Online Appendix

(Not for publication)

Methodology

We describe here the solutions offered by Sun and Abraham (2021), Callaway and Sant'Anna (2021), and Borusyak et al. (2024), respectively.

The regression for the panel event study is replicated as:

$$y_{i,t} = \alpha + \sum_{k=2}^{K} \gamma_k (\text{Lead}^k)_{i,t} + \sum_{j=1}^{J} \beta_j \left(\text{Lag}^j\right)_{i,t} + \mathbf{X}_{i,t}\mathbf{\Gamma} + \theta_i + \delta_t + \varepsilon_{i,t}, \quad (1)$$

where the notations are explained in the main text.

With the aim to estimate a weighted average of $CATT_{e,j}$ (their building block) with reasonable weights, Sun and Abraham (2021) focus on the following estimator:

$$v_j = \sum_e CATT_{e,j} \, Pr\{E_i = e | E_i \in [-j, T-j]\}, \quad (2)$$

where the weights $Pr\{E_i = e | E_i \in [-j, T-j]\}$ are the shares of cohorts. The method proceeds by first estimating each $CATT_{e,j}$ using an interacted two-way fixed effects regression. The weights are then estimated by their sample analogs. Finally, the estimated $CATT_{e,j}$ and weights are used to generate the estimator.

Coinciding with Sun and Abraham (2021)'s *cohort average treatment effect on the treated*, Callaway and Sant'Anna (2021) use as a building block the *group-time average treatment effect*, which they define as:

$$ATT(g,t) = E\left[Y_t(g) - Y_t(0) | G_g = 1\right], \quad (3)$$

where G_g is a binary variable that equals one if a country is first treated in period g, and $Y_t(g)$ and $Y_t(0)$ denote the treated and untreated potential outcomes at time t, respectively. In other words, $ATT(g,t)$ is the average treatment effect for countries that are members of a particular group (first treated in period g) at a particular time period t. Callaway and Sant'Anna (2021) then proceed to define an

aggregate that is analogous to β_j in equation (1), but which is robust to treatment heterogeneity:

$$\theta(j) = \sum_g \mathbf{1}\{g + j \leq T\} Pr(G = g | G + j \leq T)\, ATT(g, g + j), \quad (4)$$

where $\mathbf{1}$ is an indicator function, T denotes periods, and G is the time period when a country first becomes treated. In this way, $\theta(j)$ estimates the average treatment effect j periods after adoption of the treatment across all countries that have ever been treated for exactly j periods. It uses the length of exposure to the treatment as weights. Being an event-study-type estimator, it shows how average treatment effects vary with length of exposure to the treatment.

Let D_{it} be a binary treatment in a panel of country i and time period t, and let $\mathbf{\Omega}$ be a set of observations of total size N. Define the set of treated observations by $\mathbf{\Omega}_1 = \{it \in \mathbf{\Omega}: D_{it} = 1\}$ of size N_1 and the set of untreated observations by $\mathbf{\Omega}_0 = \{it \in \mathbf{\Omega}: D_{it} = 0\}$ of size N_0. Borusyak et al. (2024) use *the causal effects on the treated observations* as the building block, which is defined as $\tau_{it} = E[Y_{it} - Y_{it}(0)]$ with $it \in \mathbf{\Omega}_1$. They employ an imputation estimator similar to Liu et al. (2024) to deal with treatment effect heterogeneity. Specifically, they first estimate a model of $Y_{it}(0)$ using the untreated observations $it \in \mathbf{\Omega_0}$ and then apply it to impute $Y_{it}(0)$ for treated observations $it \in \mathbf{\Omega_1}$. Next, they obtain estimates of the observation-specific causal effect and further employ them to construct event-study plots. Borusyak et al. (2024) consider non-binary treatment intensity, but their method does not allow for treatment reversal.

References

Borusyak, Kirill, Xavier Jaravel, and Jann Spiess (2024), "Revisiting Event-Study Designs: Robust and Efficient Estimation," forthcoming in *Review of Economic Studies*.

Callaway, Brantly and Pedro H. C. Sant'Anna (2021), "Difference-in-Differences with multiple time periods," *Journal of Econometrics*, 225, pp. 200-230.

Liu, Licheng, Ye Wang, and Yiqing Xu (2024), "A Practical Guide to Counterfactual Estimators for Causal Inference with Time-Series Cross-Sectional Data," *American Journal of Political Science*, 68 (1), pp. 160-176.

Sun, Liyang and Sarah Abraham (2021), "Estimating dynamic treatment effects in event studies with heterogeneous treatment effects," *Journal of Econometrics*, 225 (2), pp. 175-199.

	Country	Region		Country	Region
1	Argentina	South America	14	Italy	Southern Europe
2	Austria	Western Europe	15	Mexico	Central America
3	Belgium	Western Europe	16	Netherlands	Western Europe
4	Brazil	South America	17	Norway	Northern Europe
5	Canada	Northern America	18	Peru	South America
6	Chile	South America	19	Portugal	Southern Europe
7	Colombia	South America	20	Russia	Eastern Europe
8	Cuba	Caribbean	21	Spain	Southern Europe
9	Denmark	Northern Europe	22	Sweden	Northern Europe
10	France	Western Europe	23	Turkey	Western Asia
11	Germany	Western Europe	24	United Kingdom	Northern Europe
12	Greece	Southern Europe	25	United States of America	Northern America
13	Guatemala	Central America	26	Venezuela	South America

Source: Dasgupta and Ziblatt (2022).

Notes: Definitions of regions follow United Nation: https://unstats.un.org/unsd/methodology/m49/. Countries and areas are grouped geographically into six major areas designated as: Africa; Asia; Europe; Latin America and the Caribbean; Northern America, and Oceania. The core countries under the classical gold standard are France, Germany, and the UK.

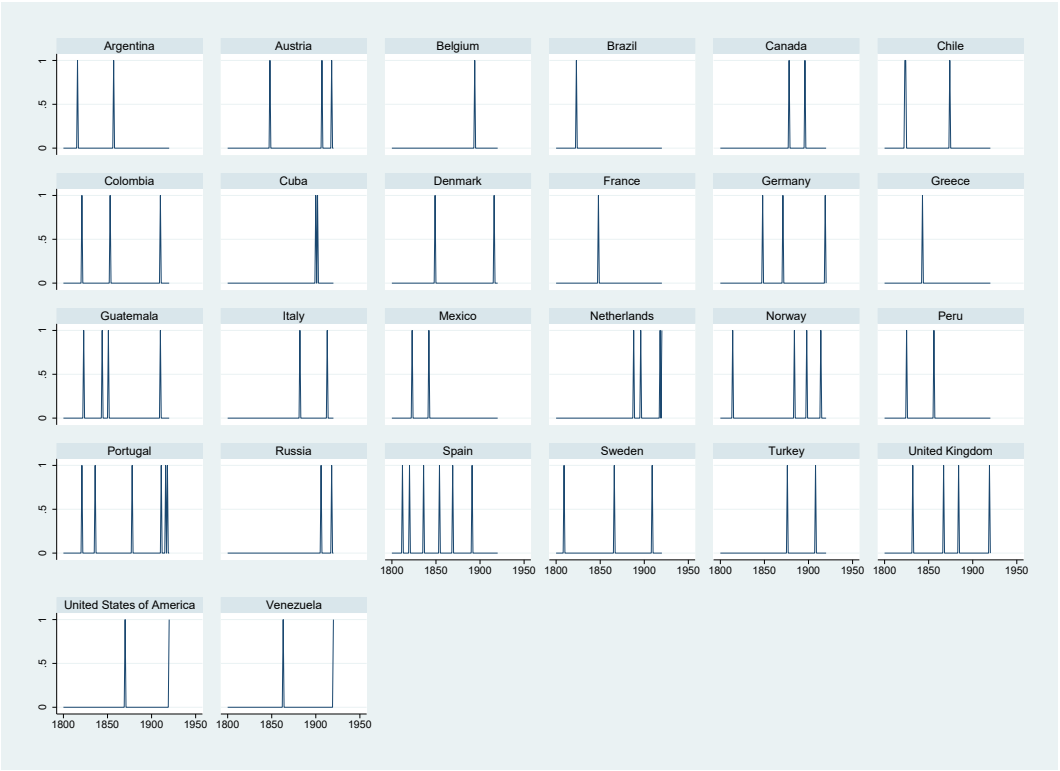
Table A1: Sample Countries of Dasgupta and Ziblatt (2022)

	Country	Region		Country	Region
1	Argentina	Non-Caribbean Latin America	15	Mexico	Caribbean Latin America
2	Austria-Hungary	Eastern Europe	16	Nicaragua	Caribbean Latin America
3	Brazil	Non-Caribbean Latin America	17	Norway	Northern Europe
4	Bulgaria	Eastern Europe	18	Ottoman Empire	Eastern Europe
5	Chile	Non-Caribbean Latin America	19	Peru	Non-Caribbean Latin America
6	China	Asia	20	Portugal	Southern Europe
7	Colombia	Caribbean Latin America	21	Romania	Eastern Europe
8	Costa Rica	Caribbean Latin America	22	Russia	Eastern Europe
9	Denmark	Northern Europe	23	Serbia	Eastern Europe
10	Ecuador	Non-Caribbean Latin America	24	Spain	Southern Europe
11	Greece	Eastern Europe	25	Sweden	Northern Europe
12	Guatemala	Caribbean Latin America	26	Uruguay	Non-Caribbean Latin America
13	Italy	Southern Europe	27	Venezuela	Caribbean Latin America
14	Japan	Asia			

Source: Tuncer and Weller (2022).

Notes: These countries are independent capital-importing countries in Latin America, Southern and Eastern Europe, Scandinavia, and Asia. Definitions of regions follow Tuncer and Weller (2022), p. 9.

Table A2: Sample Countries of Tuncer and Weller (2022)



Source: Dasgupta and Ziblatt (2022), Figure 2.

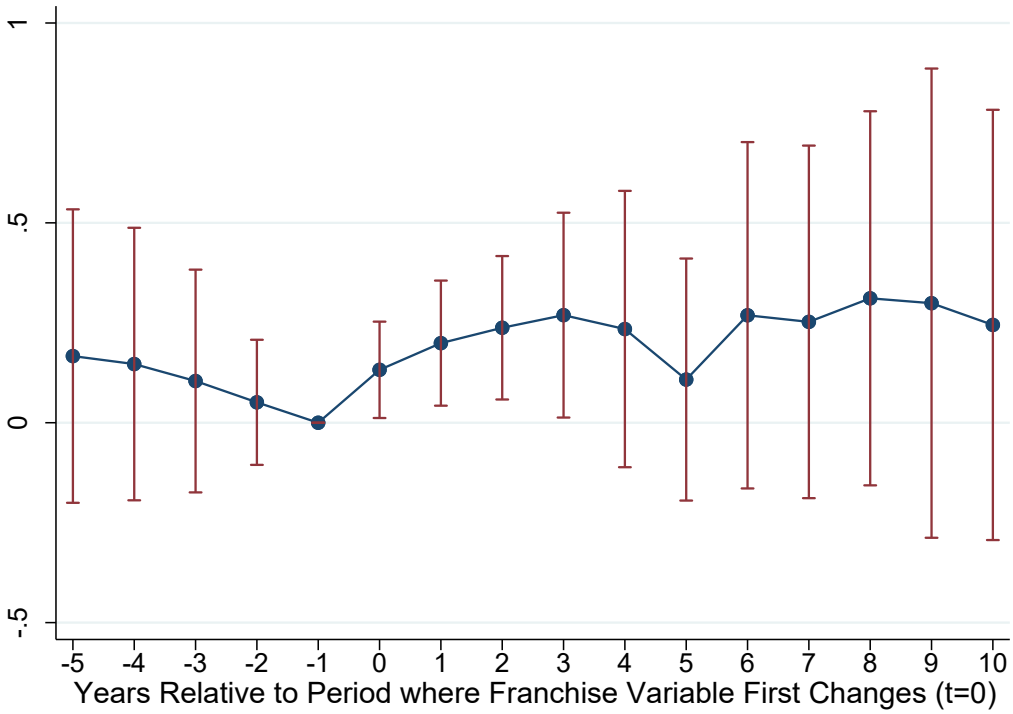
Notes: Dasgupta and Ziblatt (2022) define franchise extensions as reforms that extend the right to vote by more than five percentage points. Each subpanel in the figure shows franchise extensions for each country. The horizontal axis goes from 1800 to 1920. If the vertical axis is at 1, then there is a franchise extension.

Figure A1: Franchise Extension

Source: Dasgupta and Ziblatt (2022), Figure 3.

Notes: Dasgupta and Ziblatt (2022) define franchise contractions as reversals of reform that reduce the right to vote by more than five percentage points. Each subpanel in the figure shows franchise contractions for each country. The horizontal axis goes from 1800 to 1920. If the vertical axis is at 1, then there is a franchise contraction.

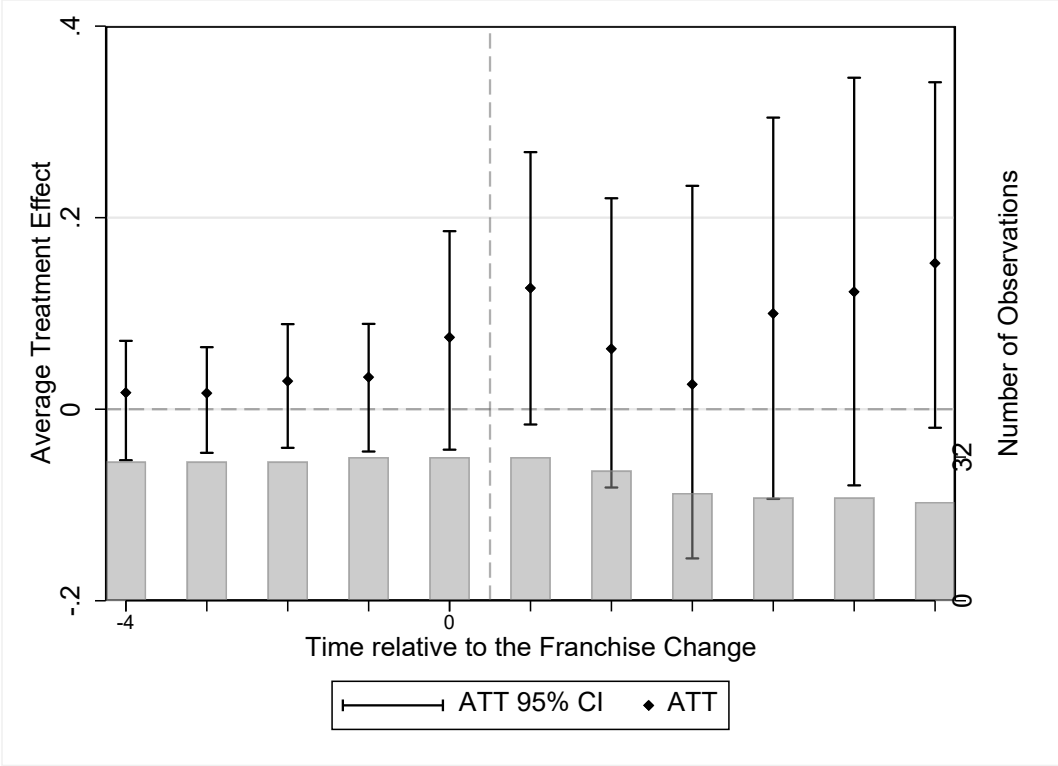
Figure A2: Franchise Contraction



Source: Authors' calculation.

Notes: The horizontal axis denotes the years relative to the period when the franchise variable first changes (either an extension or a contraction). The vertical axis reports the estimated effects of the franchise variable on the government bond yields and placebo estimates, using the data of Dasgupta and Ziblatt (2022) and DID estimation method of De Chaisemartin and D'Haultfoeuille (2020; 2024). Standard errors are clustered at the country level, while 95% confidence intervals, obtained from 200 bootstraps, appear in red.

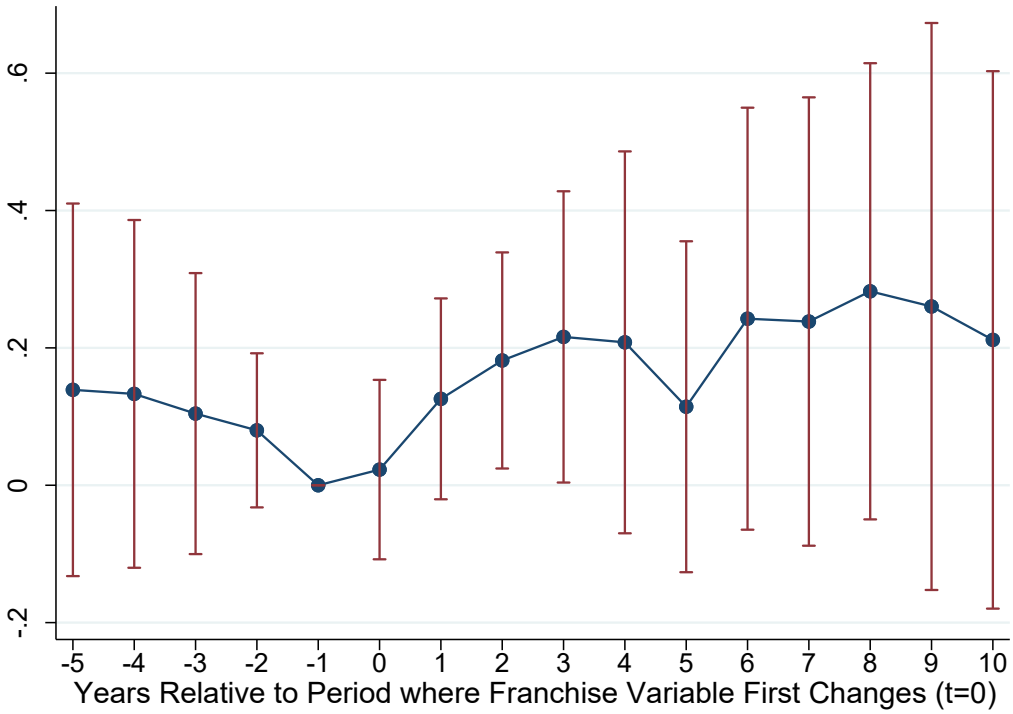
Figure A3: Effects of Franchise Variable on Government Bond Yields, Emerging Economies



Source: Authors' calculation.

Notes: The horizontal axis denotes the years relative to the period when the franchise variable changes. The vertical axis reports the estimated effects of the franchise variable on the government bond yields and placebo estimates, using the data of Dasgupta and Ziblatt (2022) and imputation method of Liu et al. (2024). Standard errors are clustered at the country level, while 95% confidence intervals are obtained from 200 bootstraps. The bar plot at the bottom of the figure denotes the number of treated units at the given period relative to the onset of the treatment.

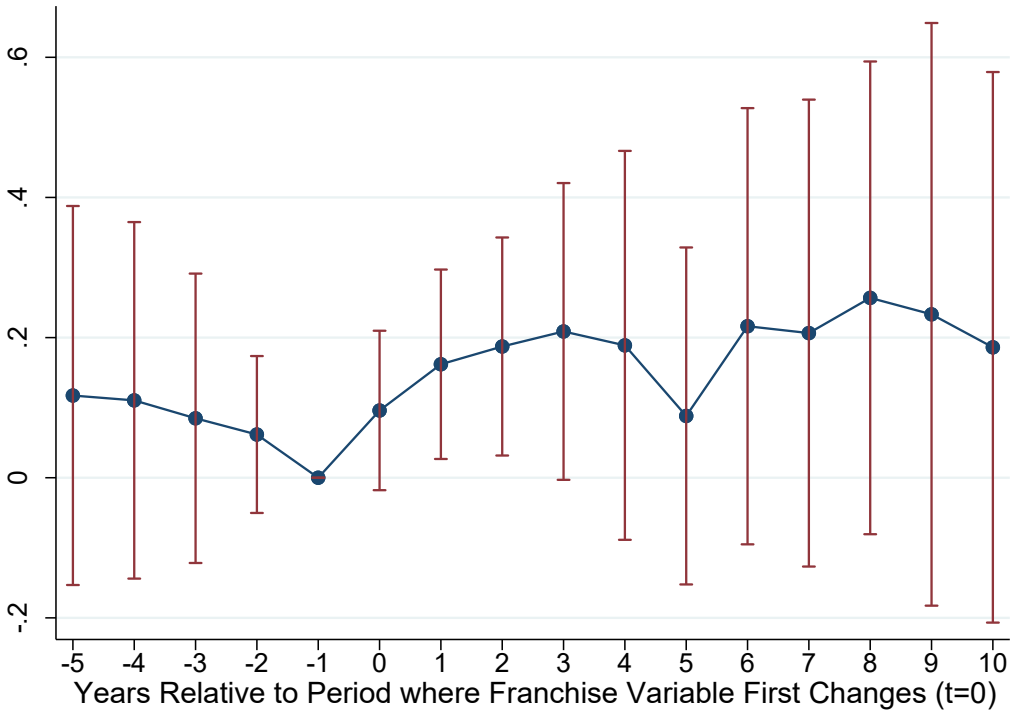
Figure A4: Effects of Franchise Variable on Government Bond Yields



Source: Authors' calculation.

Notes: The horizontal axis denotes the years relative to the period when the franchise variable first changes (either an extension or a contraction). The vertical axis reports the estimated effects of the franchise variable on the government bond yields and placebo estimates, using the data of Dasgupta and Ziblatt (2022) and DID estimation method of De Chaisemartin and D'Haultfoeuille (2020; 2024). Standard errors are clustered at the country level, while 95% confidence intervals, obtained from 200 bootstraps, appear in red. When constructing the franchise variable, we assume a franchise contraction is twice as important as a franchise extension.

Figure A5: Effects of Franchise Variable on Government Bond Yields



Source: Authors' calculation.

Notes: The horizontal axis denotes the years relative to the period when the franchise variable first changes (either an extension or a contraction). The vertical axis reports the estimated effects of the franchise variable on the government bond yields and placebo estimates, using the data of Dasgupta and Ziblatt (2022) and DID estimation method of De Chaisemartin and D'Haultfoeuille (2020; 2024). Standard errors are clustered at the country level, while 95% confidence intervals, obtained from 200 bootstraps, appear in red. To allow for diminishing effects, we let a franchise extension (or contraction) be lower by half for the first three concessive periods following a franchise change.

Figure A6: Effects of Franchise Variable on Government Bond Yields