



Is trust in government really declining? Evidence using the sequential probability ratio test

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Published online: 27 April 2020
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Abstract

Evidence for declining trust in government is often presented as the difference between the present day and an idealized period of high trust in government. The fact is, though, trust in government, in many OECD countries, was relatively low historically and remains so now. This questions whether one can definitively state that trust is declining. If trust in government is not declining but instead fluctuating, then the effects of declining trust on political and policy outcomes may be overstated. Additionally, if trust is relatively stable, then it suggests that marginal shifts in trust may be affected by specific policy actions rather than large shifts in citizens' attitudes. Using a simple yet powerful tool, the Sequential Probability Ratio Test, this analysis tests whether trust is in general decline. This test works in a manner that is different from traditional hypothesis testing. Rather than using fixed samples, one chooses a single measure—such as trust at an idealized time or average trust within a given period, and then tests whether individual observations are different than that observation. The findings provide evidence that in all but a few cases, one cannot find statistically significant evidence for declining trust in government in OECD countries. Therefore, statements of general decline in trust may be overstated and relying on declining trust as an explanatory variable may require consideration of the events that preceded those declines.

Keywords Political trust · Methods · SPRT · Europe

Introduction

The study of trust in government has generally noted that trust is in decline (Newton and Norris 2000; Hetherington 2005). While some such as Van de Walle et al. (2008) use descriptive statistics to point out that a decline in trust may be overstated,

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and rather that it is simply fluctuating, the breadth of literature using trust in government both as an independent and dependent variables examines trust from the standpoint of a decline. Good reasons for an *a priori* view of declining trust are found in a quote by Nye (1997, p. 4) who observed, “explanations that confidence in government has declined because of the growth of its scope or its poor performance have *prima face* plausibility, but they are suspect unless one can prove that other institutions suffering a similar decline have also outgrown their appropriate scope...”.

Nye pointed out that polling data indicated a declining level of trust in government, in similar fashion to the declining trust related to declining social capital noted by Putnam (2000). Just as Putnam’s assertions of declining social capital were criticized for failing to account for levels of social capital observed prior to the starting point of his analysis, e.g., the Middletown studies, observation of general declines of trust in government may be overstated given that we observe from them from an idealized standpoint. In the USA, this tends to be late 1950s and early 1960s when trust in government was as high as 73% (ANES 2018). In other countries, where the data are less robust, we tend to point to the end of the Cold War as an idealized time (Kepplinger 2000; Vowles et al. 1998)—although many OECD countries and post-soviet countries lack data to test this assertion (Van de Walle et al. 2008). This raises a question about how we think about trust in government; is it reasonable to say that trust has declined, or do we simply observe fluctuations relative to mean levels of trust and point to an idealized time that is itself significantly different than the norm?

This manuscript addresses this question by offering a methodologically sound test for determining if trust in government is indeed declining. Further, the method employed herein can be used to determine if trust is indeed higher or lower relative a single point in time or over the average for a given period. There are numerous studies identifying the antecedents of changes in trust and so the intent of this manuscript is not to identify those antecedents in any general or specific sense. However, when evidence of changes in trust is found, either in fluctuation or in general decline, the author contextualizes the actions that preceded the changes within the individual countries.

Background

The null position in much of the literature appears to be that trust in government is in general decline across the world. In the US context, Hetherington (2005), Hetherington and Rudolph (2008), Rudolph and Evans (2005), Porumbescu (2017), Dalton (1999), Klingemann (1999), Khan (2016), and Macdonald (2019), all examining different phenomena related to trust, begin with a starting position that trust is in general decline. The USA is a relatively special case when considering trust given both the long run of data available and the fact that the USA has remained far more religious and conservative than other western industrialized countries (Inglehart



1997). In the US context, Rudolph and Evans (2005) note at the onset, trust has never recovered to the levels observed in the Great Society period (the period of pro-social/anti-poverty policies in the USA from 1964–1969). This means that when examining new methods for assessing changes in trust, we can reasonably consider the USA as a test case since we know what to expect given the breadth of data and generally accepted decline in trust from the 1960s onward.

Even in the US case, we may note some fluctuations, albeit unmeasured ones. High levels of trust during the Great Society period do not mean that trust was constant up to that period. If one considers the Middletown studies for example, although not a formal poll of political attitudes, the analysis found divergence in the levels of trust in government and political participation between wealthy elites and lower income individuals—the same sorts of findings observed by Macdonald (2019).

As with USA declines after the Great Society, we see similar positions of declining trust from idealized periods in European OECD countries, although studies of those countries are more nuanced given that they tend to be comparisons between individual states as opposed to studies of the OECD as a bloc. As noted by Dalton (2005, p. 137) though, “by expanding the cross-national and cross-temporal breadth of the empirical data, there is now clear evidence of a general erosion in support for politicians and government in most advanced industrial democracies.” This is reflected in observations by Inglehart (1997) and Newton and Norris (2000), that all public institutions showed significant (although varying) declines in trust following the Cold War. Their observations were based on the changing levels of trust observed in European countries from the fall of the USSR to the late 1990s. In their observations, they make note of the changing process and performance requirements placed upon government following the end of the Cold War. This is a point which Van der Meer and Hakhverdian (2017) take up in their study of how macroeconomic outcomes affected levels of trust in government across 42 European countries. Their analysis shows that after controlling for levels of corruption, macroeconomic policy does not affect levels of trust, e.g., studying the OECD as a bloc smooths the effects of macroeconomic policy. However, their study aggregates data for these countries, while individual studies show that macroeconomic policies do affect average levels of trust, for example, studies of Spain, Portugal, Greece, and Sweden (Holmberg 1998; Miller and Listhaug 1990; Torcal 2014; Exadaktylos and Zahariadis 2012; Medina 2015).

We are left with the proposition that trust is declining based on observations of levels of trust from an often idealized period, coupled with studies examining incremental fluctuations in trust that show it varying up and down based on policy actions. Studies that seek statistical significance of changing levels of trust such as Dalton (2005), Schoon and Chang (2011), and Van der Meer and Hakhverdian (2017) model changing levels of trust over time as a function of social, economic and political attitudes but do not address whether levels of trust are significantly



different than some prior (idealized or not) time period. There is a scarcity of studies examining whether one can state that declines in trust are meaningful relative to previous time periods, or whether we are simply interpreting the downward sloping line as indicative of meaningful decline and simply assuming statistical significance. An exception to this is Van de Walle et al. (2008), although they use a graphical representation of decline as opposed to statistical analysis.

Previous methods of testing whether trust is in general decline such as measuring cumulative sums or trusting or distrusting attitudes may be appealing; however, the need to adjust for unique, country-level, contexts adds an additional layer of complexity that may not produce reliable measures. Other suggestions include simply plotting differences between expected levels of trust given prior distributions of social surveys. This is in keeping with the general trend analysis detailed by Nye (1997) and used by Van de Walle et al. (2008). If one is concerned with identifying changes in trust, this means that non-trusting attitudes in excess of a prior distribution or relative to an event can be monitored, and changes in trust can be more easily identified based on the posterior distribution of respondent characteristics. For example, if one expects that trust or lack of trust in one's government has some average within a given confidence interval and one then observes a spike in non-trusting attitudes relative to some event, then one can determine how much of the difference in that spike versus the average is attributable to the event. By that same token, if one knows the average levels of trust over a given time period within a given confidence interval, then one can determine whether changes in trust relative to the average of a given time period are statistically significant or not.

Given the above, one must set appropriate thresholds indicating a point at which attitudes can be identified as being less trusting than prior time periods. These can be established from the data using surveys such as the American National Election Survey or Eurobarometer, both of which have standard trust questions. Specifically, using the data for prior time periods, one can establish the likelihood that a subsequent time period displays excess distrust, e.g., the sequential probability ratio test.

From a practical standpoint, if one can establish that trust is or is not in general decline, then one can begin to identify the sets of actions or policies that took place relative to that decline. If this is done outside of idealized starting points such as the Great Society in the USA or the end of the Cold War in Europe, then the capacity for identifying specific policy proposals to help rebuild trust is greatly improved. Further, if a decline does not exist, then it questions the basis for arguments of a general decline and should encourage further study of specific topics related to fluctuations in trust that are relative to the specific countries in which they are observed, and seek patterns that may be generalizable over specific policy types.

This manuscript proceeds with a discussion of why evidence of declining trust matters which includes a discussion of studies that use trust both as dependent and as independent variables. This is followed by a discussion of the data used to test the null that trust is in decline, followed by a description of the methods used to test the hypothesis. Finally, results, discussion, and conclusions are provided.



Why evidence of declining trust matters

If one starts from an assumption of a general decline in trust, but this assumption does not hold, then the analysis that proceeds from that assumption may be flawed. For example, our analyses of how factors such as macroeconomic conditions, social policies, or corruption affect trust may only reflect marginal changes in an otherwise stable variable. If trust is at otherwise stable levels with transient shocks, this would also change the conversation about trust in government from ‘why is trust declining?’ to ‘why do these specific policies/scandals/activities alter trust relative to the average?’ and ‘why do we see different levels of marginal change in one country versus another?’ Note that this analysis does not seek to address questions of effects on trust, rather it simply seeks to establish whether we can find statistically significant evidence for declining trust that is not dependent on using an idealized starting point. If no evidence of declining trust is found, then the reframing of questions noted above become more pertinent.

When examining trust government in the comparative context, scholars often cite Inglehart’s (1997) culture map in arguing that western countries are shifting towards post-materialist views which in turn is associated with greater co-production of policies; this in turn is associated with increased civic engagement and therefore increased trust, (Marien 2011; Schneider 2017). We have not seen such phenomena in the USA to the same degree as Europe though. As noted in the previous section, Inglehart’s rankings have the USA as an outlier relative to the rest of the western industrialized world, i.e., levels of religiosity and conservatism closer to developing countries (Simoni 2013). This means we likely cannot explain the changes in trust in other western countries in the same ways as in the USA. Therefore, any reason one could offer for declining trust in the USA (scope of government, policy failures, etc.) likely would not have the same effect if one were studying Europe. This is all the more reason to examine whether levels of trust are actually changing in a statistically significant way—if we cannot show that levels of trust are actually changing, then the study of cultural and institutional phenomena that start from a position of declining trust become country or culture-specific correlates of marginal change.

While the decline in trust in the USA has been explained by polarization and poor perceptions of government performance (Hetherington and Husser 2012; Hetherington 2005), accounting for declining trust in other OECD countries is more difficult. For example, sharp fluctuations in levels of trust in Greece and Spain between 2007 and 2010 (Table 1) may be accounted for by the austerity measures put in place in those countries coming out of the last recession (Exadaktylos and Zahariadis 2012; Medina 2015). However, other countries have seen increased levels of trust in government, e.g., Austria, Finland, and Sweden (Table 1). Relative to the findings of Inglehart (1997), the greater levels of social cohesion in these countries may account for the relatively higher levels of trust compared to other OECD countries (Ritzen and Woolcock 2000).



Table 1 Percentage Trust in OECD Countries, excluding USA

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Austria	40	45	47	51	51	46	56	54	54	49	50	42	42
Belgium	38	38	45	49	53	38	36	22	37	41	47	38	42
Denmark	53	56	57	54	62	58	59	50	48	43	38	48	55
Finland	49	67	66	65	67	65	51	49	59	60	52	52	60
France	30	29	24	22	39	30	26	25	25	37	19	17	19
Germany	24	33	28	33	45	39	43	32	36	40	41	48	50
Greece	47	50	42	43	44	29	35	25	12	7	10	14	37
Ireland	31	39	39	38	37	35	18	21	32	21	18	23	28
Italy	27	28	31	32	30	15	26	25	18	14	11	18	16
Luxembourg	60	67	70	64	66	58	73	66	73	63	57	51	51
Netherlands	37	38	40	45	61	51	53	47	51	45	41	51	51
Portugal	39	27	32	35	38	32	30	20	22	20	13	16	21
Spain	42	51	41	42	51	50	32	20	20	12	9	11	12
Sweden	42	41	33	41	48	51	56	57	63	59	59	54	49
UK	24	32	34	27	32	27	20	26	27	23	23	28	37

We see fluctuations in trust in most countries with several, e.g., Germany and the Netherlands experiencing increasing trust while others, e.g., France and Italy are pervasively low and declining

If we were to plot a line of average trust levels over time using the ANES, it would be difficult to draw a conclusion other than declining trust—see, e.g., Van de Walle et al. 2008. Specifically, in the USA, even if one discounts the idealized late 1950s and early 1960s as a period of high trust, we still see levels of trust in 2018 that are less than half what they were in the 1970s. In Europe, the question is more difficult since the reliability of data across most European countries is only reliably collected beginning in about 2003 (Van de Walle et al. 2008) and we tend to find variation in the levels of trust across European countries. While studies in the USA acknowledge a starting point of the Great Society period as the point from which trust declines, European studies tend to focus on declines in trust resulting from specific policies. Table 1 shows the levels of trust in government for European OECD countries for 2003 to 2015 using the Eurobarometer data. We tend to see fluctuations in levels of trust in these countries. Germany and Netherlands appear to show increasing trust over time, while France and Italy have trust that is pervasively low and apparently declining. We also observe fluctuations in declines that are associated with time periods following domestic and economic policies—which have well-documented effects on trust in government, e.g., the effects of austerity measures following the 2008–2009 recession (Exadaktylos and Zahariadis 2012; Medina 2015).

On its face, the variation for European countries in Table 1 would seem to question the null hypothesis of a general decline. While some have argued trust in government has always been a concern and that democratic institutions have always been questioned (Dahrendorf 2000), others caution against such ‘communitarian pessimism,’ arguing instead that trust has always fluctuated (Stolle and Hooghe



2004). A certain level of skepticism of government is healthy, it allows one reasonable means to make election decisions, hold government accountable, and to demand changes to policies.

Establishing evidence for declining trust

Given the long-run history of trust measures in the USA, and conclusions in the literature over 20 years that trust in the US government has been declining, the USA is used as a test case in this analysis while levels of trust in OECD countries used as the dominant points of interest. This analysis uses the two sets of data, the Eurobarometer for European OECD countries from 2003 to 2015 and the ANES data for the USA. The Eurobarometer measure relies on a normed question of trust in the national government across OECD countries, specifically, Eurobarometer question 24 asks, “How much do you trust the (national government) to do what is right? Do you trust it just about always, most of the time, only some of the time, or almost never?”.

The ANES data are a well-known data source for measuring political attitudes in the USA. The data collected are from 1958 to 2018 with partial annual data for 2019. The question used to assess trust is the standard trust question on the ANES, i.e., “How much of the time do you think you can trust the government in Washington to do what is right? Just about always, most of the time, or only some of the time?”.

Eurobarometer values comprise data collected from 2003 to 2015. This time series is shorter than that observed in the USA and begins with the most reliable starting point as indicated by Van de Walle et al. (2008) and Gonzalez and Smith (2017). Although questions on the Eurobarometer tend to change frequently given the survey’s concern with immediate policy questions, the trust in government question is stable over time (Gonzalez and Smith 2017). Additionally, the question has been shown to correlate with other non-government sponsored surveys, i.e., Gallup, at the 0.78 level (Gonzalez and Smith 2017). Because the question is about trust in individual governments, as opposed to satisfaction with a form of government, i.e., democracy, responses to the question of trust are used as the evaluand. However, if one were interested in changing attitudes towards democracy as opposed to questions of trust in government, then the questions on the ANES and Eurobarometer regarding, “satisfaction with the way democracy works,” could just as easily be used as an evaluand.

Questions of trust such as that used on the Eurobarometer and ANES have been criticized for being unbalanced in the responses—it is unclear whether someone who trusts the government just more than 50% of the time would answer “just about always” or “only some of the time” (see Gershtenson and Plane 2007). This is a problem of survey design and not one which all users of the Eurobarometer and ANES data must confront. The responses used to measure trust in both the OECD and US cases include two responses, the percentage of respondents who trust in the US case are the percentage who responded, “just about always” or “most of the



time.” This is the same for the OECD countries. In this way, trust is measured on the same scale on the same question.

The USA as a test case

As described above, the longer length of US data and the fact that there is a significant body of literature establishing trust in the USA as being in general decline (Hetherington and Husser 2012; Hetherington 2005; Van de Walle et al. 2008; Gonzalez and Smith 2017) make it a suitable test case to establish the utility of the SPRT for identifying excess levels of distrust relative to previous periods. Specifically, the author examines changing levels of trust relative to multiple time periods—beginning from 1958 when the USA saw the highest levels of trust, from 1970 to 1990 when the USA saw its first major sustained declines in Trust following the Great Society (falling from 73% in 1958 to 54% beginning in 1970 and declining from there), and from 1992 to 2000, the period when the USA saw its second major sustained decline in levels of trust (falling to 33% in 1990 and generally declining from there). We would therefore expect that changes in trust would vary when comparing attitudes to the average levels of trust within each time period.

The data from the USA show the highest levels of trust in 1958 and 1964 (73% and 77%, respectively). These decline to 53% in 1972 and then to 36% in 1974. From 1974 onwards trust varies between a high of 45% in 1984 to a low of 17% in 2018. However, the average level of trust between 1974 and 2018 is 31.15% with a standard deviation of 9.96%. If we include the idealized time period from 1958 to 1972, then the average is 35.34% with a standard deviation of 14.25%. Therefore, any period greater than 50.67% would be considered significantly different than the period from 1974 onwards, and all periods prior to 1974 are at least 53%. It is obvious then that if one compares trust from the idealized time period of the Great Society that trust will appear to be in decline. Of course, if one references the Middletown studies, then one would note that trust was observed to be low during the 1920s. Of course, this was not polling data, so it is not directly comparable, but the anecdote of low trust persisted in these studies whereas it is was at an all-time high in the Great Society.

European OECD countries

Turning to Europe, each country has differing levels of trust, i.e., France has traditionally low levels of trust in government while the Scandinavian countries traditionally have higher levels of trust. The average results across all EU member states from 2003 to 2018¹ ranges between 25% trust in the national government in 2012 and 36% in 2005, $m=31$, $s=3.57$. Therefore, we can observe that the aggregate levels of trust in Europe are on par with levels of trust in the US post-Great Society, but

¹ 2003–2018 are the time periods for recording this variable on the Eurobarometer. As noted by Van de Walle and colleagues, the availability of long-run trust data in countries outside of the USA is largely unavailable.



do not show the same levels of fluctuation. Simply from a standpoint of averages we do not see evidence of a general decline. However, these statistics can be misleading, since taking an average over time and using the standard error assumes that data are symmetric, but these data can be unduly influenced by outliers (Spiegelhalter 2019). For example, if we examine a trust in Denmark and remove the 2013 value of 38, then the standard deviation drops from 6.77 to 5.45. Therefore, it becomes apparent that relying on techniques that assume symmetry in the data are likely to provide biased results when attempting to determine if a given time period is different than a preceding time period.

Methods and materials

Methods for sequential analysis were independently developed by Barnard (1946) and Wald (1945) and remain the most robust technique for rejecting null hypotheses (Spiegelhalter et al. 2000; Royall 2017; Schönbrodt et al. 2017). As detailed by Spiegelhalter et al. (2000) in their analysis of tracking medical procedures and homicides, the formal procedure has three separate elements: a test statistic, thresholds for that statistic, and theorized actions for cross that threshold. Put succinctly, these will be shown as the likelihood of declining trust (test statistic), the thresholds for the likelihood that trust is declining, and identifying actions that preceded declines should one find values that have crossed the negative threshold to reject the null then one can say that trust has indeed declined.

Test statistic (s_i)

If we have a set of trust statistics such as a response to levels of trust, then we can state two hypotheses:

h_0 Declining trust (Null since currently state of the literature)

h_1 Trust is not declining

Given that the generally accepted norm is that trust is declining, declining trust is stated as the null. The test statistic takes the form of the likelihood that trust is significantly different than a stated level of trust which can be pre-specified. As demonstrated by Wald, the most powerful means of establishing divergence from expected responses is a log-likelihood ratio test (Wald 1945; see also Pawitan 2000). The likelihood ratio test is a function of the data and for sequential methods, the likelihood ratio increases or decreases based on the responses within the data. Formally, the test is stated as follows:



$$\lambda(x) = \frac{\mathcal{L}(\theta_0|x)}{\mathcal{L}(\theta_1|x)}$$

where the numerator corresponds to likelihood of the null given the data and the denominator corresponds to the likelihood of the alternative given the data. Because each year's level of trust has a given likelihood, one can use sequential methods, e.g., multiply the likelihoods given the responses, to determine the likelihood for the null given the data and the likelihood of the alternative given the data.

Thresholds

Thresholds are established using Wald's recommendation that the lower likelihood ratio (LLR) lies between two points α and β . If the LLR exceeds this then one can reject the null hypothesis, and vice versa, if the LLR falls below α then one fails to reject the null. Formally, α is the probability of Type I error—rejecting the null when it is true and β is the probability of Type II error, failing to reject the null when the alternative hypothesis true (typically set as 5% in the social sciences).

If one pre-specifies values for α and β , then one can apply the equations provided by Wald to approximate thresholds for α and β .

$$A = \log \left[\frac{\beta}{1 - \alpha} \right] \text{ and } B = \log \left[\frac{(1 - \beta)}{\alpha} \right]$$

Since one pre-specifies values for α and β , the sizes of these thresholds should reflect the relative probability of incorrectly failing to identify declining trust. To illustrate this, the author provides analysis in which A and B are equal, in line with Spiegelhalter et al. (2003). Because these thresholds can be described based on varying levels of risk, one can think of these as two horizontal lines at each threshold point as representing the degree to which we can be certain that trust is or is not declining. Therefore, if we consider a single country's survey, then we may set $A = B = 0.05$. Given that the null in this analysis is the accepted view that there is declining confidence, the measure for rejecting the null will be when likelihood ratios consistently fall below the point of rejecting the null and the space between indicates the point at which no decision can be made. With a value of $p < 0.05$ this would mean consistent likelihood ratios below -2.944. Simply put, measures above the threshold should cause one to accept the alternative that trust is not in decline, while measures below the threshold should cause one to accept the null that trust is in decline. Measures between the thresholds do not provide enough evidence either way.

$A < s_i < B$: Inequality, lack of evidence either way.

$s_i \geq B$: Accept h_1

$s_i \leq A$: Accept h_0



Action

Scandals, policy actions, or macroeconomic outcomes in a given country can increase or decrease trust. Therefore, if one desires to increase or maintain levels of trust in the government then, should one observe evidence that trust is in decline, one can then examine what policy actions, economic outcomes, scandals, etc., preceded the point. They can then begin to think about whether those actions can, or should, be changed. Since evidence for declining trust requires that one find consistent likelihood ratios below the null point, one may observe that trust declines because of transient shocks that cannot be addressed in the short term, e.g., austerity measures cannot simply be reversed without knock-on effects the rest of the economy, however a political scandal can be immediately addressed and oversight activities implemented to increase public trust (Mackenzie and Hafken 2002; Rauh 2015).

Measures

There are two sets of measures used in this analysis. For the USA (the test case), the measures are the responses to the ANES question, “How much of the time do you think you can trust the government in Washington to do what is right?” This question is rated on a four-point scale: Always, Most of the Time, Some of the Time, Never.

For the European OCED countries in this analysis: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the UK, the measures are the levels of trust based on the OECD estimates. Other OECD countries were dropped from the analysis due to a lack of data for the full 12-year timeframe. These estimates are measured from 2003 to 2015 in the current data set and are the levels of trust based on a single factor in the OECD database: “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? National government.”

Using the responses to these questions, the analysis assesses the probability of trust in government (answering Always or Most of the Time). Based on these probabilities, it is possible to determine the prior distribution for Always or Most of the Time responses. From there, one establishes likelihood thresholds for the cumulative probabilities of response in line with the probabilities specified from prior years.

As noted above, the USA has a long run of data relative to the rest of the world, with periods of spikes in trust relative to focusing events. Given that the intent of the test case is to assess the SPRT as a tool for assessing general decline as well as measures relative to known periods of trust spikes, cut points must be established against which we measure. In the USA, trust in 1958 was exceptionally high (73%) and showed a steady decline from 1964 to 1978 with the end of the Vietnam war (29%) (Damico et al. 2000). It showed a steady upward trend, hovering in the mid-40s until 1990 (33%) with the end of the first USA–Iraq war. From there, trust



Table 2 SPRT Results for declining trust in OECD Countries

Country	μ Trust, 2003—2015 (%)	Max Trust		Min Trust		μ -min (%)	max-min (%)	s_i
		Value (%)	Year	Value (%)	Year			
Austria	48.07	56.00	2009	40.30	2003	7.77	15.70	2.460
Belgium	40.18	52.50	2007	22.00	2010	18.18	30.50	− 0.151
Denmark	52.25	62.00	2007	38.00	2013	14.25	24.00	1.349
Finland	58.45	67.00	2004	49.00	2010	9.45	18.00	1.401
France	26.12	39.00	2007	17.00	2014	9.12	22.00	11,159.270
Germany	37.75	50.00	2015	24.20	2003	13.55	25.80	2.462
Greece	30.08	50.00	2004	6.50	2012	23.58	43.50	− 241.297
Ireland	29.05	39.00	2004	17.50	2012	11.55	21.50	− 0.494
Italy	22.20	31.50	2006	10.50	2013	11.70	21.00	0.000
Luxembourg	62.68	72.50	2009	50.50	2014	12.18	22.00	− 0.146
Netherlands	46.91	61.00	2007	36.80	2003	10.11	24.20	0.968
Portugal	26.37	39.30	2003	12.50	2013	13.87	26.80	1.894
Spain	30.03	51.00	2004	8.50	2013	21.53	42.50	− 1375.780
Sweden	50.11	63.00	2005	33.00	2011	17.11	30.00	5.833
UK	27.55	37.00	2015	20.00	2009	7.55	17.00	1.555
μ Trust, 1958—2018								
USA	35.00	74.00	1964	17.00	2018	18.00	57.00	− 192.092

Most countries do not cross the threshold to indicate significant declines in trust. Exceptions are the USA, Spain, and Greece. In France, trust is generally low and significant evidence shows that trust is not declining

fluctuated in the 1990s but never moved above the 33% point from 1992 to 1999. There were large increases in trust in 2001 and 2002 (49% and 45%) which may partially be explained by the growing national unification after the 2001 attacks on the World Trade Center in New York (Davis and Silver, 2004; Hetherington and Husser 2012). From that point, trust showed fluctuation but declined on average, hitting an annual low of 19% in 2014 which was constant through 2017.

The cut points for the USA were selected based on specific time frames from transient shock to transient shock and then an overall average. Specifically, time-frame one is 1970–1990 ($m = 39.2\%$, $s = 7.8\%$), 1992–2000 ($m = 29.7\%$, $s = 5.9\%$), and 1958–2018 ($m = 35.2\%$, $s = 14.2\%$). The initial two timeframes drop the outlier years while the full timeframe uses the average for all years. In this way, the analysis can determine if overall trust shifted significantly from previous time periods while avoiding years that skew the average. Cut points for the OECD countries were the 95% confidence intervals over the 12-year timeframe of the OECD data, e.g., are levels of trust declining relative to average trust for the country for the 12-year timeframe? Using this method should provide a robust means of determining whether



trust has been declining in general terms or if there is simply not statistically significant fluctuation.

Results

Descriptive statistics of the responses for each timeframe are presented in Table 2. As described above, trust in the USA has declined on average from 1958 to 2018 and has fluctuated across the OECD countries from 2003 to 2015. The goal of the test case analysis was to determine if there is consistent evidence that a significant decline occurred between the cut points of the 1970–1990 timeframe and in the 1958–2018 timeframe in the USA and then apply the method to the 2003–2015 timeframe in other OECD countries. We find evidence of decline for the USA relative to specific cut points, thus demonstrating the robustness of the method. Further, we find similar evidence for Spain and Greece with s_i below the significance threshold. However, we find significant evidence that trust has not declined in France and Sweden, both with s_i above the significance threshold. All other countries on average have s_i that do not provide enough evidence to accept or reject the null in favor of the alternative. We see that most countries have s_i that are at times above the threshold for non-decline and at times below the threshold for decline and then returning to the indeterminant point. This provides significant evidence that, in most European OECD countries, trust has not declined but simply fluctuated in a way that does not allow us to say whether it has declined or not.

The s_i for decline (also shown in Table 2) indicates that only three countries show evidence of a general decline for their respective timeframes: Greece, Spain, and the USA. France and Sweden show evidence against a general decline. France is traditionally low in trust (13-year average = 26.31%) but shows variation that is on par with Denmark (44.23 in France versus 45.92 in Denmark). Sweden is traditionally in the mid-range on trust (13-year average = 50.23%) with variation close to that in the Netherlands (79.35 in Sweden versus 71.76 in the Netherlands). Both countries have individual years in which trust was high relative to the average, i.e., trust in France reached 39% in 2005 and 37% in 2012 while trust in Sweden reached 63% in 2011. If we remove these years from the equation and reexamine the averages and likelihood ratios, the average level of trust in France falls by 2% and the s_i value declines from 11,159.270 to 11,153.154, still indicating evidence against a general decline. Additionally, the average trust level for Sweden declines to 49.17% and the s_i value declines to 5.604 from 5.833 thus still indicating evidence against a decline.

In Greece and Spain, we can identify the points at which trust became significantly different and remained so. These correspond to the timepoints associated with austerity measures following the last worldwide recession. For the USA, this decline is significant when the average levels of trust from 1970 to 1990 are used as reference points (refer to Table 1). However, it is only in 2018 that levels of trust cross the threshold for the overall average from 1958 to 2018 (Table 3). This indicates that using long-run averages of trust does not necessarily provide a good measure of



Table 3 Trust by year, USA

Year 1958–1994	% Trust	Years 1995–2018	% Trust
1958	73	1995	21
1964	77	1996	30
1966	65	1997	29
1968	62	1998	31
1970	54	1999	33
1972	53	2000	39
1974	36	2001	49
1976	35	2002	45
1977	34	2003	37
1978	29	2004	41
1979	30	2005	31
1980	30	2006	31
1982	33	2007	28
1984	45	2008	25
1985	43	2009	21
1986	43	2010	22
1987	43	2011	19
1988	41	2012	22
1989	40	2013	20
1990	33	2014	19
1991	43	2015	19
1992	25	2017	19
1993	25	2018	17
1994	21		

We see a general decline with some transient shocks which have been previously explained in the literature, e.g., 9/11/2001 terrorism attacks (Davis and Silver 2004)

trust given the non-normality of the data. Given this non-normality and therefore the undesirability of using measures that require fixed samples as opposed, this should strengthen the argument for using sequential methods for assessing trust in government. Taken the 1958–2018 findings in conjunction with the other findings for cut points in the USA, it provides support for the time period argument regarding trust (Phelan 2006; Wilkes 2014). We can therefore conclude that trust in the USA has declined significantly from the higher trust timeframe, excluding the highest trust outliers, but that trust in 2018 is significantly lower than any other time period. For Greece and Spain, we see that the likelihood of observing the levels of trust seen in 2014 and 2015 relative to the average levels of trust for 2003–2015 is associated with a probability of less than 5% (Table 2).

Note, one may argue that the stability observed is simply a methodological artifact, i.e., that non-response among low-trust individuals increased on these surveys because they are low trust. However, observing variation across countries in



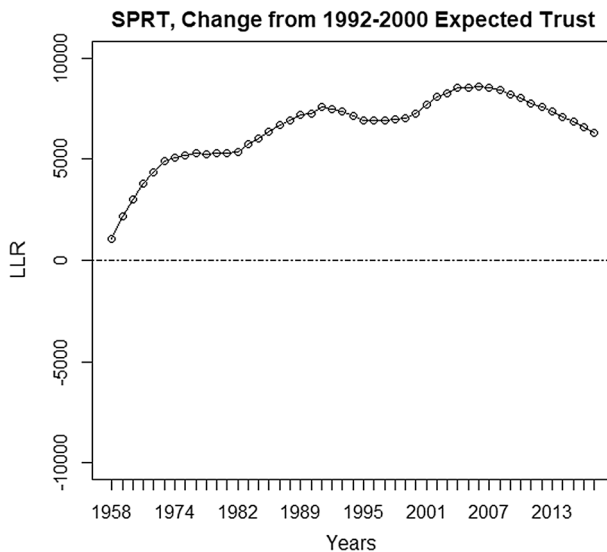


Fig. 1 SPRT for US Trust, 1992–2000. Comparing expected values from 1992, we do not see a decline

expected ways that correspond to known policy shocks would seem to indicate that even if this is occurring, it does not affect the identification of spikes in trust/distrust relative to the time series average.

United States

Relative to the points for significance from the 1970 to 1990 period, we see similar fluctuations as those described by Van de Walle et al. with declining likelihood beginning in 1995. There is some smoothing in the 2001–2002 periods, although this has been previously explained as related to the increased trust immediately after the 2001 attacks on the world trade center. In general, though we see declines from 1995 through 2006 such that levels of trust in 2007 are significantly different than those that would have been expected in 1970–1990. Looking at Fig. 1, we see that it is unlikely to find levels of trust that are statistically dissimilar from those between 1992 and 2000. This suggests that the period between 1992 and 2000 may be a balance point relative to declines in trust seen in prior years (Fig. 2) and dissimilar from average trust overall (Fig. 3). Specifically, it may indicate a period when trust was lower than previous generations but also one in which the levels of decline stabilized.

Finally, if we turn our attention to Fig. 3, we see a similar pattern of fluctuation in likelihood that any level of trust would be different from the average levels of trust from 1958 to 2018. However, in 2018, the levels of trust decline to the point that they are significantly different from any point prior. There may be several reasons for this related to the investigations into President Trump or simply increasing



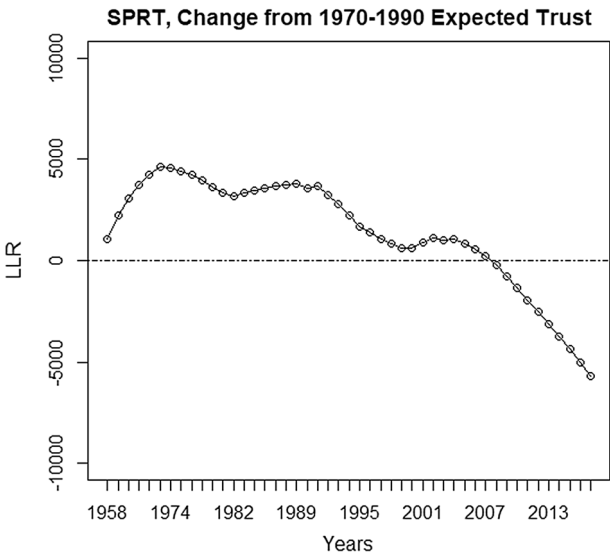


Fig. 2 SPRT for US Trust, 1970–1990. We see that trust became significantly different in 2008

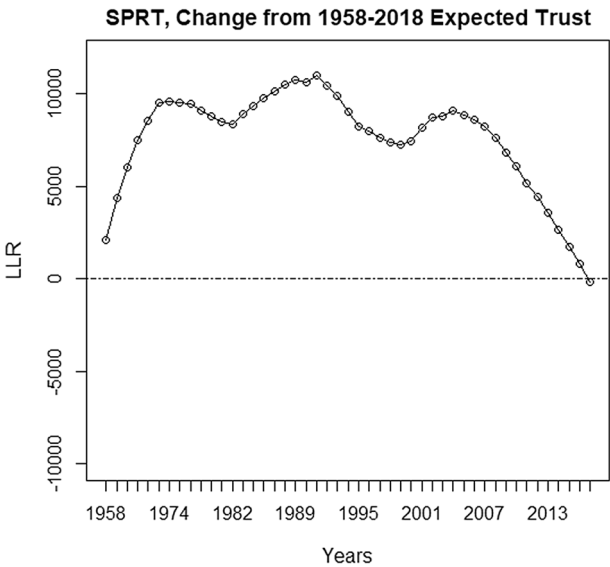


Fig. 3 SPRT for US Trust, 1958–2018. Using the full time series, Trust became significantly different in 2018



polarization. In any case, we can say that levels of trust in 2018 are statistically below any point that when trust began to be measured.

OECD Countries

Below, the author provides the results of the SPRT method for OECD countries. When changes in trust are observed during given time periods the author provides some context by touching on preceding political events. However, trust is complicated and declines in trust generally cannot be attributed to single events. As such, one should take the information on preceding events as context rather than causation.

If one examines Figs. 4, 5, 6, 7, 8, 9, 10, 11, and 12, they will immediately notice that some countries fall below the -2.944 point (declining trust) and then return above the 2.944 point (no decline). This indicates a fluctuation in levels of trust in these countries rather than a general decline. For example, the UK (Fig. 13) showed general declines from 2011 to 2014 but returned above the 2.944 threshold in 2015. In April 2010, then Prime Minister Gordon Brown received permission to dissolve Parliament, triggering a May 2010 General Election. The 2010 British general election resulted in a hung parliament with Gordon Brown resigning as Prime Minister on May 11, 2010, and a coalition government between the Conservatives and Liberal Democrats being formed the following day, led by David Cameron. However, events preceded the dissolving of Parliament and the General Election that significantly hindered trust in the government. For example, Ipsos MORI polls released in

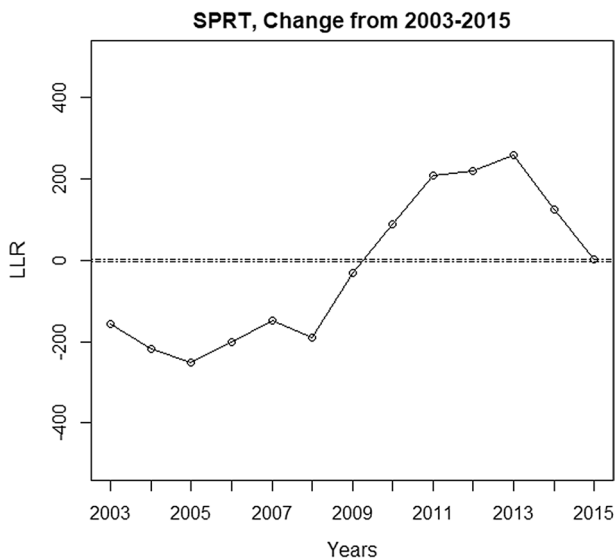


Fig. 4 SPRT for Austria Trust, 2003–2015. Fluctuations with insignificant (2.460) LR for changes in trust



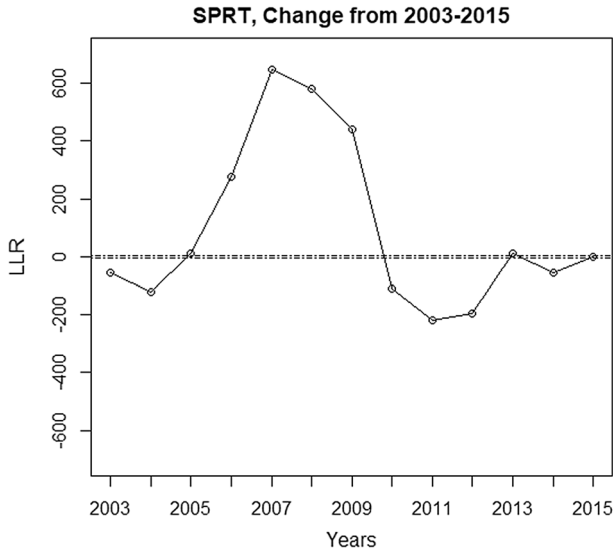


Fig. 5 SPRT for Belgium Trust, 2003–2015. Fluctuations with insignificant (-0.151) LR for changes in trust

November 2009 and February 2010 showed increasing dissatisfaction with the policies of the Labor Government.

Sweden (Fig. 14) shows a general decline in trust relative to average levels from 2003 to 2013 but we see an increase in the likelihood of observing average levels of trust in 2014 and 2015. On average, though, the measure for trust in Sweden suggests no significant decline in trust, the opposite in fact (Table 2) (Fig. 15). As has been previously shown across multiple studies, levels of trust tend to be higher in the Scandinavian countries and are increasing in Sweden, providing more evidence that assuming a general decline may be misguided. The findings here indicate that trust in Sweden is fluctuating in general but that the levels for expected values are relatively stable. In Portugal we see a decline in s_t , but it does not cross the threshold for suggesting declining trust (Fig. 16). As in Sweden, the s_t in the Netherlands (Fig. 17) and Germany (Fig. 9) indicates evidence of declining trust for most years, but overall returns to stability in 2015, e.g., while there may have been general declines they may have abated. In Germany, as in the Netherlands, declines in trust have been attributed to the role of political elites and a disconnection from the median citizen. This is indicative of an important element of trust raised by Marien (2011) and Schneider (2017), trust is not one thing and changing levels of trust are rarely confined to single institutions. As Kaina (2008) pointed out, declines in trust in Germany extended not just to the government but also to business and journalists. This is a trend that has been seen across Western Europe but with particular declines seen in Germany. Similar discontent with the government of the Netherlands was also observed by Kemmers et al. (2014) who pointed out different forms of discontent with the government, some of which could be repaired by policy initiatives,



but others of which were more deeply rooted in social attitudes such as normative beliefs about the treatment of Muslim minorities.

Luxembourg (Fig. 18) shows an initial s_i that would seem to indicate levels of trust in 2003 that are significantly different and show 11 years where s_i is sufficient to accept h_1 of no decline. This is also true of Italy (Fig. 12), Ireland (Fig. 11), Finland (Fig. 7), and Denmark (Fig. 6). On average, though, these countries do not show s_i levels that are significant to reject the null or accept an alternative. Belgium (Fig. 5) shows heavy fluctuations in s_i . We see increased likelihood that trust is not declining trust from 2007–2010 with evidence for declining trust from 2010–2012. However, these levels return to the null threshold in 2013, drop below in 2014 and return in 2015. The declines in Belgian within this time period align with the period of political instability from 2007 to 2010 sparked by electoral victories for Flemish political parties and the resurgence of disagreement over the levels of political power within the Brussels–Halle–Vilvoorde electoral district which tends to provide greater electoral power to French-speaking politicians who can compete for votes in Flanders while being only subject to Belgian electoral regulations but not Flemish regulations.

In Austria, (Fig. 4) we see levels of trust from 2003 to 2009 significantly below the 12-year average but likelihoods from 2010 to 2015 that would lead one to accept the alternative hypothesis that trust is not declining. Again, there are political priors that may explain this. The highest levels of political volatility in Belgium (Pedersen index)² were observed in this time period which was also marked by significant gains followed by major losses for the two traditional parties—Social Democrats and the Conservative People’s Party. As pointed out by Heinisch (2004), much of this can be explained by declining attitudes towards the role of Europe in Australian politics, which has also explained increases in the rise of right-wing populism in other European countries, not just Austria. Given the evidence for the null in the wide fluctuations in the likelihood ratios from year-to-year and the evidence for the alternative in other years, we can conclude that overall there is not a general decline in trust. Although trust is generally low in some countries, e.g., France, Ireland, Italy, and Portugal, it has remained low, and in other countries, we do not find evidence of general decline but rather fluctuation over time.

Discussion

This manuscript sought to determine whether statistically significant evidence for declining trust could be established outside of the idealized starting points often used in studies of trust. In order to accomplish this, this manuscript used the sequential probability ratio test to determine whether levels of trust varied in a statistically significant way over time. The results indicated that a decline that was significantly different from other time periods could not be found in most countries besides Greece, Spain, and the USA. In Greece and Spain, the declines were associated with unpopular policy actions in the form of austerity

² The Pedersen index (Pedersen 1979) is based on the vote share of all parties with $\geq 1\%$ of the vote in each election plus all parties that have won at least one seat. It runs the time series from 1945 onward.



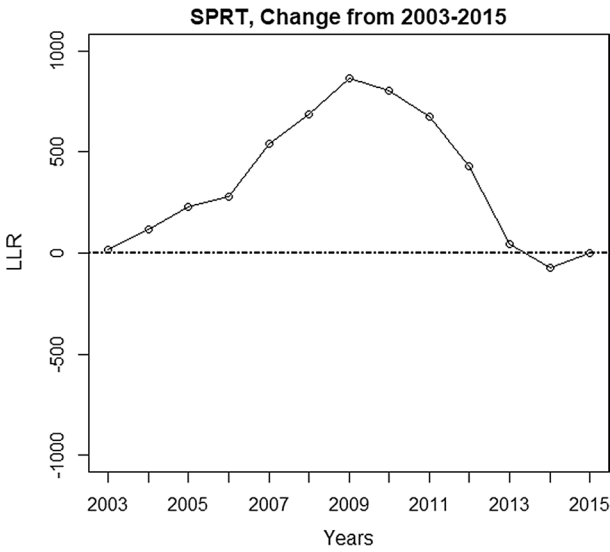


Fig. 6 SPRT for Denmark Trust, 2003–2015. Fluctuations with insignificant (1.349) LR for changes in trust

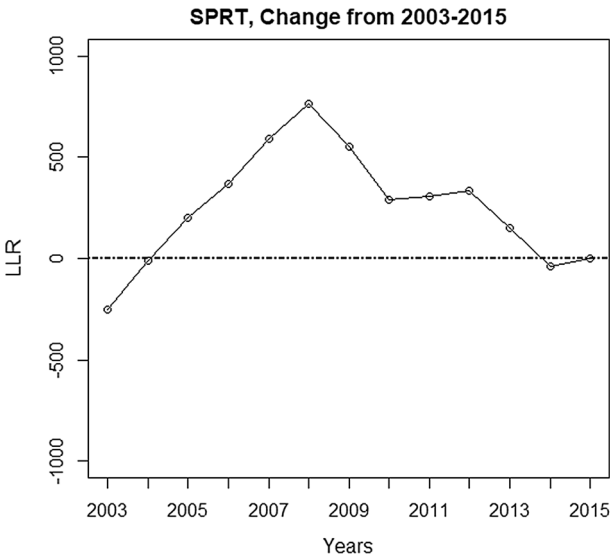


Fig. 7 SPRT for Finland Trust, 2003–2015. Fluctuations with insignificant (1.401) changes in trust

measures—a finding that has already been established in the literature. Still, even outside of the austerity measures, the changes in trust produce result indicating that trust is declining relative to the average. Looking graphically for similarities across other OECD countries, we do see corresponding declines associated



with these same austerity measures, following the 2008–2009 recession but no long-run significant effect. As such, the changing levels of trust in these countries may be tied to perceptions of government performance related to the economy. This would be in keeping with findings from Exadaktylos and Zahariadis (2012) and are in line with the rise of populist movements in these countries following austerity, which Guiso et al. (2019) tie to a lack of trust in government. These findings suggest that when considering how policy actions affect trust, that trust is a relatively stable variable over time. However, there are periods of economic, political, or policy upheaval that causes trust to fluctuate in line with findings from Phelan (2006) that public trust is regained gradually after what he describes as policy betrayals. Therefore, the effects of a given policy action have time-bound effects and do not premise a general decline. Given these findings, scholars seeking to understand changes in trust in the European context may wish to focus on explaining why policy actions produce different levels of marginal changes rather than attempting to explain a general decline which, according to this analysis, largely does not exist.

The statistically significant declines in trust in the USA are in keeping with previous studies including Hetherington (2005), Hetherington and Rudolph (2008), Rudolph and Evans (2005), Porumbescu (2017), Dalton (1999), Klingemann (1999), Khan (2016), and Macdonald (2019). This was expected and the US case was used to demonstrate the efficacy of the SPRT. Therefore, they reinforce prior studies of the correlates of trust in government in the US context. For example, the use of primaries beginning in the 1970s gives more voice to extreme candidates on both the left and right and is shown as a key reason for increases in polarization which is in turn associated with declining trust in the USA (see Hirano et al. 2010; Burden 2001; Cox and Kernell 2019). Miller and Listhaug (1990) show that structural elements of government affected trust in both the US and Scandinavian countries; however, levels of trust recovered in the latter after structural reforms whereas the same reforms did not occur in the USA and thus the continued decline.

The contextualization of the spikes in distrusting attitudes, while reinforcing the argument that trust is not in general decline, also reinforces arguments about the relevance of time periods when discussing trust. If one were to look to attitudes over a two-to-three-year period on the UK or in Belgium, then one may incorrectly conclude that trust was in decline. In fact, there were short-term issues that led to a crisis of trust for a few years, but trust was not in general decline. Because the analysis uses the average levels of trust as the point that must be diverged from to identify changes, it is useful for identify both whether there is decline on average and whether there are spikes. Should one desire, one could just as easily set thresholds that are relative to a single year or a specific time period—as was done in the US example. For the space available here though, and given the intent of this manuscript, this is not feasible for each OECD country. However, the author would certainly encourage other researchers to use this method to test levels of trust relative to specific years.

In keeping with a prior statement, that trust is complicated and single events generally do not explain changes in trust, the question used herein, “How much



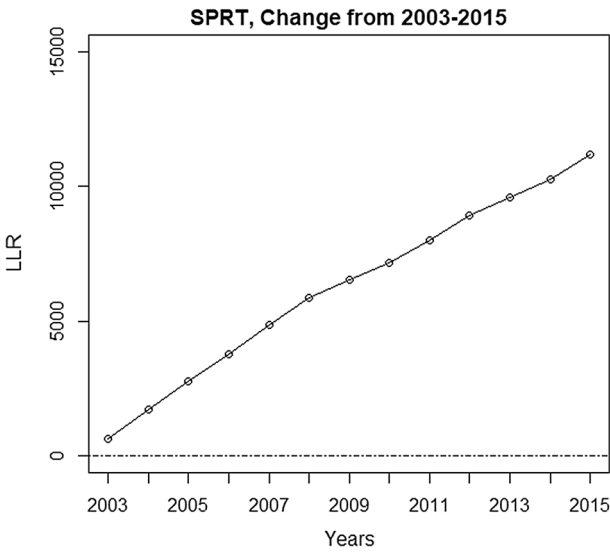


Fig. 8 SPRT for France Trust, 2003–2015. Significant decline in trust LR = 11,159.270

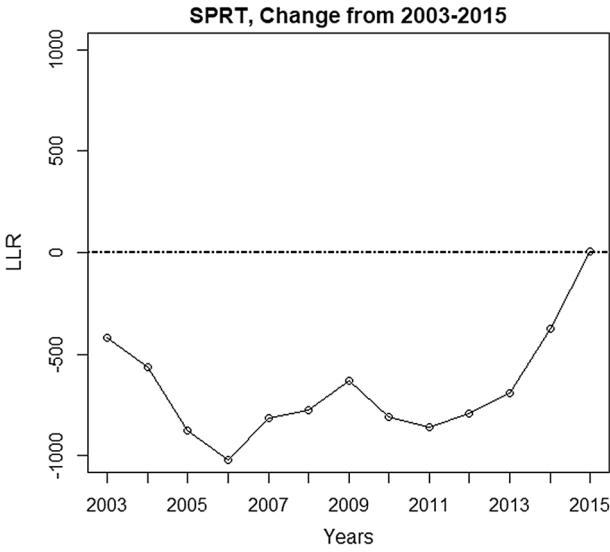


Fig. 9 SPRT for Germany Trust, 2003–2015. Fluctuations with insignificant (2.462) LR for changes in trust

do you trust the (national government) to do what is right?” this analysis is confined to attitudes towards the national government. However, it is possible that attitudes towards the national government are intertwined with attitudes towards other institutions, e.g., police, bureaucracy, judges, and (as Putnam noted) social



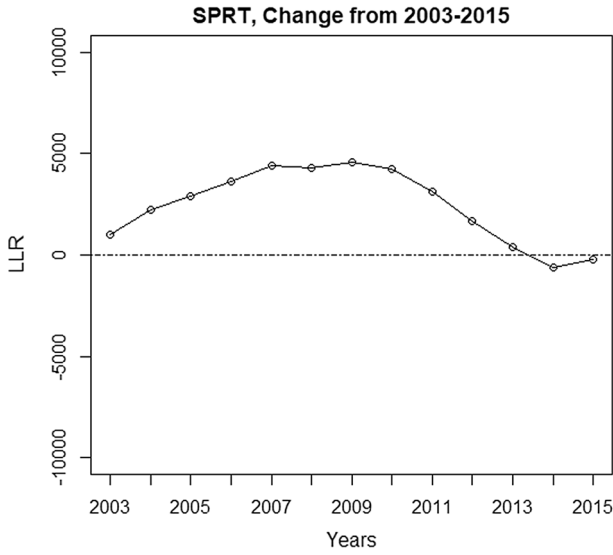


Fig. 10 SPRT for Greece Trust, 2003–2015. Significant declines in trust between 2011 and 2014, $LR = -241.297$

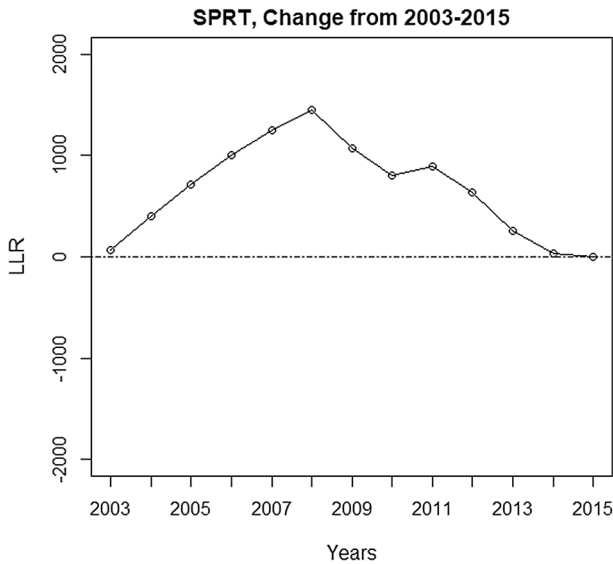


Fig. 11 SPRT for Ireland Trust, 2003–2015. Fluctuations with insignificant (-0.494) changes in trust



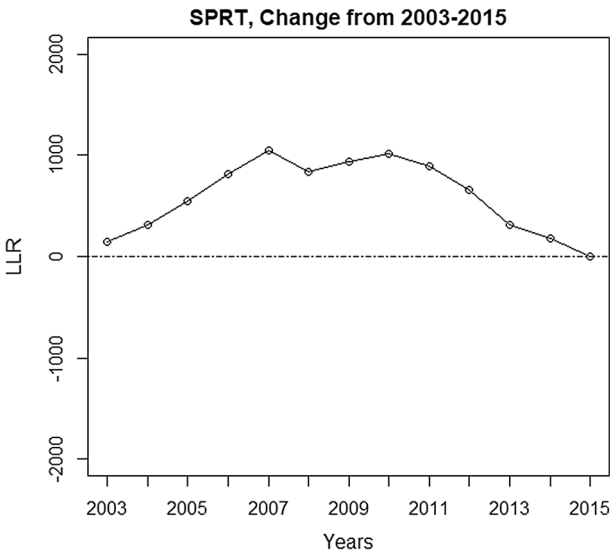


Fig. 12 SPRT for Italy Trust, 2003–2015. Fluctuations with insignificant (0.000) LR for changes in trust

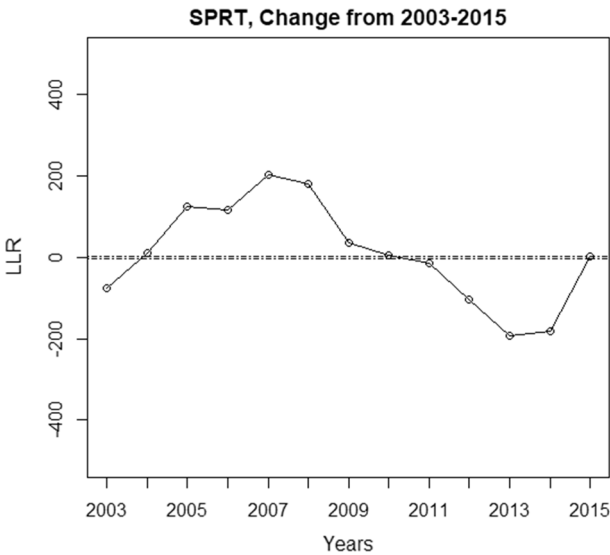


Fig. 13 SPRT for UK Trust, 2003–2015. Fluctuations with insignificant (1.555) LR for changes in trust



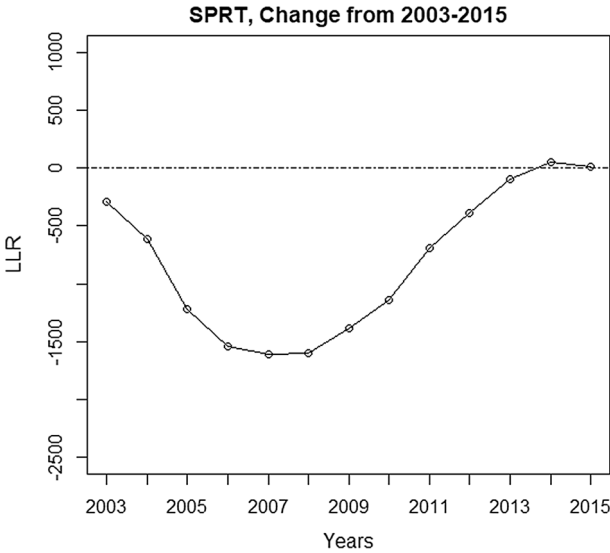


Fig. 14 SPRT for Sweden Trust, 2003–2015. Significant evidence for changes in trust, positive and negative (5.833) LR

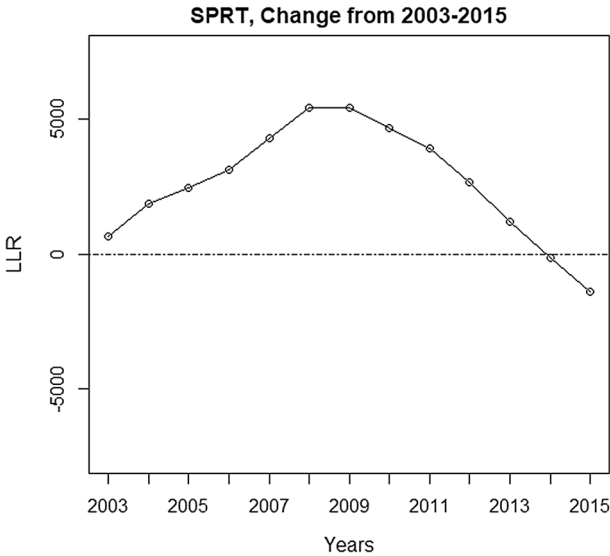


Fig. 15 SPRT for Spain Trust, 2003–2015. Significant (– 1375.780) LR for declining trust



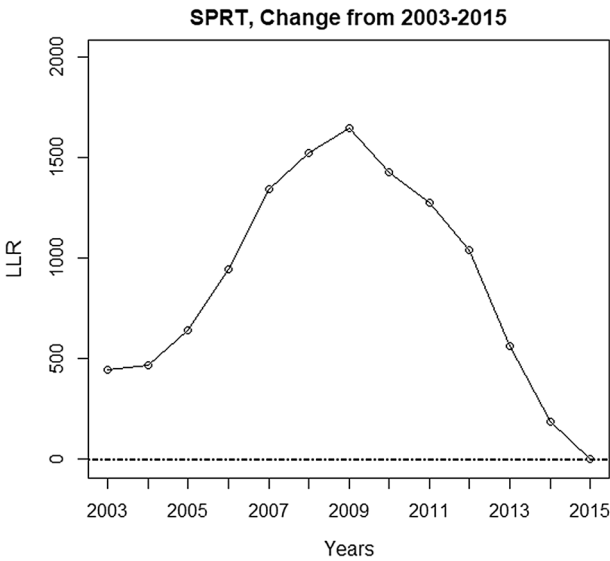


Fig. 16 SPRT for Portugal Trust, 2003–2015. Fluctuations with insignificant (1.894) LR for changes in trust

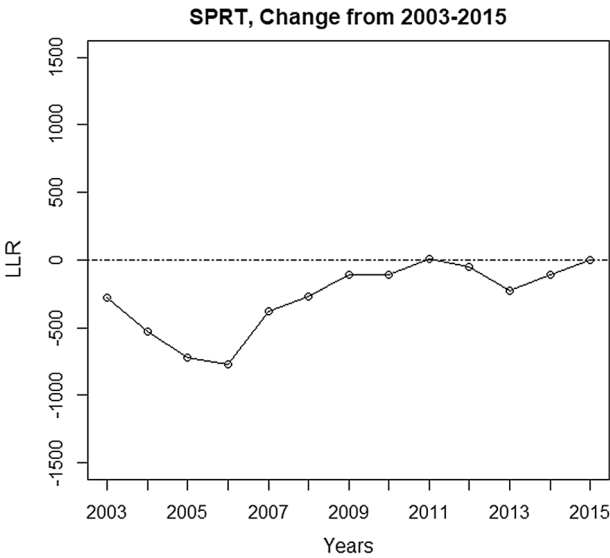


Fig. 17 SPRT for Netherlands Trust, 2003–2015. Fluctuations with insignificant (0.968) LR for changes in trust



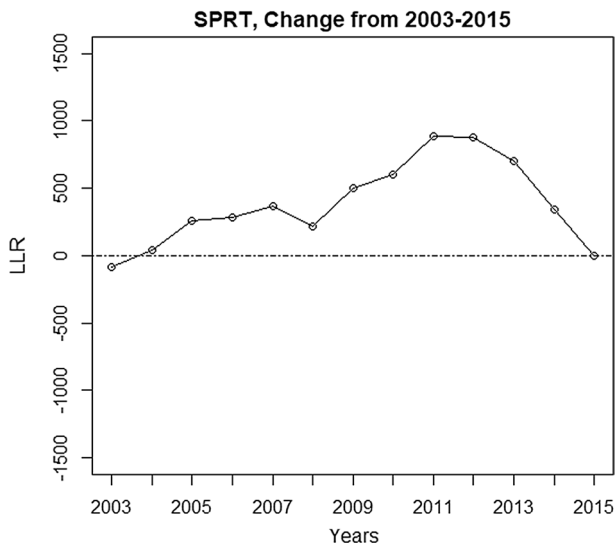


Fig. 18 SPRT for Luxembourg Trust, 2003–2015. Fluctuations with insignificant (-0.146) LR for changes in trust

trust. While this manuscript does not address the interconnectedness of these issues with trust in the national government, should one wish to identify more explicitly the causes of distrusting attitudes then one should also consider how these elements interact—see e.g., Hooghe et al. (2017), Jilke et al. (2015), Schneider (2017).

Despite the simplicity of SPRT, implementation requires reliable data. Although other countries lack reliable data for the analysis conducted herein, the results suggest that changes in lack of trust can be detected through a relatively simple techniques and that trust in government can therefore be monitored more efficiently and accurately. However, if one were to use this procedure to, for example, examine trust in individual agencies or across countries, they would also need to consider the multiple responses across varieties of populations. Trust in the Internal Revenue Service is likely to be very different from general trust in government and so it may be incorrect to directly compare them under a single construct of trust. Spiegelhalter et al. (2003) and Armstrong (2014) recommend using a Bonferroni correction of dividing error rates by the number of respondents.

Closing remarks

Given that the lack of trust cannot be shown as declining in a statistically significant way outside of a few countries, it is likely worthwhile to examine the policy issues or political changes that occurred prior to the periods in which we see periods of statistically declining trust. Specifically, if policy performance accounts for declining



trust, but trust is not declining in a significant way, then are there specific policy types or policy issues that affect trust more than others? In one country more than another? Does the salience of specific policies affect trust more than general performance? None of this is to say that policy and politics does not impact trust, it almost certainly does. However, the evidence presented herein suggests that such effects cannot explain a general decline in trust since, save for a few countries, no general decline could be found.

Compliance with ethical standards

Conflict of interest The Author has no financial or personal relationship with a third party whose interests could be positively or negatively influenced by this manuscript's content.

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