Public Gender Egalitarianism: A Dataset of Dynamic Comparative Public Opinion Toward Egalitarian Gender Roles in the Public Sphere

Societal attitudes toward gender roles in the workplace and politics play a central part in theorizing on the difficulty women face in achieving political equality, but shortcomings in the available data have prevented direct examination of many implications of these theories. Drawing on recent advances in latent variable modeling of public opinion and a comprehensive collection of survey data, we present the Public Gender Egalitarianism dataset to address this need: comparable estimates of the public's attitudes on gender equality in the public sphere across more than one hundred countries over time. These PGE scores are strongly correlated with responses to individual survey items and with women's rates of participation in the labor force and corporate boards. We expect that the PGE data will become an invaluable source for broadly cross-national and longitudinal research on the causes and consequences of collective attitudes toward gender equality in the public sphere. [148/150 words]

Keywords: gender roles, gender inequality, public opinion, political culture, measurement

Collective attitudes toward the appropriate roles of women and men in society—whether labeled culture, norms, ideology, or public opinion—constitute one of the primary explanations for women's exclusion from the traditionally masculine public sphere of the workforce, political power, and policy influence (see, e.g., Paxton, Hughes and Barnes 2021, 113-114). Yet even a half century after Rule Krauss (1974, 1719) called for more and better data on these collective attitudes, what we have available to us remains inadequate for fully examining their causes and consequences. In the decades since, national and cross-national surveys have included a plethora of relevant questions, but sustained focus has been scant and the variety of these survey items renders the resulting data incomparable. As a consequence, cross-national research has been constrained to study countries at just one or a few time points (see, e.g., Paxton and Kunovich 2003; Alexander 2012; Glas and Alexander 2020) or to rely on proxies such as predominant religion or the percentage of women in office (see, e.g., Burns, Schlozman and Verba 2001, 340-341; Claveria 2014; Barnes and O'Brien 2018). Cross-national and longitudinal investigation of, for example, the argument that such "attitudes influence both the supply of, and demand for, female candidates" has remained persistently a topic for future research (Paxton, Hughes and Painter 2010, 47).

In this letter, we present the Public Gender Egalitarianism (PGE) dataset, which is based on

the host of national and cross-national survey data available and recent advances in latent variable modeling of public opinion that allow us to make use of this sparse and incomparable data. It provides comparable estimates of the public's attitudes on gender equality in the public sphere of politics and paid work across countries and over time. We show that these PGE scores are strongly correlated with responses to single survey items as well as with measures of women's participation in the workforce and in the boardroom. We expect that the PGE data will become an invaluable source for broadly cross-national and longitudinal research on the causes and effects of collective attitudes toward gender equality in the public sphere.

Examining the Source Data on Public Gender Egalitarianism

National and cross-national surveys have often included questions tapping attitudes toward equality for women and men in the public sphere over the past half-century, but the resulting data are both sparse, that is, unavailable for many countries and years, and incomparable, generated by many different survey items. In all, we identified 46 such survey items that were asked in no fewer than five country-years in countries surveyed at least twice; these items were drawn from 88 different survey datasets.[1] Together, the survey items in the source data were asked in 124 different countries in at least two time points over 48 years, from 1972 to 2020, yielding a total of 2,710 country-year-item observations. Observations for every year in each country surveyed would number 5,952, and a complete set of country-year-items would encompass 273,792 observations. Compared to this complete set of country-year-items, the available data can be seen to be very, very sparse. From a more optimistic standpoint, we note there there are 1,193 country-years in which we have at least *some* information about the public gender egalitarianism of the population, that is, some 44% of the 2,695 country-years spanned by the data we collected. But there can be no denying Claveria's (2014) observation that the many different survey items employed renders these data incomparable and difficult to use together.

The upper left panel of Figure 1 shows the dozen countries with the highest count of country-year-item observations. The United States, with 140 observations, is far and away the best repre-

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[1]The complete list of public gender egalitarianism survey items is included in online Appendix A. A discussion of excluded survey items—those covering the related but distinct concepts of gender equality in the private sphere, how women should balance opportunities in the public sphere with their traditional duties in the private sphere, or issues of gender dominance such as sexual harassment—is found in online Appendix B.
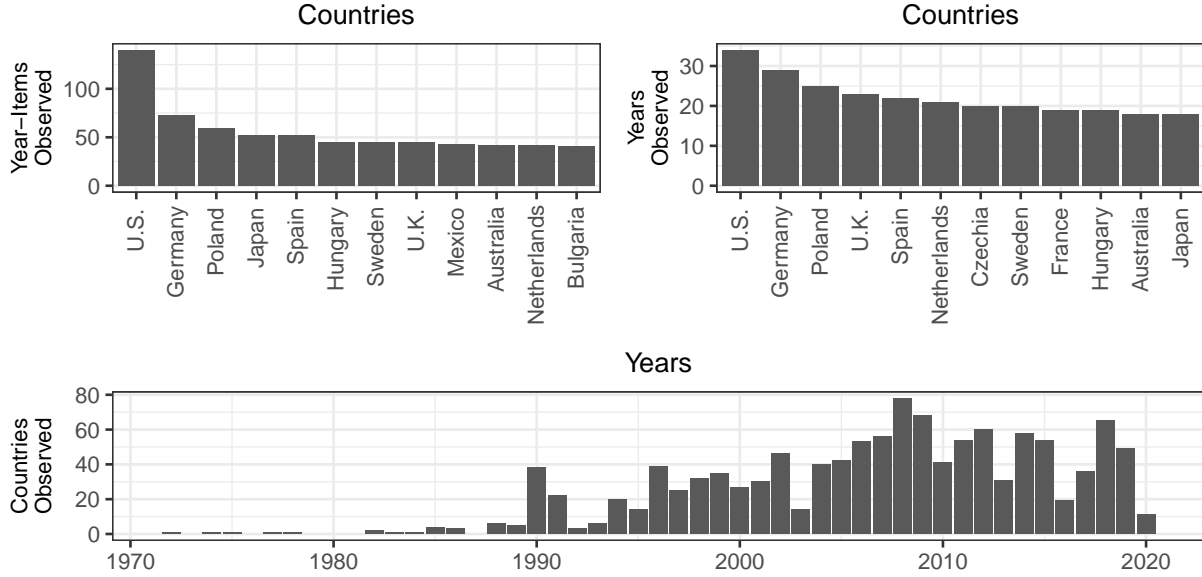
Figure 1: Countries and Years with the Most Observations in the PGE Source Data

sented country in the source data, followed by Germany, Poland, Japan, and Spain. At the other end of the spectrum, three countries—Cambodia, Sri Lanka, and Suriname—have only the minimum two observations required to be included in the source dataset at all. The upper right panel shows the twelve countries with the most years observed; this group is similar, but with Czechia and France joining the list and Mexico and Bulgaria dropping off. The bottom panel counts the countries observed in each year and reveals just how few relevant survey items were asked before 1990. Country coverage reached its peak in 2008, when respondents in 78 countries were asked items about gender egalitarianism in the public sphere. In the next section, we describe how we are able to make use of all of this sparse and incomparable survey data to generate the PGE scores using a latent variable model.

Estimating Public Gender Egalitarianism

There has been a recent blossoming of scholarship developing latent variable models of public opinion based on cross-national survey data (see Claassen 2019; Caughey, O'Grady and Warshaw 2019; McGann, Dellepiane-Avellaneda and Bartle 2019; Kolczynska et al. 2020). To estimate public gender egalitarianism across countries and over time, we draw on the latest of these methods that is appropriate for data that is not only incomparable but also sparse, the Dynamic Comparative

Public Opinion (DCPO) model presented in Solt (2020*b*).[2]

The DCPO model is a population-level two-parameter ordinal logistic item response theory (IRT) model with country-specific item bias. That is, η_{ktqr}, the expected probability that a random person in country k at time t answers question q with a response at least as positive as response r, is estimated as varying with the mean and standard deviation of the unbounded latent trait of public opinion, $\bar{\theta}'_{kt}$ and σ_{kt}; with the dispersion, α_q, of the question and the difficulty, β_{qr}, of the question's response category; as well as with a term to capture how responses to particular questions may be biased in particular countries, δ_{kq}: $\eta_{ktqr} = \text{logit}^{-1}(\frac{\bar{\theta}'_{kt}-(\beta_{qr}+\delta_{kq})}{\sqrt{\alpha_q^2+(1.7*\sigma_{kt})^2}})$. A beta-binomial distribution is used to model the observed survey data given η_{ktqr}, random-walk priors are used to account for the dynamics in $\bar{\theta}'_{kt}$ and σ_{kt}, and weakly informative priors are placed on the other parameters. Finally, the logistic function is used to transform $\bar{\theta}'_{kt}$ to the unit interval and so give the bounded mean of latent public opinion, $\bar{\theta}_{kt}$, which is our parameter of interest here (see Solt 2020*b*, 3-8).

We estimated the model using the `DCPO` package for R (Solt 2020*a*), running four chains for 4,000 iterations each, with the first half discarded as warmup and the remainder thinned by eight to leave us with 1,000 samples. The $\hat{R}$ diagnostic had a maximum value of 1.02, indicating the model converged.

The dispersion parameters of the survey items indicate that all of them load well on the latent variable (see online Appendix A). The result is estimates, in all 6,076 country-years spanned by the source data, of mean public gender egalitarianism, what we call PGE scores. Figure 2 displays the most recent available PGE score for each of the 124 countries and territories in the dataset.

The Scandinavian countries and France are at the top of this list, along with Puerto Rico, which has had women of both of its major parties serve as chief executive and as recently as 2020 had a woman from each party holding the two most prominent elected offices on the island. The latest scores for Burkina Faso, Yemen, Uzbekistan, Egypt, and Iraq have them as the places where public opinion is least favorable to gender equality in the public sphere.

Figure 3 displays how PGE scores have changed over time in sixteen countries. Like Figure 2,

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[2]Solt (2020*b*) demonstrates that the DCPO model provides a better fit to survey data than the models put forward by Claassen (2019) or Caughey, O'Grady and Warshaw (2019). The McGann, Dellepiane-Avellaneda and Bartle (2019) model depends on dense survey data unlike the sparse data on public gender egalitarianism described in the preceding section. Kolczynska et al. (2020) is the very most recent of the five works and builds on each of the others, but the MRP approach developed in that piece is suitable not only when the available survey data are dense but also when ancillary data on population characteristics are available, so it is similarly inappropriate to this application.

Note: Gray whiskers represent 80% credible intervals.

Figure 2: PGE Scores, Most Recent Available Year

Note: Countries are ordered by their PGE scores in their most recent available year; gray shading represents 80% credible intervals.
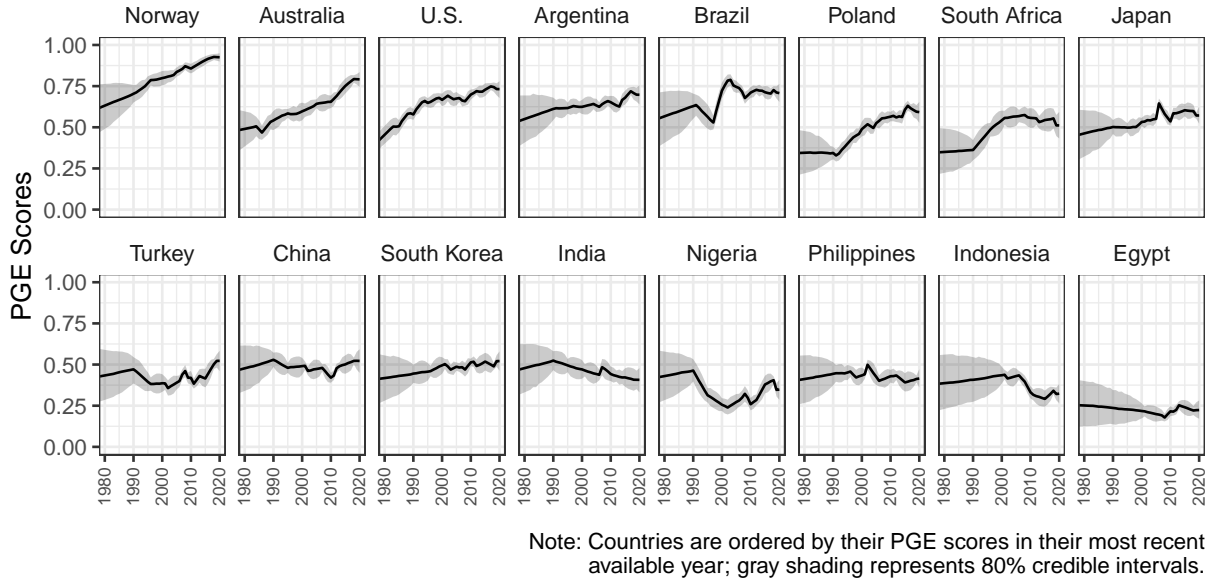
Figure 3: PGE Scores Over Time Within Selected Countries

it underscores the geographic breadth of the PGE dataset, which allows the study of countries and regions too often neglected in political science research (see Wilson and Knutsen 2020). The figure also shows that while public opinion favoring gender equality in the public sphere has risen steadily in some countries, such as Norway and Australia, attitudes have changed little over time in others, like South Korea and the Philippines, or fallen, as in Indonesia. They have even advanced and retreated as in Brazil or have declined and recovered as in Nigeria. There is much to do to explain the causes and consequences of these trends in public gender egalitarianism.

Validating Public Gender Egalitarianism

Such future research, however, depends on the validity of the PGE scores. Like Caughey, O'Grady and Warshaw (2019, 684-685), we provide evidence of our measure's validity with convergent validation and construct validation. Figure 4 displays our demonstrations of convergent validation. Convergent validation refers to showing that a measure is empirically associated with alternative indicators of the same concept (Adcock and Collier 2001, 540). Here, we compare PGE scores to responses to individual survey items that were included in the source data, that is, we provide an 'internal' validation test (see, e.g., Caughey, O'Grady and Warshaw 2019, 689; Solt 2020*b*, 10). In the left panel, we examine the four-point question on political leaders mentioned above, the most

Note: Gray whiskers and shading represent 80% credible intervals.
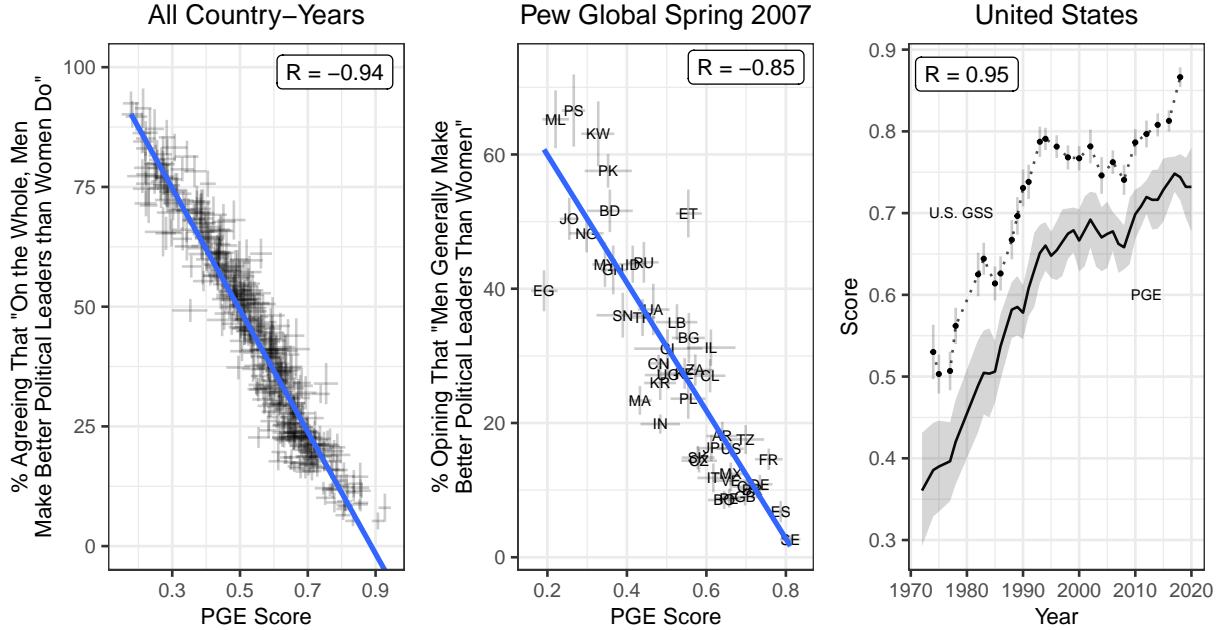
Figure 4: Convergent Validation: Correlations Between PGE Scores and Individual PGE Source Data Survey Items

common item in the source data across all country-years. Then, in the center panel, we look at the question that provides the most data-rich cross-section, which asked whether respondents felt "men generally make better political leaders than women" and was included in Pew Global's Spring 2007 survey. Finally, in the right panel, to evaluate how well the PGE scores capture change over time, we focus on the item with the largest number of observations for a single country, which asked respondents to the U.S. General Social Survey whether they agreed or disagreed that "most men are better suited emotionally for politics than are most women." In every case, the correlations—estimated taking into account the uncertainty in the measures[3]—are in the expected direction and very strong.

We continue, then, to construct validation, which refers to demonstrating, for some *other* concept believed causally related to the concept a measure seeks to represent, that the measure is empirically associated with measures of that other concept (Adcock and Collier 2001, 542). In

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[3]The uncertainty in the PGE score and in the percentage in the population who would agree with the item does not substantially affect the correlation with the political leadership question, but failing to account for this uncertainty would overstate the correlation with the Pew item, at $R = -0.88$, and the U.S. GSS item, at $R = 0.98$. We take up the issue of the importance of taking uncertainty into account when working with the PGE data in a subsequent section.
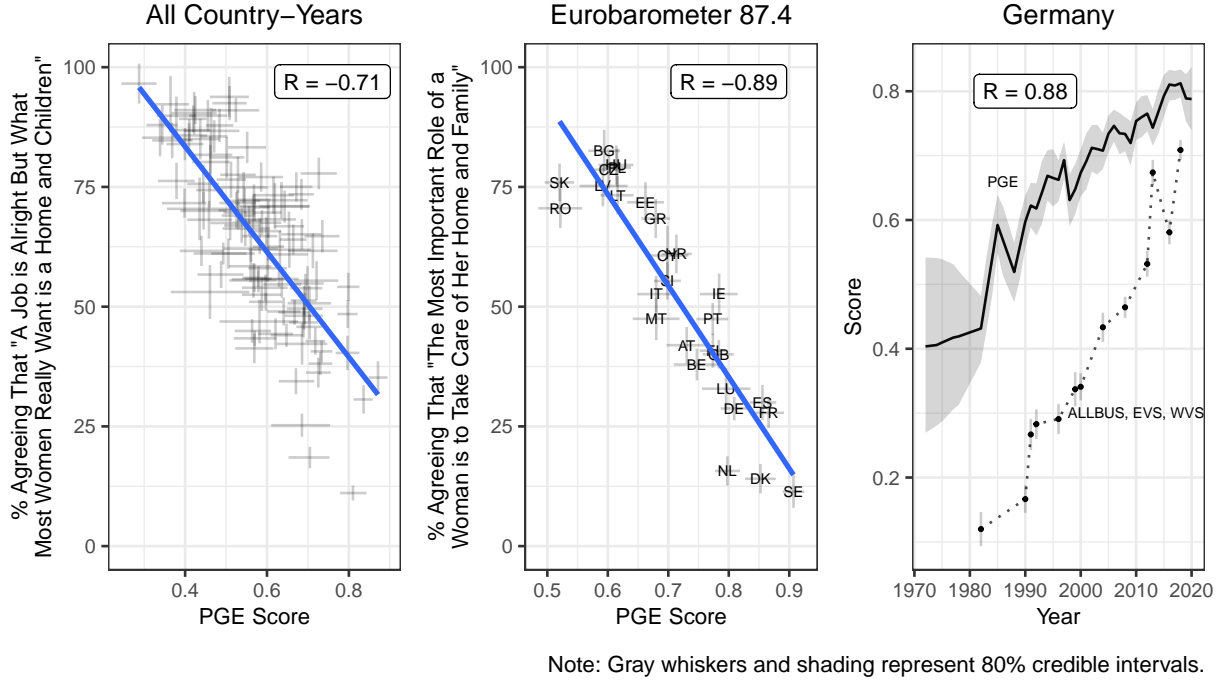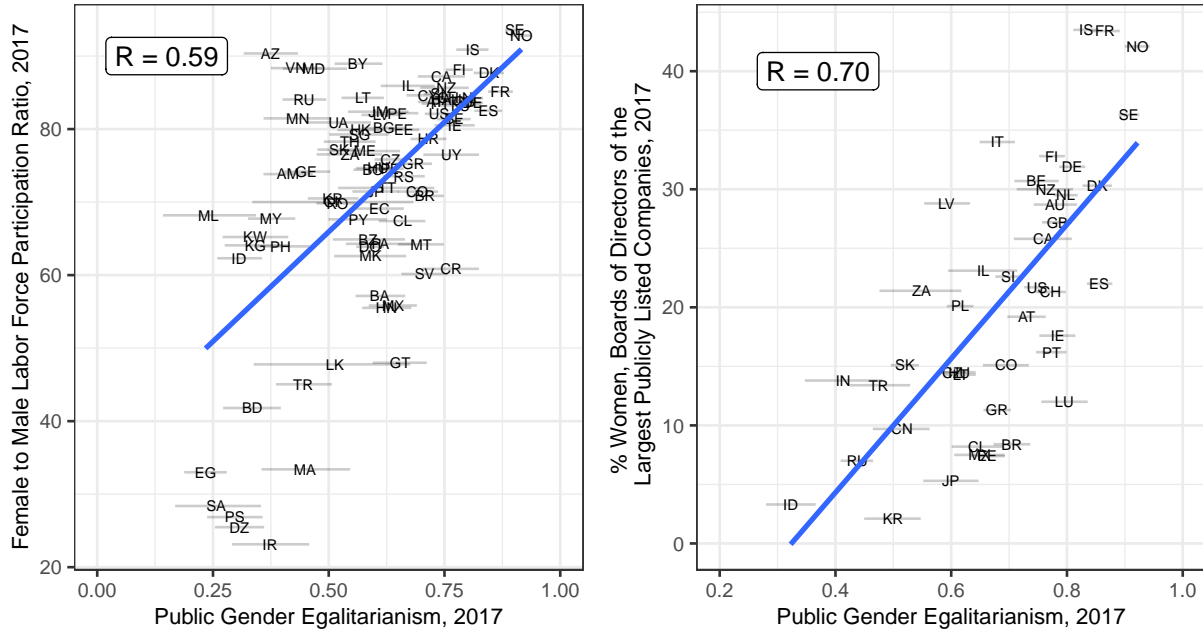
Figure 5: Construct Validation: Correlations Between PGE Scores and Individual 'Balancing' Gender Egalitarianism Survey Items

Figure 5, we look to individual survey items from a related category of gender egalitarianism, namely questions that ask how women should balance opportunities in the public sphere with their traditional duties in the private sphere. Assuming that attitudes that women should prioritize housework and childcare over paid employment and politics—or convictions that there will be negative consequences if they do not—will lead to less gender egalitarian opinions with regard to these latter, public-sphere activities, evidence for this theoretical relationship will provide construct validation for the PGE scores. Exemplars of such items across all available country-years ("a job is alright but what most women really want is a home and children" from the WVS and EVS), in cross-section ("the most important role of a woman is to take care of her home and family" from the Eurobarometer 87.4), and in time series ("a pre-school child is likely to suffer if his or her mother works" from the German ALLBUS, WVS, and EVS) all show strong correlations with the PGE scores.

Finally, Figure 6 shows additional tests of construct validation. As attitudes toward gender egalitarianism in the public sphere plausibly both cause and are caused by women's gains in the workplace, strong relationships between the PGE scores and measures of workplace gender equality

Note: Gray whiskers represent 80% credible intervals.

Figure 6: Construct Validation: Correlations Between PGE Scores and Indicators of Workplace Gender Equality

provide construct validation for our measure. In the left panel of Figure 6, we compare the PGE scores to the ratio of women's to men's labor force participation rates in 68 countries in 2017, drawing on data compiled by the Statistics Division of the UN Department of Economic and Social Affairs (2020). In the right panel, we plot the PGE scores against the percentage of women on the boards of directors of the largest publicly listed companies in 43 countries, also in 2017 (see OECD 2020). Both correlations are strong. Together, this evidence of construct validation and convergent validation attests to the validity of the PGE scores as measures of public opinion towards gender equality in the public sphere.

Using the Public Gender Egalitarianism Dataset

Version 1.0 of the PGE dataset includes PGE scores for 124 countries for as many years as possible from 1972 to the present, a total of 2,695 country-years. It can be accessed in two ways: via a user-friendly web application on the PGE website, which plots scores for as many as four countries for easy comparison of levels and trends, and via the Harvard Dataverse, where the entire dataset is available for download for use in statistical analysis.

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One aspect of latent-variable estimates of public opinion like the PGE dataset that is easy for researchers to overlook is the quantified uncertainty in the estimates. But neglecting to incorporate this uncertainty by using only the mean estimate for each country-year in an analysis can lead one to mistakenly conclude that the analysis supports the hypothesis (see Tai, Hu and Solt 2021) as well as to mistakenly conclude that it does *not* support the hypothesis (see Crabtree and Fariss 2015). Therefore, taking the uncertainty in the PGE scores into account is crucial to reaching well-grounded conclusions. Step-by-step instructions for doing this via simulations, with examples, are included in the data download.

The PGE dataset will allow researchers to not only better address such long-standing questions as how collective attitudes on gender roles have influenced the election of women to national legislatures and vice versa (see, e.g., Paxton and Kunovich 2003; Alexander 2012) but also, for example, to pursue both new and more nuanced lines of inquiry on issues of policy responsiveness and policy feedback (cf., Kittilson 2008; Busemeyer, Abrassart and Nezi 2021). We will revise and update the dataset as new survey data on public gender egalitarianism becomes available, and we look forward to a rapid growth in research that advances our understanding of the relationships between collective attitudes on gender roles and a wide range of other political phenomena.

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