The Changing Relationship between Gender and Corruption*

Word Count: 6404

Justin Esarey[†1] and Maya Dalton[2]

[1]Wake Forest University, Department of Politics and International Affairs
[2]Pennsylvania State University, Department of Political Science

March 4, 2023

Abstract

Greater representation of women in government is strongly associated with less corruption in that government among democracies. In this chapter, we show that the empirical association between women's representation and corruption has gotten smaller over the last forty years. We probe the etiology of this decline using instrumental variables analysis, allowing us to eliminate simultaneity and confounding as barriers to causal inference. Our results indicate that the negative effect of corruption on women's representation has grown weaker during this period, but the causal impact of increased women's representation on reducing corruption remained relatively stable. We theorize that corruption networks might be less effective now than they once were at protecting their operations via excluding women from public office because of increased women's representation worldwide.

*We gratefully acknowledge the financial support for this project provided by the Wake Forest University Undergraduate Research and Creative Activities Center (URECA) and the WFU Department of Politics and International Affairs.

†Corresponding author: justin@justinesarey.com.

Scholars have known that greater representation of women in government strongly associates with less corruption in that government since Dollar, Fisman and Gatti (2001) and Swamy et al. (2001) first reported the finding at the turn of the twenty-first century. Later research established that the relationship was limited to democracies, causal, and bi-directional: more women in government reduces corruption but greater corruption in government also reduces women's representation (Jha and Sarangi, 2018; Paweenawat, 2018; Esarey and Schwindt-Bayer, 2019). The policy implications of this finding are exciting because efforts to make government more representative and to fight corruption in that government could be mutually-reinforcing.

In this chapter, we report a new and concerning development: the empirical association between women's representation in the legislature and corruption among democratic countries has steadily gotten smaller over the last forty years. Why is the relationship between women's representation and corruption shrinking? There are many competing explanations for why this relationship exists (Esarey and Valdes, 2023), and potential explanations for why the relationship is diminishing vary accordingly. For example, if the reason why women's representation in a country and corruption in that country are negatively associated is because women are intrinsically more resistant to corruption than men due to socialization into different values or gender roles (Sung, 2003; Wängnerud, 2020), it could mean that women's values are changing as society changes. If women avoid corruption because it is a risky activity and women are more risk-averse than men (Eckel and Grossman, 2008; Barnes and Beaulieu, 2018; Esarey and Schwindt-Bayer, 2019), perhaps the empirical association is declining because corruption is becoming less risky. If corrupt countries have lower women's representation because corruption networks exclude outsiders (including women) to minimize their exposure to law enforcement (Goetz, 2007; Sundström and Wängnerud, 2014; Bjarnegård, 2013), the shrinking association between women's representation and corruption could signal that corrupt officials are adapting to enable their continued activities.

Regardless of the explanation, the trend is of critical importance to scholars and policy-makers because it raises the disappointing possibility that increasing diversity and fighting corruption are no longer synergistic activities.

As noted above, the relationship between women's representation and corruption has been firmly established as bi-directional; causal influence flows both ways. Therefore, to explore causal explanations for why the empirical relationship between these two variables has shrunk, we must separately identify and study the effect of women's representation on corruption as well as the effect of corruption on women's representation. Using instrumental variables allows us to do so, presuming that the exclusion restriction and a few other basic structural assumptions are met (Morgan and Winship, 2014, pp. 296-299). We use six different instruments for each model to ensure that our results are more robust to this assumption and not sensitive to any particular choice of instrument. We find that the effect of women's representation on corruption has remained relatively stable over the last forty years. However, we also find evidence that the effect of corruption on women's representation has become weaker during this time frame. While our findings are basically consistent across different measures of corruption, there are some discrepancies that might indicate disagreement among those measures in how much corruption changes within countries year over year (Dalton and Esarey, 2021). We conclude that future research into this phenomenon should focus on exploring theoretical mechanisms by which corrupt institutions are less willing (or able) to exclude women from participating in governance today compared to in the past.

Data

Our data set draws from two sources: the Quality of Government data set (QoG, Teorell et al., 2021) and the Varieties of Democracy data set (V-Dem, Coppedge et al., 2021*b*). Table

1 depicts the summary statistics for the variables we use in this chapter's analysis. Although our replication data file includes data from 199 countries, we only study 118 democratic-leaning countries; we operationalize "democratic-leaning" country years as those whose value for the V-Dem Electoral Democracy index (or *polyarchy*) is higher than the midpoint (0.5) for the studied year. Our base data file spans the years 1980 to 2020, but not all variables are available for every year (particularly for certain instruments) and so some models are estimated on a more time-restricted sample.

Table 1: **Summary Statistics**

	N	mean	min year	max year	# countries
V-Dem Corruption	3148	32.295	1980	2020	118
WBGI Corruption	1927	47.971	1996	2019	116
BCI Corruption	2579	42.535	1984	2017	115
TI CPI Corruption	2072	48.596	1995	2020	116
Wom. in Parliament	3139	16.835	1980	2020	118
Wom. Labor Force %	2663	42.442	1990	2020	116
Wom., Business, & Law Index	3000	73.417	1980	2019	117
Gender Eq. Civil Liberties	3120	1.816	1980	2020	118
Fertility Rate	2940	2.585	1980	2018	117
Civil Society Org. Wom. Particip.	3148	1.732	1980	2020	118
Women's Secondary School %	2227	86.745	1980	2019	107
Impartial Public Admin.	3148	1.381	1980	2020	118
Transparent Laws & Enf.	3148	1.75	1980	2020	118
Media Corruption	3148	1.527	1980	2020	118
Gov't Media Censorship	3148	1.793	1980	2020	118
Political Stability	1927	0.267	1996	2019	116
Ethnolinguistic Frac. (1985)	2531	0.413	1985	2020	97

Our core measure of corruption is the V-Dem political corruption index (Coppedge et al., 2021*a*, p. 296). The V-Dem project constructs 470 democracy measures created from subjective, expert-led assessments that score how well governments are performing relating to democratic ideals. One of their products is a measure of overall corruption in a country-year. This composite measure is created by averaging four other sub-indicators of corruption: (i) the public sector corruption index, (ii) the executive corruption index, (iii) a measure of legislative corruption, and (iv) a measure of judicial corruption. These four measures are in turn created from expert assessments of corruption in the corresponding government sector. The resulting composite measure of overall corruption is available from 1980 to 2020.[1]

We chose to focus our analysis on the V-Dem corruption measure because:

1. it is available for the full time span we study;
2. it is based on the assessment of country experts with detailed knowledge;
3. it is available alongside the V-Dem high-level measure of polyarchic democracy, which we use to focus our analysis on only democratic-leaning countries; and
4. it comprehensively covers all types of government corruption (including both petty and grand corruption).

However, it is well-known that the measurement of corruption is difficult and different measures can disagree on their assessment of the same observations (for an overview of these issues, see Andersson and Heywood, 2009). To ensure that our findings are not overly reliant on a particular measure, we repeat our analyses with three alternatives: the Bayesian Corruption Index (or BCI, see Standaert, 2015), Transparency International's Corruption Perceptions Index (or CPI, see Transparency International, 2020), and the World Bank's Control of Corruption governance indicator (or WBGI, see The World Bank Group, 2020). Appendices A and B offer detailed descriptions for each of these measures and information about their availability over time. We re-scaled all the corruption measures to range from 0 (least corrupt) to 100 (most corrupt) for ease of interpretation and comparison.

Our key independent variable is the percentage of female representatives in the sole or lower chamber of the legislature (Coppedge et al., 2021*a*, p. 156). This variable was originally

[1]This paragraph about the V-Dem project and its corruption measure is paraphrased from Coppedge et al. (2021*a*) and similar to text in Dalton and Esarey (2021), a paper we wrote contemporaneously with this chapter.

collected by Paxton, Green and Hughes (2008) and updated using information from the Inter-Parliamentary Union (Inter-Parliamentary Union, 2013). The average proportion of women in parliament in our sample rises gradually over the 41-year period it covers, from an initial value of about 7% in 1980 to just over 26% in 2020.

The Shrinking Relationship between Women's Representation and Corruption

Figure 1 illustrates the relationship between corruption and women in parliament for each year between 1980 and 2020 in our sample of democratic-leaning countries. Each gray dot in the plot is the bivariate slope coefficient from a linear regression using country-level data from the year indicated on the x-axis.[2] In each regression, the V-Dem corruption score is the dependent variable and the percentage of women in the lower house of parliament is the independent variable. The gray barred lines indicate the 95% confidence interval for each coefficient estimate. The black solid line and the dashed lines around it are an estimate of the linear trend of coefficients over time and a bootstrapped 95% confidence interval for that trend.[3] The inset panel underneath each plot shows the slope of the time trend and whether that trend is statistically significant.

For all four measures of corruption, there is a strong, negative, and statistically significant bivariate relationship between corruption and the percentage of women in parliament in the earliest time periods studied. For example, when using the V-Dem corruption index as our

[2]Although each coefficient depends only on data from its own year and includes no control variables, the models are run as part of a joint linear model saturated with year dummy variables and interactions between each year dummy and the percentage of women in parliament. A joint model allows the estimation of the covariance in coefficient estimates across years. This procedure facilitates a more accurate draw of bootstrap replicates of those coefficients for each year to calculate 95% confidence intervals for the trend estimates.

[3]The bootstrapping procedure involves drawing coefficients for each year from the limiting normal distribution of the model using the variance-covariance matrix of the joint model, then estimating the linear trend of coefficient change over time using a regression on each bootstrap replicate. The 2.5th and 97.5th percentile bootstrap estimates for that trend at each year in the graph form the limits of the 95% confidence interval.

dependent variable (in the lower left-hand panel of Figure 1), every one percentage point increase in women's representation in the lower house of the legislature is associated with about a 1.5 point reduction in V-Dem corruption score.[4] However, as time progresses, this bivariate relationship gets substantially closer to zero for all four measures of corruption. For the V-Dem corruption measure, the association between women in parliament and corruption is about a third smaller in the late 2010s compared to the early 1980s. For our other corruption measures, the reduction in magnitude of this relationship is even more substantial.

As noted in the introduction, there are many possible theoretical explanations for this shrinkage over time. But one possibility we *can* exclude is that the gradual atrophy of the women-corruption relationship we see in Figure 1 is explained by newly democratizing countries entering the sample over time (e.g., after the collapse of the Warsaw Pact in the early 1990s).[5] When we repeated our analysis for only those countries classified as democracies for the full 41 years covered by our data set, we still found that the bivariate relationship between women in parliament and corruption was shrinking over time for this subset of countries. The results of this analysis are provided in Appendix D.

Instrumental Variables

As we also noted in the introduction, theoretically explaining *why* corruption is less strongly associated with women's representation now than in the past requires separately identifying the causal impact of each on the other. Each of these potential explanations is, in essence, a story about why one mechanism that makes women's representation cause less corruption (or a mechanism that makes corruption cause less women's representation) is weaker now than it was before. We must therefore be able to examine each causal relationship separately to determine which (if any) possible explanations are consistent with the evidence. Given the

[4] See Appendix C for exact values of the estimates of the trend over time and its 95% confidence interval.
[5] We thank an anonymous reviewer for suggesting this possibility to us.

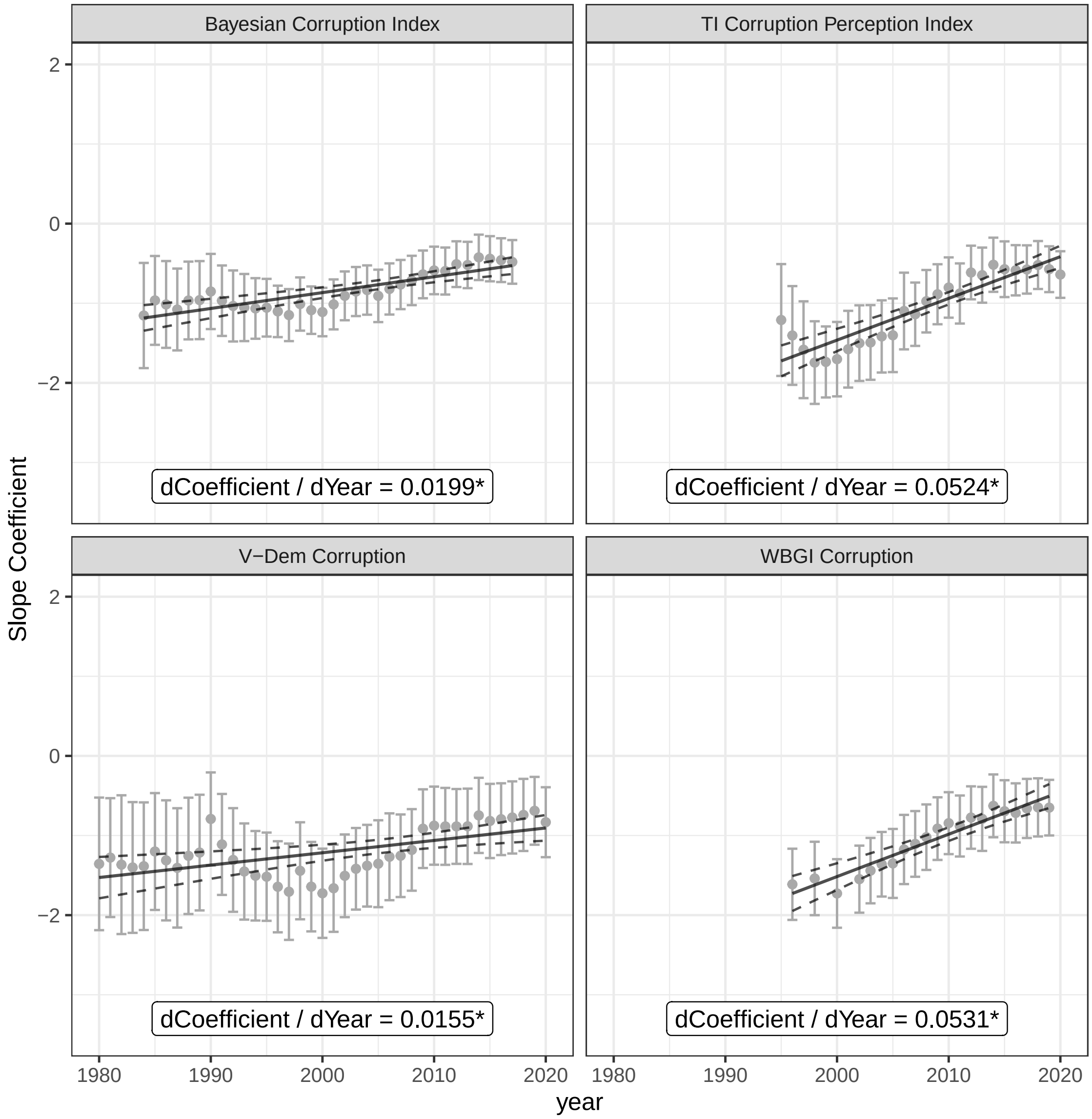


Figure 1: **The changing relationship between gender and corruption among democratic-leaning countries.** Each panel shows the association between a measure of corruption (named at the top of each panel, the dependent variable in a linear regression) and the percentage of women in the lower house of the legislature (the independent variable in the regression). Each gray dot reports a bivariate linear regression slope coefficient using data from the year on the x-axis. The coefficient is shown on the y-axis; 95% confidence intervals for each coefficient are represented by gray barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dCoefficient/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

observational nature of our data, we elect to employ instrumental variables analysis using two-stage least-squares regression (2SLS) to achieve this goal.

For 2SLS to be valid, each instrumental variable (IV) must cause changes in the independent variable but not in the dependent variable *except* through its effect on the independent variable (Morgan and Winship, 2014, pp. 297-298); this assumption is called the "exclusion restriction" (Angrist and Pischke, 2009, pp. 153-155).[6] Unfortunately, this assumption is not directly testable outside of an experimental context. For each instrument, we offer a rationale for why we believe the exclusion restriction is satisfied. But we also recognize that these rationales are debatable and could be wrong. Therefore, to mitigate the possibility that we violate this exclusion restriction, we use six different IVs for our analysis of the effect of women's representation on corruption and six more IVs for our analysis of the effect of corruption on women's representation. Our reasoning is that we can be reasonably certain that our results are insensitive to violation of the exclusion restriction *if all six instruments lead to similar results* because it is *unlikely that all six possibilities violate the exclusion restriction in the same way*.

Instruments for the Percentage of Women in the Legislature

We use the following[7] instrumental variables (IVs) in concert with two-stage least-squares regression (2SLS) to isolate the effect of the percentage of women in the lower (or sole) house of the legislature on corruption:

[6]Because our independent variables and instruments are continuous, we must make two additional assumptions to justify the use of the 2SLS model. First, we must assume that there is a non-zero linear association between the instrument and the independent variable. Second, we must assume that a linear model for the effect of the independent variable on the dependent variable is appropriate (e.g., the causal impact of women in parliament on corruption is linear). See Morgan and Winship (2014), p. 298, for more details.

[7]We also investigated using the percentage of female journalists (Coppedge et al., 2021*a*, p. 201) as an instrument for the percentage of women in the lower house of parliament; results are shown in Appendix E. These estimates were highly inconsistent with the literature and our other findings. We speculate that this instrument might violate the exclusion restriction; e.g., corruption might influence whether media positions are open to women.

1. **Female secondary school enrollment.** From the QoG data set, this variable measures "Total female enrollment in secondary education, regardless of age, expressed as a percentage of the female population of official secondary education age" (Teorell et al., 2021, p. 578). Greater secondary school enrollment of women provides a greater pool of potential candidates for office, as explained by Esarey and Schwindt-Bayer (2019) who also use this instrument. We expect this instrument to satisfy the exclusion restriction because women's secondary school enrollment is conceptually difficult to directly connect to the integrity of government officials except through its effect on women's representation in government. We believe that more women in high school would not directly change an official's incentives to accept bribes or appropriate public goods, nor would it directly impact the degree to which they find corruption ethically acceptable.

2. **Women's participation in the labor force.** From the QoG data set, this variable measures "female labor force as a percentage of the total" (Teorell et al., 2021, p. 593). As with secondary school enrollment, this instrument is also used by Esarey and Schwindt-Bayer (2019) as a measure of the pool of suitable and interested female candidates for office. We think this instrument satisfies the exclusion restriction because we see no way that women's labor force participation could directly change corruption except through its effect on women's representation; like secondary school enrollment, it does not change the intrinsic or extrinsic motivations to engage in corruption.

3. **Women, business, and the law index.** From the QoG data set, this variable "measures how laws and regulations affect women's economic opportunity" (Teorell et al., 2021, pp. 624-625) on a 1-100 scale, 100 being the highest value. The components of the index are scores on "Going Places, Starting a Job, Getting Paid, Getting Married, Having Children, Running a Business, Managing Assets and Getting a Pension." With a

greater opportunity to participate in the economy, women will presumably have greater access to the resources, connections, and experience necessary to successfully run for office. We also do *not* believe that greater economic opportunities for women would directly change the incentives for or moral barriers to government officials behaving corruptly.

4. **Gender equality in respect for civil liberties.** From the V-Dem data set, this variable measures whether "women enjoy the same level of civil liberties as men" (Coppedge et al., 2021*a*, p. 211) on a 0-4 scale with 0 being the highest degree of inequality in civil liberties. We believe that having the same access to the public sphere as men is necessary, if not sufficient, for women to attain office (and thereby reduce corruption); however, we do not think that the protection of civil liberties for women alone is sufficient to make government officials more or less corrupt.

5. **Women's participation in civil society organizations.** From the V-Dem data set, this variable measures whether "women [are] prevented from participating in civil society organizations" (Coppedge et al., 2021*a*, p. 195) on a 0-4 scale, with 4 being the greatest level of participation. As for the equal civil liberties instrument, this variable measures women's access to the public sphere which we believe is necessary for women to attain political office but insufficient to reduce corruption on its own.

6. **Fertility rate.** From the V-Dem data set, this variable measures "the mean number of children that would be born to a woman over her lifetime if (a) she were to experience the current age-specific fertility rates through her lifetime, and (b) she were to survive through the end of her reproductive life" (Coppedge et al., 2021*a*, p. 360). High fertility rates represent a barrier to women's representation in that childbearing is time-consuming and can reduce women's control over their own lives and careers. But we do not believe that higher (or lower) birth rates on their own have any connection

to policymakers' incentives to engage in corruption nor their moral disapproval of it.

Instruments for Corruption

To isolate the effect of corruption on women's representation in the legislature, we use the following IVs for corruption:

1. **Ethnolinguistic fractionalization in the year 1985.** From the QoG data set, the ELF variable measures the "probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group" (Teorell et al., 2021, p. 482). This variable increases corruption by decreasing cooperation among ethnic groups competing for government resources. It is used as an instrument for corruption by Mauro (1995) and Esarey and Schwindt-Bayer (2019). We argue that it satisfies the exclusion restriction because we do not believe there is a credible mechanism by which greater ethnic or racial diversity in a country would change the degree to which women participate in governance. Feminist policies have sometimes come long after efforts to achieve equal rights for racial and ethnic groups but have also co-existed with extensive racial discrimination.

2. **Government media censorship.** From the V-Dem data set, this variable measures whether "the government directly or indirectly attempt[s] to censor the print or broadcast media" (Coppedge et al., 2021*a*, p. 199) on a 0-4 scale, 0 being the highest level of censorship. A free press is strongly linked to decreased corruption because it can hold officials accountable and coordinate citizens and officials on low-corruption behavior (Stapenhurst, 2000; Brunetti and Weder, 2003). We believe it satisfies the exclusion restriction because we presume that greater government censorship would have an ambiguous effect on women's representation depending on the political agenda of the government imposing the censorship.

3. **Media corruption.** From the V-Dem data set, this variable measures whether "journalists, publishers, or broadcasters accept payments in exchange for altering news coverage" (Coppedge et al., 2021*a*, p. 203) on a 0-4 scale with 0 being the highest level of corruption. As with censorship, this variable measures the degree to which the media holds the government accountable for corruption. And, as with censorship, we do not have a theoretical reason to expect that the media's willingness to accept bribes would consistently help or hinder the cause of women who seek to serve in the legislature.

4. **Impartial public administration.** From the V-Dem data set, this variable measures "the extent to which public officials generally abide by the law and treat like cases alike, or conversely, the extent to which public administration is characterized by arbitrariness and biases (i.e., nepotism, cronyism, or discrimination)" (Coppedge et al., 2021*a*, pp. 175-176) on a 0-4 scale with 0 being the lowest level of impartiality. This is a measure of the rule of law, which we believe is necessary but not sufficient for low corruption (Uslaner, 2008). We also believe that rule of law is neither directly nor indirectly implicated in women's representation, as gender discrimination can and is often written into the law itself (and measures to balance gender representation in, e.g., employment are sometimes undertaken although contrary to the letter of the law).

5. **Transparent laws and enforcement.** From the V-Dem data set, this variable measures whether "laws of the land [are] clear, well-publicized, coherent (consistent with each other), relatively stable from year to year, and enforced in a predictable manner" (Coppedge et al., 2021*a*, p. 175) on a 0-4 scale with 0 being the lowest level of transparency and predictability. As with impartial administration, we believe this second measure of rule of law is necessary but not sufficient for low corruption in government. We also believe that laws oppressing women can be enforced transparently or not, just as laws aiding women can be enforced consistently or not; therefore we expect no

violation of the exclusion restriction.

IV/2SLS results

Figure 2 shows our 2SLS estimates of the causal impact of women's representation on corruption for every year between 1980 and 2020 using the V-Dem Political Corruption index as the dependent variable. Each of the six panels uses a different instrumental variable indicated at the top of the panel. Every gray dot in a panel is the estimated marginal effect (ME) of a 1 percentage point increase in women's share of the lower house of parliament on corruption score for the year indicated on the x-axis. The gray barred lines are 95% confidence intervals around that estimate. The black solid lines are the estimated linear time trend for the size of the marginal effects, with the black dashed lines showing 95% confidence intervals around this estimate. The inset at the bottom of each panel (labeled dME/dYear) shows the slope of the time trend. Finally, the top of the panel shows the averaged time trend across the six different instruments, with bootstrapped 90% confidence intervals.[8] F-statistics for the first stage of these regressions are reported in Appendix F; most are over the threshold of 10 recommended by Staiger and Stock (1997) with the notable exception of the fertility rate and labor force participation instruments which over closer to 5-8 over the span of the data.

For all six instrumental variables, an increase of 1 percentage point in women's share of the legislature is estimated to cause somewhere between a 2 to 5-point decrease in corruption score (where corruption is measured on a 100-point scale). This relationship is nearly always

[8] 10,000 coefficient values from the asymptotically normal distribution of the slope of each trend estimate are drawn. For each draw, the six estimates are averaged. The 90% CI estimate for the trend is calculated using the 5th and 95th percentiles of the bootstrapped average. This procedure assumes that trend estimates for the six instruments are independently and identically distributed—that is, treating each trend estimate as a draw from a distribution where systematic error associated with each instrumental variable's estimate of the trend is considered random. This procedure is similar in spirit and justification to one suggested by Ibragimov and Muller (2010) for cluster-robust inference; there, they treat each cluster-specific estimate of a target quantity as an independent and identical draw from a normal density that can be used to estimate a grand mean and variance for that density.

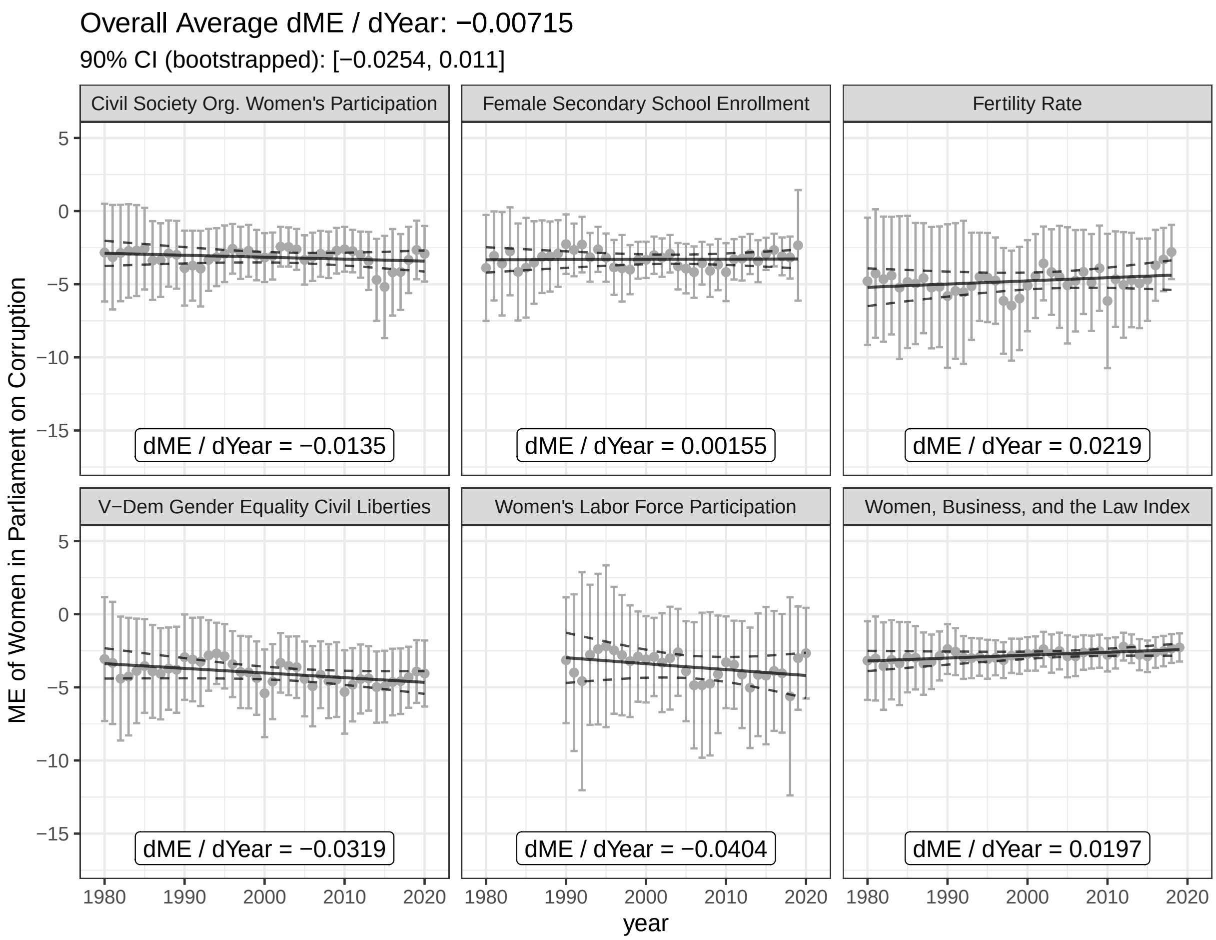


Figure 2: **The causal impact of women's representation on corruption in democratic-leaning countries over time.** Each panel studies the causal impact of the proportion of women in the lower house of the legislature on the V-Dem Political Corruption Index using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

statistically significant (i.e., whenever the gray barred 95% confidence interval lines do not overlap zero in the plot). In general, this relationship does not change appreciably over time: the change in ME is substantively small and not consistently in the same direction depending on the instrument chosen to estimate the causal relationship. The average trend across all six instruments is negative—that is, on average the effect of an increase in women's representation in parliament on corruption is growing *stronger* over time—but not statistically distinguishable from zero at conventional levels.

Results for our alternative measures of corruption are shown in Appendix Figures G through I. For the WBGI and TI CPI measures, the trend also has an inconsistent sign and the overall average effect across all six instruments is statistically insignificant at conventional levels. But for the BCI measure, while the sign of the trend is inconsistent across the instruments, for four of these instruments the marginal effect of women in parliament on corruption is getting smaller over time at a statistically significant rate ($\alpha = 0.05$, two-tailed). In addition, the overall average marginal effect of women in parliament on the BCI is shrinking by 0.0232 points per year, a relationship that is statistically significant at the $\alpha = 0.1$ level (two-tailed). We speculate that the discordant result produced by the BCI could indicate that this measure includes (or excludes) features of corruption that are absent (or present, respectively) in the V-Dem, TI CPI, and WBGI measures (Dalton and Esarey, 2021).

On the other hand, Figure 3 shows that the effect of corruption on the share of women in the legislature is getting substantially closer to zero over time. All six instruments report that the marginal effect of corruption on women's representation is getting closer to zero over time, with two of these estimates statistically significant at the $\alpha = 0.05$ level (two-tailed). On average across the six instruments, the marginal effect shrinks by 0.00233 points per year or over 0.09 points over 40 years; this represents a roughly 30-35% decline in the strength of this effect over the duration of the panel that is statistically significant ($\alpha = 0.1$, two-tailed).

First-stage F-statistics for these models, shown in Appendix J, are generally well above the threshold of 10 set by Staiger and Stock (1997) with the exception of a few time periods for the ELF and media censorship instruments.

Models using alternative measures of corruption (reported in Appendix Figures K through M) are broadly consistent with the findings using the V-Dem corruption measure, although the result using the TI CPI corruption measure is notably different. For example, the overall average marginal effect estimate from using the WBGI measure of corruption indicate a statistically significant ($\alpha = 0.1$, two-tailed) shrinkage of the effect of corruption on women in parliament over time, amounting to a 0.00178 point per year decline in the marginal effect. Models using the Bayesian Corruption Index return a trend that is similar in magnitude, but statistically insignificant at conventional levels. However, models using the TI Corruption Perception Index report a trend that is extremely close to zero (specifically an increase of 0.000000881 per year in the magnitude of the marginal effect).

Conclusion

What does it mean that the empirical association between corruption and women in government has gotten smaller over the past 40 years? Our instrumental variables analysis allows us to make several inferences. First, we can tentatively conclude that **women are not becoming intrinsically less resistant to corruption over time**. If that were happening (and if women's different value commitments compared to men explain their different behavior), we should expect to see the causal impact of women in government on corruption to be shrinking over time as they become more well-represented in governance; we find no such evidence. Second, and for the same reason, we may conclude that **corruption is not becoming less risky** (if women avoid corruption because it is a risky behavior).

At the same time, we find some evidence that corruption's impact on the representation

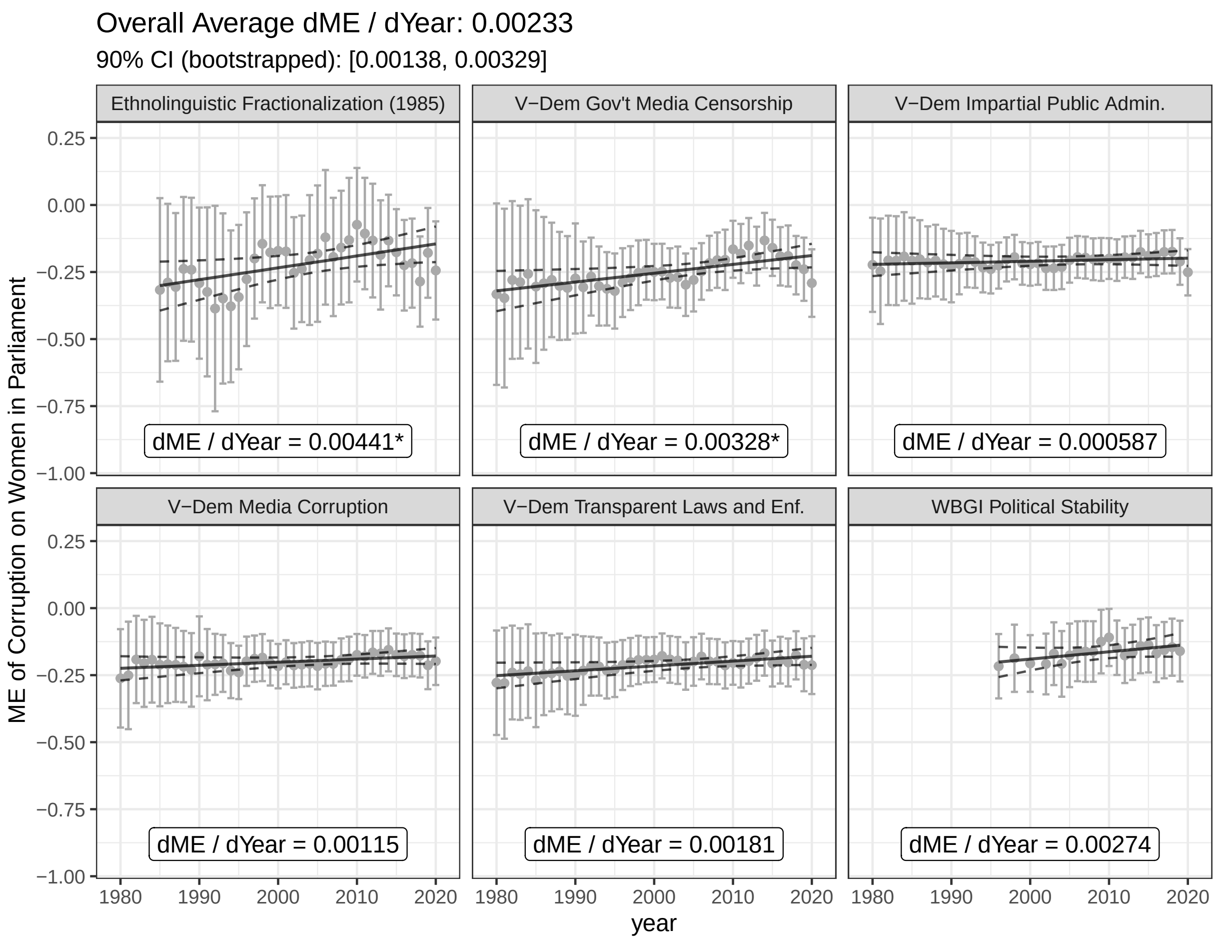


Figure 3: **The causal impact of corruption on women's representation in democratic-leaning countries over time.** Each panel studies the causal impact of the V-Dem Political Corruption Index on the proportion of women in the lower house of the legislature using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

of women in the legislature has gotten smaller over time. One possible explanation is that, by reducing corruption in government, **increased women's representation over the last 40 years has made corruption networks sparser and less effective**. If these networks are less effective, they will not just be less capable of exploiting public office for private gain. In addition, they will *also* be less effective at excluding women from public office to protect their corrupt interests. The strength of the empirical relationship between corruption and women in parliament could get weaker if one of the causal mechanisms underlying that association gets weaker.

That explanation is consistent with the understanding common to the existing literature that corruption is a systemic phenomenon, not an individual one (Andvig and Moene, 1990; Aidt, 2003). While some people may be more resistant to corruption than others, the extent of state-wide corruption is not primarily a function of the moral fiber of its people but the degree to which the population as a whole has coordinated on common expectations for behavior. Increasing the representation of women in government reduces corruption directly, but it also disrupts the expectation that bribery, graft, and patronage are normal and unpunished parts of statecraft. Disrupting that expectation makes it more difficult for networks of corrupt officials to influence policy to protect their activities.

Of course, there are other possible explanations for our findings. For example, earlier in the chapter we observed that the average proportion of women in legislatures worldwide has grown substantially over the last 40 years. Because it is more common for women to be involved in governance, **it is possible that women are now less likely to be perceived as outsiders by corruption networks than they were in the 1980s and 1990s**. Concordantly, these corruption networks may exert less effort in trying to exclude women from office to protect themselves from exposure. If true, we would still expect to see a weakening of the causal impact of corruption on women's representation while the effect of women's representation on corruption remained stable. There is **also the possibility that differences among corrup-**

tion measures, particularly differences for within-country changes in corruption over time, are obscuring our ability to assign firm causal explanations for the declining correlation we clearly see in Figure 1 (Dalton and Esarey, 2021).

We believe that the next step in this research program is to generate and empirically test these (and other) explanations for why the effect of corruption on women's representation is weakening over time. As one example, we think it would be productive to study how the marginal effect of corruption on women's representation varies as a function of preexisting corruption in a state. If our preferred theoretical explanation is correct, we should find a strong, negative causal relationship between corruption and participation by women in government among states that have high preexisting corruption but a smaller (or possibly non-existent) relationship among relatively clean states. Such a finding would suggest that increases in women's representation over time could push states into a self-reinforcing equilibrium of low corruption and high women's representation.

References

Aidt, Toke S. 2003. "Economic Analysis of Corruption: A Survey." *The Economic Journal* 113(491):F632–F652. URL: https://doi.org/10.1046/j.0013-0133.2003.00171.x.

Andersson, Staffan and Paul M. Heywood. 2009. "The politics of perception: use and abuse of Transparency International's approach to measuring corruption." *Political Studies* 57(4):746–767.

Andvig, Jens C. and Karl O. Moene. 1990. "How corruption may corrupt." *Journal of Economic Behavior & Organization* 13(1):63–76. URL: https://doi.org/10.1016/0167-2681(90)90053-G.

Angrist, Joshua D. and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. 1 edition ed. Princeton: Princeton University Press.

Barnes, Tiffany D. and Emily Beaulieu. 2018. "Women Politicians, Institutions, and Perceptions of Corruption." *Comparative Political Studies* 52(1):134–167.

Bjarnegård, Elin. 2013. *Gender, Informal Institutions and Political Recruitment: Explaining Male Dominance in Parliamentary Representation*. Basingstoke, UK: Palgrave Macmillan.

Brunetti, Aymo and Beatrice Weder. 2003. "A free press is bad news for corruption." *Journal of Public Economics* 87:1801–1824.

Coppedge, Michael, John Gerring, Carl Henrik Knutsen et al. 2021*a*. *V-Dem Codebook v11.1*. Varieties of Democracy (V-Dem) Project. URL: https://www.v-dem.net/en/data/data/v-dem-dataset-v111/.

Coppedge, Michael, John Gerring, Carl Henrik Knutsen et al. 2021*b*. *V-Dem Dataset v11.1*. Varieties of Democracy (V-Dem) Project. URL: https://www.v-dem.net/en/data/data/v-dem-dataset-v111/.

Dalton, Maya and Justin Esarey. 2021. "Measuring Changes in Corruption over Time." Working Paper. URL: http://justinesarey.com/Corruption_Measurements___Fixed_Effects__Dalton___Esarey_.pdf accessed 8/9/2021.

Dollar, David, Raymond Fisman and Roberta Gatti. 2001. "Are women really the 'fairer' sex? Corruption and women in government." *Journal of Economic Behavior & Organization* 46(4):423–429.

Eckel, Catherine C. and Philip J. Grossman. 2008. Men, Women, and Risk Aversion: Experimental Evidence. In *Handbook of Experimental Economic Results*, ed. Charles Plott and Vernon Smith. Vol. 1 New York: Elsevier pp. 1061–1073.

Esarey, Justin and Leslie A. Schwindt-Bayer. 2019. "Estimating Causal Relationships Between Women's Representation in Government and Corruption." *Comparative Political Studies* 52(11):1713–1741.

Esarey, Justin and N. Valdes. 2023. *Revisiting Corruption: Emerging Issues*. Routledge chapter 10: The Past, Present, and Future of Research on Gender and Corruption, pp. 139–153.

Goetz, Anne Marie. 2007. "Political Cleaners: Women as the New Anti-Corruption." *Development and Change* 38(1):87–105.

Ibragimov, Rustam and Ulrich K. Muller. 2010. "t-Statistic Based Correlation and Heterogeneity Robust Inference." *Journal of Business & Economic Statistics* 28(4):453–468.

Inter-Parliamentary Union. 2013. *Historical data on women in national parliaments*. URL: https://data.ipu.org/historical-women.

Jha, Chandan Kumar and Sudipta Sarangi. 2018. "Women and corruption: What positions must they hold to make a difference?" *Journal of Economic Behavior & Organization* 151:219–233.

Mauro, Paolo. 1995. "Corruption and growth." *The Quarterly Journal of Economics* 110(3):681–712.

Morgan, Stephen L. and Christopher Winship. 2014. *Counterfactuals and Causal Inference: Methods and Principles for Social Research*. 2nd ed. Cambridge University Press.

Paweenawat, Sasiwimon W. 2018. "The gender-corruption nexus in Asia." *Asian-Pacific Economic Literature* 32(1):18–28.

Paxton, Pamela, Jennifer Green and Melanie M. Hughes. 2008. "Women in Parliament, 1945-2003: Cross-National Dataset." Inter-university Consortium for Political and Social Research [distributor].

Staiger, Douglas and James H. Stock. 1997. "Instrumental variables regression with weak instruments." *Econometrica* 65(3):557.

Standaert, Samuel. 2015. "Divining the level of corruption: A Bayesian state-space approach." *Journal of Comparative Economics* 43(3):782–803.

Stapenhurst, Rick. 2000. "The Media's Role in Curbing Corruption." World Bank Institute. URL: https://web.worldbank.org/archive/website01006/WEB/IMAGES/WBI37158.PDF accessed 8/9/2021.

Sundström, Aksel and Lena Wängnerud. 2014. "Corruption as an obstacle to women's political representation: Evidence from local councils in 18 European countries." *Party Politics* 22(3):364–369.

Sung, Hung-En. 2003. "Fairer sex or fairer system? Gender and corruption revisited." *Social Forces* 82:703–723.

Swamy, Anand, Stephen Knack, Young Lee and Omar Azfar. 2001. "Gender and corruption." *Journal of Development Economics* 64(1):25–55.

Teorell, Jan, Aksel Sundström, Sören Holmberg, Bo Rothstein, Natalia Alvarado Pachon and Cem Mert Dalli. 2021. "The Quality of Government Dataset, version Jan21." URL: http://www.qog.pol.gu.se.

The World Bank Group. 2020. "Worldwide Governance Indicators." URL: https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators.

Transparency International. 2020. "Corruption Perceptions Index Overview." URL: https://www.transparency.org/en/cpi/2020/index/nzl.

Uslaner, Eric M. 2008. *Corruption, Inequality, and the Rule of Law.* Cambridge University Press chapter 2: Corruption and the Inequality Trap, pp. 23–57.

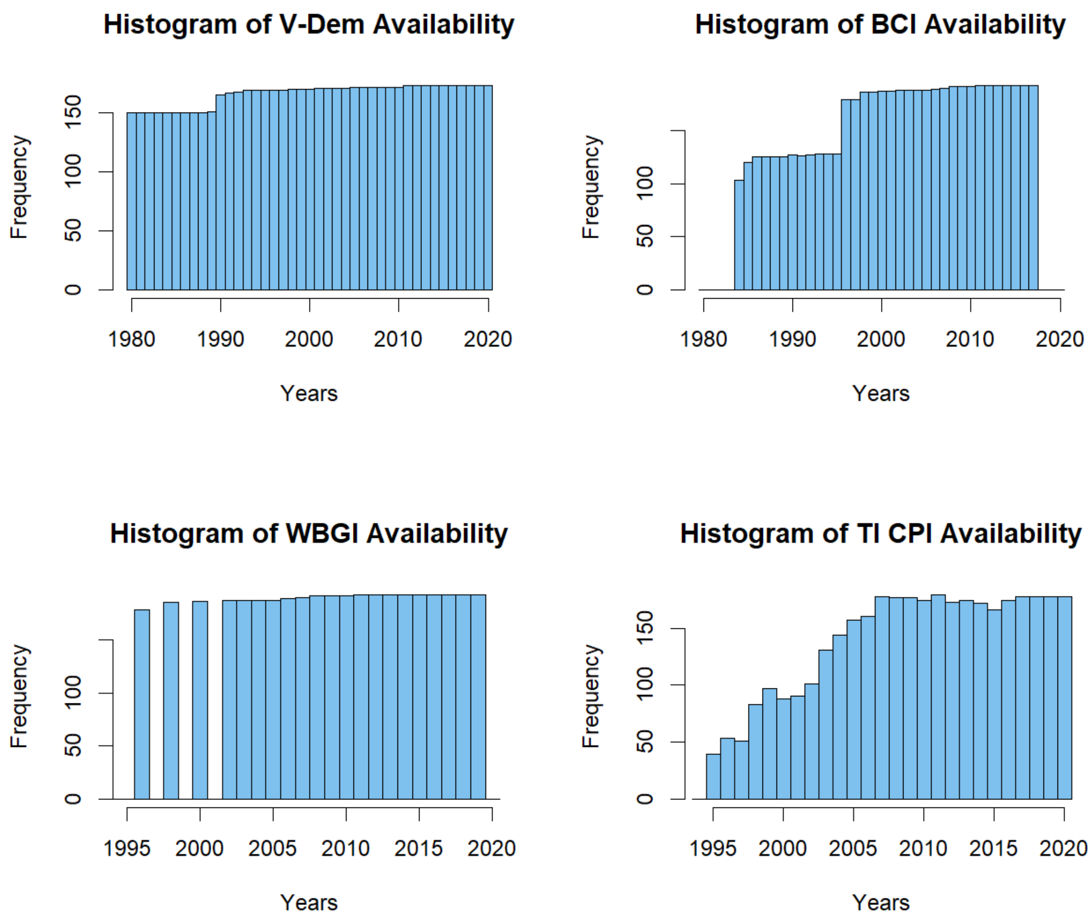
Wängnerud, Lena. 2020. "Why Women in Elected Assemblies Reduce Levels of Corruption: The Indirect Approach." Presented to the ECPR General Conference Online, August 24-28, 2020. URL: https://ecpr.eu/Filestore/paperproposal/20c5788c-29a0-4464-9834-76c888414f7a.pdf accessed 1/14/2021.

Online Appendices and Supporting Information

Contents

A Dependent Variables' Availability Over Time

Figure 4: **Availability of Corruption Measures by Year**



The availability of each of the four corruption measures during different time periods, ranging from 1980 to 2020.

B Descriptions of Frequently-Used Corruption Measures

The descriptions in this section are identical to descriptions in the online appendix of Dalton and Esarey (2021); that paper was written contemporaneously with this chapter and uses (some of) the same variables.

1. *Varieties of Democracies (V-Dem)*[9]

   The V-Dem project constructs 470 democracy measures created from subjective, expert-led assessments that score how well governments are performing relating to democratic ideals. One of their products is a measure of overall corruption in a country-year. This composite measure is created by averaging four other sub-indicators of corruption: (i) the public sector corruption index, (ii) the executive corruption index, (iii) a measure of legislative corruption, and (iv) a measure of judicial corruption. These four measures are in turn created from expert assessments of corruption in the corresponding government sector. The resulting composite measure of overall corruption ranges from 0 to 1, with 0 indicating low corruption, and is available from 1980 to 2020.

2. *Bayesian Corruption Index (BCI)*[10]

   The BCI is an index of perceived overall corruption (abuse of public power for private gain) within a country. It is constructed from 17 different surveys of countries' inhabitants, business executives, and governments. The BCI expands upon the number of sources used by the WBGI and CPI and is available over a larger time span than either of these two measures, but the measurement models used by the BCI and WBGI are broadly similar. Unlike the WBGI, the BCI's measurement model accounts for variation over time to avoid discrepancies in corruption measurements and prevent selection bias. The BCI ranges between 0 (least corrupt) to 100 (most corrupt) in countries and is available from 1984 onward.

3. *World Bank Group's Worldwide Governance Indicators (WBGI)*[11]

   The WBGI is created from 30 data sources from a variety of surveys, organizations, and governments. It utilizes an Unobserved Components Model (UCM) to construct six aggregated indicators of governance and estimate margins of error for each indicator. Of the six indicators, our interest is in their measure of *control of corruption*, defined by Kaufmann, Kraay and Mastruzzi (2010, p.4) as "the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests". The WBGI ranges from -3 (least control over corruption - highly corrupt) to 3 (most control over corruption - least corrupt) and is available for 1996, 1998, 2000, and 2002-2020.

4. *Transparency International's Corruption Perceptions Index (CPI)*[12]

[9] Information about the V-Dem has been paraphrased from Coppedge et al. (2021).
[10] Information about the BCI has been paraphrased from Standaert (2015).
[11] Information about the WBGI has been paraphrased from Kaufmann, Kraay and Mastruzzi (2010).
[12] Information about the CPI has been paraphrased from Transparency International (2016) and Transparency International (2020)

The CPI is an extremely influential indicator of corruption widely used by scholars and policymakers.[13] It is constructed by averaging at least three (but as many as thirteen) different corruption scores taken from perception-based surveys and assessments of corruption in a given country. The CPI targets corruption in the public sector within a country and compiles relevant data from multiple, independent sources. The CPI standardizes the corruption scores from these sources to the same scale, then averages the scores. Finally, the standard error and confidence interval for each country's CPI value is calculated to account for any variation in the sources. The CPI ranges from 0 (most corrupt) to 100 (least corrupt), and is available from 1995-2020.

[13] According to Galtung (2006, p. 106), "The impact of the CPI has been considerable. It has been credited as a factor that gave the issue of corruption 'greater international prominence' (Florini, 1998).... The CPI has facilitated a qualitative shift in journalistic writing and public discourse on corruption.... This interest and awareness of the CPI extends well beyond the business and financial press."

C Time trends for Relationship between Corruption and Women in Parliament

Table 2: **Time Trends for Figure 1**. The table contains the estimated trend in the relationship between gender and corruption over time along with its associated 95% confidence interval. Confidence intervals are calculated by using a regression on corruption with interaction terms between a dummy variable for each year and the percentage of women in parliament to estimate slope coefficients between gender and corruption for each year, simulating values for these coefficients from their (asymptotically) normal distribution, calculating the linear trend of coefficients over time using each simulation, and reporting the 2.5^{th} and 97.5^{th} percentiles for the simulated trends.

	time trend	2.5% CI	95.5% CI
WBGI Corruption	0.0530953	0.0390130	0.0673703
V-Dem Corruption	0.0155335	0.0059824	0.0251958
Bayesian Corruption Index	0.0198892	0.0127227	0.0271108
TI Corruption Perception Index	0.0524026	0.0404257	0.0641867

D The Relationship between Gender and Corruption among Countries Classified as Democratic-leaning over the Full Time Period

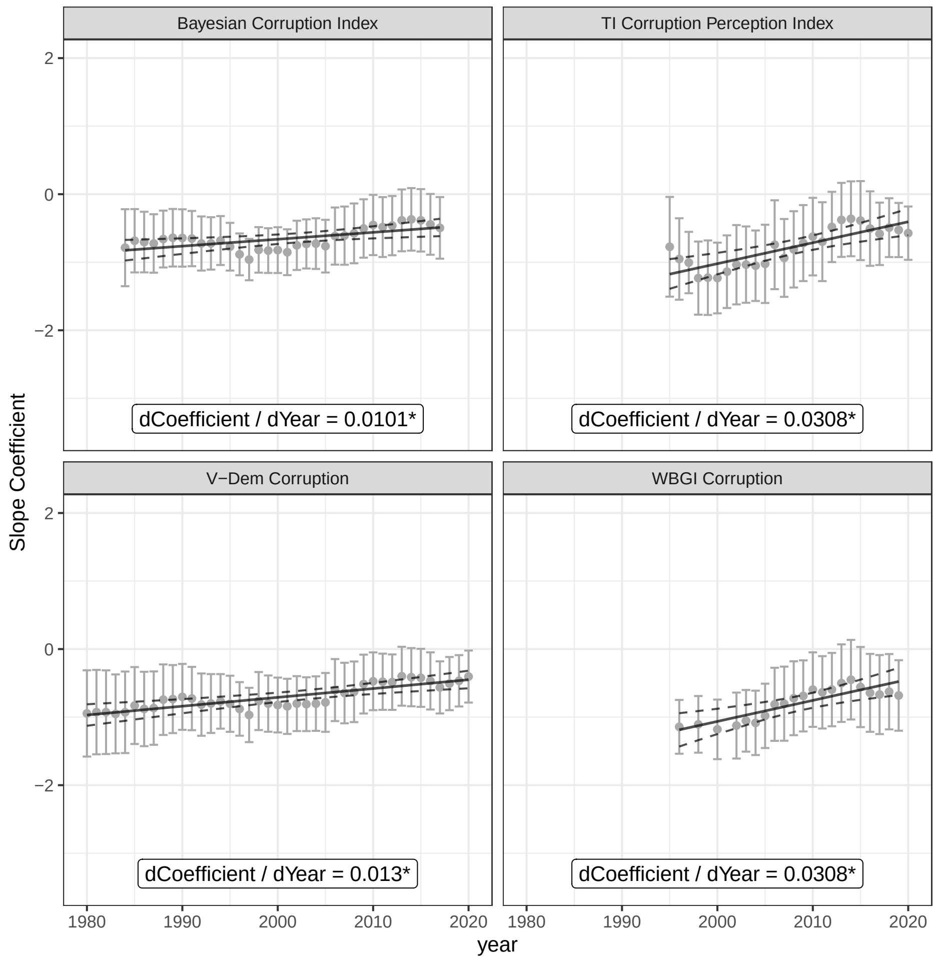


Figure 5: **The changing relationship between gender and corruption among countries classified as democratic-leaning over the entire 41-year time period of our sample.** Each panel shows the association between a measure of corruption (named at the top of each panel, the dependent variable in a linear regression) and the percentage of women in the lower house of the legislature (the independent variable in the regression) for a subset of countries classified as democratic for the full 41 years covered by our sample. Each gray dot reports a bivariate linear regression slope coefficient using data from the year on the x-axis. The coefficient is shown on the y-axis; 95% confidence intervals for each coefficient are represented by gray barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dCoefficient/dYear shows the slope of this time trend; $* = p < 0.05$. The inset panel shows the slope of this time trend. Countries included in this analysis are: Australia, Austria, Barbados, Belgium, Botswana, Canada, Costa Rica, Cyprus, Denmark, Ecuador, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Malta, Mauritius, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Trinidad and Tobago, the United Kingdom, the United States, and Vanuatu.

E Impact of Women in Parliament on Corruption: IV Analysis with Female Journalists Instrument

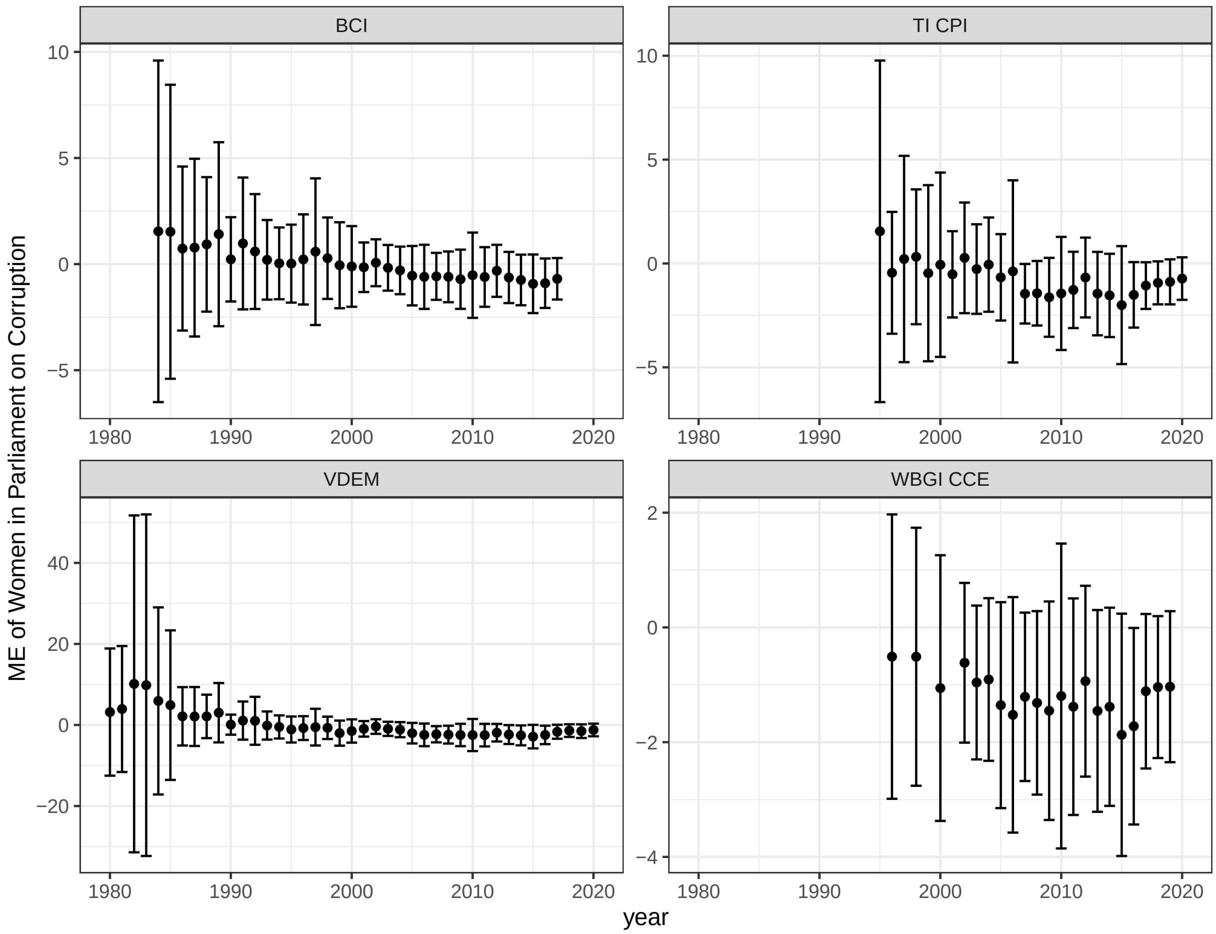


Figure 6: **The causal impact of women's representation on corruption in democratic-leaning countries over time, using the percentage of female journalists as an instrument.** Each panel studies the causal impact of the proportion of women in the lower house of the legislature on the V-Dem Political Corruption Index using a different dependent variable (indicated at the top of the panel). Dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis.

F First Stage F-statistics Plot: Women in Parliament's Effect on Corruption

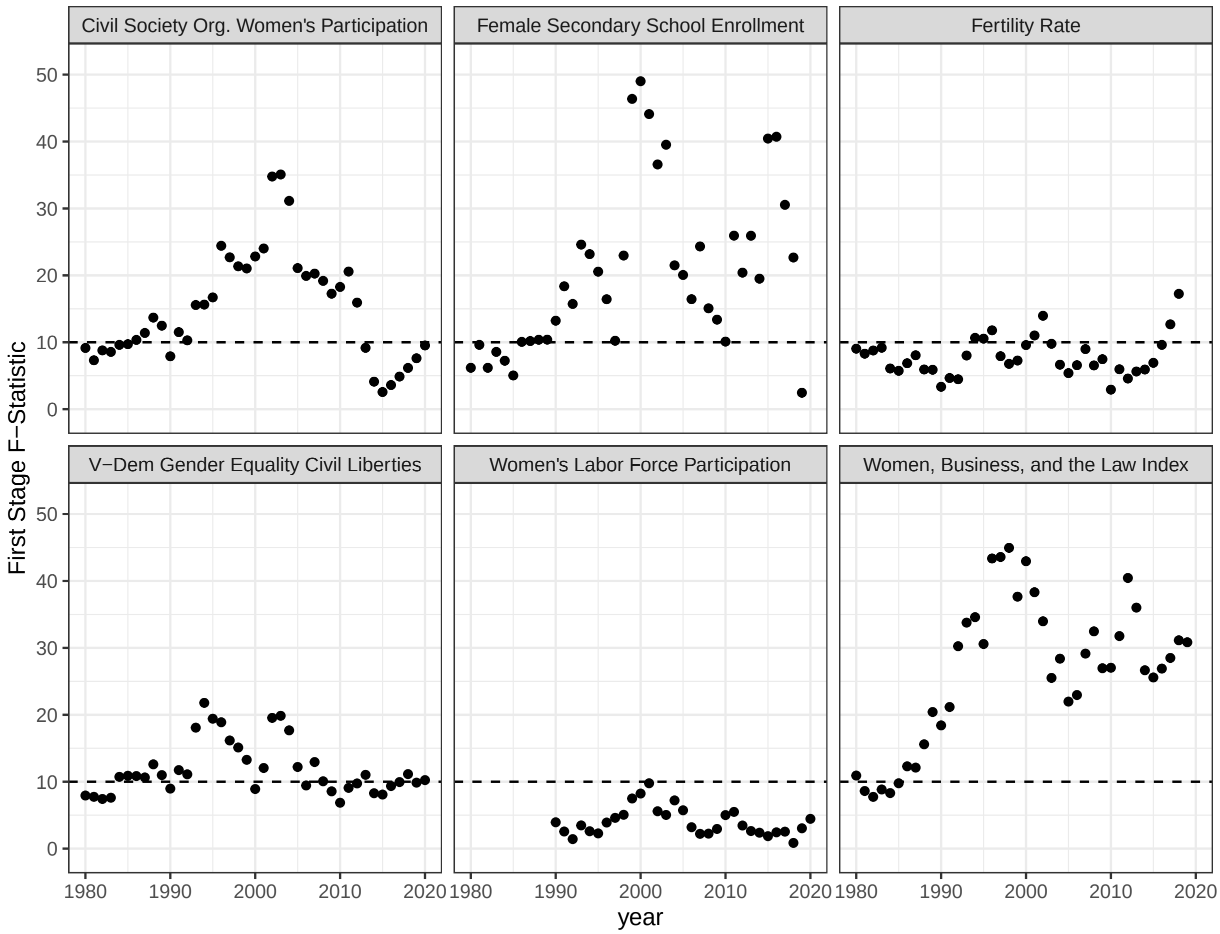


Figure 7: **First stage F-statistics for IV/2SLS models in Figure 2.** Each dot indicates the F-statistic corresponding to the year and instrumental variable indicated in Figure 2. The conventional minimum of 10 recommended by Staiger and Stock (1997) is indicated by a dashed line.

G Impact of Women in Parliament on Corruption (BCI)

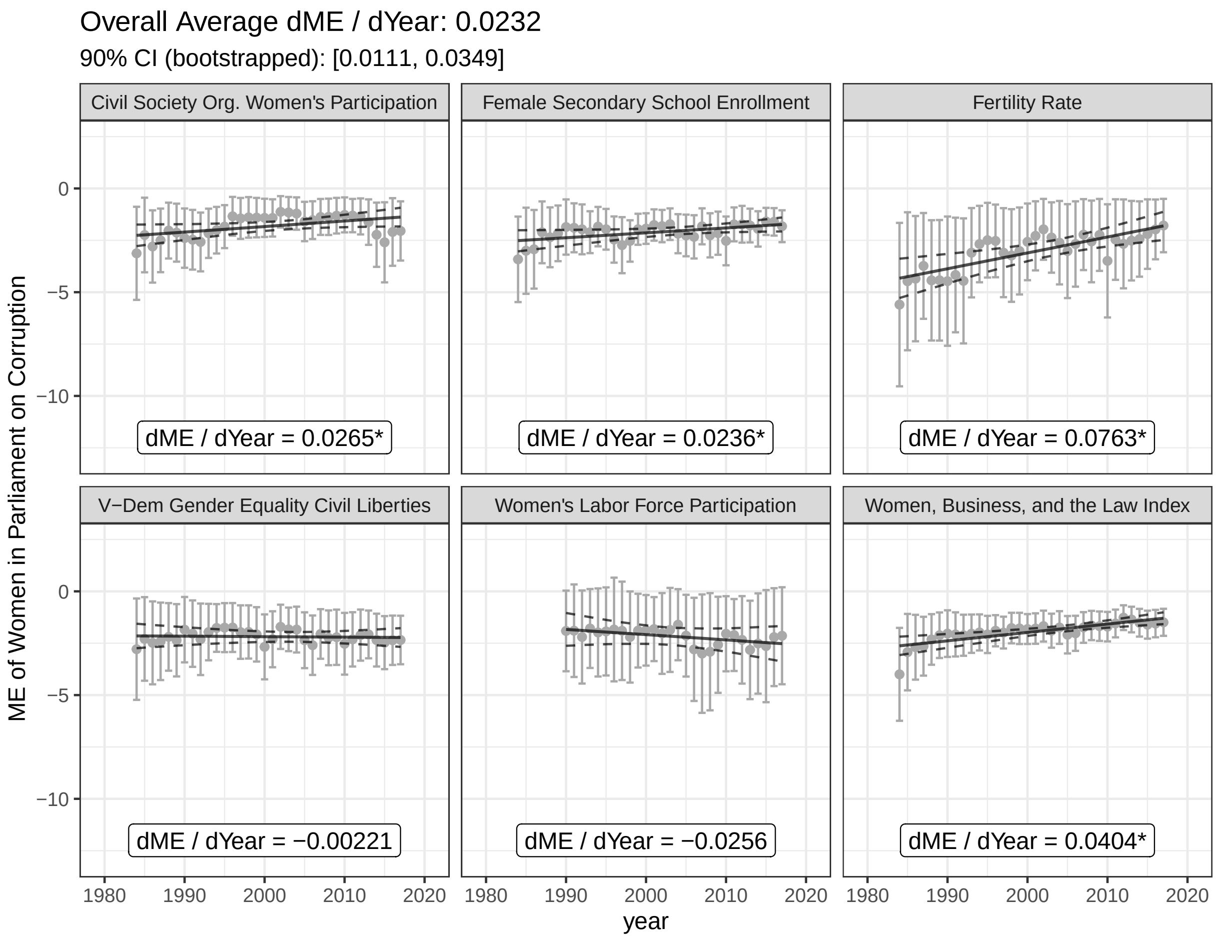


Figure 8: **The causal impact of women's representation on corruption in democratic-leaning countries over time, Bayesian Corruption Index DV.** Each panel studies the causal impact of the proportion of women in the lower house of the legislature on the Bayesian Corruption Index using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

H Impact of Women in Parliament on Corruption (WBGI)

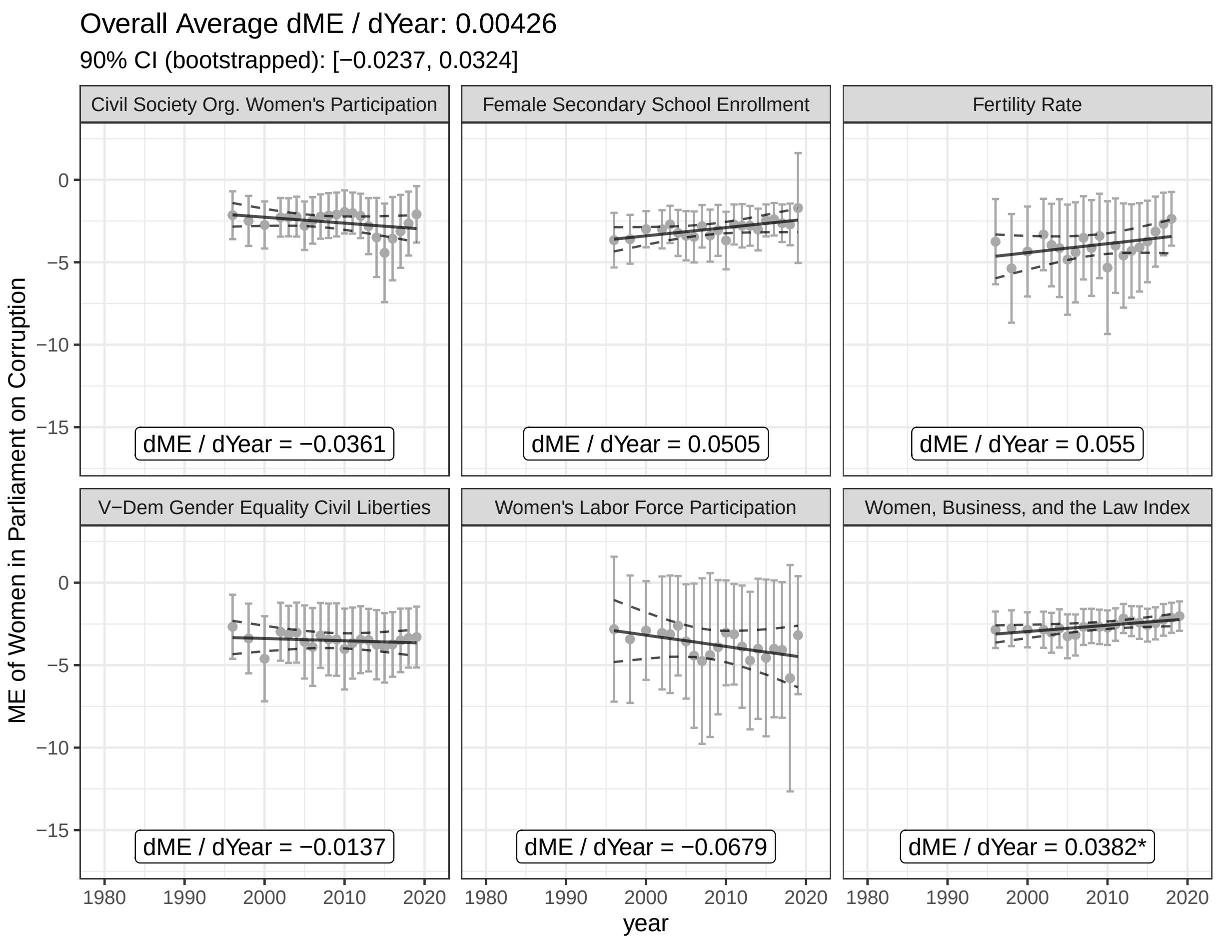


Figure 9: **The causal impact of women's representation on corruption in democratic-leaning countries over time, World Bank Governance Indicators Control of Corruption DV.** Each panel studies the causal impact of the proportion of women in the lower house of the legislature on the Bayesian Corruption Index using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

I Impact of Women in Parliament on Corruption (TI CPI)

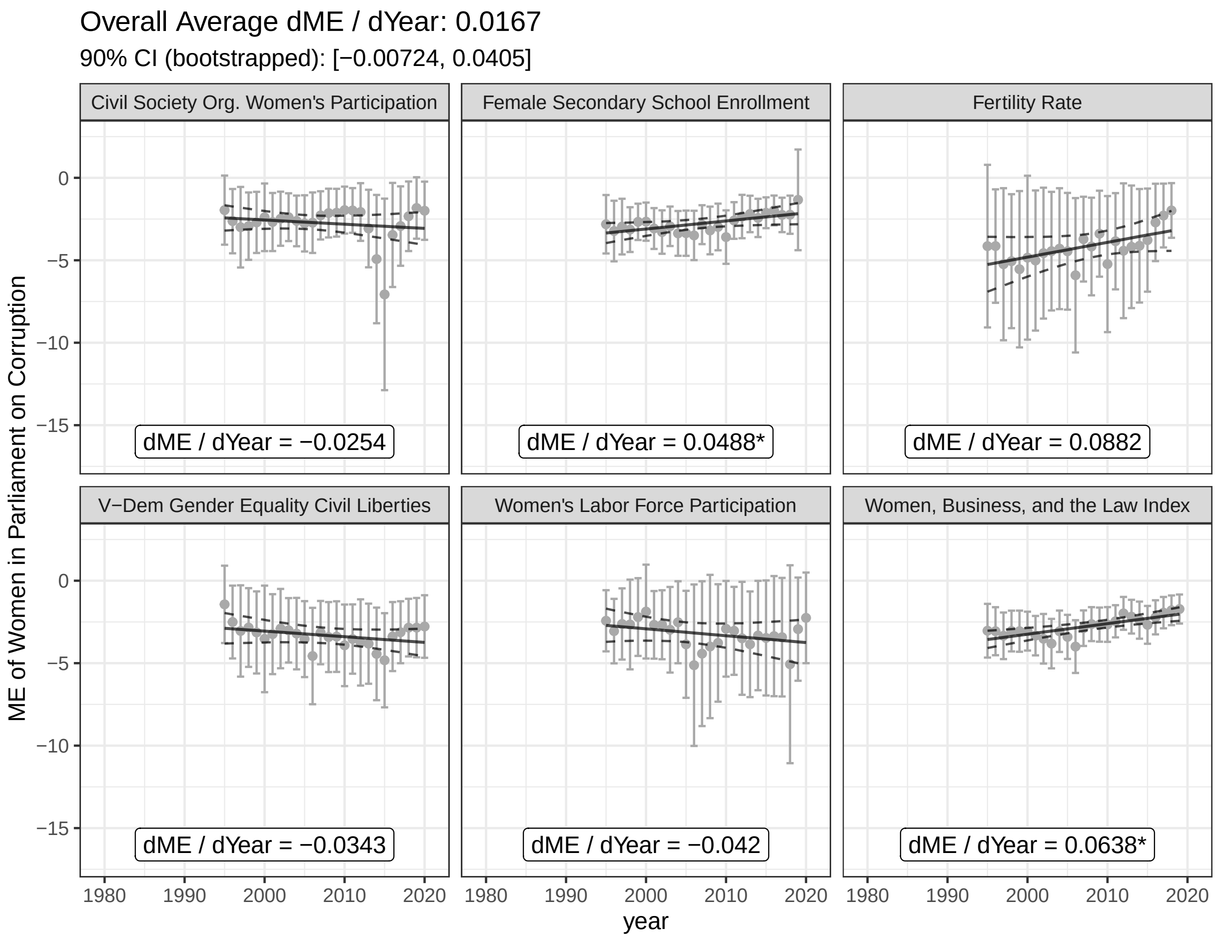


Figure 10: **The causal impact of women's representation on corruption in democratic-leaning countries over time, Transparency International Corruption Perceptions Index DV.** Each panel studies the causal impact of the proportion of women in the lower house of the legislature on the TI Corruption Perceptions Index using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

J First Stage F-statistics: Corruption's Effect on Women in Parliament

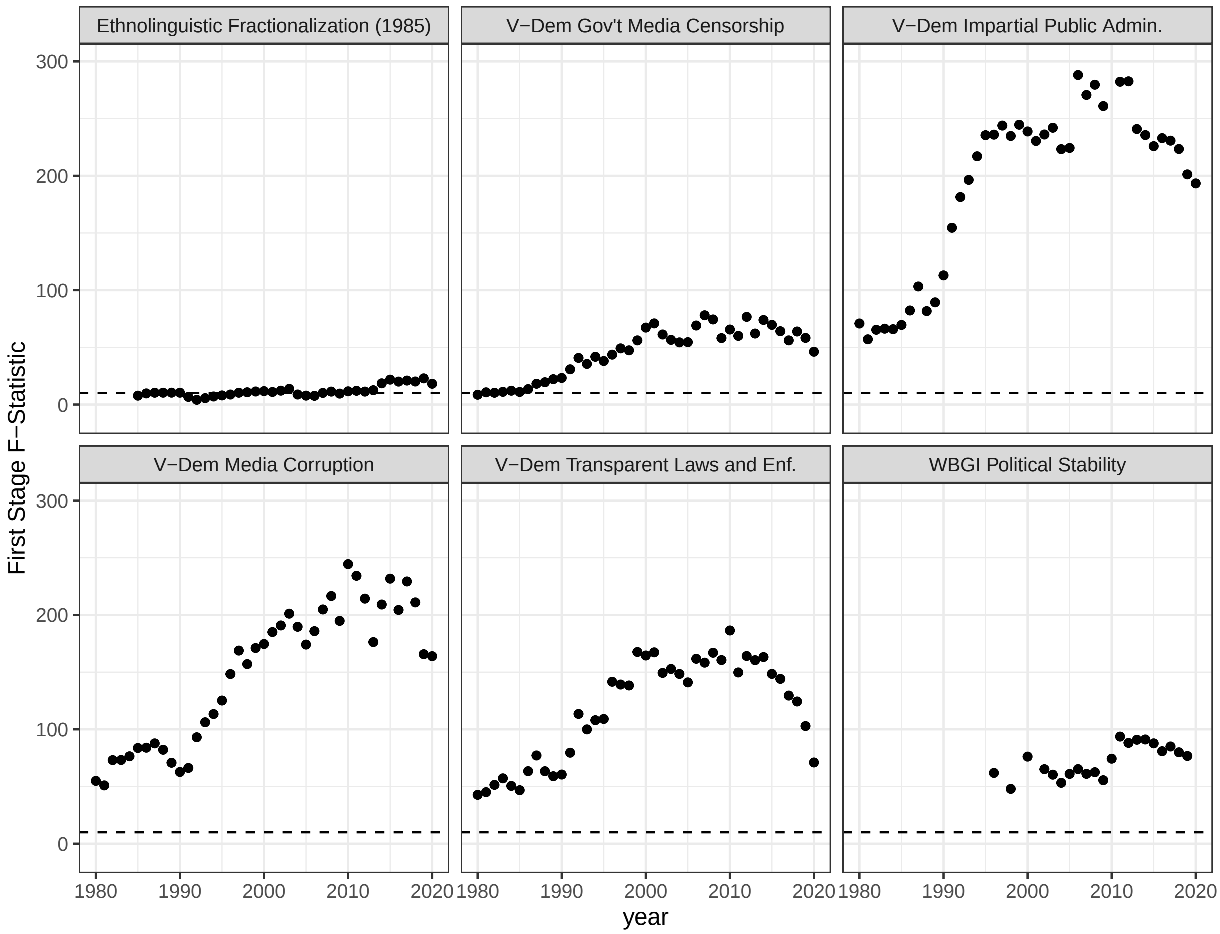


Figure 11: **First stage F-statistics for IV/2SLS models in Figure 3.** Each dot indicates the F-statistic corresponding to the year and instrumental variable indicated in Figure 3. The conventional minimum of 10 recommended by Staiger and Stock (1997) is indicated by a dashed line.

K Impact of Corruption on Women in Parliament (BCI)

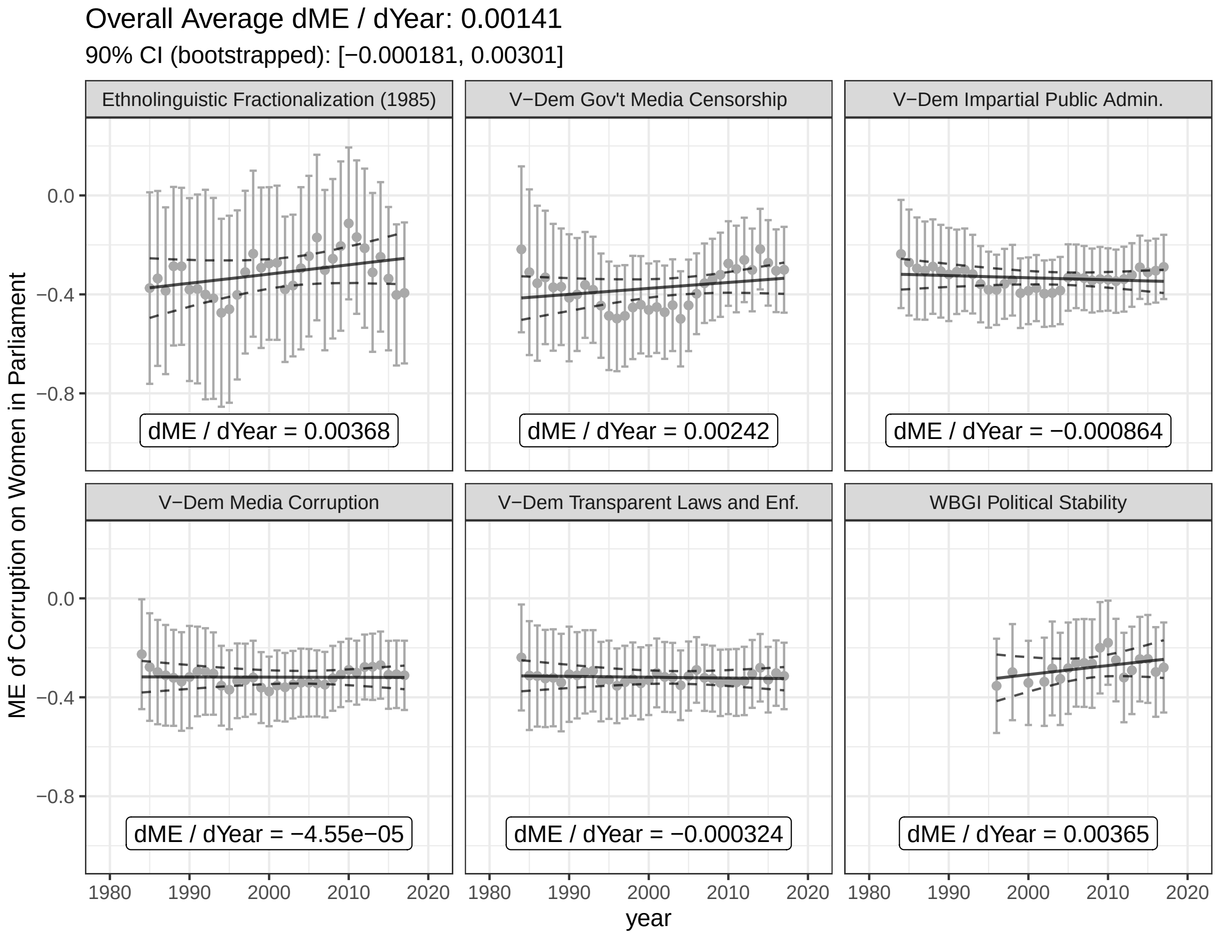


Figure 12: **The causal impact of corruption on women's representation in democratic-leaning countries over time, Bayesian Corruption Index DV.** Each panel studies the causal impact of the Bayesian Corruption Index on the proportion of women in the lower house of the legislature using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

L Impact of Corruption on Women in Parliament (WBGI)

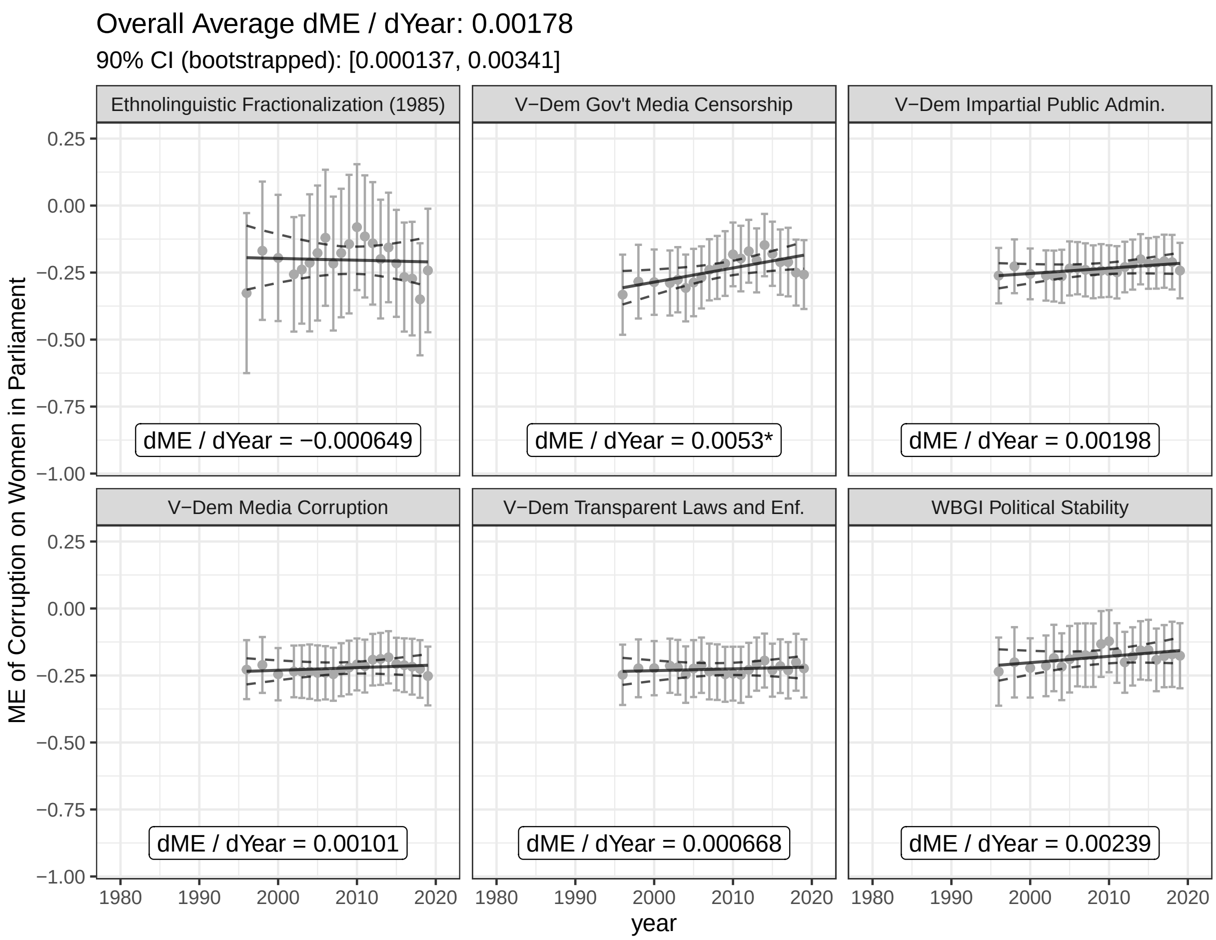


Figure 13: **The causal impact of corruption on women's representation in democratic-leaning countries over time, World Bank Governance Indicators Control of Corruption DV.** Each panel studies the causal impact of the WBGI Control of Corruption measure on the proportion of women in the lower house of the legislature using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

M Impact of Corruption on Women in Parliament (TI CPI)

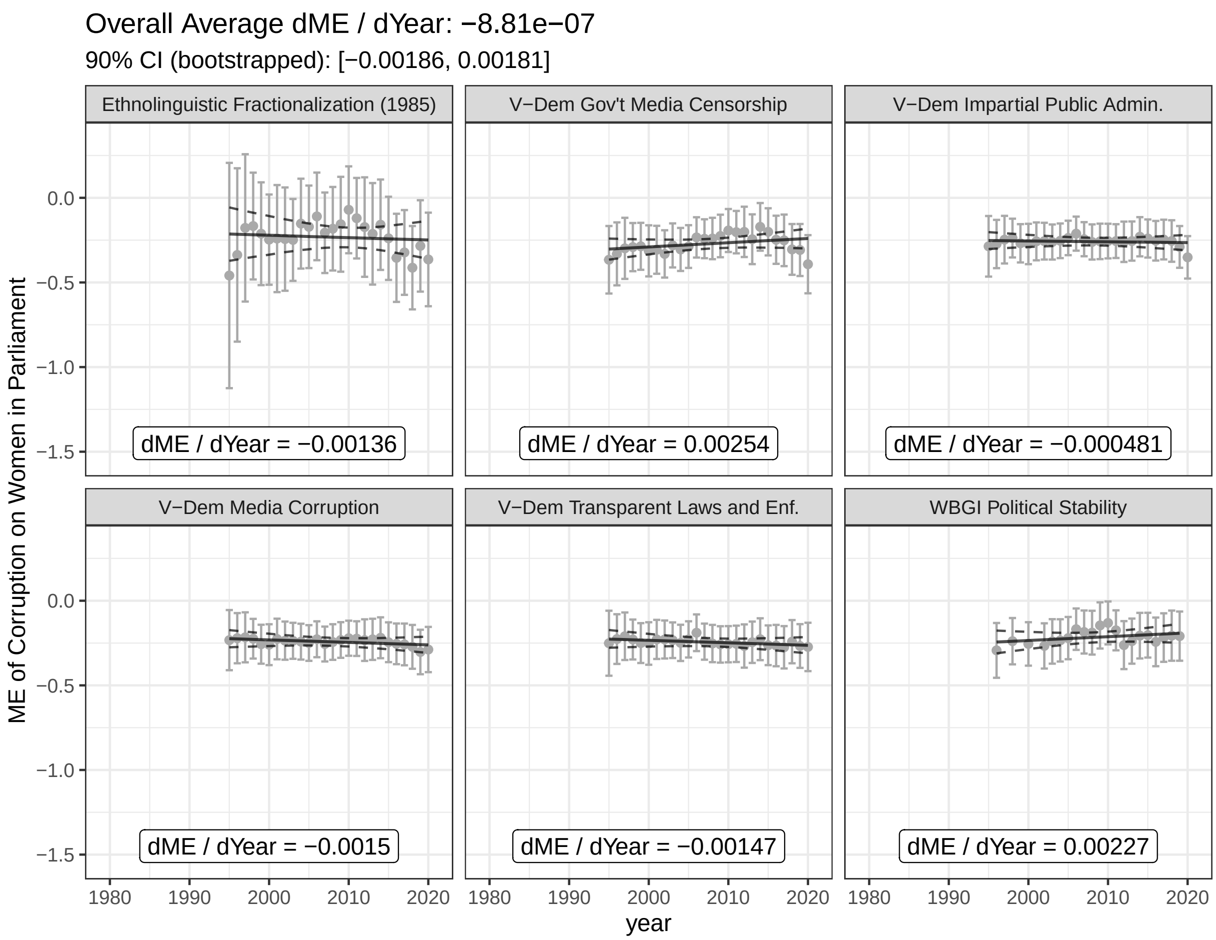


Figure 14: **The causal impact of corruption on women's representation in democratic-leaning countries over time, Transparency International Corruption Perceptions Index DV.** Each panel studies the causal impact of the TI Corruption Perceptions Index on the proportion of women in the lower house of the legislature using a different instrumental variable (indicated at the top of the panel). Gray dots report a slope coefficient from a bivariate two-stage least-squares regression using data from the year indicated on the x-axis, with the magnitude of the slope on the y-axis and 95% confidence intervals represented by barred lines. The trend in coefficients over time and bootstrapped 95% confidence intervals for this trend are presented as solid and dashed black lines, respectively. The inset panel labeled dME/dYear shows the slope of this time trend; $* = p < 0.05$, two-tailed.

References

Coppedge, Michael, John Gerring, Carl Henrik Knutsen et al. 2021. *V-Dem Codebook v11.1*. Varieties of Democracy (V-Dem) Project. URL: https://www.v-dem.net/en/data/data/v-dem-dataset-v111/.

Dalton, Maya and Justin Esarey. 2021. "Measuring Changes in Corruption over Time." Working Paper. URL: http://justinesarey.com/Corruption_Measurements___Fixed_Effects__Dalton___Esarey_.pdf accessed 8/9/2021.

Florini, Ann. 1998. "The End of Secrecy." *Foreign Policy* (111):50–63.

Galtung, Fredrik. 2006. Measuring the Unmeasurable: Boundaries and Functions of (Macro) Corruption Indices. In *Measuring Corruption*, ed. Charles J. G. Sampford, Arthur Shacklock, Carmel Connors and Fredrik Galtung. Burlington, VT: Ashgate Publishing, Ltd. pp. 101–130.

Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi. 2010. *The Worldwide Governance Indicators: Methodology and Analytical Issues*. SSRN.

Staiger, Douglas and James H. Stock. 1997. "Instrumental variables regression with weak instruments." *Econometrica* 65(3):557.

Standaert, Samuel. 2015. "Divining the level of corruption: A Bayesian state-space approach." *Journal of Comparative Economics* 43(3):782–803.

Transparency International. 2016. "Technical Methodology Note." URL: https://bit.ly/2Iu9IrU accessed 6/20/2019.

Transparency International. 2020. "Corruption Perceptions Index Overview." URL: https://www.transparency.org/en/cpi/2020/index/nzl.