# Behind Bureaucracy: Public Opinion on Public Servants in Dynamic Comparative Perspective

December 21, 2024

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**Abstract**

Trust in civil servants is essential for effective governance, enabling policy implementation, public service delivery, and compliance. However, comparative public administration research is often hindered by the lack of comparable trust measures across countries and time. To address this gap, based on 132 national and cross-national surveys from 98 countries spanning 1986 to 2022, we employ an advanced latent-variable modeling technique to measure trust in civil servants. Our measures reveal variations in trust both within and between countries. Our analysis indicates that economic performance and public security enhance trust in the short term, whereas government quality and effectiveness have more enduring, long-term impacts on trust in civil service. This study contributes to the field of comparative public administration by providing a robust, longitudinal dataset on trust in civil servants, facilitating the exploration of the dynamic relationship between trust and various governance factors and enabling more accurate testing of theoretical models.

Despite the long-standing call for comparative studies in public administration, much of the field remains focused on national contexts. Without comparative research, claims for a "science of public administration" remain unconvincing (Dahl 1947, 8). Comparative studies offer valuable insights and innovative concepts but face significant methodological challenges (Pollitt 2011), with measurement equivalence being one of the most critical. Specifically, non-equivalent measures across countries pose a serious threat to comparative public administration study, yielding biased results, wrong theoretical conclusions, and misleading policy implications (Jilke, Meuleman, and Van de Walle 2015).

The challenge of non-comparable data is particularly evident in public administration survey research. Trust, a core topic in comparative administration, bridges classical administrative theories and behavioral perspectives (Van Ryzin 2011). Given that the public cannot directly monitor agencies or civil servants, trust in bureaucracy is essential for empowering officials to act in the public's interest (Thomas 1998). Since civil servants implement policies, deliver public services, and frequently interact with citizens, public trust is crucial for the acceptance of services and compliance with public policies (Morelock 2021). With sufficient trust, the public supports policy implementation (Kim 2005, 611), whereas a lack of trust can hinder officials' ability to perform their tasks and gain public cooperation (Yates 1982; Van Ryzin 2011). However, cross-national studies on trust in bureaucracy are plagued by the lack of comparable data. Existing studies are subject to a limited geographic and temporal scope (Morelock 2021; Choi 2018; Houston et al. 2016; Van de Walle and Migchelbrink 2022) and cannot capture the dynamic relationship between trust in bureaucracy, government outcomes, and administrative quality in a broadly comparative context. In addition, the scarcity of comparable data makes it challenging to test competing theories about the factors influencing trust in bureaucracy, whether it is government performance, governance quality, or other factors (Bouckaert 2012; Kettl 2000; Van de Walle and Migchelbrink 2022; Morelock 2021).

In this research, we introduce the Trust in Civil Servants (TCS) dataset, which leverages 132 national and cross-national surveys covering 98 countries over 36 years (1986–2022) and

applies recent advances in latent-variable modeling of public opinion (Solt 2020c). This dataset provides comparable estimates of public trust in civil servants across countries and time. We validate the TCS data by demonstrating strong correlations with individual survey items and related measures of perceived corruption and trust in other political institutions.

Using the TCS data, we conduct a cross-national time-series analysis to examine competing theories on trust in civil servants, focusing on government outcomes versus government quality. We find that government outcomes, such as economic performance and public security, have short-term effects on trust, while government quality including effectiveness, exerts more significant, enduring effects. This underscores that while both factors are important, the quality of governance plays a long-term role in fostering trust in civil servants.

Our study contributes to comparative public administration studies by providing valid, comparable longitudinal data on trust in civil servants. Recent studies emphasize the need to explore how public management reforms like NPM affect governance outcomes, such as accountability and efficiency(Pierre, Peters, and Rönnerstrand 2024), and how governance indicators, like trust in public institutions, influence complex policy challenges like CO2 emissions and decarbonization Cole et al. (2024). The Trust in Civil Servants (TCS) dataset responds to these recent calls by providing a data to examine how trust interacts governance quality and public sector performance, facilitating cross-national studies that connect administrative practices to governance challenges and policy outcomes.

### Debates on the Causes of Trust in Bureaucracy

A longstanding puzzle in public administration is understanding what explains trust in bureaucracy. A dominant theme is the belief that higher levels of government performance lead to greater trust in civil servants, based on the assumption that better performance correlates with higher trust and that lower trust toward bureaucrats reflects dissatisfaction with government performance (Yang and Holzer 2006). One common approach to measuring performance is through macroeconomic outcomes, such as economic growth, unemployment rate, economic inequality, and inflation. However, the results from studies on macroeco-

nomic outcomes are mixed. For example, Choi (2018) found that GDP per capita positively affects trust in bureaucracies, while Houston et al. (2016) did not find significant effects of GDP per capita and inflation rate on trust in civil servants. Instead, Houston et al. (2016) found that the unemployment rate negatively influences trust in civil servants. Contrary to previous studies that found some evidence for the role of government outcomes, Morelock (2021) found that none of the outcome indicators, including GDP per capita, inflation rate, unemployment, and the Gini index, had a significant effect on trust in civil servants.

Amidst these mixed results regarding macroeconomic outcomes, a growing body of literature emphasizes the role of government quality—or process—in explaining trust in bureaucracies. Van Ryzin (2011) found that the quality of government, measured by the World Bank's Worldwide Governance Indicators, plays a more crucial role than government outcomes measured by the UN's Human Development Index, which had a negative effect in his model. Morelock (2021) also highlights the positive role of government effectiveness, although Houston et al. (2016) finds inconsistent role of government effectiveness. A relatively consistent finding across studies is the significant role of corruption. Van de Walle and Migchelbrink (2022) concluded that the perceived absence of corruption is more impactful on trust in bureaucracies than performance evaluations. The critical influence of perceived corruption and corruption control on public trust in civil servants is also supported by Houston et al. (2016) and Morelock (2021). Beyond these findings, recent research has explored dimensions of government performance, including transparency, agency reputation, and the integration of input, process, and output measures. Studies show that both public and private elite actors' trust in agencies is strongly influenced by performance (Kappler et al. 2024). Moreover, transparency and perceived organizational reliability have been identified as key factors in shaping public trust (Schmidthuber, Willems, and Krabina 2023). Despite these advancements, variations in measures and modeling strategies—such as whether both outcomes and quality indicators are included in the same model—leave uncertainty about the consistency of these results. A more standardized approach is needed to clarify these relationships.

These mixed results also reflect limitations in comparative data, including limited country coverage, reliance on cross-sectional rather than dynamic analysis, and the absence of comparable measures across countries or regions (Van Ryzin 2011; Houston et al. 2016; Choi 2018; Morelock 2021; Van de Walle and Migchelbrink 2022). These shortcomings hinder a deeper understanding of the relationship between government outcomes, quality, and trust in bureaucracies.

To address these challenges, we developed the Trust in Civil Servants (TCS) dataset, a dynamic, cross-national measure that enables rigorous testing of competing theories about the sources of trust in civil servants.

### Examining the Source Data on Trust in Bureaucracy

Over the past half-century, many national and cross-national surveys have asked questions on trust attitudes toward public administrations. However, these data are sparse—unavailable for many countries and years—and incomparable, derived from different survey items. To construct a dynamic and comparable trust dataset, we undertook an extensive effort to collect and compile relevant survey questions. This involved a systematic review of 132 unique survey projects spanning 125 countries over 49 year to maximize broad geographic and temporal coverage and 27 unique survey questions in capturing public attitudes toward trust in civil servants. To minimize the noise from the sparse data and increase comparability, drawn from the raw data, we followed a common approach (Woo, Goldberg, and Solt 2023) and excluded 17 survey items that were asked in fewer than five country-years in countries surveyed at least twice.[1]

Together, the survey items in the source data were asked in 98 different countries in at least two time points over 36 years, from 1986 to 2022, yielding a total of 1,814 country-year-item observations. If all of these countries were surveyed in all of these years, we would have 3,528 observations per year and a total of 59,976 country-year-item observations. However, the actual dataset is far more limited, with only 1,344 country-years containing at least some

[1]The complete list of trust in civil servants/public administration survey items is included in online Appendix A.

data on trust in civil servants. This accounts for 54% of the 2,475 country-years spanned by our dataset. Moreover, the many different survey items employed render these data incomparable and difficult to use together.

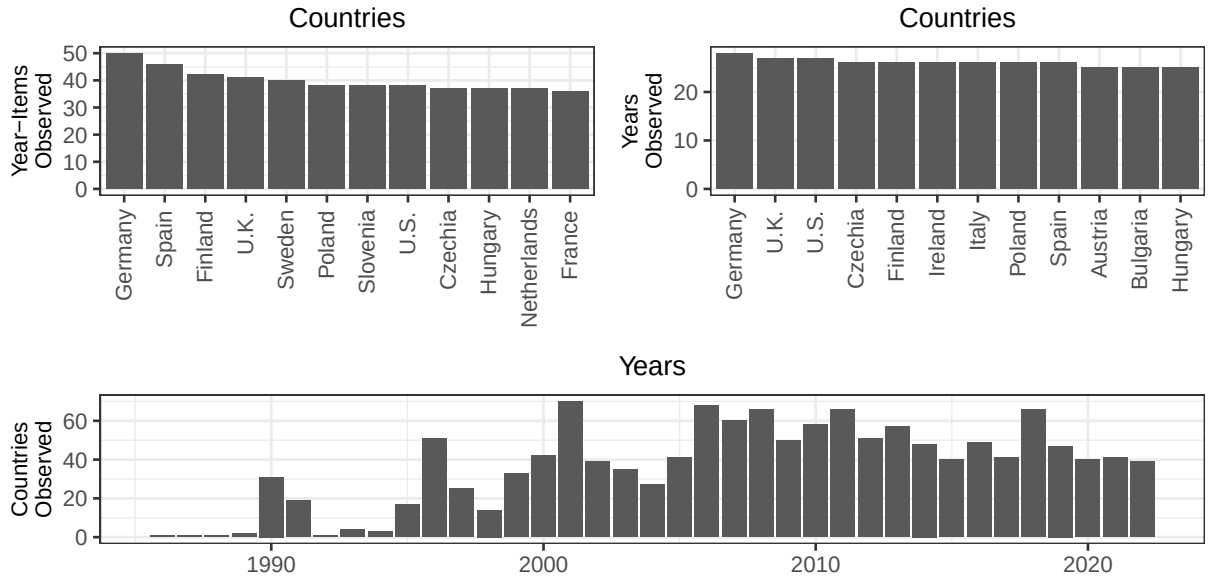


Figure 1: Countries and Years with the Most Observations in the Source Data

Consider the most frequently asked item in the data we collected, which asks respondents whether they strongly agree, agree, disagree, or strongly disagree with the statement "I am going to name a number of institutions. For each one, could you tell me how much trust you have in them. Is it a great deal of trust, some trust, not very much trust or none at all? Civil service."[2] Employed by the Arab Barometer, the Asia Europe Survey, the Asian Barometer, the British Social Attitudes Survey, the Latino Barometer, the East Asian Social Survey, the European Values Survey, the Italian National Election Study, the South Asian Barometer, and the World Values Survey, this question was asked in a total of 614 different country-years. However, this represents only 25% of the country-years spanned by our data, despite being the *most common* survey item. This again underscores the sparse and often

[2]Question text may vary slightly across survey datasets, but not, roughly speaking, by more than the translation differences across languages found within the typical cross-national survey dataset. In this case, some questions ask about "the public administration" or "government officials" rather than "the civil service," and some refer to "confidence" rather than "trust." These words are often translated identically.

incomparable nature of the available public opinion data on this topic.

The distribution of country-year-item observations further highlights the limitations of the raw dataset. As depicted in the upper left panel of Figure 1, Germany, with 50 country-year-item observations, is the most represented country, followed by Spain, Finland, the United Kingdom, and Sweden. The upper right panel expands on this by listing the twelve countries with the highest number of years observed, revealing overlaps and differences from the previous group; Ireland, Italy, Austria, and Bulgaria join the list, replacing Sweden, Slovenia, Netherlands, and France. The bottom panel counts the countries observed in each year and reveals just how few relevant survey items were asked before 1996. Country coverage reached its peak in 2001, when respondents in 70 countries were asked items about trust in civil servants.

In the next section, we describe how we leveraged this sparse and incomparable survey data to generate complete, comparable time-series TCS scores using a latent variable model.

### Estimating Trust in Civil Servants

Several latent-variable models of public opinion based on cross-national survey data have been developed recently (see Claassen 2019; Caughey, O'Grady, and Warshaw 2019; McGann, Dellepiane-Avellaneda, and Bartle 2019; Kolczynska et al. 2020). To estimate trust in civil servants across countries and over time, we employ the recent and suitable method for handling data that is both incomparable and sparse: the Dynamic Comparative Public Opinion (DCPO) model built by Solt (2020c).[3] The DCPO model, a population-level two-parameter ordinal logistic item response theory (IRT) model with country-specific item-bias terms, addresses the two principal challenges posed by our source data: incomparability and sparsity.

[3]The DCPO model provides a better fit to survey data than the models proposed in Claassen (2019) or Caughey, O'Grady, and Warshaw (2019; Solt 2020c). The model put forward in McGann, Dellepiane-Avellaneda, and Bartle (2019) depends on dense survey data unlike the sparse data on trust in civil servants just described. Building on all of these four works, Kolczynska et al. (2020) is the very most recent effort, but the multilevel regression and post-stratification (MRP) approach it offers depends both on dense survey data and on additional data describing population characteristics, so it too is inappropriate for our purposes here.

The DCPO model accounts for the incomparability of different survey questions with two parameters. First, it incorporates the *difficulty* of each question's responses, that is, how much trust in civil servants is indicated by a given response. The extent to which each response reflects the latent trait is most clearly demonstrated through ordinal responses to the same question: strongly agreeing with the statement "Most government administrators (civil servants) can be trusted to do what is best for the country," exhibits more trust in civil servants than simply agreeing, which shows more trust than responding "disagree," which in turn is a more trusting response than "strongly disagree." This logic extends across different questions as well. For example, expressing "great trust" in civil servants "to look after your interests" likely expresses even more trust than just strongly agreeing that civil servants can be trusted to do what is right. Second, the DCPO model accounts for each question's *dispersion*, its noisiness with regard to our latent trait. The lower a question's dispersion, the better that changes in responses to the question map onto changes in trust of civil servants. Together, the model's difficulty and dispersion estimates work to generate comparable estimates of the latent variable of trust in civil servants from the available but incomparable source data.

To address the sparsity of the source data, characterized by gaps in the time series for each country and many country-years with only a single available item, the DCPO model employs random-walk priors for each country. This means that within each country, a given year's trust level is modeled as the previous year's estimate plus a random shock. These random-walk priors smooth trust estimates over time, allowing the generation of estimates even for years with little or no data, albeit with greater measurement uncertainty. For more information on the DCPO model, see Appendix B and Solt (2020c, 3–8).

We estimated the model using the `DCPOtools` package for R (Solt 2020a), running four chains for 1,000 iterations each and discarding the first half as warmup, which left us with 2,000 samples. The $\widehat{R}$ diagnostic had a maximum value of 1.01, indicating that the model converged. The dispersion parameters of the survey items indicate that all of our source data items load well on the latent variable (see Appendix A).

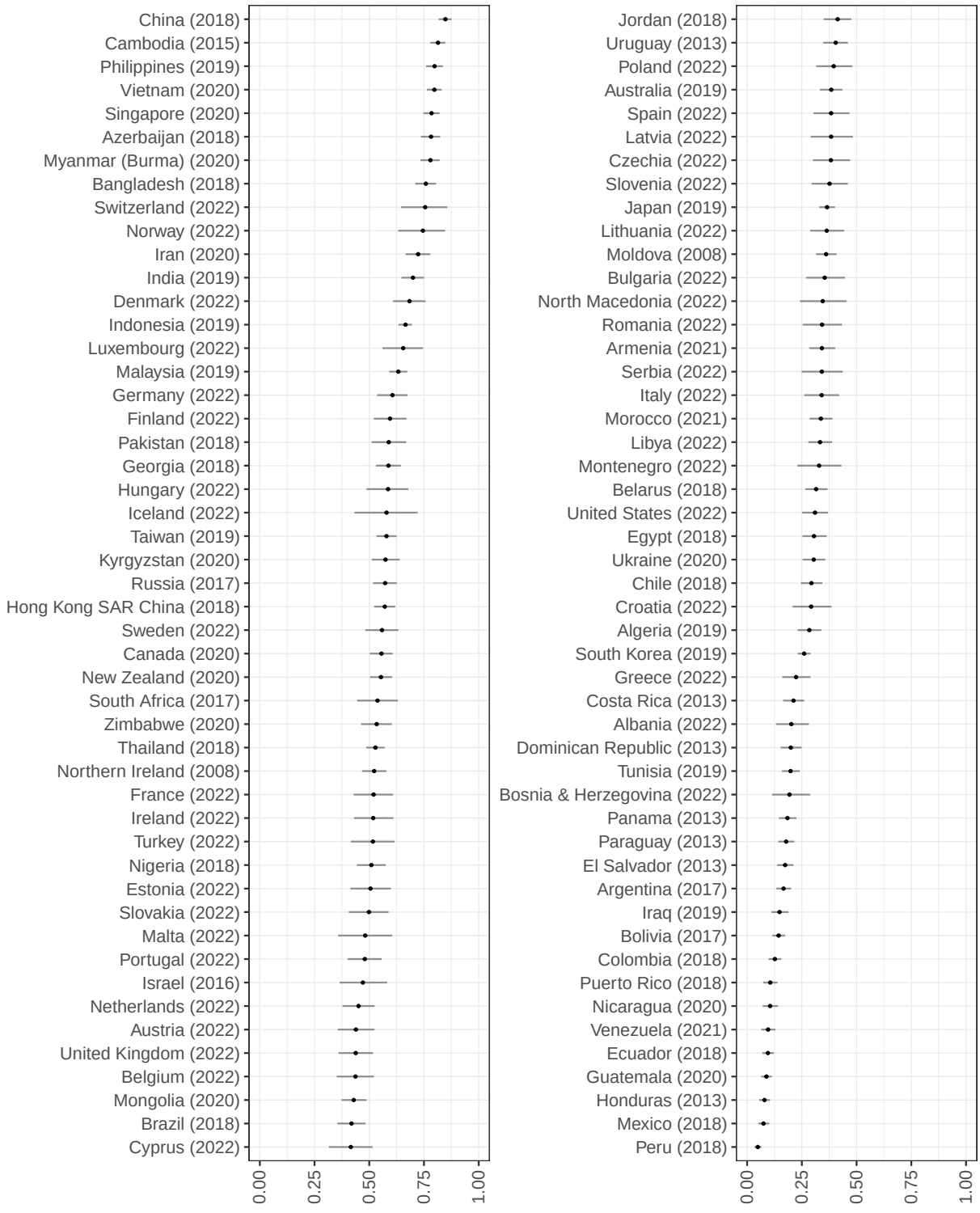


Figure 2: TCS Scores, Most Recent Available Year

The result is estimates, in all 2,475 country-years spanned by the source data, of public trust in civil servants, what we call TCS scores. Figure 2 displays the most recent available TCS score for each of the 98 countries and territories in the dataset.

Asian countries, especially those with a history of meritocracy, dominate the top of the list. The least corrupt counties, like Switzerland, Norway, Denmark and Finland, also rank highly. On the other hand, the latest scores for Peru, Mexico, Honduras, Guatemala, and Ecuador have them as the places where the public has the lowest trust toward civil servants. The bottom-ranked countries are either among the most corrupt, like Venezuela, or have high crime rates, like Peru and Honduras.

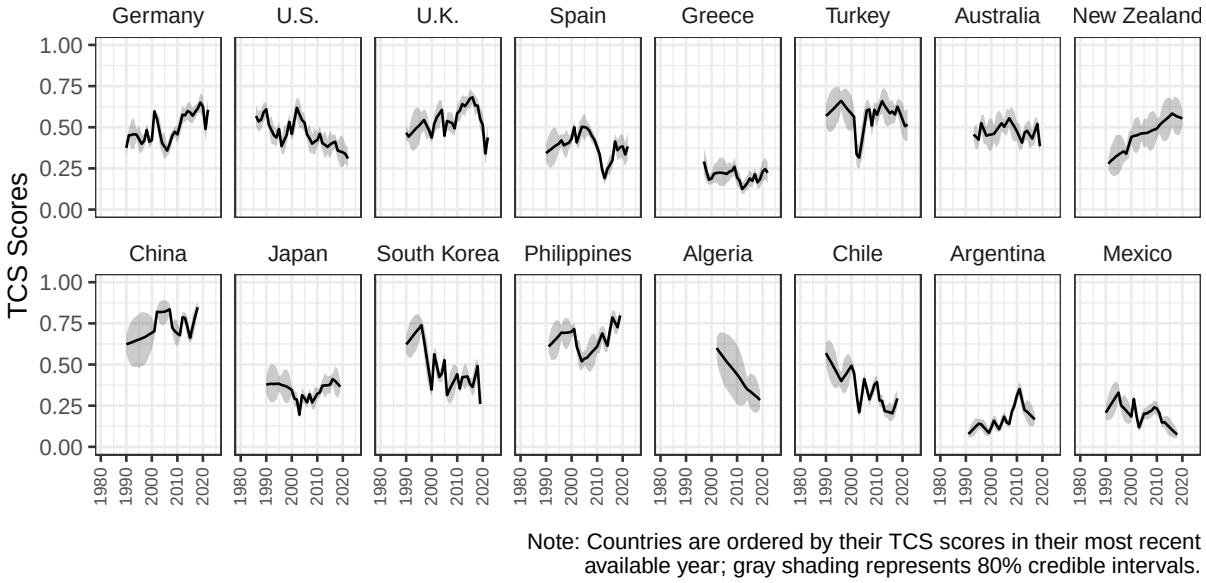


Figure 3: TCS Scores Over Time Within Selected Countries

We show the changes of TCS over time in sixteen countries in Figure 3. As displayed in Figure 2, the dataset covers a wide geographic breadth, allowing comparative studies of countries and regions too often neglected (see Wilson and Knutsen 2020). Figure 3 also shows that trust in civil servants has risen prominently in some countries, such as Germany and New Zealand, while remaining fairly constant over time in others, like Greece and Australia. In contrast, TCS scores have fallen steadily in countries such as South Korea and the United States. Some countries exhibit fluctuations, as seen in the United Kingdom, where trust

has advanced and retreated, or the Philippines, where trust has declined and later recovered. Together, the differences within countries over time and the differences across countries present a challenge to theories on the causes and consequences of trust in civil servants.

### Validating Trust in Civil Servants

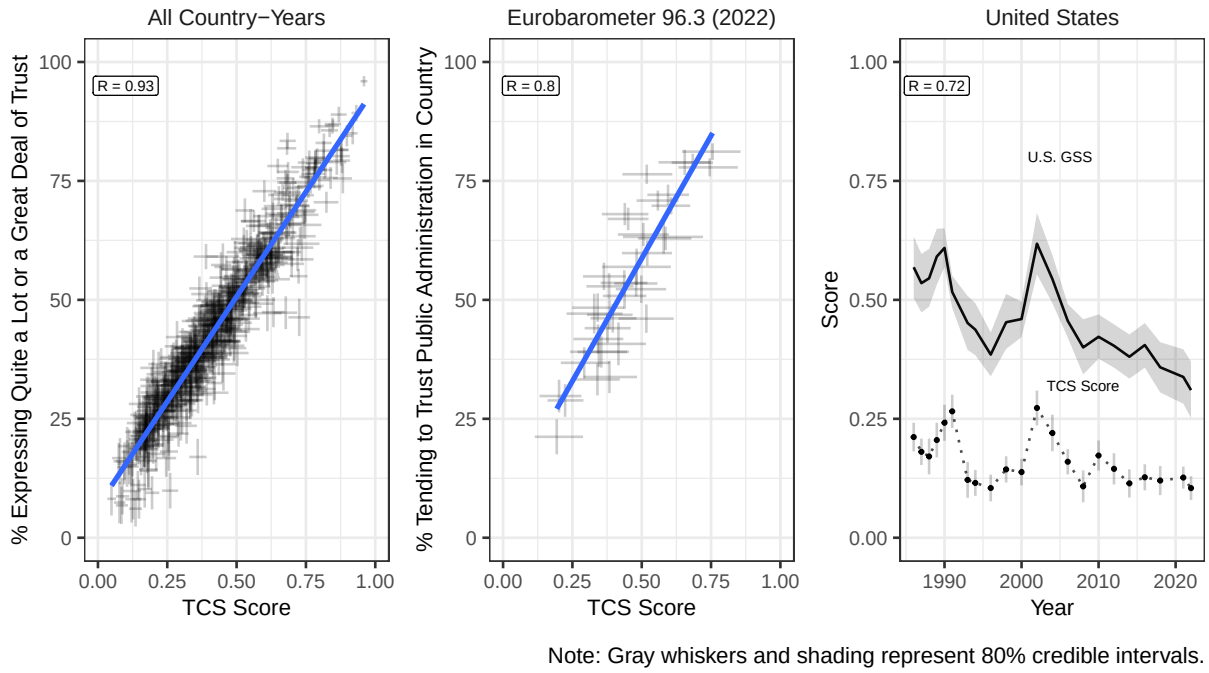


Figure 4: Convergent Validation: Correlations Between TSC Scores and Individual TSC Source-Data Survey Items

Before using these estimates in analysis, we validate our trust civil service score through convergent validation and construct validation, since validation tests of cross-national latent variables are crucially important (see, e.g., Hu et al. 2023). Figure 4 shows the measure's validity in tests of convergent validation that tests whether a measure is empirically associated with alternative indicators of the same concept (Adcock and Collier 2001, 540). We started with 'internal' convergent validation test (see, e.g., Caughey, O'Grady, and Warshaw 2019, 689; Solt 2020c, 10) by comparing our TCS score with individual items from source-data to generate them.

The left panel in Figure 4 shows a scatterplot of country-years in which the TCS scores are plotted against the percentage of respondents who expressed "a quite a lot"or "a great deal" of trust in response to the question: "I am going to name a number of institutions. For each one, could you tell me how much trust you have in them. Is it a great deal of trust, some trust, not very much trust or none at all? Civil service." The strong correlation (R = 0.93) indicates that TCS scores effectively capture variations in trust in civil service across country-years.

The middle panel plots our TCS score against the percentage who responded "Tend to trust." to the question, "I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it: Public administration in (OUR COUNTRY)" in the Eurobarometer 96.3 January-February 2022 module. This question is asked in the most countries, and the strong correlation demonstrates the broad applicability of the TCS scores in capturing trust across diverse contexts.

Finally, the right panel compares the trend of the longest item that has been asked since 1973 in U.S.General Social Survey, "I am going to name some institutions in this country. As far as the people running these institutions are concerned, would you say you have a great deal of confidence, only some confidence, or hardly any confidence at all in them? Executive branch of the federal government." to the trend of the TCS scores. The TCS scores align with trends in trust in the executive branch over time, effectively capturing historical changes.

Figure 5 present three 'external' convergent validation tests, comparing TCS scores to responses to survey items that were *not* included in the source data: items that asked respondents' confidence and trust in national government, parliament, and judiciary in their countries. In the left panel, we plot TCS score against data from seven rounds of World Value Survey, which asked respondents how much they trust their national government. The center plot shows data from European Values Surveys asking respondents' confidence in parliament. The right presents the percentage of respondents who expressed at least some trust in judiciary in their country in Latinobarometro. Our measure positively correlated

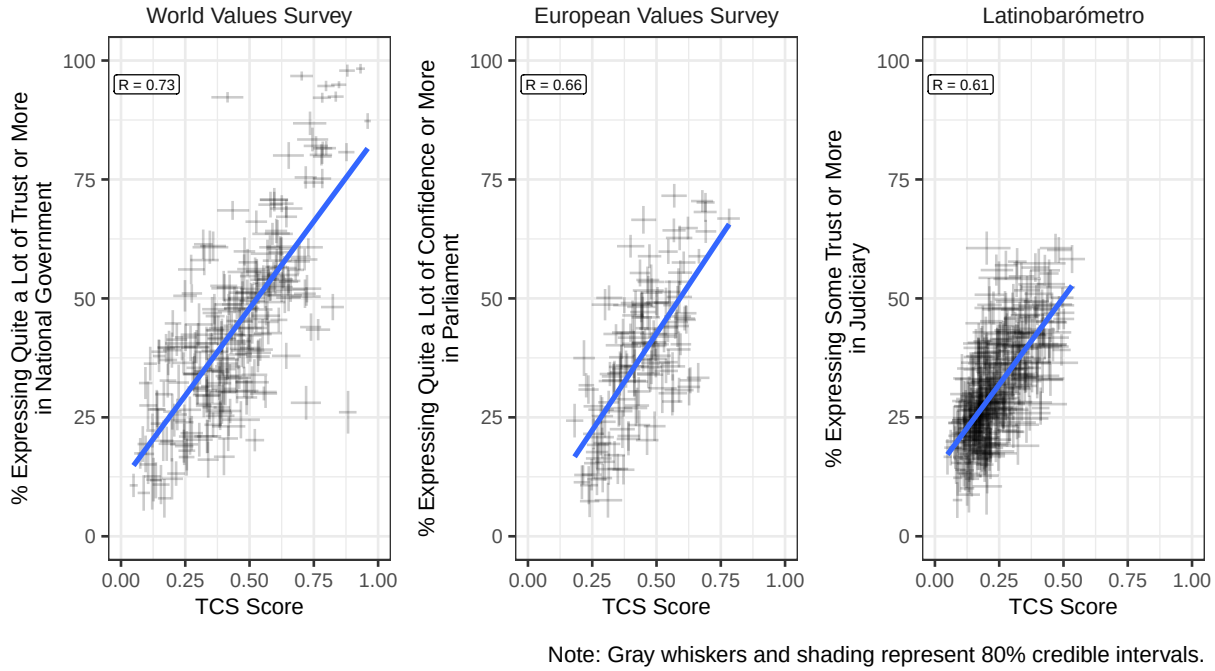


Figure 5: Construct Validation: Correlations Between TCS Scores and Trust in Institutions Survey Items

with all of them, with a stronger correlation with trust in national government and mild correlation with trust in parliament and judiciary.

There is a longstanding debate about the dimentionality of political trust (Easton 1965; Marien and Hooghe 2011; Norris 2011; Rothstein and Stolle 2008; Tai 2022). Trust in civil servants has been theoretically grouped within the same dimension as all three types of institutional trust (Marien and Hooghe 2011; Hooghe 2011), or one of them (Norris 2011; Rothstein and Stolle 2008; Tai 2022). However, the variation in correlations between TCS scores and trust in institutions requires empirical analysis of trust's dimensions.

We next conduct tests of construct validation in Figure 6. Construct validation assesses whether a given indicator is empirically correlated with other indicators in a way that conforms to theoretical expectations (Adcock and Collier 2001, 542). Corruption is often often argued as a likely contributor to distrust in civil servants and public administration (see, e.g., Anderson and Tverdova 2003; Van Ryzin 2011; Van de Walle and Migchelbrink 2022).

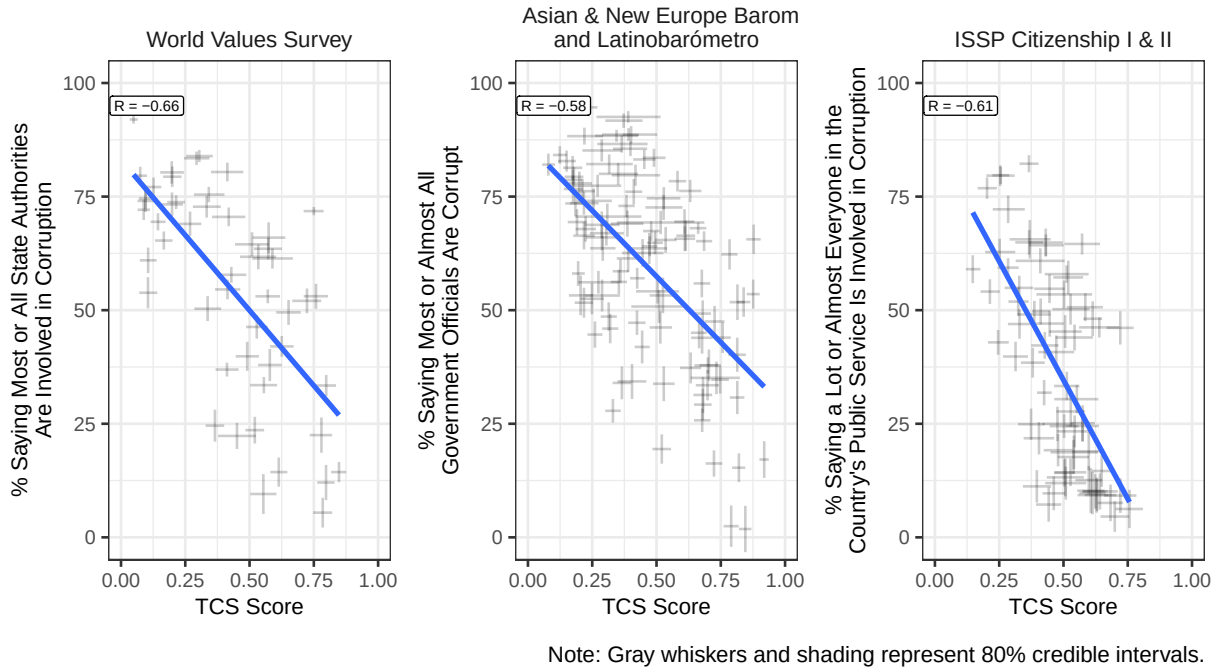


Figure 6: Construct Validation: Correlations Between TCS Scores and Corruption of Public Servants Survey Items

The left panel compares perceived widespread of corruption, measured as the percentage of those saying most or state authorities are involved in corruption in seven waves of the WVS, with the TCS scores. As anticipated, there is a clear negative relationship between the spread of perceived corruption and the TCS scores: when there is widespread perception of corruption in authorities, the public tends to distrust civil servants. The similar negative correlations between TCS scores and perceived corruption among government officials are also perceived in the center and right panel of Figure 6, which used data from different regions. The center panel shows the data in developing or newly democratic countries surveyed in the Asian Barometer, the New Europe Barometer, and the Latinobarometro, and the right panel displays the data in countries surveyed in the International Social Survey Programme Citizenship module (2004, 2014).

To sum up, the evidence of construct validation of TCS scores against the perceived widespread of corruption in Figure 6, together with the evidence of external validation in

Figure 5 and convergent validation in Figure 4, demonstrates the validity of the TCS scores as measures of the public's trust in civil servants.

**Explaining Trust in Civil Servants**

With our time-series cross-national data on trust in civil servants, we combined both outcome and quality indicators to examine the factors influencing this trust. For outcome indicators, we followed previous studies and used GDP per capita, inflation, and unemployment from 1984 to 2022 as measures of macroeconomic performance. GDP per capita and inflation data were sourced from the International Monetary Fund, while unemployment data were collected from the World Bank, which uses modeled International Labour Organization estimates. Regarding income inequality, we relied on the Standardized World Income Inequality Database presented in Solt (2020b), specifically the Gini index of inequality in disposable income.

For quality of government indicators, we included the Corruption Perceptions Index from Transparency International, covering the years 1995 to 2022, to capture the perceived level of corruption. We also used the Government Effectiveness indicator from the World Bank's Worldwide Governance Indicators, as it reflects the overall quality of public services, the civil service, and policy formulation and implementation.

To further leverage our trust data, we collected the number of intentional homicides at the country-year level from the United Nations Office on Drugs and Crime, capturing outcomes in public safety, given that macroeconomic outcomes do not represent government performance in other critical fields (Van Ryzin 2011; Morelock 2021). To account for the effect of democratic development on trust, we included the Liberal Democracy Index from the V-Dem dataset(Coppedge et al. 2023; Pemstein et al. 2023).

We adopted a Bayesian multilevel model with varying intercepts for each country and each year. The varying intercepts for each country account for heteroskedasticity across countries, while those for each year account for 'time shocks' that impact all countries simultaneously (Shor et al. 2007). To differentiate between short-term and historical effects, we used the

'within-between random effects' specification as described by Bell and Jones (2015) and Woo et al. (2023). This approach models the time-invariant country mean alongside the time-varying difference from this mean for each country-year.

Finally, we addressed measurement uncertainty in the data for trust in bureaucracies, income inequality, and the Corruption Perceptions Index by incorporating it into the analysis (see Tai, Hu, and Solt (2024)). The model was estimated using the `brms` R package (Bürkner 2017).

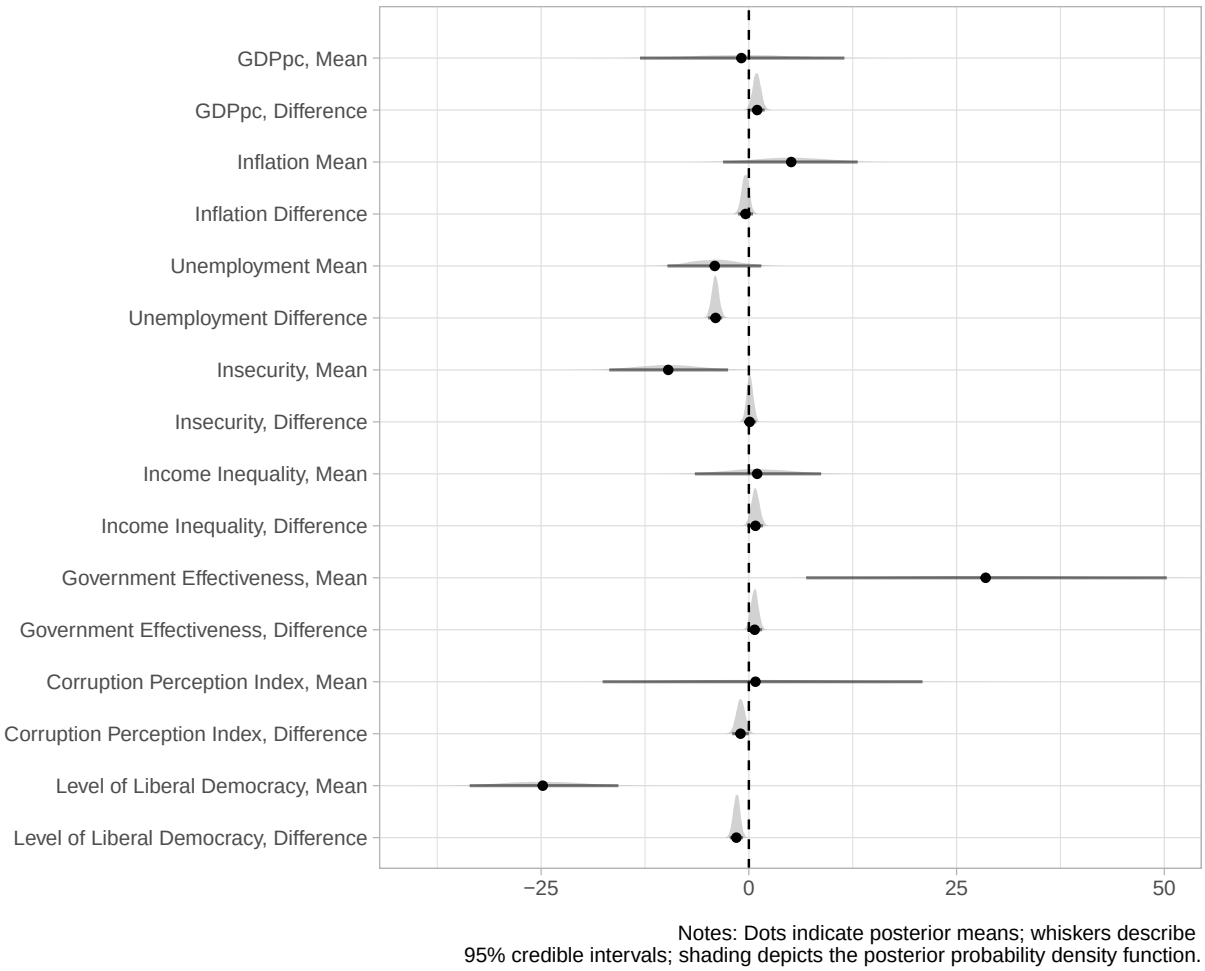


Figure 7: Predicting Trust in Civil Servants Across Countries Over Time

The results are presented in Figure 7. In terms of economic outcomes, the increase in GDP per capita is associated with a higher level of trust in civil servants in the short term.

A two-standard-deviation year-to-year change in per capita income increases trust by 1 (95% c.i.: 0 to 1.9) point. This significant but relatively small effect suggests that GDP growth alone may not be sufficient to sustain high levels of trust in civil servants, given that economic growth may not transfer to effective resource management and service delivery.

Unemployment exhibits a strong negative effect on trust in civil servants, with a two-standard-deviation year-to-year increase in unemployment decreasing trust in civil servants by 4 (95% c.i.: -4.9 to -3.2) points. High unemployment rates can signal government inefficiency or failure to address critical economic challenges, eroding trust in civil servants.

In terms of public safety, the mean number of intentional homicides has a long-term negative impact on trust in civil servants. A two-standard deviation increase in a country's mean number of homicides is associated with 9.7 (95% c.i.: -16.8 to -2.5) points less trust. High levels of violence and insecurity can undermine public confidence in the administration's competence to uphold law and order, diminishing trust in its civil service (Berg and Johansson 2016; Uddin 2024). We found no evidence that either inflation or income inequality significantly affects trust in civil servants in the short or long term, when other factors are controlled.

Regarding process, a higher government effectiveness score has a strong positive long-term effect on trust in civil servants. A two-standard deviation increase in a country's mean effectiveness score is associated with 28.5 (95% c.i.: 6.9 to 50.3) points more trust across countries. This finding suggests that improving the perceived quality of public services and policy formulation can lead to a sustained increase in trust. Coproduction of public value provides a compelling explanation, emphasizing how involving individuals in policy-making processes can strengthen trust in the public sector(Schmidthuber, Ingrams, and Hilgers 2021).

Although democratic capacity is found to mediate the relationship between government openness and public trust (Schmidthuber, Ingrams, and Hilgers 2021), we found the development of democracy is associated with less trust in civil servants, both in the long run and in the short term. Critical citizens in more democratic countries may trust civil servant only

critically and have higher expectations of them (Norris 1999). However, perceived corruption was not consistently associated with trust in civil servants in either the long term or short run; these estimates are close to zero.

We find evidence for arguments on both government outcomes and government quality. However, government quality, measured by mean government effectiveness—exert larger effects over long term than economic and public security outcomes like GDP per capita, unemployment, and insecurity. To sustain trust in civil servants, policymakers and practitioners should prioritize institutional reforms that enhance effectiveness and inclusiveness.

## Conclusion

The study of comparative public administration has long been hindered by the lack of comparable measures across countries and over time. Specifically, the scarcity of comparable data on trust in civil servants complicates the testing of competing theories regarding the determinants of such trust, leading to inconsistent findings.

In this research, we employ a state-of-the-art latent-variable model (Solt 2020c) to develop a dynamic comparative measure of trust in civil servants. Our measures reveal significant variations in trust both within and across countries over time. Our analysis of time-series cross-sectional data indicates that trust in civil servants is positively influenced by economic performance and public security in the short term. However,in the long term, trust is more strongly enhanced by government quality and effectiveness in service delivery, policy formation, and implementation.

While this study focuses on the sources of trust in civil servants, the publicly accessible Trust in Civil Servants (TCS) dataset we provide opens opportunities for future research to explore the consequences of such trust. Researchers can leverage the TCS dataset to examine how varying levels of trust influence governance such as policy implementation effectiveness, citizen compliance with regulations, and overall public satisfaction with government services. Moreover, the longitudinal nature of the dataset facilitates the study of temporal dynamics, enabling researchers to assess how changes in trust over time correlate with shifts in

government's policy priorities, governance reforms, or public policy preferences. By offering a robust and comparable measure across countries and over time, the TCS dataset serves as a valuable resource for testing theoretical models that link trust to aspects of public administration and governance.

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# Behind Bureaucracy: Public Opinion on Public Servants in Dynamic Comparative Perspective

December 21, 2024

## Appendices

### Appendix A: Survey Items Used to Estimate Trust in Civil Servants

National and cross-national surveys have often included questions tapping trusting attitudes 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 17 such survey items that were asked in no fewer than five country-years in countries surveyed at least twice; these items were drawn from 132 different survey datasets. These items are listed in the table below, along with the dispersion ($\alpha$) and difficulty ($\beta$) scores estimated for each from the DCPO model. Question text may vary slightly across survey datasets, but not, roughly speaking, by more than the translation differences across languages found within the typical cross-national survey dataset. Lower values of dispersion indicate questions that better identify publics with a higher level of trust from those with lower. Items have one less difficulty score than the number of response categories. Survey dataset codes correspond to those used in the `DCPOtools` R package; they appear in decreasing order of country-years contributed.

Together, the survey items in the source data were asked in 98 different countries in at least two time points over 36 years, from 1973 to 2022, yielding a total of 1,814 country-year-item observations. The number of items observed in the source data for each country-year is plotted in Figure @ref(fig:obs_by_cy) below. The TCS scores of country-years with more observed items are likely to be estimated more precisely. The estimates for country-years with fewer (or no) observed items rely more heavily (or entirely) on the random-walk prior and are therefore less certain.

Table A1: Indicators Used in the Unidimensional Latent Variable Model of Democratic Support

| Survey Item Code | Country-Years | Question Text | Response Categories | Dispersion | Difficulties | Survey Dataset Codes |
|---|---|---|---|---|---|---|
| trust4 | 614 | And how much trust do you have in... Civil service / public administration | 1 A great deal of trust / 2 Quite a lot of trust / 3 Not a lot of trust / 4 No trust at all | 0.88 | -1.39, 1.00, 3.86 | evs, wvs, ases, lb, bsa, asianb, eass, itanes, kgss, sasianb, arabb |
| trust2 | 348 | I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trustit or tend not to trust it? Civil service | 1 Tend to trust / 2 Tend not to trust | 1.13 | 0.79 | eb, cceb |
| runswell4 | 197 | How would you judge the current situation in each of the following? The way public administration runs in | 1 Very good / 2 Rather good / 3 Rather bad / 4 Very bad | | | eb |
| right5 | 109 | Most of the time we can trust people in government to do what is right. | 1 Strongly agree / 5 Strongly disagree | 0.85 | -1.11, 0.65, 2.00, 4.66 | issp, usgss |
| best5 | 94 | Most government administrators | 1 Strongly agree / 5 Strongly disagree | 1.24 | -1.61, 0.53, 2.32, 5.65 | issp, usgss, kgss |
| image4 | 89 | Could you please tell me for each of the following, whether the term brings to mind something very positive, fairly positive, fairly negative or very negative. Public administration | 1 Very positive / 2 Fairly positive / 3 Fairly negative / 4 Very negative | 0.83 | -1.80, 0.30, 3.03 | eb |
| trustmun4 | 81 | Generally speaking, the public administration of [CITY NAME] can be trusted | 1 Strongly agree / 4 Strongly disagree | | | feb, lb |
| trustff4 | 73 | Please look at this card and tell me how much confidence you have in each of the following groups, institutions or persons mentioned on the list: a lot, some, a little or no confidence? Firefighters | 1 A lot / 2 Some / 3 A little / 4 None | | | lb |
| right4 | 60 | You can generally trust the people who run our government to do what is right. | 1 Strongly agree / 4 Strongly disagree | 0.54 | -0.58, 1.18, 3.44 | asianb |
| trust3 | 32 | Trust in Ministries and Government Agencies | 1 Very much / 2 Some / 3 Not very much | 1.02 | -0.02, 3.02 | usgss, jgss |
| trusteuro2 | 30 | If you would trust information they provide on the changeover to the euro: Public administration | 1 trust / 2 do not trust | | | feb |
| trustpollution5 | 26 | How much trust do you have in each of the following groups to give you correct information about causes of pollution? Government departments | 1 A great deal of trust / 2 Quite a lot of trust / 3 Some trust / 4 Not much trust / 5 Hardly any trust | | | issp |

*(continued)*

| Survey Item Code | Country-Years | Question Text | Response Categories | Dispersion | Difficulties | Survey Dataset Codes |
|---|---|---|---|---|---|---|
| trust5 | 23 | Confidence in the Civil Service? | 1 Complete confidence / 2 A great deal of confidence / 3 Some confidence / 4 Very little confidence / 5 No confidence at all | 0.54 | -0.81, 0.41, 1.88, 3.38 | issp, gles, fsdtrust, fsdeva, bsa |
| trust11 | 16 | Now, thinking about institutions like Parliament, please use the scale of 0 to 10 to indicate how much trust you have for each of the following, where 0 is no trust and 10 is a great deal of trust: | 0 No trust / 10 A great deal of trust | 0.56 | -1.36, -1.01, -0.55, -0.08, 0.32, 1.04, 1.50, 2.15, 3.11, 3.96 | cid, fsdelection, bes |
| right4a | 10 | In general, do you feel that the people in government are too often interested in looking after themselves, or do you feel that they can be trusted to do the right thing nearly all the time? | 1 Usually look after themselves / 2 Sometimes look after themselves / 3 Sometimes can be trusted to do the right thing / 4 Usually can be trusted to do the right thing | 0.81 | 0.48, 1.49, 2.93 | aes |
| interests7 | 8 | To what extent do you trust each of these political institutions to look after your interests? Civil servants | 1 No trust / 7 Great trust | 0.40 | -1.14, 0.20, 0.84, 1.53, 2.86, 3.46 | neb |
| trustmun7 | 4 | Please tell me for each institution or organisation how much trust you place in it. The municipal administration | 1 Absolutely no trust at all / 23456 / 7 A great deal of trust | | | allbus |

## Appendix B: The DCPO Model

A number of recent studies have developed 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 trust in civil servants across countries and over time, we employ 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 elaborated in Solt (2020c).[1] The DCPO model is a population-level two-parameter ordinal logistic item response theory (IRT) model with country-specific item-bias terms.

DCPO models the total number of survey responses expressing at least as much trust in civil servants as response category $r$ to each question $q$ in country $k$ at time $t$, $y_{ktqr}$, out of the total number of respondents surveyed, $n_{ktqr}$, using the beta-binomial distribution:

$$a_{ktqr} = \phi\eta_{ktqr} \tag{1}$$

$$b_{ktqr} = \phi(1 - \eta_{ktqr}) \tag{2}$$

$$y_{ktqr} \sim \text{BetaBinomial}(n_{ktqr}, a_{ktqr}, b_{ktqr}) \tag{3}$$

where $\phi$ represents an overall dispersion parameter to account for additional sources of survey error beyond sampling error and $\eta_{ktqr}$ is 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 $r$.[2]

This expected probability, $\eta_{ktqr}$, is in turn estimated as follows:

$$\eta_{ktqr} = \text{logit}^{-1}\left(\frac{\bar{\theta'}_{kt} - (\beta_{qr} + \delta_{kq})}{\sqrt{\alpha_q^2 + (1.7 * \sigma_{kt})^2}}\right) \tag{4}$$

In this equation, $\beta_{qr}$ represents the difficulty of response $r$ to question $q$, that is, the degree of trust in civil servants the response expresses. The $\delta_{kq}$ term represents country-specific item bias: the extent to which all responses to a particular question $q$ may be more (or less) difficult in a given country $k$ due to translation issues, cultural differences in response styles, or other idiosyncrasies that render the same survey item not equivalent across countries.[3]

[1] Solt (2020c) 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 trust in civil servants described in the preceding section. Kolczynska et al. (2020) is the very most recent of these 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.

[2] The ordinal responses to question $q$ are coded to range from 1 (expressing the least trust in civil servants) to $R$ (expressing the most trust in civil servants), and $r$ takes on all values greater than 1 and less than or equal to $R$.

[3] Estimating $\delta_{kq}$ requires repeated administrations of question $q$ in country $k$, so when responses to question $q$ are observed in country $k$ in only a single year, the DCPO model sets $\delta_{kq}$ to zero by assumption,

The dispersion of question $q$, its noisiness in relation to our latent variable, is $\alpha_q$. The mean and standard deviation of the unbounded latent trait of trust in civil servants are $\bar{\theta'}_{kt}$ and $\sigma_{kt}$, respectively.

Random-walk priors are used to account for the dynamics in $\bar{\theta'}_{kt}$ and $\sigma_{kt}$, and weakly informative priors are placed on the other parameters.[4] The dispersion parameters $\alpha_q$ are constrained to be positive and all survey responses are coded with high values indicating more trust in civil servants to fix direction. The difficulty $\beta$ of "disagree" (on the four-point, "strongly agree" to "strongly disagree" scale) to the statement "On the whole, men make better political leaders than women do" is set to 1 to identify location, and for each question $q$ the difficulties for increasing response categories $r$ are constrained to be increasing. The sum of $\delta_{kq}$ across all countries $k$ is set to zero for each question $q$:

$$\sum_{k=1}^{K} \delta_{kq} = 0 \tag{5}$$

Finally, the logistic function is used to transform $\bar{\theta'}_{kt}$ to the unit interval and so give the bounded mean of latent trust in civil servants, $\bar{\theta}_{kt}$, which is our parameter of interest here (see Solt 2020c, 3–8).

The DCPO model accounts for the incomparability of different survey questions with two parameters. First, it incorporates the *difficulty* of each question's responses, that is, how much trust in civil servants is indicated by a given response. That each response evinces more or less of our latent trait is most easily seen with regard to the ordinal responses to the same question: strongly agreeing with the statement "both the husband and wife should contribute to household income," exhibits more trust in civil servants than responding "agree," which in turn is more egalitarian than responding "disagree," which is a more egalitarian response than "strongly disagree." But this is also true across questions. For example, strongly disagreeing that "on the whole, men make better business executives than women do" likely expresses even more egalitarianism than strongly agreeing merely that both spouses should have paying jobs. Second, the DCPO model accounts for each question's *dispersion*, its noisiness with regard to our latent trait. The lower a question's dispersion, the better that changes in responses to the question map onto changes in trust in civil servants. Together,

increasing the error of the model by any country-item bias that is present. Questions that are asked repeatedly over time in only a single country pose no risk of country-specific item bias, so $\delta_{kq}$ in such cases are also set to zero.

[4]The dispersion parameters $\alpha_q$ are drawn from standard half-normal prior distributions, that is, the positive half of N(0, 1). The first difficulty parameters for each question, $\beta_{q1}$, are drawn from standard normal prior distributions, and the differences between $\beta$s for each $r$ for the same question $q$ are drawn from standard half-normal prior distributions. The item-bias parameters $\delta_{kq}$ receive normally-distributed hierarchical priors with mean 0 and standard deviations drawn from standard half-normal prior distributions. The initial value of the mean unbounded latent trait for each country, $\bar{\theta'}_{k1}$, is assigned a standard normal prior, as are the transition variances $\sigma^2_{\bar{\theta'}}$ and $\sigma^2_{\sigma}$; the initial value of the standard deviation of the unbounded latent trait for each country, $\sigma_{k1}$, is drawn from a standard lognormal prior distribution. The overall dispersion, $\phi$, receives a somewhat more informative prior drawn from a gamma(4, 0.1) distribution that yields values that are well scaled for that parameter.

the model's difficulty and dispersion estimates work to generate comparable estimates of the latent variable of trust in civil servants from the available but incomparable source data.

To address the sparsity of the source data—the fact that there are gaps in the time series of each country, and even many observed country-years have only one or few observed items—DCPO uses simple local-level dynamic linear models, i.e., random-walk priors, for each country. That is, within each country, each year's value of trust in civil servants is modeled as the previous year's estimate plus a random shock. These dynamic models smooth the estimates of trust in civil servants over time and allow estimation even in years for which little or no survey data is available, albeit at the expense of greater measurement uncertainty.

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