonviolent revolutions on female property rights in Table 5. Column 1 shows a positive and statistically significant effect of 1.1. However, this simple model does not control for the wide variations between countries and over time. In Column 2, after controlling for country, the results increase to 1.6 and remain statistically significant. When controlling for year in Column 3, the effects reduce to 0.28, but they remain statistically significant. Once both country and year fixed effects are applied in Column 4, the effect is a .43 increase in female property rights due to a nonviolent revolution. These results are statistically significant at the 0.01 level.

Both of these results face challenges in outlining the true effect of revolutions on female private property rights. Liu et al. (2024) provides a more sophisticated approach

Table 4: Impact of violent revolution on property rights for women

| | Female Property Rights | | | |
	(1)	(2)	(3)	(4)
Constant	5.3837***	5.301 ***	5.4415***	5.3972***
	(.0205)	(.0116)	(.0187)	(.0082)
Violent	.2755***	1.337***	-.4655***	.1031**
	(.0733)	(.0537)	(.0694)	(.0405)
Fixed-effects				
country		Yes		Yes
year			Yes	Yes
Fit statistics				
Observations	6,888	6,888	6,888	6,888
R^2	0.0020	0.6999	0.1871	0.8544
Within R^2	0.0020	0.0833	0.0066	0.0010

Clustered (country & year) standard-errors in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

used in Table 6. Two way fixed effects are provided in the first column to outline the effect of nonviolent revolutions on female property rights using 2000 bootstrapped iterations, and the results indicate a 0.5 statistically significant increase in private property rights. The interactive fixed effects model (IFE) method uses 2000 bootstrapped iterations and controls for country and year fixed effects. Also, it allows for potential unobserved factors like cultural, regional, or historical factors that change over time and affect units differently. These results are no longer statistically significant, and the effects are small. Finally, the third column presents the matrix completion generalized synthetic control (MCGSC) method. This is the most advanced model for controlling for heterogeneity, and our results are bootstrapped 2000 times, and the matrix was optimized to tighten our match. The results show a statistically significant 0.49 increase in female property rights following a nonviolent revolution. Figure 2 illustrates the strength and effects of

Table 5: Impact of nonviolent revolution on property rights for women

| | Female Property Rights | | | |
	(1)	(2)	(3)	(4)
Constant	5.4616***	5.4268***	5.5281***	5.5166***
	(.018)	(.0101)	(.0165)	(.007)
Nonviolent	1.1704***	1.6378***	.2785***	.4338***
	(.0657)	(.0430)	(.0646)	(.0327)
Fixed-effects				
country		Yes		Yes
year			Yes	Yes
Fit statistics				
Observations	7,872	7,872	7,872	7,872
R^2	0.0387	0.7045	0.2136	0.8646
Within R^2	0.0387	0.1565	0.0024	0.0224

Clustered (country & year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

each model.

Alternatively, none of the results are statistically significant in the fourth, fifth, and sixth columns that explore the results of violent revolutions on female property rights. Results include 0.06, -0.21, and 0.14 for the TWFE, IFE, and MCGSC models respectively. The results are bootstrapped 2000 times, demonstrating that any effects shown in the various models are likely due to chance. These results are striking, given violent revolutions' grave costs and radical nature. Figure 3 highlights these results.

6.5 Robustness

Many countries in synthetic control lack statistical significance. To address this concern, t-statistics tests are used. In some cases, the countries change signs, but these sign changes are explained in the sections above with a lack of significance or a change within
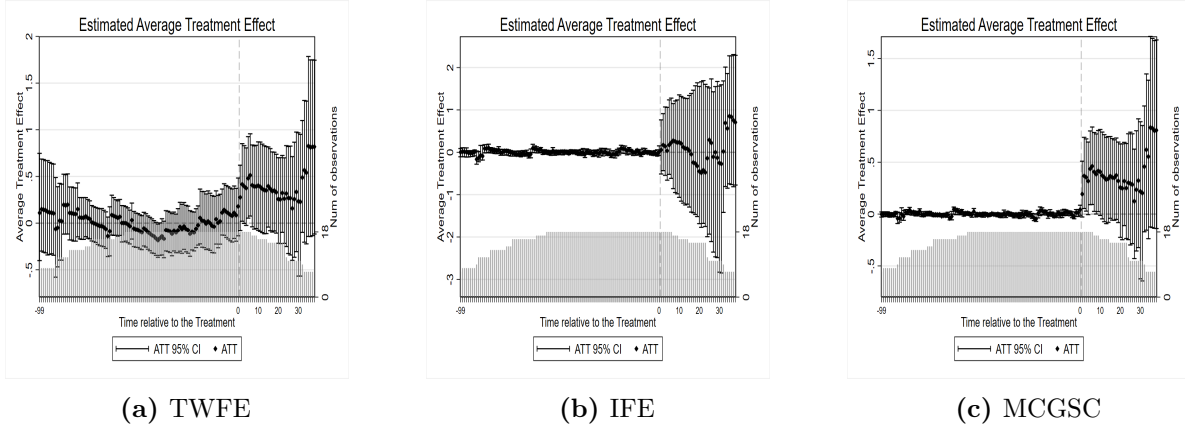
Figure 2: Nonviolent

(a) TWFE   (b) IFE   (c) MCGSC

Figure 3: Violent

(a) TWFE   (b) IFE   (c) MCGSC
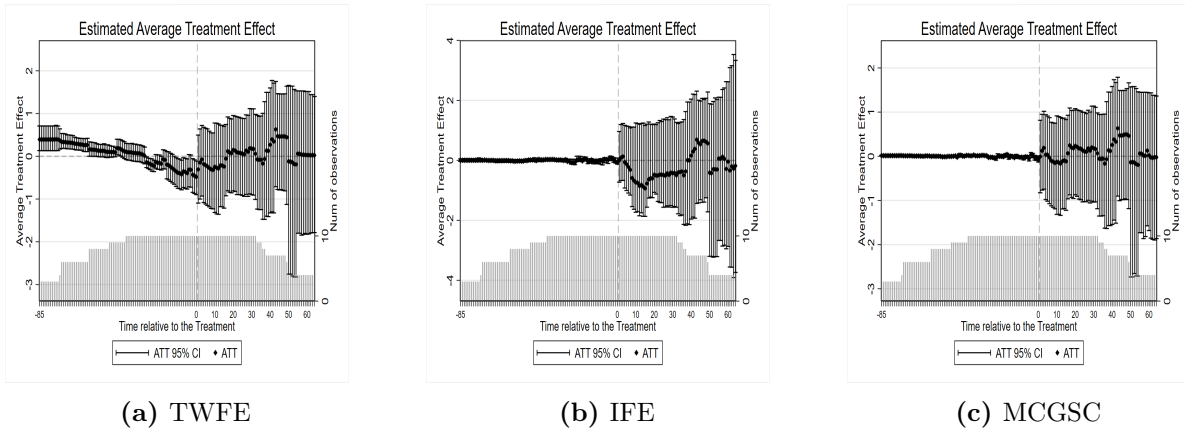
the period studied. Additional Chow tests are included in table A1 to show statistical significance, and insignificant results are noted when explaining the results for each country. This evidence does not indicate nonviolent revolution being highly predictive of property rights for women in the synthetic controls or the t-statistics. Synthetic controls for violent revolutions also have mixed results.

However, the seven additional models used for violent revolutions prove that the impacts on female property rights are insignificant. A null finding is important because violent methods coincide with repression, death, and significant economic and social costs. Given the immense cost of conflict and uncertainty created by war, it would also be reasonable to expect property rights to diminish. Yet, we do not find meaningful effects.

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Table 6: Impact of nonviolent and violent revolution on property rights for women

| | Female Property Rights | | | | | |
	TWFE	IFE	MCGSC	TWFE	IFE	MCGSC
Nonviolent ATT	.5074**	.1536	.4916**			
Violent ATT				.0647	-.2137	.1354
SD	(.243)	(.458)	(.229)	(.425)	(.485)	(.443)
N	587	587	587		537	537
Fixed-effects						
country	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
Observations	7,872	7,872	7,872	6,888	6,888	6,888
MSPE	.3364	.0763	.0589	.3264	.0764	.0609
P-Value	.03	.74	.03	.88	.65	.76

Standard deviation in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Most models have positive and statistically significant effects from nonviolent revolutions on female property rights. This finding is robust. However, as we saw in the synthetic control cases, some countries have large gains while others experience reversals. Therefore, two case studies are provided to explore the mechanisms driving these results.

7 Case Studies

7.1 India

In 1977 India, a nonviolent successful campaign against Prime Minister Indira Gandhi takes place. The famous Indian Independence movement against British colonialism led by Mahatma Gandhi from 1919-1947 (Sharp, 1960, 1979) is coded as a limited success in NAVCO. Despite being the first and only successful nonviolent campaign in NAVCO data, the country also experienced unsuccessful violent campaigns [2]. Unsuccessful nonviolent

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[2]Moplah Rebellion (1921-1922), Punnapra-Vayalar Uprising (1946), Hyderabad activists (1948), Telangana People's Front (1948-1952), Naxalite insurgency (1967-1971), Mizo Revolt (1966-1986), Sikh insurgency (1984-1994), Kashmiri Muslim separatists (1990-1994), and the Naga Rebellion (1956-2019)

campaigns include an earlier phase of the Anti-Indira Campaign, the topic of this analysis, the Khalistan Campaign (1986-1987), and the Kashmir Plebiscite Protests (1990). Even though India is world renowned for using nonviolent tactics against the British, the country is the only country in the NAVCO data with eight violent campaigns, whether failed or successful (Chenoweth and Shay, 2020).

In 1956, women in India saw a one-point improvement in private property rights from 1874 to 1955, according to the V-Dem data (Coppedge et al., 2021). Before 1873, women in India held virtually no private property rights. In 1956, women's property rights were extremely limited, especially for Hindu and Muslim women who were governed by patriarchal personal laws (Halder and Jaishankar, 2008). Legally, Hindu women had few property inheritance rights and limited rights in family property controlled by husbands. The passage of the Hindu Succession Rights Act (HSA) of 1956 is a probable cause of the improvement in the data. Still, it only applied to Hindu, Buddhist, Jain, or Sikh women, and some women found enforcing their newly found rights to inheritance was impossible (Bates, 2004). The experience of some Hindu women who were practically denied their inheritance rights highlights the heterogeneity in Indian law because many Hindu women saw the law as making female descendants equal to males (Pal, 2016). Muslim women were similarly disadvantaged under Islamic law and did not have full rights to inheritance of property under the Indian personal laws (Narain, 1998). Only Christian women had somewhat greater protections under the Indian Succession Act 1925, which granted some inheritance rights to Christian women and entrenched some patriarchal powers (Mishra, 2014).

Rural women had little protection or means to claim land rights (Agarwal, 1988). Due to social norms and legal precedents, they depended entirely on husbands and sons. Dowry practices and dependence on husbands for housing further hindered property ownership for women across communities. Even when certain legal rights existed on paper, few women had the knowledge or means to exercise them. Cultural norms and family pressures overwhelmingly favored male control of property.

Reforms in the 1950s, like the Hindu Marriage Act, focused more on divorce and marriage rights, and the Hindu Succession Rights Act did not apply to farmland (Majumdar, 2010). Property rights were not yet on the legislative agenda. Post-colonial India guaranteed Constitutional equality of women, but inheritance law is a civil law matter and subjected to wide variations due to the religious and cultural contexts in which it is enforced (Narain, 1998). Further research should be done on why inter-jurisdictional competition seemingly failed in India while being an essential element for explaining female property rights in America (Lemke, 2016). Nevertheless, the notion of women owning property independently from husbands or sons was alien to most communities. The V-Dem data until 2022 tracks no changes in private property rights for women since 1957, even though some of the changes mentioned above made marginal improvements to property rights for women. These changes were not great enough to change the category of property rights in the data.

One reason the synthetic control method is helpful for a country like India is because instead of showing a country whose property rights for women are lacking and in stasis, we see those other similar countries, like Canada and Australia, showed tremendous gains after India's 1977 revolution. These countries are also useful comparisons because they all share a history of British colonialism, despite having differing colonial origins (Acemoglu et al., 2001). Additionally, India is a federal parliamentary democratic republic, whereas Canada is a constitutional monarchy with a federal system, and Australia is a constitutional monarchy with a parliamentary system. Despite institutional differences before 1950, when Australia improved private property rights for women, the three were closely matched, with India still lagging slightly behind. In 1957, property rights for women scores were identical for India and Canada in the V-Dem data. This trend continued until 1975 when Canada met Australia's score. This change coincides with the campaign against the female Prime Minister Indira Gandhi, who the Allahabad High Court found guilty of electoral malpractices in June 1975. She was assassinated in 1984. Although not the first female Prime Minister in the world, a title taken by Sirimavo Bandaranaike in

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Ceylon, present-day Sri Lanka, Prime Minister Indira Gandhi was one of the first women in the world to hold the title, and many countries still do not have an example of women held in such high political esteem.

In addition to the appointment of one female leader, an article (Katzenstein, 1978) written near this time on the prevalence of women in Indian politics says, "that in comparison to the U.S. Bill of Rights and subsequent Constitutional Amendments, the Indian Constitution affords women essentially more of, and certainly more explicitly, the rights afforded men." As previously mentioned, in most cases, these laws did not extend to female property rights because those laws were governed by civil personal law. Additionally, this article notes that the cultural underpinnings of the patriarchy, comparable to the United States in 1978, were alive and well, saying, "68.16% of those surveyed expressed their opinion against girls have some share with their brothers in parental property." Despite these challenges, many experts assumed that women in India would overcome gender discrimination at the same rates as women in Western industrialized countries, given the presence of women in high office and Constitutional protections.

The evidence suggests that the campaign against Prime Minister Indira Gandhi and the institutions she changed causally explain why India did not keep up with similar countries like Canada, which saw tremendous improvements in property rights for women in the following periods. Some caution should be given to interpreting these results too closely. While India, Canada, and Australia have a similar colonial history in some respects, they have quite different colonial origins and cultures. India's complex social fabric, influenced by various religions, languages, and traditions, presents unique challenges in legislating and implementing women's rights. This is different from the more homogeneous cultures of Canada and Australia. Additionally, in all periods studied, India had far higher levels of corruption and lower life expectancy than Canada and Australia. Corruption was a major reason for Indira Gandhi's expulsion from office in 1977 (Klieman, 1981). Life expectancy variation could be attributed to India's large agrarian and rural populations, less prevalent in largely industrialized Canada and Australia. On

top of that, matching with only two countries is not ideal for analysis, and the match with Canada is particularly tight. India is also not significant in the t-test.

Despite these legitimate concerns, the evidence suggests that the campaign against Prime Minister Indira Gandhi, while not resulting in a change in private property rights for women, limited further improvements. Additionally, the campaign against Indira Gandhi could have had a chilling effect on progressive social reforms, including women's property rights. This is an unseen cultural cost of the revolution because we do not know if India might have issued the progressive reforms seen in Canada and Australia, and the data suggests that this relationship is likely. The reputational effects of her rule and the revolution against her are a matter of speculation and contention.

To add to the problems in India, not only did Indira Gandhi's demise stall further progress, but her actions while in power contributed to a lack of constitutional checks and balances (Maiorano, 2015). She was a socialist Prime Minister who consolidated power into the hands of the Prime Minister, removed judicial constraints, and limited the power of chief ministers in parliament. This is especially true during the years preceding the election of 1977 where she lost power because her use of emergency powers was deeply polarizing. Economic literature demonstrates that real or manufactured crises often result in the growth of government (Higgs, 1987; Hall and Coyne, 2018). Indira Gandhi, the daughter of the first Prime Minister of India Jawaharlal Nehru, wanted to ensure that her sons would inherit the office. She succeeded in this effort, but it required electoral malpractice and autocratic tendencies that led to her political demise. Scholars categorize her decisions to consolidate power, especially using emergency powers, as one of political expediency and power on one hand and individual liberty, democracy, and the rule of law on the other hand (Klieman, 1981). Indira Gandhi chose the former, and this consolidation of power meant that any reforms to female property rights would be heavily influenced by whoever sat in her chair.

Prime Minister Indira Gandhi took steps in her career against property rights in India (Everett, 2013). She undertook a populist campaign to nationalize industry, which the

Supreme Court struck down for violating Constitutional property rights protections. In response, Gandhi used a two-thirds majority in Parliament to change the Indian Constitution in conjunction with a campaign she called "Garibi hatao" or remove poverty. She also used emergency powers, largely in response to the campaigns against her, to institute land reforms. Indian land reforms have been shown to cause deleterious effects on economic development (Watts and Woodruff, 2017). Gandhi confiscated and heavily taxed wealth generated from grey or black markets, engaged in ambitious industrial policy, banned strikes, mandated price ceilings, and considered wealth ceilings in urban centers (Erdman, 1977). Not only did Gandhi's regime fail to ensure women in India had private property rights, but her rule represented a general threat to private property rights, albeit a danger from which some well-connected industrialists benefited handsomely. Rajagopalan (2015) catalogs Indira Gandhi's assault on the Indian Constitution, the rule of law, and private property rights, with the Ten-Point Program, the Twenty-Fourth Amendment to the Indian Constitution, the Twenty-Fifth Amendment, the Twenty-Ninth Amendment, the Thirty-Fourth Amendment, and the Forty-Second Amendment. In short, Indira Gandhi was devastating for private Constitutionally protected property rights and the rule of law in India.

Another illustrative case for the problematic nature of power vested in the hands of the Prime Minister in India involved her son, Prime Minister Rajiv Gandhi, who was later assassinated. In the mid-1980s, India's Supreme Court issued a ruling in favor of a Muslim woman seeking alimony from her ex-husband, sparking controversy across the country. Hindu fundamentalists supported the verdict as an attack on perceived Muslim patriarchy, while Muslim leaders saw it as an infringement on religious law. Initially backing the Court, Prime Minister Rajiv Gandhi later introduced legislation effectively overturning the decision due to political pressure from Islamic conservatives (Pathak and Rajan, 1989). Additionally, Rajiv Gandhi used his executive power to institute harsh family planning policies involving male vasectomies. These episodes demonstrate that the constitution's weakness and the judiciary's lack of power relative to the Prime

Minister advanced patriarchal laws, even when Former Prime Minister Indira Gandhi's son, Rajiv Gandhi, sat in her chair. However, the overwhelming trend is that the Prime Ministers, who possessed the greatest opportunity to advance private property rights for women, were indifferent to the plight of Indian women or prioritized issues other than property rights when concerns were raised regarding gender inequity.

There is a compelling case to be made that the legacy of Indira Gandhi, a symbol of gender empowerment as the second female Prime Minister in the world, hampered progress on property rights for women. These challenges came because of her policies that threatened property rights generally and the political economy issues that followed her efforts to centralize power in the hands of the Prime Minister, a seat always held by men after her rule. This case study illustrates that while nonviolent reforms hold a comparatively better shot at advancing private property rights for women, the institutional details and the ideology of the new leadership are critical factors for determining success in the years that follow.

Another problem for India is that the number of unsuccessful violent revolts likely hampered the advancement of private property rights. While this is empirically undetermined in this study because all these campaigns were unsuccessful and multiple attempts were not studied here, a convincing case could be made that these failed violent revolutions dampened any success that might have been achieved by ousting a ruler known for her autocratic tendencies. Economic historians show that violence and coups often follow from efforts to establish the rule of law and property rights in developing countries (North et al., 2009). Further research should be conducted on the effects of both failed nonviolent and violent campaigns.

As Figure 4 below demonstrates, women in India have languished under a consistent lack of property rights for over 40 years, and these trends extend to the present day. However, the synthetic control results, as represented in Figure 1, show that India might have followed the path of a synthetic India, comprised of Canada and Australia, where property rights for women improved dramatically with near-perfect scores meaning that

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Figure 4: India
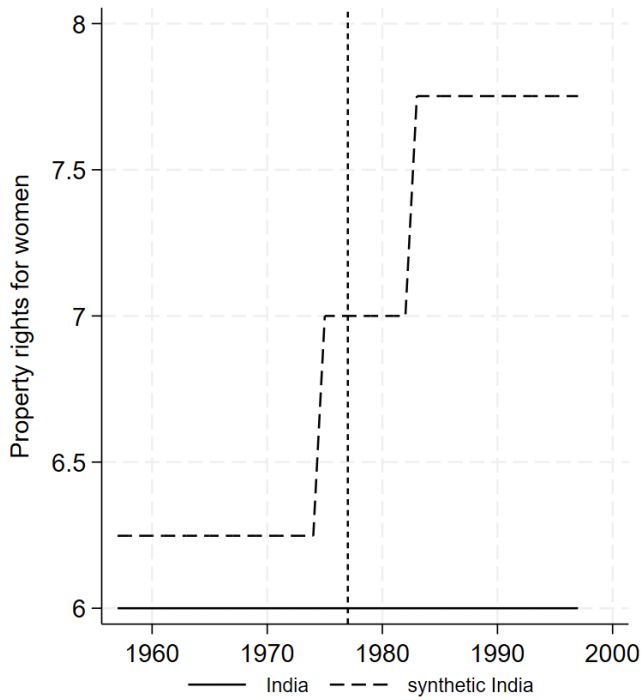
all women in the community enjoy equal rights to private property that enables them to engage in commerce, invest in education, and provide for their families without permission from male counterparts. Unfortunately for the women in India, this alternative history never happened, but Australia and Canada show property rights institutions for women can improve.

7.2 Poland

Like India, Poland's data begins with a score of 6 for women's private property rights. The peaceful revolution of 1989 shifted the property rights regime for women to an 8, which is a perfect score under the V-Dem data, meaning "virtually all women enjoy all, or almost all, property rights." This score is maintained from 1990 to 2015 in V-Dem. Economic freedom scores in all categories of the Fraser Institute's Economic Freedom of the World (Gwartney et al., 2022) show improvements after the revolution of 1990. The synthetic control pairs Poland with Canada, Kuwait, and Singapore. The upward shifts in the synthetic control are generated by two one-point increases in Canadian property

rights for women that preceded the revolution. In contrast, Kuwait and Singapore remain at a score of 6 throughout the time observed.

The Solidarity Movement was a civil resistance campaign in Poland lasting from 1980 to 1989 against the Communist regime (Pakulski, 2010). Economists note that the market process can be a form of nonviolent action through voluntary acts of commission and omission in markets (Alshamy et al., 2023), and Poland's Solidarity Movement is an example of economic omission. Lech Wałesa, who later became a Nobel Laureate, organized the first worker's strike in Poland in August 1980, seeking an independent trade union to secure workers' rights in the People's Republic of Poland. This voluntary act of omission and actions to join the union spread to nearly 10 million workers at the peak of membership. The Solidarity movement advocated for workers' rights, greater personal and economic freedoms, democracy, and ending authoritarian Communist rule. However, it was not overtly anti-Communist. In December 1981, concerned by Solidarity's rising power, the Polish government declared martial law, suspending civil liberties and arresting thousands of Solidarity members. The movement was outlawed. During the 1980s, Solidarity remained underground but kept pressure through protests and strikes. Faced with ongoing social and economic crises, the Communist government started negotiations with Solidarity in 1989. This led to semi-free elections in June 1989, in which Solidarity won a majority, signaling the end of Communist rule.

Female workers were involved right from the start of the August 1980 strikes at the Lenin Shipyard. Key female leaders included Anna Walentynowicz, whose firing from the shipyard directly led to the strikes, and Alina Pienkowska, who co-founded the strike committee (Penn, 2005).

Women took part in the negotiations with the Communist government and were signatories to the Gdańsk Agreement that allowed Solidarity's formation. Within Solidarity, women formed their departments and sections to represent women workers and push for gender equality. These groups pressed employers for maternity benefits, childcare, and policies against sexual harassment. Activists like Barbara Labuda and Izabela Jaruga-

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Nowacka advocated for women's rights and representation within the larger Solidarity movement (Reading, 1992).

After martial law, women helped sustain the movement by facilitating communication between imprisoned leaders like Wałesa and the outside world. The participation of Catholic, working-class women challenged stereotypes and helped make the Solidarity movement broad-based and impactful (Long, 1996). The movement helped pave the way for more women's rights after communism fell, although it did not provide everything needed to ensure equal rights for women.

Additionally, it is important to recognize the media's role in the rapid institutional shifts in Poland (Coyne and Leeson, 2004). Underground media in Poland gradually introduced new ideas and viewpoints that were alternatives to the communist regime, helping create a growing gap between people's actual preferences and publicly stated ones. This underground media coordinated workers' strikes and dissent. By the late 1980s, there was a robust underground press network covering political issues and dissent. Female activists, like Helena Łuczywo, contributed to dissident publications like Tygodnik Mazowsze, giving women a voice in the underground press (Miller, 2011).

In 1989, Poland's media licensing laws were relaxed, allowing many new independent newspapers and magazines to be published (Coyne and Leeson, 2004). This proliferated the number and diversity of media outlets. The media served as a key mechanism to turn the potential for major institutional change into actual change by creating common knowledge and coordinating citizens. For example, the televised debate between Lech Walesa and the state union president created common knowledge about Solidarity's alternative vision. This punctuated change ended communist rule. Afterward, papers like Rzeczpospolita expanded economic coverage during privatization, reinforcing new institutions. These "brokers in ideas" were critical to the movement's success (Kozłowski, 2021).

The Communist regime severely limited private property ownership. Farms, businesses, and housing were largely state-owned. Solidarity argued for expanding private

Figure 5: Poland
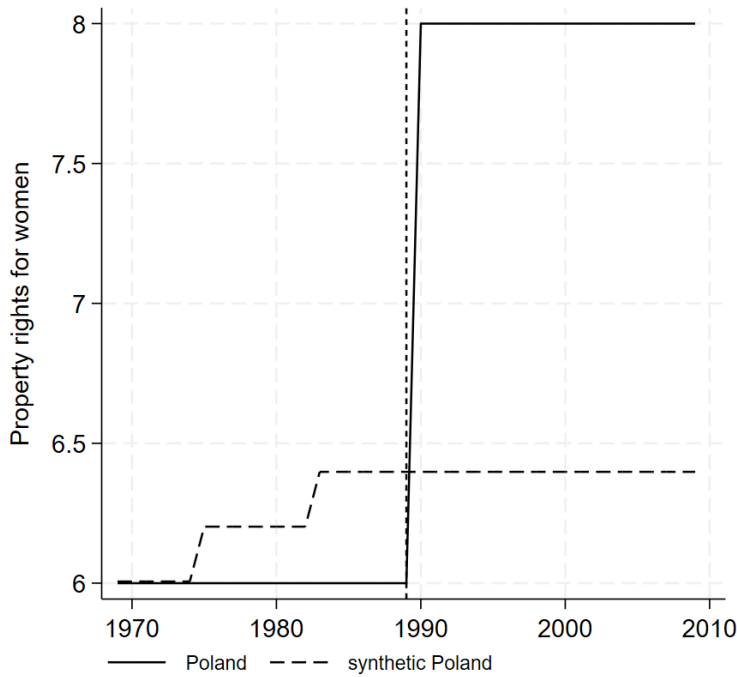
property rights (Sachs, 1991). Granting private land ownership was seen as a way to motivate farmers to produce more food and goods to ease shortages in Poland. Allowing private farms aligned with Solidarity's calls for greater economic freedom (Wierzbicki and Rambaud, 1982). Broader private property ownership, including small businesses and homes, was viewed as a step toward nurturing a middle class outside of state control in Poland. This would diminish the Communist Party's power.

More broadly, private property was central to Solidarity's pro-democracy, anti-authoritarian agenda. The right to own land and assets was intrinsic to the human rights and personal freedoms they advocated, and these social reforms were essential aspects of the legal reforms that followed (Woodruff, 2004). Once in power, Solidarity implemented reforms to privatize state-run farms and industries and recognize private enterprises. This transformed Poland into a market economy and helped dismantle the communist system (Sachs, 1991).

The synthetic control in Figure 5 is a striking demonstration of the success of private property rights for women gained through the solidarity movement. Before the revolu-

tion, women in Poland faced a property rights regime much like that of India, albeit with very different cultural institutions. However, they similarly experienced the lack of property rights endemic to the socialist system. The "shock therapy" in Poland resulted in major cultural and legal changes, unlike India, where post-Indira Gandhi resulted in more of the same constitutional, social, and political issues for property rights for women that occurred before the revolution. The primary issue in India was not removing Prime Minister Indira Gandhi, but rather that the movement did not overcome the many political economy challenges created by her autocratic rule in the years that followed. This is evident because she gained power again after the revolution, whereas Poland never experienced communism again. These case studies demonstrate that nonviolent movements hold the prospect of being an effective check against a lack of private property rights for women, but nonviolent resistance alone is not sufficient.

8 Conclusion

This paper investigates the differential impacts of violent versus nonviolent revolutions on the advancement of private property rights for women. While women's rights may be an ethical justification for violent revolution, empirical evidence often shows such movements failing to achieve durable societal transformations. Focusing specifically on female property rights, we find support for the efficacy of nonviolent resistance in expanding formal protections. However, case study analysis highlights that other political economy factors remain critical in determining the sustainability of gains.

Qualitative evidence from Poland shows how nonviolent campaigns can expand both political freedoms and economic rights in synergy. Women actively participated in Solidarity and advocated for gender equality within the movement. Media coordination and the formation of common knowledge precipitated rapid institutional change after initial protests cracked the communist regime. Privatization policies additionally catalyzed broader growth in Poland's market economy.

The Indian case highlights limitations, however. While initially displacing an autocratic leader through nonviolent civil resistance, progress in gender equality stagnated after Indira Gandhi. Her legacy increased constraints and dampened progressive reforms even after her death. Multiple unsuccessful violent revolts likely compounded the damaging effects in India. This indicates that while nonviolent revolutions may open opportunities, durable change requires overcoming political economy barriers and the broader ideological commitments of incoming regimes. Sustained participation and vigilance are needed to achieve lasting shifts.

This analysis employs multiple comparative methods to isolate effects and probe causal channels. However, limitations around causal identification in observational studies occur in multiple models, especially amidst complex social dynamics. The matrix completion generalized synthetic control method (MCGSC) is well suited to causally identify treatment effects in cases like this with 120 years of data across many countries because it is designed to overcome the real challenges of heterogeneity across countries. These results show that despite the great costs of violent revolutions, these upheavals do not reliably result in greater property rights for women. Nonviolent revolutions create gains in female property rights on average.

This study contributes uniquely to scholarship on the gendered dimensions of conflict and contentious politics. Economic rights constitute an essential pillar for expanding women's status, and private property, in particular, incentivizes human capital investments that boost prosperity. Understanding conditions that strengthen protections has profound policy significance, especially given the failures of foreign interventions at top-down institutional engineering. Our findings highlight the promise of nonviolent movements arising endogenously while emphasizing that sustained participation and vigilance against the centralization of power remain critical for durable progressive change.

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Figure A1: Synthetic Control Results
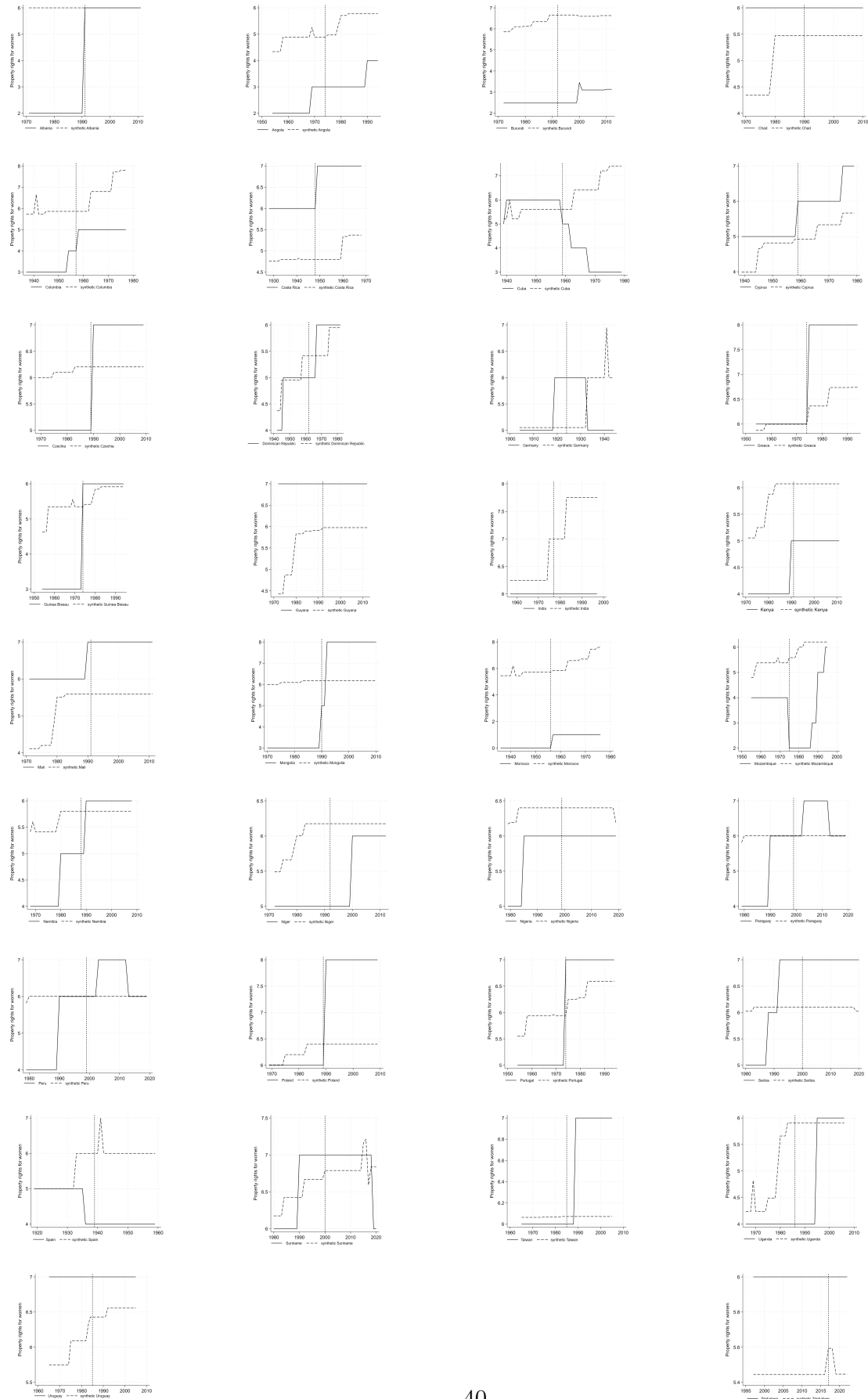
Figure A2: Synthetic Control P-Values

Table A1: Female Property Rights Index—Chow tests

Country	Ave. Pre-RMSPE	RMSPE	F-stat	F-(p-value)	Type
Albania	0	4.0000000	11.41	0.0000	Nonviolent
Bulgaria	0.32	0.7599693	1.07	0.3808	Nonviolent
Colombia	0	2.7321070	7.07	0.0000	Nonviolent
Czechia	0.166666667	1.1040570	6.09	0.0000	Nonviolent
Dom. Rep.	0.92	0.3200091	1.71	0.1165	Nonviolent
Germany	0.583333333	0.4759160	2.26	0.0361	Nonviolent
Greece	1	0.0575225	9.09	0.0000	Nonviolent
Guyana	0.12	1.6646550	4.49	0.0002	Nonviolent
India	0.92	0.3941569	11.80	0.0000	Nonviolent
Kenya	0.08	1.6583550	7.18	0.0000	Nonviolent
Mali	0.16	1.2789850	6.72	0.0000	Nonviolent
Mongolia	0	3.0988950	6.18	0.0000	Nonviolent
Niger	0.333333333	0.9644945	4.02	0.0005	Nonviolent
Nigeria	0.291666667	0.7637450	2.31	0.0321	Nonviolent
Paraguay	0.12	1.4776760	3.12	0.0049	Nonviolent
Peru	0.48	0.7222095	4.50	0.0002	Nonviolent
Poland	1	0.2476324	4.65	0.0001	Nonviolent
Portugal	0.48	0.8801355	11.12	0.0000	Nonviolent
Serbia	0.32	0.8865608	4.58	0.0001	Nonviolent
Suriname	0.8	0.3687455	3.12	0.0050	Nonviolent
Taiwan	0.96	0.0652581	7.54	0.0000	Nonviolent
Uruguay	0.36	1.0751150	5.48	0.0000	Nonviolent
Angola	0.04	2.5801960	14.85	0.0000	Violent
Burundi	0.083333333	3.7297320	3.2800	0.0033	Violent
Chad	0.083333333	1.1967400	5.3600	0.0000	Violent
Costa Rica	0.25	1.2128280	10.58	0.0000	Violent
Cuba	0.68	0.4852487	3.88	0.0008	Violent
Cyprus	0.64	0.5786663	3.30	0.0032	Violent
Guinea-Bissau	0.04	2.2730100	28.90	0.0000	Violent
Morocco	0	5.6476720	10.91	0.0000	Violent
Mozambique	0.24	1.3291500	8.16	0.0000	Violent
Namibia	0.28	1.2300420	8.99	0.0000	Violent
Spain	0.48	0.8660254	3.54	0.0018	Violent
Uganda	0.36	1.0597960	7.69	0.0000	Violent

Table A2: Nonviolent Synthetic Control Fit 1

Country	Covariates	Treated	Synthetic	Syn. Country	Syn. Weight
Albania	v2x_polyarchy	0.1743	0.2333742	Bhutan	0.278
Albania	v2xnp_regcorr	0.0758	0.1647401	Kuwait	0.208
Albania	ln_gdp	3.036151	3.13504	Singapore	0.514
Albania	ln_pop	2.455533	2.153604		
Albania	e_pelifeex	71.095	67.22529		
Albania	longitude	200	268.4251		
Colombia	v2x_polyarchy	0.2049	0.4596923	Cape Verde	0.069
Colombia	v2xnp_regcorr	0.5403	0.0801036	Belgium	0.931
Colombia	ln_gdp	3.592769	3.634638		
Colombia	ln_pop	3.063994	2.783258		
Colombia	e_pelifeex	49.37	62.42733		
Colombia	longitude	108	182.068		
Czechia	v2x_polyarchy	0.16905	0.2670255	Canada	0.101
Czechia	v2xnp_regcorr	0.62865	0.4938835	Kuwait	0.899
Czechia	ln_gdp	4.368305	3.890194		
Czechia	ln_pop	3.202563	2.248688		
Czechia	e_pelifeex	70.725	72.66482		
Czechia	longitude	195.5	213.2496		
Dom. Rep.	v2x_polyarchy	0.14975	0.2864324	Canada	0.244
Dom. Rep.	v2xnp_regcorr	0.9414	0.3011426	Cape Verde	0.291
Dom. Rep.	ln_gdp	2.792005	2.487223	Singapore	0.465
Dom. Rep.	ln_pop	2.458081	1.967759		
Dom. Rep.	e_pelifeex	56.195	57.92572		
Dom. Rep.	longitude	109.3333	198.103		
Germany	v2x_polyarchy	0.34735	0.4162898	Canada	0.053
Germany	v2xnp_regcorr	0.0748	0.0254863	Belgium	0.947
Germany	ln_gdp	4.559917	3.736523		
Germany	ln_pop	3.825355	2.901039		
Germany	e_pelifeex	46.985	49.24316		
Germany	longitude	189	178.753		
Greece	v2x_polyarchy	0.27795	0.4334112	Canada	0.368
Greece	v2xnp_regcorr	0.41345	0.3013848	Cape Verde	0.003
Greece	ln_gdp	3.81136	3.713446	Kuwait	0.507
Greece	ln_pop	2.955511	2.326474	Singapore	0.122
Greece	e_pelifeex	72.71	69.71119		
Greece	longitude	202	181.7943		
Guyana	v2x_polyarchy	0.28415	0.2843455	Cape Verde	0.066
Guyana	v2xnp_regcorr	0.5922	0.579171	Jamaica	0.382
Guyana	ln_gdp	2.453967	2.47259	Equ. Guinea	0.479
Guyana	ln_pop	1.903208	1.869947	Kuwait	0.059
Guyana	e_pelifeex	62.045	61.18787	Malta	0.013
Guyana	longitude	121	156.4224		

Table A3: Nonviolent Synthetic Control Fit 2

Country	Covariates	Treated	Synthetic	Syn. Country	Syn. Weight
India	v2x_polyarchy	0.62425	0.8156472	Canada	0.752
India	v2xnp_regcorr	0.238	0.049832	Australia	0.248
India	ln_gdp	4.84358	4.553369		
India	ln_pop	4.732439	3.275492		
India	e_pelifeex	48.005	71.96784		
India	longitude	257	141.544		
Kenya	v2x_polyarchy	0.19735	0.2841741	Canada	0.194
Kenya	v2xnp_regcorr	0.86765	0.5700346	Equ. Guinea	0.315
Kenya	ln_gdp	3.577593	3.404717	Kuwait	0.491
Kenya	ln_pop	3.252049	2.194581		
Kenya	e_pelifeex	61.715	65.91668		
Kenya	longitude	218	188.1201		
Mali	v2x_polyarchy	0.15075	0.1779875	Canada	0.088
Mali	v2xnp_regcorr	0.85845	0.7558711	Equ. Guinea	0.589
Mali	ln_gdp	2.742324	2.29792	Kuwait	0.199
Mali	ln_pop	2.859642	1.607672	Zanzibar	0.125
Mali	e_pelifeex	45.7	50.16666		
Mali	longitude	176	164.694		
Mongolia	v2x_polyarchy	0.17895	0.2081132	Bhutan	0.614
Mongolia	v2xnp_regcorr	0.10115	0.1109327	Canada	0.089
Mongolia	ln_gdp	2.559304	2.620015	Singapore	0.297
Mongolia	ln_pop	2.244144	2.020517		
Mongolia	e_pelifeex	56.615	60.78012		
Mongolia	longitude	285	257.9406		
Niger	v2x_polyarchy	0.1352	0.2256962	Bhutan	0.414
Niger	v2xnp_regcorr	0.38615	0.3673173	Canada	0.173
Niger	ln_gdp	2.948252	2.885379	Equ. Guinea	0.17
Niger	ln_pop	2.831316	2.06034	Kuwait	0.243
Niger	e_pelifeex	44.885	61.7994		
Niger	longitude	188	214.3129		
Nigeria	v2x_polyarchy	0.2414	0.3313637	Canada	0.208
Nigeria	v2xnp_regcorr	0.878	0.4355077	Equ. Guinea	0.021
Nigeria	ln_gdp	4.28898	4.02094	Kuwait	0.772
Nigeria	ln_pop	3.969632	2.505608		
Nigeria	e_pelifeex	54.555	75.62479		
Nigeria	longitude	188	197.4221		
Paraguay	v2x_polyarchy	0.3141	0.2956559	Equ. Guinea	0.19
Paraguay	v2xnp_regcorr	0.9476	0.6184954	Kuwait	0.611
Paraguay	ln_gdp	3.334821	3.319584	Mauritius	0.199
Paraguay	ln_pop	2.634067	2.096321		
Paraguay	e_pelifeex	74.985	69.9578		
Paraguay	longitude	122	222.4715		

Table A4: Nonviolent Synthetic Control Fit 3

Country	Covariates	Treated	Synthetic	Syn. Country	Syn. Weight
Peru	v2x_polyarchy	0.50975	0.5232206	Canada	0.534
Peru	v2xnp_regcorr	0.59775	0.3781899	Equ. Guinea	0.292
Peru	ln_gdp	4.042875	3.922386	Kuwait	0.173
Peru	ln_pop	3.355152	2.713481		
Peru	e_pelifeex	69.09	69.56755		
Peru	longitude	104	140.2549		
Poland	v2x_polyarchy	0.19345	0.3736085	Canada	0.196
Poland	v2xnp_regcorr	0.1448	0.2660214	Kuwait	0.469
Poland	ln_gdp	4.482734	3.8851	Singapore	0.336
Poland	ln_pop	3.567818	2.471658		
Poland	e_pelifeex	70.95	72.62717		
Poland	longitude	200	218.7884		
Portugal	v2x_polyarchy	0.1282	0.4306839	Canada	0.304
Portugal	v2xnp_regcorr	0.214	0.2035504	Equ. Guinea	0.019
Portugal	ln_gdp	3.747474	3.489771	Kuwait	0.289
Portugal	ln_pop	2.969691	2.38587	Singapore	0.388
Portugal	e_pelifeex	65.16	68.36224		
Portugal	longitude	172	205.3576		
Serbia	v2x_polyarchy	0.19445	0.2563456	Canada	0.078
Serbia	v2xnp_regcorr	0.77095	0.5122627	Equ. Guinea	0.052
Serbia	ln_gdp	3.997403	3.818053	Kuwait	0.87
Serbia	ln_pop	3.173648	2.336185		
Serbia	e_pelifeex	70.175	74.94779		
Serbia	longitude	201	214.5725		
Suriname	v2x_polyarchy	0.51165	0.5119864	Bhutan	0.052
Suriname	v2xnp_regcorr	0.2123	0.2131832	Cape Verde	0.248
Suriname	ln_gdp	2.503571	2.500602	Qatar	0.118
Suriname	ln_pop	1.630057	1.629526	Jamaica	0.174
Suriname	e_pelifeex	69.14	69.01724	Barbados	0.373
Suriname	longitude	124	142.8106	Zanzibar	0.034
Taiwan	v2x_polyarchy	0.1116	0.2716373	Canada	0.004
Taiwan	v2xnp_regcorr	0.53755	0.5211198	Australia	0.063
Taiwan	ln_gdp	4.063694	3.765587	Kuwait	0.933
Taiwan	ln_pop	3.231376	2.088996		
Taiwan	e_pelifeex	70.82	71.36078		
Taiwan	longitude	301	232.464		
Uruguay	v2x_polyarchy	0.32485	0.3721624	Bhutan	0.055
Uruguay	v2xnp_regcorr	0.22205	0.2217659	Canada	0.215
Uruguay	ln_gdp	3.417679	3.427097	Cape Verde	0.126
Uruguay	ln_pop	2.479662	2.345332	Kuwait	0.243
Uruguay	e_pelifeex	69.51	69.19444	Singapore	0.361
Uruguay	longitude	124	210.5812		

Table A5: Violent Synthetic Control Fit 1

Country	Covariates	Treated	Synthetic	Syn. Country	Syn. Weight
Angola	v2x_polyarchy	0.00965	0.2716347	Canada	0.078
Angola	v2xnp_regcorr	0.376	0.298119	Equ. Guinea	0.370
Angola	ln_gdp	3.188341	2.552269	Singapore	0.552
Angola	ln_pop	2.749855	2.045557		
Angola	e_pelifeex	45.945	57.93945		
Angola	longitude	198.5	233.5876		
Burundi	v2x_polyarchy	0.10785	0.28457	Bhutan	0.7
Burundi	v2xnp_regcorr	0.2592	0.12875	Canada	0.3
Burundi	ln_gdp	2.652249	2.809856		
Burundi	ln_pop	2.660015	2.182086		
Burundi	e_pelifeex	46.865	60.8255		
Burundi	longitude	210	214.85		
Chad	v2x_polyarchy	0.11285	0.1368907	Equ. Guinea	0.528
Chad	v2xnp_regcorr	0.79855	0.768436	Kuwait	0.403
Chad	ln_gdp	2.711946	2.52466	Zanzibar	0.069
Chad	ln_pop	2.689027	1.645096		
Chad	e_pelifeex	50.75	55.16732		
Chad	longitude	199	192.0662		
Costa Rica	v2x_polyarchy	0.3259	0.330441	Canada	0.384
Costa Rica	v2xnp_regcorr	0.392	0.364143	Qatar	0.313
Costa Rica	ln_gdp	2.262549	2.236191	Jamaica	0.233
Costa Rica	ln_pop	1.797409	1.774379	Belgium	0.035
Costa Rica	e_pelifeex	47.32	49.75481	Zanzibar	0.035
Costa Rica	longitude	96	135.3438		
Cuba	v2x_polyarchy	0.35595	0.4170403	Cape Verde	0.197
Cuba	v2xnp_regcorr	0.7	0.1830668	Belgium	0.803
Cuba	ln_gdp	3.28964	3.238642		
Cuba	ln_pop	2.765045	2.48799		
Cuba	e_pelifeex	61.75	61.91017		
Cuba	longitude	100	178.484		
Cyprus	v2x_polyarchy	0.08775	0.0944511	Botswana	0.204
Cyprus	v2xnp_regcorr	0.45845	0.4607936	Cape Verde	0.333
Cyprus	ln_gdp	1.055318	1.061378	Kuwait	0.273
Cyprus	ln_pop	0.7850626	0.7805956	Malta	0.079
Cyprus	e_pelifeex	57.645	52.89809	Singapore	0.111
Cyprus	longitude	213	202.5885		
Guinea-Bissau	v2x_polyarchy	0.0145	0.0967751	Bhutan	0.716
Guinea-Bissau	v2xnp_regcorr	0.14325	0.2895179	Canada	0.068
Guinea-Bissau	ln_gdp	1.883911	1.82211	Equ. Guinea	0.215
Guinea-Bissau	ln_pop	1.840113	1.567314		
Guinea-Bissau	e_pelifeex	37.415	45.88563		
Guinea-Bissau	longitude	165	240.308		

Table A6: Violent Synthetic Control Fit 2

Country	Covariates	Treated	Synthetic	Syn. Country	Syn. Weight
Morocco	v2x_polyarchy	0.04765	0.4294342	Cape Verde	0.135
Morocco	v2xnp_regcorr	0.514	0.133194	Netherlands	0.117
Morocco	ln_gdp	3.229614	3.398583	Belgium	0.748
Morocco	ln_pop	2.953482	2.612501		
Morocco	e_pelifeex	310.75	61.71468		
Morocco	longitude	175	180.4248		
Mozambique	v2x_polyarchy	0.02925	0.293148	Bhutan	0.289
Mozambique	v2xnp_regcorr	0.25025	0.2278022	Canada	0.207
Mozambique	ln_gdp	2.873325	2.627489	Equ. Guinea	0.207
Mozambique	ln_pop	2.923001	2.082693	Singapore	0.297
Mozambique	e_pelifeex	46.21	56.62349		
Mozambique	longitude	215	219.3881		
Namibia	v2x_polyarchy	0.0727	0.138415	Bhutan	0.325
Namibia	v2xnp_regcorr	0.50605	0.5000542	Equ. Guinea	0.196
Namibia	ln_gdp	2.815622	2.764462	Kuwait	0.479
Namibia	ln_pop	2.023519	1.810364		
Namibia	e_pelifeex	59.025	61.02191		
Namibia	longitude	197	234.2007		
Spain	v2x_polyarchy	0.24845	0.4892	Belgium	1
Spain	v2xnp_regcorr	0.38365	0.02485		
Spain	ln_gdp	4.030373	3.814101		
Spain	ln_pop	3.39307	2.92851		
Spain	e_pelifeex	47.53	57.44		
Spain	longitude	176	184		
Uganda	v2x_polyarchy	0.1572	0.297183	Canada	0.249
Uganda	v2xnp_regcorr	0.82025	0.6276126	Equ. Guinea	0.588
Uganda	ln_gdp	3.099569	2.886514	Kuwait	0.163
Uganda	ln_pop	3.061907	2.033006		
Uganda	e_pelifeex	51.725	58.11096		
Uganda	longitude	212	169.9933		