Journal of Comparative Economics xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Comparative Economics

journal homepage: www.elsevier.com/locate/jce

Freedom from unit roots? The time series properties of democracy and economic freedom

Colin O'Reilly [a,*], Ryan H. Murphy [b]

[a] Creighton University, Menard Family Center for Economic Inquiry, 2500 California Plaza Omaha NE 68178, United States
[b] Southern Methodist University, Bridwell Institute for Economic Freedom, 6212 Bishop Blvd. Dallas TX 75275-0333, United States

ARTICLE INFO

JEL classification:
O43
D72
P17
C33

Keywords:
Economic freedom
Democracy
State Capacity
Cointegration

ABSTRACT

This paper revisits Sobel and Coyne (2011), which finds a cointegrating relationship between democracy and economic freedom. We extend their sample with data published since that time, make use of the second generation of panel unit root and panel cointegration tests, and apply the more comprehensive measure of democracy from *Varieties of Democracy*. With these methodological improvements in place, we do not find that either economic freedom or democracy has a unit root in the full set of countries studied, and they therefore cannot have a cointegrating relationship. We then apply the methodology developed by Chortareas and Kapetanios (2009) in order to isolate a subset of countries whose institutions may in fact have a cointegrating relationship.

1. Introduction

Are liberal freedoms fundamentally interrelated? Sobel and Coyne (2011; see also Coyne and Sobel, 2010) find that measures of economic freedom and democracy are cointegrated – that these different dimensions of institutions move together through time. This paper returns to the question with updated data and methodology. Although there is an extensive literature on the relationship between economic freedom and democracy – especially the causal effects of democracy on economic freedom – there has been little on the time series properties of economic freedom and democracy since then, with the closest perhaps being applications of panel vector autoregression (Krieger and Meierrieks, 2016; Góes, 2016; Murphy and O'Reilly, 2019).

A binding limitation to this research vein is that the power of any test or estimation one may wish to perform is constrained by the time dimension of a panel. While this may not be a significant issue for democracy, yearly data for economic freedom only runs back to 2000. Any investigation that hopes to uncover long run, or even medium run, properties of the data must use five-year increments. Therefore, even the addition of three more time periods (in this case, 2010, 2015, and 2020) can manifestly impact conclusions.

After the publication of Sobel and Coyne (2011), a growing appreciation for the relevance of cross-sectional dependence in these contexts has led to the development of panel tests for unit roots and cointegration that are robust to its effects. Our explorations will make use of these most recent, better tests. Unfortunately, despite having more power than earlier pure time-series tests, concerns about the power of our panel tests will remain.

Finally, also in the last decade, the *Varieties of Democracy* dataset has come into prominence, offering denser and more nuanced measures of democracy than those that were available previously. Although we will consider the measures of democracy selected by

* Corresponding author.
E-mail addresses: colinoreilly@creighton.edu (C. O'Reilly), rhmurphy@mail.smu.edu (R.H. Murphy).

https://doi.org/10.1016/j.jce.2025.02.003
Received 3 June 2024; Received in revised form 3 December 2024; Accepted 20 February 2025

Please cite this article as: Colin O'Reilly, Ryan H. Murphy, *Journal of Comparative Economics*, https://doi.org/10.1016/j.jce.2025.02.003

Sobel and Coyne (2011), our main results will use democracy indicators produced by *Varieties of Democracy*.

We ultimately find little support for a presence of a unit root in all countries for either democracy or economic freedom, unlike Sobel and Coyne (2011). And without the presence of a unit root, testing for cointegration is not meaningful. While that is our headline result and what we ourselves see to be true, we introduce a few points of nuance to the analysis. Specifically, tests for unit roots in panels answer a narrow question, which is whether a significant proportion of the series in a panel have a unit root. But that is only one approach to the question. In addition to that, we make use of a procedure from Chortareas and Kapetanios (2009), which sequentially determines which time series within a panel have a unit root. In doing so, we allow for heterogeneity between countries in a way that previous methods did not. After isolating the set of countries in which both economic freedom and democracy have a unit root, we test for a cointegrating relationship between these institutions. Even amongst this subset of countries, we find little evidence to support the notion that economic freedom and democracy are cointegrated.

Our analysis produces two broad conclusions. First, countries, as a rule, should be expected to see their institutions revert to their respective means following a shock. Second, institutions of economic freedom and electoral democracy do not necessarily move together through time. One final caveat however, is a possible exception in *Varieties of Democracy*'s "deliberative democracy," where a cointegrating relationship appears plausible.

In the section that follows, we will explore the lengthy literature on the relationship between democracy and economic freedom, attempting to frame this literature in the context of cointegration. We then describe our data and methods and review our results. Taken at face value, our results have scholarly implications for important ideas in social sciences (like modernization theory), and practical implications for whether advanced economies will eventually see their institutions doomed to revert to the mean.

2. Literature review

There is an extensive amount of scholarship on the relationship between democracy and economic freedom. We will cover the specific theorized mechanisms between democracy and economic freedom, as we are aware of them. Causal relationships, in either direction, are not necessarily essential for a cointegration story. After reviewing each point in the existing literature, however, we will give emphasis to the arguments or theories for which cointegration is most relevant.

Much of the scholarship out there comes in one of two very different clusters: one, informal social science or even writing intended for mass consumption on the relationship between democracy and economic freedom, and two, applied empirical work, which is often rather atheoretical. As an example of the former, capitalism and democracy as natural counterparts is a subtext of Fukuyama (1992) as the Cold War ended. But in other contexts, writers on the left have framed market-oriented reform as something that only occurs when the democratic masses are hoodwinked or distracted, with socialism being framed the true expression of democracy (Klein, 2007; Gilens, 2012; MacLean, 2017). Conversely, there have been arguments put forth by advocates of free markets that democracy is not always a friend of economic freedom (Caplan, 2007; Brennan, 2016; Jones, 2021, c.f. Murphy, 2019).

Among the more formal or quasi-formal treatments of the topic[1] is the notion of "open access orders" (North et al., 2009) or "inclusive institutions" (Acemoglu and Robinson, 2012). In either of these framings, societies that adopt institutions that allow the whole of the adult population to engage with the polity (i.e., democracy) will adopt policies like free markets that are good for the people as a whole, in contrast with "extractive institutions" or "limited access orders," which align the structures of the state to benefit insiders only. Democracy and markets thereby go hand-in-hand in the process of economic development.[2]

The Hayek-Friedman Hypothesis is widespread in the literature, and can be at least stated in propositional terms: *if* there is no economic freedom, *then* there will be no political freedom. Although this point was raised by Friedman (1962), the formal mechanism is the logic described by Hayek (1944) concerning the progression that will take place within political institutions should central planning take place, as its logic dictates that political power must be consolidated for socialism to "work." Although the literature closest to this paper, Sobel and Coyne (2011), use the Hayek-Friedman hypothesis as their primary framing device for cointegration, conventionally-specified cointegration does not quite address this question, as the Hayek-Friedman hypothesis is asymmetrical and allows for the possibility of economic freedom without political freedom, as is clearly the case, for example, in Singapore.[3] There are numerous papers in the literature that either directly test the Hayek-Friedman hypothesis (Lawson and Clark, 2010; Pryor, 2010; Benzecry et al., 2024) or test an adjacent theory while making reference to it (Boudreaux and Holcombe, 2017; Bjornskov, 2018). Others describe testing the general relationship between economic freedom and democracy as a test of the Hayek-Friedman hypothesis, although that does not address the propositional nature of the theory (Dawson, 1998, 2003; Kodila-Tedika and Khalifa, 2023). The vast majority of all of these tests confirm the hypothesis, with very marginal counterexamples (Pryor, 2010).

Another conceptual framing is conceiving of democracy and economic liberalism as fitting within an overall rubric of economic development within a hierarchy of variables (Williamson, 2000; c.f. Galor, 2022). The most famous of these is the modernization hypothesis (Lipset, 1959). Modernization theory itself differs in presentation across writers, but Lipset and others have argued that

[1] One formal, but narrow theoretical model is found in Przeworski (1991), which gives a potential description of the interaction between political and economic liberalization in the course of transition. For a more recent model on this specific piece of the puzzle, see Dorsch and Maarek (2015).

[2] Additional motivation via case studies and historical vignettes can be found in both Acemoglu and Robinson (2012) and Acemoglu and Robinson (2019a). More detailed theoretical elaboration can be found in Acemoglu and Robinson (2008) and Acemoglu et al. (2015).

[3] A carefully specified error-correction model, rather than a generalize test of cointegration, would be a better way of addressing the Hayek-Friedman hypothesis. Such an application is of interest to us, our intention in this paper is to sort out the time series properties of institutions, not to test the Hayek-Friedman hypothesis.

either certain levels of economic abundance, education, or credible state structures must be attained before effective, liberal democracy sticks (Huntington, 1968; Zakaria, 2003; c.f. Barro, 1999). One possible way of thinking about the modernization hypothesis is that economic freedom facilitates the accumulation of sufficient levels of those variables, which in turn allow democracy to take route. Becker and Posner (2009: 315–320) articulate a version of that chain of causation, but caution against overemphasizing democracy as acting in support of economic freedom. On the other hand, the modernization hypothesis has no shortage of critics (e.g., Acemoglu et al., 2009).

Democracy and economic liberalization may also appear alongside one another within hierarchies of economic development. In Williamson (2000), the general hierarchy is the development of social norms, culture, and informal institutions (changing on the time scale of centuries) giving rise to the general rules of the game like democracy (on a time scale of decades), which in turn give rise to different policies like economic freedom (on a time scale of years), which then yield economic outcomes (on a continuous time scale). Similar theories remain very prominent: the hierarchy of Galor (2022) is similar but zoomed out even further, while Acemoglu and Robinson (2019a) *The Narrow Corridor* stress the relationship between cultural and social characteristics of a society and its state institutions as the basis for future institutional and economic development. These theories clearly predict that different aspects of institutions will form and change through a (slow) dynamic, time contingent process.

One final mechanism, which operationalizes the issues worrying Klein (2007), Gilens (2012) or a MacLean (2017) is that economic freedom leads to more inequality, and more inequality harms institutional quality, especially democracy. While results are contradictory and seem contingent on time and place (Bennett and Nikolaev, 2017), detrimental effects of economic freedom on inequality are perhaps the most common "bad" finding in the entire empirical literature on economic freedom (Lawson et al., 2024). And on the second link in that chain of reasoning, negative effects of inequality on democracy, there is much less controversy (Glaeser, 2008), though the negative effect is at times somewhat blurry (Savoia et al., 2010).[4]

With all that said from the standpoint of theory, there is also the rather enormous empirical literature on the relationship between democracy and economic freedom. While it is preferable to keep the effects of civil liberties and democracy on economic freedom distinct, as was at least attempted by Lawson et al. (2020), the fact is that most measures of democracy conflate democracy with civil liberties (inclusive of free speech), such that it is difficult to consistently differentiate them. Per Lawson et al., however, the evidence is overwhelming – such that it can be – that civil liberties improve economic freedom, while democracy does have positive effects, but it is somewhat more ambiguous.

Highlights from this empirical literature include de Haan and Sturm (2003), Fidrmuc (2003), Grosjean and Senik (2011), Rode and Gwartney (2012), Giuliano et al. (2013), Dutta and Williamson (2016), Chen and Li (2018), Acemoglu et al. (2019), and Castro and Martins (2021).[5] When the converse question, the effect of economic freedom on democracy, is asked, it is usually done in concert with also testing the effect of democracy on economic freedom (Dawson, 1998, 2003; Murphy and O'Reilly, 2019). Where scholarship has focused on the effect of economic freedom on political institutions, it has typically tested concepts related to but not the same as democracy, such as political stability (Comeau, Jr. 2003) or durability of democratic regimes (Boudreaux and Holcombe, 2017), freedom of the press (Bjornskov, 2018), and human rights (Dreher et al., 2012; de Soysa and Vadlamannati, 2013). Should economic freedom harm democracy through the inequality mechanism, either its relationship is yet to have been shown empirically, or economic freedom's effects on other variables in turn mitigate negative effects on democracy.

A final theoretical point that does not directly relate to democracy or economic liberalization per se is whether institutional reforms must reflect underlying cultures and mores (again, c.f. Williamson, 2000). For North (1990: 83), because institutions are rooted in preferences, the source of institutional change is changes in relative prices or preferences. Therefore, "[t]he process of change is an incremental one" (83). Though he does not rule out discontinuous institutional change, he speaks directly to mean reversion, noting that new institutions built on ideology "are going to be subverted and force reversion to more compatible constraints" (91). Rather than simply assessing certain cultural underpinnings as being conducive to institutional development, scholars such as Scott (1998), Boettke et al. (2008), Easterly (2008), and Murstazashvili and Murstazashvili (2015; 2016a) go further, warning that institutional reforms that occur "exogenously," i.e., without reference to the norms, mores, local experience ("mēis"), and already-existing institutions, are very unlikely to succeed. Reforms imposed from the outside may change institutions temporarily, but these changes fail to take root, over time reverting back to their pre-reform state. In other words, institutions do not have a unit root, therefore rendering a cointegrating relationship is unlikely.

Issues of mismatch between institutions and their cultural underpinnings have arisen empirically in topics such as the failures of both foreign aid (Easterly, 2005; Young and Sheehan, 2014; Bologna et al., 2022) and foreign military intervention (Berger et al., 2013; Coyne, 2008a; 2008b) to improve institutions. Institution building, where successful, occurs endogenously within a society, or it at least must be rooted in local experience (Murstazashvili and Murstazashvili, 2016b; Jochem et al., 2016; O'Reilly and Zhang, 2018); for an opposing view on both foreign intervention and aid, see Collier (2007).

Both the theoretical literature and empirical literature point in the direction of democracy and economic freedom as being somehow related to one another, although that is not necessarily the same as being cointegrated. For example, a theory may predict that a change in democratic institutions is associated with changes to economic institutions, but with no reference to a time contingent process. By contrast, many of the grand unified theories of economic history and development like Williamson (2000), North et al. (2009), and Acemoglu and Robinson (2012; 2019a), as well as modernization theory, certainly sound akin to democracy and economic freedom being intrinsically linked as they evolve together through time. (And as stated earlier, the Hayek-Friedman hypothesis almost

[4] See also Krieger and Meieerrieks (2016) for further work in this vein.
[5] C.f. Lundstrom (2005).

predicts a cointegrating relationship, but the Hayek-Friedman hypothesis is one-sided with respect to economic freedom and democracy.) On the other hand, the view that outside exogenous shocks have no long run impact on institutions implies regression to the mean and no unit roots.

If institutions revert to their original state following a shock, the question of whether democracy and economic freedom move together through time in the sense of cointegration is moot. Therefore, we begin by testing if institutions are non-stationary and for which countries this is the case. If institutions are non-stationary (the series has a unit root), institutional changes "stick." We will conclude that overall, institutions are stationary, but then we will isolate specific countries where non-stationary behavior is most evident. Evidence of cointegration would support various theories that posit the co-evolution of economic and political institutions over time, whereas the failure to find a cointegrating relationship, even in those narrow cases, would be evidence contrary to the predictions of some of the leading theories of institutional development.

3. Data

Like Sobel and Coyne (2011), economic freedom and democracy are our two variables of interest. Also in line with them, our measure of economic freedom is the *Economic Freedom of the World* (EFW) index (Gwartney et al., 2022). The data in their current published form run back to 1970, with annual data since 2000 and quinquennial data from 1970 to 2020. In order to say anything about long run relationships, we use the data on a quinquennial basis for the full sample 1970–2020. Although this only adds three observations to each country-level time series, the additional data is key for the under-powered tests which our diagnostics strongly recommend.

The EFW data consists of five areas, the [limited] size of government, the quality of the legal system and property rights, sound money, the freedom to trade internationally, and [limited] regulation. All areas, components, and subcomponents are placed on a [0,10] scale, with higher values always corresponding to more freedom. In the main analysis, we will narrow the 165 countries in the index to only those with consistent data back to 1970, which limited us to 82 countries.

Our second measure of market liberalization is the KOF Globalization index (Dreher, 2006; Gygli et al., 2019). We chose this as a secondary measure even though it is a mixture of many dimensions of globalization, not just institutions and policies, because it goes beyond the data that is already contained within EFW and provides yearly data back to 1970. The globalization index is a simple average of the de jure and de facto KOF globalization indices. The addition of annualized data back to 1970 is a considerable benefit for the low-powered tests we will be using, where the time dimension is the binding constraint for the power of the test.

Sobel and Coyne (2011) make use of data from the *Polity IV* project and Freedom House's *Freedom in the World* to measure democracy. We view switching from these variables for measuring democracy to measures from *Varieties of Democracy* (V-Dem) data (Coppedge et al., 2022) as a methodological improvement for a few reasons. The first is that the variation in the data that can be expressed in either measure of the measures Sobel and Coyne used is limited, because the scores of both are limited to integer values on short scales,[6] with a [−10,10] scale for Polity and a pair of [1,7] scales for Freedom House. This issue is worsened by the fact that the minimal and maximal values are often actually binding for both measures, which presents difficulties for unit root tests (Cavaliere and Xu, 2014; Alanya-Beltran, 2022). While we ultimately consider both the Polity data (Marshall and Gurr, 2020) and the Freedom House (Freedom House, 2022) data in the appendix, our use of EFW, the KOF Globalization index, and *Varieties of Democracy* makes this latter issue hypothetical rather than practical.[7]

Varieties of Democracy, as its name implies, offers several ways of conceptualizing democracy, with annual data running as far back as 1789. The first measure that we will make use of is "electoral democracy" or "polyarchy," which is their baseline level of democracy and combines data on "freedom of association thick," "clean elections," "freedom of expression," "elected officials," and "suffrage." The other versions of democracy they produce are liberal democracy, participatory democracy, deliberative democracy, and egalitarian democracy. Rather than piling every option in, we chose deliberative democracy as our main secondary measure of democracy.

The deliberative democracy index combines electoral democracy with a "deliberative component index," which contains measures of "reasoned justification," "common good justification," "respect for counterarguments," "range of consultation," and "engaged society." As these variables imply, deliberative democracy emphasizes the importance of thoughtful engagement of policy questions by the electorate. A standard "rational ignorance" mode of the electorate would suggest that subsidies or sanctions designed to remove that ignorance through deliberation would result in better policy choices. But Brennan (2016: 54–73) offers an unconventional scholarly position concerning deliberative democracy (as a concept, not the *Varieties of Democracy* variable), which is that more deliberative democracies cause greater dysfunction (because engagement results in more tribalism), including in ways that would make a country's policies less economically liberal. Others, e.g. Landemore (2012), may disagree. But using deliberative democracy as an alternative to electoral democracy provides a level of intrigue that a different arbitrary robustness check does not. Summary statistics are presented in Table 1.

We view the question of which democracy index to use to be twofold, and ultimately the *Varieties of Democracy* data appears superior on both fronts. First, it avoids the "clunkiness" of either *Freedom House* or *Polity* V in terms of its granularity and completeness as a measure. Second, we think at least a somewhat expansive definition of democracy as we see in V-Dem presents a better test of the

[6] A more detailed score is made available now by Freedom House, but only over a limited number of years.

[7] Although we are aware of corrections for unit root tests in the conventional application in time series analysis, we are unaware of any existing means of applying these tests to panel data. But as we have said, our choice of data (which was already our preference before confronting this issue) means that the problem is only hypothetical.

Table 1
Summary statistics.

	Mean	S.D.	Min.	Max.	N*T	N	T
Economic Freedom and V-Dem							
Economic Freedom	6.32	1.37	2.37	9.15	902	82	11
Electoral Democracy	0.55	0.29	0.07	0.92	902	82	11
Deliberative Democracy	0.45	0.28	0.01	0.89	902	82	11
Economic Freedom and V-Dem – Extended Sample							
Economic Freedom	6.10	1.36	2.50	8.85	1200	80	15
Electoral Democracy	0.50	0.30	0.01	0.92	1200	80	15
Deliberative Democracy	0.41	0.29	0.00	0.89	1200	80	15
KOF and V-Dem							
KOF Globalization	51.01	17.64	13.86	91.14	6528	128	51
Electoral Democracy	0.46	0.29	0.01	0.93	6528	128	51
Deliberative Democracy	0.37	0.28	0.01	0.89	6528	128	51
Economic Freedom and Polity							
Economic Freedom	6.33	1.37	2.37	8.85	650	65	10
Democracy	6.21	4.07	0.00	10.00	650	65	10
Autocracy	1.94	3.03	0.00	10.00	650	65	10
Economic Freedom and Freedom House							
Economic Freedom	6.20	1.33	2.37	8.85	1040	104	10
Political Rights	3.36	2.11	1.00	7.00	1040	104	10
Civil Liberties	3.38	1.81	1.00	7.00	1040	104	10

Note: Data on Economic Freedom is from Gwartney et al. (2022). The KOF Globalization index is from Gygli et. al (2019) and the V-dem measures of electoral and deliberative democracy are from Coppedge et al. (2022). Measures of democracy and autocracy are from the Polity 5 dataset (Marshall and Gurr, 2020). Finally, measures of political rights and civil liberties are from Freedom House (Freedom House, 2022). N denotes the number of countries and T denotes the number of time periods. "S.D." indicates standard deviation.

effects of democracy as is intended by political scientists, even if this seen as undesirable by critics such as Jones (2021). But either way, our results are not contingent on our preference for V-Dem over the two measures used by Sobel and Coyne, as shown in the appendix.

4. Methods: unit root and cointegration tests

4.1. Discussion of challenges

The peculiarities of economic and political institutions present several challenges when we conduct our analysis with time-series methods. Institutions tend to change slowly and are therefore measured over long time-horizons at infrequent intervals. In the case of economic institutions, this data limitation has often precluded time-series analysis of individual countries. The data that is most of interest to us, for example, is only available on a quinquennial basis prior to the year 2000. But innovations in panel unit root and panel cointegration testing has since opened the door to time-series analyses of institutions as pioneered by Sobel and Coyne (2011; c.f. Coyne and Sobel, 2010). Leveraging the large dimension of data across countries improves the power of unit root tests relative to the single country alternatives (Baltagi 2021: 342). Yet, Karlsson and Löthgren (2000) and Baltagi (2021: 350) warn that, when applied to data with a short time dimension, panel unit root tests may still be underpowered, leaving "the potential risk of concluding that the whole panel is nonstationary even when there is a large proportion of stationary series in the panel." Sobel and Coyne conduct their tests on a panel with eight time-periods. In this study, we use updated panel data that is over one-third-longer.

The cost of the greater power of panel unit root tests, relative to testing a single time series, is the introduction of heterogeneity across time series (countries). Different countries may have different autoregressive parameters or different orders of integration. A further complication is the likelihood of cross-sectional dependence. Shocks such as technology, disasters, and disease are likely to affect all countries. Moreover, countries are clustered spatially, meaning shocks are likely to be geographically correlated. In this context, consider as examples the fall of the Soviet Union or the Arab Spring. Failing to account for cross-sectional dependence can lead to substantial size distortion of the standard "first generation" unit root tests (Baltagi et al., 2007). Tests may become oversized such that they reject the null hypothesis of a unit root despite the series having a unit root. The discussion that follows weighs these tradeoffs across unit root tests to choose the most appropriate tests.

4.2. First-generation unit root tests

The selection of which unit root test to use starts first with the assumptions of the tests and which are most adhered to. Studying institutional change involves the potential for substantial heterogeneity due to historical contexts specific to each country and the possibility of cross-sectional dependence. Further, institutions may have a significant degree of serial correlation. And in this specific case, we are constrained by the aforementioned short time dimension.

The test with the best small sample properties is the Harris and Tzavalis (1999) test that relies on fixed T asymptotics. However, this test assumes both a homogeneous autoregressive parameter for all cross-sections and the absence of serial correlation, both of which are implausible in the present context. The Im et al. (2003) (IPS) test and the Fisher test (Choi, 2001) allow for both serial correlation and heterogenous autoregressive parameters. Indeed, Sobel and Coyne chose to use the IPS tests and two versions of the Fisher test in their study.

But both tests are underpowered in samples with a short time dimension. The IPS test performs relatively well in small samples as long as a sufficient number of augmented Dickey-Fuller (ADF) lags are included in the test (Im et al., 2003). Choi (2001) finds that the Fisher test outperforms the IPS tests in terms of size-adjusted power. Of the several variants of the Fisher test, Baltagi (2021: 347) notes that the inverse normal Z-test outperforms the others. Therefore, we use the Fisher Z-type test rather than the Fisher Chi-squared test used in Sobel and Coyne.

4.3. Cross-section dependence

Shocks in macroeconomic panels are likely to be correlated across countries. Unobserved factors such as technology, culture, and crises affect many or all countries, though to different degrees. For example, changes in the acceptability of women engaging in politics and economics have swept the world over the last half century which may have influenced the character of political and economic institutions. However, this shift has been more pronounced in the West than in the Middle East and Sub-Saharan Africa. If unaccounted for in estimation, these common shocks introduce cross-sectional dependence in the error term that can bias testing and estimation (Pesaran, 2007). To test for the possibility of cross-sectional dependence, we apply the test developed by Pesaran (2021). The tests for cross-sectional dependence presented in Table 2 find evidence of cross-sectional dependence for all measures of institutions considered. The first-generation unit root tests do not account for or model cross-sectional dependence. However Levin et al. (2002) suggest that demeaning variables can mitigate cross-sectional dependence. Therefore, we present the results from the first-generation unit root tests on demeaned data. Because demeaning assumes that shocks at a given time affect all countries equally, it may not fully remove cross-sectional dependence from asymmetric shocks.

Substantial cross-sectional dependence distorts the size of the first-generation unit root tests (Pesaran, 2007) and can lead to deceptive inference (Westerlund and Breitung, 2013). More recent second-generation unit root tests have been developed to explicitly model the omitted common factors to account for cross-sectional dependence. We implement the CIPS test developed by Pesaran (2007), which accounts for cross-sectional dependence by modifying the IPS test equation to include cross-sectional averages of the variable being tested. In a Monte Carlo study assuming high cross-section dependence, Pesaran (2007) shows that, unlike the first-generation tests, the CIPS test exhibits "no evidence of size distortions." Like the first-generation tests, the second-generation test tends to have low power for short panels. Therefore, there is a risk of failing to reject the null hypothesis of a unit root when no unit root is present.

4.4. Interpretation and heterogeneity

Care must be taken to interpret the results of these tests correctly. For unit root tests of individual time series (countries), the null hypothesis is that the series has a unit root, and the alternative hypothesis is that the series does not have a unit root (i.e., the series is stationary). However, for the Fisher panel unit root test, the alternative hypothesis is that *at least one* panel does not have a unit root (at least one series is stationary). For the IPS and CIPS tests the alternative is that the fraction of panels that do not have a unit root is non-zero. Pesaran (2012: 1) clarifies, "that rejection of the panel unit root hypothesis should be interpreted as evidence that a statistically significant proportion of the units are stationary."

Therefore, a rejection of the null hypotheses is evidence that a statistically significant proportion of countries have stationary institutions which revert to the mean following an exogenous shock. However, theory predicts substantial heterogeneity between the institutions of different countries. Therefore, there are likely many countries in the panel for which institutions are not mean reverting and, therefore, may have a cointegrating relationship with other institutions. The nature of panel unit root testing simply imposes certain restrictions on what hypotheses we are even able to test.

In cases where a long panel is available, individual unit root tests can be used to identify which time series (countries) do or do not have a unit root (Pesaran, 2012). But this approach forgoes the needed increase in power of the panel tests, and is not feasible in our scenario with such a short panel. Following Chortareas and Kapetanios (2009), we investigate which countries have non-stationary institutions using their Sequential Panel Selection Method (SPSM). Using SPSM, a panel unit root test is first run on the full sample. If the test fails to reject a unit root, then the conclusion is that all panels have a unit root. If the test rejects the unit root, it drops the country with the largest test statistic and reruns the test. The method then continues this process until the test fails to reject the unit root. The set of countries dropped in this process are considered to be stationary (no unit root) whereas the final set of countries that remain are considered to be non-stationary (have a unit root). We implement this method using the CIPS unit root test and a threshold to drop countries if they reject the null at the 10 % level.[8] These are the countries we will consider in our cointegration tests.

[8] We are using the low level of "significance" because we are not seeking to perform hypothesis testing, but rather generate a useful list of countries for what we view as a speculative analysis.

Table 2
Cross-sectional dependence tests.

Economic Freedom, Electoral Democracy and Deliberative Democracy 1970–2020 (5-year) (N = 82, $T = 11$)			
	EFW	Electoral	Deliberative
Test- Statistic	123.361	93.892	93.853
P-value	0.000	0.000	0.000
Economic Freedom, Democracy and Autocracy – Polity - 1970–2015 (5-year) (N = 65, $T = 10$)			
	EFW	Democracy	Autocracy
Test- Statistic	98.333	20.611	22.751
P-value	0.000	0.000	0.000
KOF Openness, Electoral Democracy, Deliberative Democracy – 1970–2020 (annual) (N = 128,51)			
	KOF	Electoral	Deliberative
Test- Statistic	605.641	317.070	321.921
P-value	0.000	0.000	0.000

Note: The Pesaran (2021) test for cross-sectional dependence is used in all cases.

4.5. Cointegration tests

Like unit root tests, selecting the correct cointegration tests depends on the context of the data generating process. As discussed earlier, the series studied here likely exhibit heterogeneity and cross-sectional dependence. Of the several first-generation tests, the Pedroni (2004) test allows for heterogeneous autoregressive coefficients and performs well in small samples (Baltagi, 2021: 363). Specifically the Pedroni group-mean ADF test performs better than several alternatives (Wagner and Hlouskova, 2007). We use this test as our primary test for cointegration. The drawback of the Pedroni test is that it does not account for cross-sectional dependence and therefore, we present test results on demeaned data which should obviate the importance of cross-sectional dependence. However, Monte Carlo studies show that the Pedroni test are often oversized, leading to the rejection of the null hypothesis of "no cointegration" too frequently (Westerlund, 2007).

The second-generation Westerlund (2007) panel tests for cointegration explicitly account for cross-sectional dependence. Unlike the residual-based first generation tests, the Westerlund tests are based on estimates of α, the coefficient on the error correction term in the model. Westerlund proposes two group mean tests in which the error correction term is estimated for each country individually, and the tests statistic is then subsequently calculated using the mean of the individual country estimates. Alternatively, Westerlund proposes a pair of panel test-statistics that are calculated based on the estimate of a common error-correction parameter. For the group mean tests, rejecting the null hypothesis is evidence that the series is cointegrated for at least one county; for the pooled tests, the rejection of the null is evidence that the series is cointegrated in all countries. For each approach, there is an α test, calculated as a direct measure of α, and a τ statistic, constructed by dividing the coefficient by the standard error. The kernel bandwidth is chosen by: $4 * \left(\frac{T}{100}\right)^{\frac{2}{9}}$.

Westerlund considers selecting lag and leads either based on the Akaike information criteria (AIC) or based on the following rule as a function of the time dimension: $4 * \left(\frac{T}{100}\right)^{\frac{2}{9}}$. A deterministic selection criterion may be a problem because the test can be sensitive to different lag and lead specifications in small samples (Persyn and Westerlund, 2008). For our primary sample, the data only permit a lag and lead length of one. To determine the lag length for longer samples, we use the time dimension rule and present results using the information criteria rule as a robustness check.[9] Following Persyn and Westerlund (2008) to account for cross-sectional dependence, we use robust critical values obtained by bootstrapping over 500 iterations.

5. Results

5.1. Stationarity

To study whether institutions are non-stationary or cointegrated, we first need to know if institutions exhibit cross-sectional dependence. The results of the Pesaran (2021) test for cross-sectional dependence are presented in Table 2. The test rejects the null hypothesis of weak cross-sectional dependence for all variables in all datasets considered, which indicates that cross-sectional dependence is likely a concern. In the analysis that follows, we take steps to mitigate the likely presence of cross-sectional dependence.

Turning to one of our two main hypotheses, are shocks to institutions permanent, or are institutions mean-reverting (stationary)? To test this question, we conduct a series of unit root tests. First-generation IPS and Fisher tests on demeaned data are presented in the in Table 3. To more completely account for cross-sectional dependence, we show the results of the CIPS unit root test developed by

[9] In a Monte Carlo study Westerlund (2007) finds that the T based rule produces the best results in terms of the size of the test.

Table 3
First generation unit root tests.

	1 Lag		3 Lags	
Economic Freedom, Electoral Democracy and Deliberative Democracy 1970–2020 (5-year) (N = 82, $T = 11$)				
EFW	IPS	Fisher	IPS	Fisher
Test Stat	−3.662	−2.409	−10.330	−3.457
P-value	0.000	0.008	0.000	0.000
Electoral Democracy	IPS	Fisher	IPS	Fisher
Test Stat	−6.515	−7.065	−11.405	−6.430
P-value	0.000	0.000	0.000	0.000
Deliberative Democracy	IPS	Fisher	IPS	Fisher
Test – Stat	−5.597	−4.170	−10.916	−10.072
P-value	0.000	0.000	0.000	0.000
KOF Openness, Electoral Democracy, Deliberative Democracy – 1970–2020 (annual) (N = 128,51)				
KOF	IPS	Fisher	IPS	Fisher
Test – Stat	0.962	1.192	0.936	2.730
P-value	0.832	0.883	0.825	0.997
Electoral Democracy	IPS	Fisher	IPS	Fisher
Test – Stat	−1.514	−1.492	−1.598	−0.947
P-value	0.065	0.068	0.055	0.172
Deliberative Democracy	IPS	Fisher	IPS	Fisher
Test – Stat	−0.770	−0.836	−0.473	0.800
P-value	0.221	0.201	0.318	0.788

Note: Lag lengths for the IPS tests are selected by Akaike information criteria subject to the maximum listed in each column. Lag lengths for the Fisher tests are set by the lags listed in each column. For the Fisher test we report the inverse normal z statistic.

Pesaran (2007) in Table 4.

The IPS test is conducted using AIC to select the Augmented Dickey-Fuller (ADF) lag length. Two IPS tests are presented for each case, one with a maximum of one lag and another with a maximum of three lags. Similarly, for the Fisher test we present results of tests where the ADF lags are set to one and then set to three. First, we consider the primary sample using economic freedom and two measures of democracy from V-Dem. In testing economic freedom, we reject the null hypothesis that all panels have a unit root. These results suggest that economic freedom is a stationary, mean-reverting variable for at least some countries. All unit root tests for the two measures of democracy, electoral democracy and deliberative democracy, reject the null hypothesis that all countries have a unit root. Similar to economic freedom, these results indicate that democracy is stationary for at least some countries. However, in the presence of cross-sectional dependence, first generation tests can suffer from significant size distortions leading to over-rejection of the null hypothesis. Second generation tests, which do not suffer from such distortions even with a short time dimension, should be more reliable (Pesaran, 2007). The second generation CIPS tests in Table 4 are consistent with the first-generation tests. The null hypothesis that all panels have a unit root is rejected at the 1 % level for all three measures.

To test the robustness of the findings using economic freedom and V-Dem's measures of democracy, we consider several other measures of democracy. The results using the measures of democracy and autocracy from Polity 5 and measures of political rights and civil liberties from Freedom House (c.f. Sobel and Coyne, 2011) are presented in the appendix. These test results mirror those from the EFW and V-Dem sample, rejecting a unit root in most cases. Once again, the CIPS tests on economic freedom rejects the null hypothesis of a unit root in all countries. On the other hand, the CIPS test fails to reject the null for measures of political institutions from the Polity dataset and the Freedom House dataset.

Next, we consider the robustness of the results for economic institutions. In place of the EFW index we use the KOF globalization index. As discussed earlier, the KOF index is only an indirect measure of market liberalization, but it drastically improves the length of the time dimension from 11 to 51. First-generation tests of the KOF index fail to reject the presence of a unit root. In contrast to the tests of economic freedom, tests of the KOF index indicate that all panels have a unit root and none, therefore, are stationary. Tests of democracy in this lengthier sample are more mixed. Tests of the electoral democracy measure reject the null hypothesis in three of the four tests, but only at the ten percent level. All tests of the deliberative democracy measure fail to reject the null hypothesis. Taken together, the first-generation tests using annual data generally find that economic and political institutions are non-stationary. The second-generation tests in Table 4 show notably different results. The CIPS tests rejects the null hypothesis that all panels have unit root for the KOF globalization index and for both measures of democracy from V-Dem.

The first-generation unit root tests show somewhat mixed results but reject the null hypotheses that all countries have a unit root (are non-stationary) in most cases, whereas the second-generation tests more uniformly reject the null hypothesis. Importantly, rejecting the null means that at least some countries have stationary institutions. However, the test does not specify which countries institutions are stationary and which are non-stationary. To parse this question, we follow the SPSM developed by Chortareas and Kapetanios (2009). The results of applying this method to the primary sample of economic freedom and electoral democracy are presented in Table 5.

Table 4
Second generation unit root tests – CIPS test.

Economic Freedom, Electoral Democracy and Deliberative Democracy 1970–2020 (5-year) (N = 82, $T = 11$)			
	EFW	Electoral	Deliberative
Test Statistic	−2.98	−2.78	−2.69
10 %	−2.00	−2.00	−2.00
5 %	−2.07	−2.07	−2.07
1 %	−2.19	−2.19	−2.19
KOF Openness, Electoral Democracy, Deliberative Democracy 1970–2020 (annual) (N = 128,51)			
	KOF	Electoral	Deliberative
Maximum Lags	5	5	5
Test Statistic	−2.36	−2.40	−2.15
10 %	−2.01	−2.01	−2.01
5 %	−2.06	−2.06	−2.06
1 %	−2.14	−2.14	−2.14

Note: The number of lags included is selected using the Wald test at the 95 % level. The maximum number of lags is set to five for the KOF and V-Dem sample. The maximum is set to 1 for all other samples (larger maximums to not change the results).

The first column of Table 5 lists countries which have stationary or mean reverting economic institutions and the third column lists countries with stationary political institutions.[10] This implies that shocks to institutions in these countries are not permanent, as institutions eventually return to their pre-shock level. These are the countries with the "stickiest" institutions. Either this set of countries has reached a steady state level of institutional development or attempts to change institutions in these countries have failed. For example, countries like the United States with high quality economic institutions over the full period of study or countries that consistently failed to reform their economic institutions, like Senegal and Haiti. Similarly, Column 3 shows countries that have stationary political institutions, which have either failed to significantly reform their political institutions, Haiti and Syria, or have had consistently democratic institutions Canada and Sweden.

Countries with non-stationary economic institutions are listed in column 2 and non-stationary political institutions in column 4. The SPSM procedure indicates that shocks to institutions in these counties tend to be permanent, or non-mean reverting. The final column in Table 5 lists countries that have both non-stationary economic institutions and non-stationary political institutions. Column 4 shows that most countries have undergone some significant political reform and a smaller but non-trivial set of countries in Column 2 have undergone a significant economic reform (or collapse). The countries in the final column are of particular interest because of the possibility that economic and political institutions are cointegrated in these countries. The list of countries can be interpreted as those that either underwent reform and that it "stuck," or that have seen their institutions collapse and fail to recover.

The countries listed in the final column of Table 5 are "obvious" countries that fully reformed (or collapsed). We do not think that this procedure provides much more nuance than would be obtained by asking an informed political scientist about these countries, and no patterns of interest really emerge from the SPSM procedure. We do not think that this is a knock against the procedure; merely, there just really isn't much to say from squeezing more water from this particular stone.

5.2. *Cointegration*

Rather than conducting cointegration tests on the full set of countries, the tests are applied to only the subset of countries for which both economic freedom and democracy are found to be non-stationary using the SPSM procedure. The results of applying the Pedroni cointegration test are presented in Table 6.[11] The tests of the demeaned economic freedom and electoral democracy series only marginally reject the null hypothesis of "no cointegration," with a p-value of 0.094.[12] Alternatively, the test of economic freedom and deliberative democracy rejects the null hypothesis at 5 % level. Similarly, tests of whether KOF measure of globalization is cointegrated with electoral democracy or with deliberative democracy reject the null hypothesis of "no cointegration." Results of the first-generation tests suggest that economic and political institutions are cointegrated in this subset of countries, though the evidence for the economic freedom and electoral democracy series is weak.

As noted, the first-generation tests do not fully account for cross-sectional dependence, which can result in size distortions that lead to the rejection of "no cointegration" too frequently. The second generation Westerlund tests mitigate these size distortions. Four versions of the tests are presented in Table 7, two group-means tests and two panel (pooled) tests. We report the results of all four tests but focus on the panel (pooled) tests because they have higher power (Westerlund 2007: 730). We report unadjusted p-values as well as

[10] Table A3 in the appendix lists the results of the SPSM procedure applied the KOF and electoral democracy sample.

[11] First-generation tests using alternative measures of democracy are shown in Table A4 of the appendix.

[12] Demeaning is used to mitigate cross-section dependence. Tests on non-demeaned series reject the null at the 1% level and are available on request. As shown in Table 6, demeaning the data to mitigate cross-section dependence reduces the test statistic to the point where it is only marginally significant. See the second-generation tests in Table 7 for a full treatment of cross-sectional dependence.

Table 5
Country list: stationary and non-stationary.

Economic Freedom	Electoral Democracy		Both	
Stationary	Non-Stationary	Stationary	Non-Stationary	Non-Stationary
Austria	Algeria	Algeria	Australia	Australia
Belgium	Argentina	Argentina	Austria	Bolivia
Benin	Australia	Burundi	Belgium	Dominican Rep.
Brazil	Bolivia	Canada	Benin	Ghana
Colombia	Burundi	Chile	Bolivia	Hong Kong
Congo, Dem. Rep.	Canada	Congo, Rep.	Brazil	India
Cyprus	Chile	Costa Rica	Colombia	Indonesia
Denmark	Congo, Rep.	El Salvador	Congo, Dem. Rep.	Italy
Ecuador	Costa Rica	Fiji	Cyprus	Japan
Fiji	Dominican Rep.	Finland	Denmark	Korea, Rep.
France	El Salvador	Greece	Dominican Rep.	Malaysia
Gabon	Finland	Haiti	Ecuador	Mauritius
Germany	Ghana	Iran, Islamic Rep.	France	Mexico
Guatemala	Greece	Ireland	Gabon	Morocco
Haiti	Hong Kong	Israel	Germany	Myanmar
Honduras	India	New Zealand	Ghana	Nicaragua
Hungary	Indonesia	Philippines	Guatemala	Nigeria
Iceland	Italy	Sweden	Honduras	Norway
Iran	Japan	Switzerland	Hong Kong	Pakistan
Ireland	Korea, Rep.	Syria	Hungary	Peru
Israel	Malaysia	Taiwan	Iceland	Rwanda
Jordan	Mauritius	Uruguay	India	Singapore
Kenya	Mexico		Indonesia	South Africa
Luxembourg	Morocco		Italy	Sri Lanka
Madagascar	Myanmar		Japan	Tanzania
Malawi	Nicaragua		Jordan	Tunisia
Malta	Nigeria		Kenya	Turkey
Netherlands	Norway		Korea, Rep.	United Kingdom
New Zealand	Pakistan		Luxembourg	
Panama	Peru		Madagascar	
Paraguay	Rwanda		Malawi	
Philippines	Singapore		Malaysia	
Portugal	South Africa		Malta	
Senegal	Sri Lanka		Mauritius	
Spain	Switzerland		Mexico	
Sweden	Syria		Morocco	
Thailand	Taiwan		Myanmar	
United States	Tanzania		Netherlands	
	Tunisia		Nicaragua	
	Turkey		Nigeria	
	United Kingdom		Norway	
	Uruguay		Pakistan	
	Venezuela, RB		Panama	
	Zambia		Paraguay	
			Peru	
			Portugal	
			Rwanda	
			Senegal	
			Singapore	
			South Africa	
			Spain	
			Sri Lanka	
			Tanzania	
			Thailand	
			Tunisia	
			Turkey	
			United Kingdom	
			United States	
			Venezuela, RB	
			Zambia	

Note: The SPSM is used to determine which countries have stationary versus non-stationary series.

robust p-values (which are calculated from 500 bootstrapped iterations to account for cross-sectional dependence), but focus on the latter.

For the economic freedom and electoral democracy series, robust p-values fail to reject the null hypothesis of cointegration in all four tests. Taken together with the marginally significant first-generation test result, our interpretation of the empirical evidence is that

Table 6
Cointegration tests - first generation - pedroni.

EFW & V-Dem (N = 30, $T = 11$)		Test-stat.	*P*-value
EFW & Electoral Democracy	Group t ADF	−1.319	0.094
EFW & Deliberative Democracy	Group t ADF	−2.169	0.015
KOF & V-Dem (N = 91, $T = 51$)		Test-stat.	*P*-value
KOF & Electoral Democracy	Group t ADF	2.378	0.009
KOF & Deliberative Democracy	Group t ADF	2.079	0.019

Note: In the KOF sample the lag length is chosen based on AIC with the maximum lags set to 4. In the EFW sample the lag length is chosen based on AIC with the maximum lags set to 3.

Table 7
Cointegration tests – second generation (Westerlund).

EFW & Electoral (N = 30, $T = 11$)	Test-stat.	*P*-value	Robust *P*-value
Group t	−18.703	0.000	0.326
Group a	6.501	1.000	0.706
Pooled t	4.731	1.000	0.836
Pooled a	4.692	1.000	0.738
EFW & Deliberative (N = 30, $T = 11$)	Test-stat.	*P*-value	Robust *P*-value
Group t	−31.626	0.000	0.240
Group a	6.386	1.000	0.692
Pooled t	−4.564	0.001	0.036
Pooled a	3.595	1.000	0.088
KOF & Electoral (N = 91, $T = 51$)	Test-stat.	*P*-value	Robust *P*-value
Group t	4.923	1.000	0.946
Group a	6.794	1.000	0.996
Pooled t	2.849	0.998	0.664
Pooled a	4.924	1.000	0.936
KOF & Deliberative (N = 91, $T = 51$)	Test-stat.	*P*-value	Robust *P*-value
Group t	4.504	1.000	0.928
Group a	7.157	1.000	1.000
Pooled t	2.415	0.992	0.632
Pooled a	4.789	1.000	0.938

Notes: All tests use a kernel of 3 based on the rule of thumb in Westerlund (2007): $4 * \left(\frac{T}{100}\right)^{\frac{2}{9}}$. Tests on the EFW sample use a lag and lead length set to 1 due to the constraint of a panel with $T = 11$. Test on the KOF sample use a lag and lead length set using the time dimension rule: $4 * \left(\frac{T}{100}\right)^{\frac{2}{9}} \approx 3$.. Robust p-values are calculated based on 500 replications.

economic freedom and electoral democracy are not cointegrated in all countries. Though we cannot rule out the possibility that these institutions are cointegrated in some countries, we fail to find evidence that the whole panel of countries is cointegrated. These results contradict the conclusions of Sobel and Coyne (2011), who were constrained both by more limited data on institutions and the limitations of first-generation tests that did not account for cross-sectional dependence. Accounting for cross-sectional dependence, first by demeaning the data and then by conducting the Westerlund tests, shows that economic freedom and electoral democracy are not cointegrated in all countries.[13]

The results of the cointegration tests that account for cross-sectional dependence (using bootstrapped robust p-values) for the economic freedom and deliberative democracy series are more mixed. Both of the group mean tests fail to reject the null hypothesis of "no cointegration," whereas the pooled *t*-test rejects the null at the 5 % level and the pooled α test rejects the null at the 10 % level. These test results are somewhat inconclusive, leaving open the possibility that economic freedom and deliberative democracy are cointegrated.

Using the KOF globalization index as our measure of economic institutions produces similar results to those using the EFW index. Using the KOF index as the measure of economic institutions, first-generation cointegration tests reject the null hypothesis of "no

[13] Cointegration tests are conducted on a sample constructed from the SPSM method using a 10% significance level to determine stationarity. Appling the SPSM method with a significance level of 1% yields a larger sample but the results of second generation cointegration tests are not substantively different than those presented in Table 7. Results are available on request.

cointegration" with electoral democracy and deliberative democracy at the 5 % level. First generation tests indicate that the series are cointegrated. Accounting for cross-sectional dependence with second-generation tests shows different results. We fail to reject the null of "no cointegration" with all four second generation tests for KOF and electoral democracy and for KOF and deliberative democracy.

We take two steps to check the robustness of the second generation cointegration tests. For the samples using the EFW index we run the tests with a sample that extends back to 1950 (Murphy and Lawson, 2018), widening the panel by 29 countries and lengthening the panel by three time periods. For samples using the KOF index, we consider an alternative lag and lead structure, using information criteria to select the lag and lead lengths subject to a minimum of one lag and a maximum of five lags. The results of these robustness checks are presented in Table 8. For the economic freedom and electoral democracy sample, both group mean tests fail to reject the null hypothesis of "no cointegration" in the extended sample, whereas both pooled tests reject the null hypothesis, though only at the 10 % level.[14] All four tests of the KOF index and electoral democracy fail to reject "no cointegration" using an alternative lag selection criterion. The results from these robustness exercises buttress the findings from the primary sample, that economic freedom and electoral democracy are not cointegrated.

In contrast, all four tests reject the null of "no cointegration" between economic freedom and deliberative democracy in the extended sample. Further, when considering the KOF index and deliberative democracy with the alternative lag selection criteria, three of the four tests fail to reject the null, whereas the pooled *t*-test rejects the null of "no cointegration" at the 5 % level. Taken together, there is some limited evidence that economic institutions and deliberative democracy are cointegrated, though the results are mixed.[15]

Overall, our results find that economic institutions and electoral democracy are, in general, not cointegrated. More specifically, our unit root tests show that a significant proportion of countries cannot be cointegrated. We even fail to find evidence that economic freedom and electoral democracy are cointegrated for a significant proportion of the set of countries where a cointegrating relationship could exist. Evidence about whether economic institutions are cointegrated with deliberative democracy is less conclusive. More generally, our analysis finds that accounting for both cross-sectional dependence and heterogenous stationarity properties is important when conducting time series analysis of institutions. To underline what may not be obvious: these findings, that economic institutions and electoral democracy tend to revert to their mean runs counter to the predictions of several leading theories of economic and institutional development.

6. Conclusion

Our investigation into the time series properties of institutions shows, overall, that for a significant set of countries economic freedom or democracy or both should be thought to be mean-reverting. If they are mean-reverting, then there cannot be a cointegrating relationship between economic freedom and democracy, as described by Sobel and Coyne (2011). A long run relationship between economic freedom and democracy is still possible. If we are to extrapolate a general rule from the findings, it is that when countries move in the direction of modernization, they will typically fail before one set of institutions catches up with the other. Conversely, it also means that a country that has already succeeded at developing will see a declining institution recover rather than drag down other institutions with it. Institutions are "sticky" (Boettke et al., 2008).

Our findings that institutions are mean reverting for a sub-set of countries provides support for theories of institutions that emphasize the importance of history and context (Scott, 1998; Boettke et al., 2008). Exogenous attempts to change institutions without regard for informal norms will often lead to only transitory changes as institutions that tend to revert to their previous path. Consistent with North (1990), large shocks can cause institutional change, but the process of institutional change is overwhelmingly incremental.

We take additional steps to search for cointegrating relationships by allowing for heterogeneity between countries to identify the countries that are the best candidates to have unit roots in both their economic freedom and democracy time series, even if the general rule, for the world, is that countries do not. Suppose we were to take the position that this set of countries have true cointegrating relationships, while other countries do not. Then what does that mean? Over time, when a country is able to radically reform its economic (or political) institutions, reforms to political (or economic) institutions will soon follow. But even evidence for this claim is weak. The absence of a cointegrating relationship implies that when changes to political institutions stick there is no tendency for lasting corresponding changes in economic institutions, and vice versa. Though we cannot fully rule out the possibility of cointegrating relationships in specific countries, our results should serve as a reminder that the relationship between two measures of institutions that follow a similar trend over time may be spurious.

None of this contradicts the idea that there may be a causal relationship between democracy and economic freedom. Rather, it is that grandiose claims about how they interrelate over time do not have traction in the data. By that, we do not mean Sobel and Coyne (2011), but modernization hypothesis, as well as others which see political and economic liberalization as occurring together over time in a lengthy chain of causality, such as Williamson (2000), Acemoglu and Robinson (2019a), and Galor (2022). However, it is probably the most problematic for frameworks like North et al. (2009) and Acemoglu and Robinson (2012, 2019b: 23), which perceive of political and economic liberalizations as singular, self-reinforcing processes. It also raises issues for the Hayek-Friedman hypothesis,

[14] The alternative hypotheses for the group tests are that at least one panel is cointegrated, whereas the alternative for the pooled tests is that all panels are cointegrated. The greater rejection frequency for pooled tests in Table 8 is likely because the pooled tests have higher power than the group tests.

[15] In an additional robustness check we test for a cointegrating relationship between the EFW index and the narrower deliberative components index published by V-Dem. We fail to reject the null for three of the four tests, rejecting the null of "no cointegration" only with the pooled t test.

Table 8
Cointegration tests – second generation – robustness tests (Westerlund).

EFW & Electoral (N = 59, $T = 15$)		Test-stat.	*P*-value	Robust *P*-value
(1950–2020)	Group t	0.249	0.598	0.242
	Group a	5.345	1.000	0.556
	Pooled t	−1.581	0.057	0.054
	Pooled a	1.337	0.909	0.076
EFW & Deliberative (N = 59, $T = 15$)		Test-stat.	*P*-value	Robust *P*-value
(1950–2020)	Group t	1.321	0.093	0.074
	Group a	4.039	1.000	0.060
	Pooled t	1.762	0.039	0.036
	Pooled a	0.445	0.672	0.030
KOF & Electoral (N = 91, $T = 51$)		Test-stat.	*P*-value	Robust *P*-value
	Group t	4.211	1.000	0.922
	Group a	7.999	1.000	0.968
	Pooled t	3.669	1.000	0.866
	Pooled a	5.488	1.000	0.976
KOF & Deliberative (N = 91, $T = 51$)		Test-stat.	*P*-value	Robust *P*-value
	Group t	4.626	1.000	0.960
	Group a	8.438	1.000	0.884
	Pooled t	2.627	0.996	0.022
	Pooled a	5.286	1.000	0.848

Notes: All tests use a kernel of 3 based on the rule of thumb in Westerlund (2007): $4 * \left(\frac{T}{100}\right)^{\frac{2}{9}}$. Tests on the EFW sample use a lag and lead length set to 1. Test on the KOF sample use a lag and lead length set using AIC with a minimum set to 1 and maximum set to 5. Robust p-values are calculated based on 500 replications.

although there are strict limitations for interpreting it in terms of cointegration.

Our results concerning deliberative democracy specifically are somewhat perplexing, although they do not leave nearly enough in doubt to contradict the general findings in the paper. To our knowledge, there had not been a previous attempt at connecting this specific version of the *Varieties of Democracy* data to economic freedom. (Most of the research in this area predated the widespread use of *Varieties of Democracy*.) There is also little that obviously connects deliberative democracy to the previous literature and theory on the interrelationship between economic freedom and democracy. Deliberative democracy was chosen because of the various versions of the V-Dem data aside from electoral democracy, deliberative democracy had the clearest scholarly implications, an interpretation in terms of Brennan (2016). But our findings appear to strongly contradict Brennan (2016), such that the deliberative aspects of democracy are key to its support of economic freedom. We did not begin this project in hopes of clarifying the individual relationships between "varieties of democracy" and economic freedom, and we had assumed that they would be rather closely related on the relevant margins.

Finally, it was in the course of researching this paper that we came to realize the uniqueness of the KOF globalization index in its suitability for time series analysis. Further research narrowly tailoring the relationship between globalization and other variables with lengthy time series may be a lower hanging fruit than the one we chose to pursue concerning economic and political liberalization.

CRediT authorship contribution statement

Colin O'Reilly: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Ryan H. Murphy:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

Appendix

Tables A1 and A2 show panel unit root tests conducted on demeaned data for alternative measures of democracy and for an extended sample of economic freedom. In the first panel, unit root tests are shown for economic freedom and two measures of political institutions from the Polity dataset. The second panel shows unit root tests for a sample of economic freedom and two measures of political institutions from Freedom House. Similar to the results for the primary sample in Table 3, first generation unit root tests shown in Table A1 almost uniformly reject the null hypothesis of a unit root. Finally, the bottom panel of Table A1 shows first-generation unit root tests for economic freedom and measures of democracy from the *Varieties of Democracy* dataset in an extended sample of 5-year periods from 1950 to 2020. The tests on the extended sample uniformly reject the null of a unit root for economic freedom, though the results are more mixed for the *Varieties of Democracy* measures of democracy.

The first-generation tests shown in Table A1 do not fully account for cross-sectional dependence, whereas the second generation CIPS tests in Table A2 do. Regardless of the sample considered the null hypotheses of a unit root for economic freedom is rejected.

Similarly, we reject the null of a unit root for both measures of democracy from *Varieties of Democracy* in the extended sample. In contrast, we fail to reject the null hypotheses of a unit root for both measures of democracy from Polity and for both measures from Freedom House. Regardless of the tests conducted, we find that economic freedom is stationary (does not have a unit root) for at least some countries. The results for the various measures of democracy are more mixed.

Table A1
First generation unit root tests – alternative measures and samples.

	1 Lag		3 Lags	
Economic Freedom and Polity 1970–2015 (5-year) (N = 65, $T = 10$)				
EFW	IPS	Fisher	IPS	Fisher
Test Stat	−2.696	−1.744	−27.962	−6.283
P-value	0.004	0.041	0.000	0.000
Democracy	IPS	Fisher	IPS	Fisher
Test Stat	−3.464	−0.325	−13.168	−7.552
P-value	0.000	0.372	0.000	0.000
Autocracy	IPS	Fisher	IPS	Fisher
Test – Stat	−7.677	−8.786	−17.892	−5.151
P-value	0.000	0.000	0.000	0.000
Economic Freedom and Freedom House 1975–2020 (5-year) (N = 104,10)				
EFW	IPS	Fisher	IPS	Fisher
Test – Stat	−2.564	−0.617	−32.174	−11.757
P-value	0.005	0.269	0.000	0.000
Political Rights	IPS	Fisher	IPS	Fisher
Test – Stat	−10.796	−7.119	−18.635	−8.245
P-value	0.000	0.000	0.000	0.000
Civil Liberties	IPS	Fisher	IPS	Fisher
Test – Stat	−11.118	−7.652	−15.845	−9.210
P-value	0.000	0.000	0.000	0.000
Economic Freedom, Electoral Democracy and Deliberative Democracy (extended sample) 1950–2020 (5-year) (N = 80, $T = 14$)				
EFW	IPS	Fisher	IPS	Fisher
Test Stat	−6.872	−5.587	−8.308	−5.257
P-value	0.000	0.000	0.000	0.000
Electoral	IPS	Fisher	IPS	Fisher
Test Stat	−3.558	−2.195	−4.180	1.585
P-value	0.000	0.014	0.000	0.944
Deliberative	IPS	Fisher	IPS	Fisher
Test – Stat	−3.059	−1.501	−6.070	−0.072
P-value	0.001	0.067	0.000	0.471

Note: Lag lengths for the IPS tests are selected by Akaike information criteria subject to the maximum listed in each column. Lag lengths for the Fisher tests are set by the lags listed in each column. For the Fisher test we report the inverse normal z statistic.

Table A2
Second generation unit root tests – CIPS test.

Economic Freedom and Polity – 1970–2015 (5-year) (N = 65, $T = 10$)			
	EFW	Democracy	Autocracy
Test Statistic	−2.577	−0.642	−0.607
10 %	−2.03	−2.03	−2.03
5 %	−2.13	−2.13	−2.13
1 %	−2.32	−2.37	−2.32
Economic Freedom, Freedom House – 1975–2020 (5-year) (N = 104,10)			
	EFW	Political Rights	Civil Liberties
Test Statistic	−3.094	−1.568	−1.658
10 %	−1.99	−1.99	−1.99
5 %	−2.08	−2.08	−2.08
1 %	−2.25	−2.25	−2.25
Economic Freedom, Electoral and Deliberative Democracy (extended sample) 1950–2020 (5-year) (N = 82, $T = 11$)			
	EFW	Electoral	Deliberative
Test Statistic	−2.326	−2.555	−2.377
10 %	−2.00	−2.00	−2.00
5 %	−2.07	−2.07	−2.07
1 %	−2.19	−2.19	−2.19

The SPSM method is used in order to determine which countries have non-stationary economic and political institutions (have a unit root). Table 5 in the main text lists which countries are stationary and non-stationary for the primary sample of countries using the EFW and *Varieties of Democracy* data. Table A3 below lists the stationarity properties for countries in the sample using the KOF and *Varieties of Democracy* data on electoral democracy. The final column lists the set of countries that have both non-stationary economic and political institutions. The panel cointegration tests described in the main text are conducted on this set of countries as a robustness

check of the results using the primary sample of EFW and *Varieties of Democracy*.

Table A3
Country list (EFW and KOF sample): stationary and non-stationary.

KOF		Electoral Democracy		Both
Stationary	Non-Stationary	Stationary	Non-Stationary	Non-Stationary
Albania	Afghanistan	Congo, Rep	Afghanistan	Afghanistan
Algeria	Argentina	Egypt, Arab Rep	Albania	Argentina
Barbados	Australia	El Salvador	Algeria	Australia
Burundi	Austria	Eswatini	Argentina	Austria
Chad	Belgium	Haiti	Australia	Belgium
Ecuador	Benin	Kuwait	Austria	Benin
Equatorial Guinea	Bhutan	Malawi	Barbados	Bhutan
Gabon	Bolivia	Morocco	Belgium	Bolivia
Gambia, The	Botswana	New Zealand	Benin	Botswana
Germany	Brazil	Portugal	Bhutan	Brazil
Honduras	Bulgaria	Sweden	Bolivia	Bulgaria
Japan	Burkina Faso	Switzerland	Botswana	Burkina Faso
Kenya	Cambodia	Syria	Brazil	Cambodia
Lesotho	Cameroon	United Kingdom	Bulgaria	Cameroon
Luxembourg	Canada		Burkina Faso	Canada
Malawi	CAR		Burundi	CAR
Mexico	Chile		Cambodia	Chile
Nicaragua	China		Cameroon	China
Nigeria	Colombia		Canada	Colombia
Oman	Congo, Dem Rep		CAR Republic	Congo, Dem Rep
Senegal	Congo, Rep		Chad	Costa Rica
	Costa Rica		Chile	Cote d'Ivoire
	Cote d'Ivoire		China	Cuba
	Cuba		Colombia	Cyprus
	Cyprus		Congo, Dem Rep	Denmark
	Denmark		Costa Rica	Dominican Republic
	Dominican Republic		Cote d'Ivoire	Ethiopia
	Egypt, Arab Rep		Cuba	Fiji
	El Salvador		Cyprus	Finland
	Eswatini		Denmark	France
	Ethiopia		Dominican Republic	Ghana
	Fiji		Ecuador	Greece
	Finland		Equatorial Guinea	Guatemala
	France		Ethiopia	Guinea
	Ghana		Fiji	Guyana
	Greece		Finland	Hong Kong
	Guatemala		France	Hungary
	Guinea		Gabon	Iceland
	Guyana		Gambia, The	India
	Haiti		Germany	Indonesia
	Hong Kong		Ghana	Iraq
	Hungary		Greece	Ireland
	Iceland		Guatemala	Israel
	India		Guinea	Italy
	Indonesia		Guyana	Jamaica
	Iraq		Honduras	Jordan
	Ireland		Hong Kong	Korea, Rep
	Israel		Hungary	Lao PDR
	Italy		Iceland	Lebanon
	Jamaica		India	Liberia
	Jordan		Indonesia	Libya
	Korea, Rep		Iraq	Madagascar
	Kuwait		Ireland	Malaysia
	Lao PDR		Israel	Maldives
	Lebanon		Italy	Mali
	Liberia		Jamaica	Malta
	Libya		Japan	Mauritania
	Madagascar		Jordan	Mauritius
	Malaysia		Kenya	Mongolia
	Maldives		Korea, Rep	Myanmar
	Mali		Lao PDR	Nepal
	Malta		Lebanon	Netherlands
	Mauritania		Lesotho	Niger

(*continued on next page*)

Table A3 (*continued*)

KOF		Electoral Democracy		Both
Stationary	Non-Stationary	Stationary	Non-Stationary	Non-Stationary
	Mauritius		Liberia	Norway
	Mongolia		Libya	Pakistan
	Morocco		Luxembourg	Panama
	Myanmar		Madagascar	Paraguay
	Nepal		Malaysia	Peru
	Netherlands		Maldives	Philippines
	New Zealand		Mali	Poland
	Niger		Malta	Romania
	Norway		Mauritania	Rwanda
	Pakistan		Mauritius	Saudi Arabia
	Panama		Mexico	Senegal
	Paraguay		Mongolia	Serbia
	Peru		Myanmar	Seychelles
	Philippines		Nepal	Singapore
	Poland		Netherlands	Spain
	Portugal		Nicaragua	Sri Lanka
	Romania		Niger	Sudan
	Rwanda		Nigeria	Tanzania
	Saudi Arabia		Norway	Thailand
	Senegal		Oman	Togo
	Serbia		Pakistan	Trinidad and Tobago
	Seychelles		Panama	Tunisia
	Singapore		Paraguay	Turkey
	Spain		Peru	Uganda
	Sri Lanka		Philippines	United States
	Sudan		Poland	Uruguay
	Sweden		Romania	Venezuela, RB
	Switzerland		Rwanda	Vietnam
	Tanzania		Saudi Arabia	
	Thailand		Senegal	
	Togo		Serbia	
	Trinidad and Tobago		Seychelles	
	Tunisia		Sierra Leone	
	Turkey		Singapore	
	Uganda		South Africa	
	United States		Spain	
	Uruguay		Sri Lanka	
	Venezuela, RB		Sudan	
	Vietnam		Tanzania	
			Thailand	
			Togo	
			Trinidad and Tobago	
			Tunisia	
			Turkey	
			Uganda	
			United States	
			Uruguay	
			Venezuela, RB	
			Vietnam	
			Yemen, Rep	
			Zambia	

Note: The SPSM is used to determine which countries have stationary versus non-stationary series.

In the main text, both first- and second-generation panel cointegration tests are presented for the primary sample of EFW and *Varieties of Democracy*, and for the sample of KOF and *Varieties of Democracy*. For the sake of completeness, Table A4 presents first-generation cointegration tests on economic freedom and measures of democracy from Polity, as well as on economic freedom and measures of political institutions from Freedom House. The tests uniformly reject the null hypotheses of "no cointegration." Note that we do not conduct second-generation cointegration tests on these samples because the time dimension of the data is too short.

Table A4
Cointegration tests - first generation - pedroni.

EFW & Polity (N = 46, T = 10)		Test-stat.	P-value
EFW & Democracy	Group t ADF	−31.415	0.000
EFW & Autocracy	Group t ADF	−28.967	0.000

(*continued on next page*)

Table A4 (*continued*)

EFW & Polity (N = 46, $T = 10$)		Test-stat.	P-value
EFW & Freedom House (N = 62, $T = 10$)		Test-stat.	P-value
EFW & Political Rights	Group t ADF	−21.086	0.000
EFW & Civil Liberties	Group t ADF	−26.138	0.000

Note: Lag length is chosen based on AIC with the maximum lags set to 3.

References

Acemoglu, Daron, Johnson, Simon, Robinson, James A., Yared, Pierre, 2009. Reevaluating the modernization hypothesis. J. Monet. Econ. 56, 1043–1058.
Acemoglu, Daron, Robinson, James A., 2008. Persistence of power, elites, and institutions. Am. Econ. Rev. 98 (1), 267–293.
Acemoglu, Daron, Robinson, James A., 2012. Why Nations Fail: The Origins of Power, Prosperity, and Poverty. Crown Business, New York.
Acemoglu, Daron, Robinson, James A., 2019a. The Narrow Corridor: States, Societies, and the Fate of Liberty. Penguin Books, New York.
Acemoglu, Daron, Robinson, James A., 2019b. Rents and economic development: the perspective of why nations fail. Public Choice 181 (1), 13–28.
Acemoglu, Daron, Egorov, Georgy, Sonin, Konstantin, 2015. Political economy in a changing world. J. Political Econ. 123 (5), 1038–1086.
Acemoglu, Daron, Naidu, Suresh, Restrepo, Pascual, Robinson, James A., 2019. Democracy does cause growth. J. Politic. Econ. 127 (1), 47–100.
Alanya-Beltran, Willy., 2022. Unit roots in lower-bounded series with outliers. Econ. Model 115, 105984.
Baltagi, Badi H, 2021. Econometric Analysis of Panel Data. Springer.
Baltagi, Badi H., Bresson, Georges, Pirotte, Alain, 2007. Panel unit root tests and spatial dependence. J. Appl. Econometr. 22 (2), 339–360.
Barro, Robert J., 1999. Determinants of democracy. J. Politic. Econ. 107 (S6), S158–S183.
Becker, Gary, Posner, Richard, 2009. Uncommon Sense: Economic Insights, from Marriage to Terrorism. University of Chicago Press, Chicago.
Bennett, Daniel L., Nikolaev, Boris, 2017. On the ambiguous economic freedom – inequality relationship. Empir. Econ. 53, 717–754.
Benzecry, G.F., Reinarts, N.A., Smith, D.J., 2024. You have nothing to lose but your chains? Pub. Choice. https://doi.org/10.1007/s11127-024-01223-8.
Berger, Daniel, Corvalan, Alejandro, Easterly, William, Satyanath, Shanker, 2013. Do superpower interventions have short and long term consequences for democracy? J Comp Econ 41 (1), 22–34.
Bjornskov, Christian., 2018. The Hayek-Friedman hypothesis on the press: is there an association between economic freedom and Press freedom? J. Inst. Econ. 14 (4), 617–638.
Boettke, Peter J., Coyne, Christopher J., Leeson, Peter T., 2008. Institutional stickiness and the new development economics. Am. J. Econ. Soc. 67 (2), 331–358.
Bologna, P.J., Benjamin, P., Andrew, T.Y., 2022. Does aid cause changes in economic freedom? South Econ. J. 89 (1), 90–111.
Boudreaux, Christopher, Holcombe, Randall G., 2017. Economic institutions and the durability of democracy. Atlantic Econ. J. 45, 17–28.
Brennan, Jason., 2016. Against Democracy. Princeton University Press, Princeton.
Caplan, Bryan., 2007. The Myth of the Rational Voter: Why Democracies Choose Bad Policies. Princeton University Press, Princeton.
Castro, Vitor, Martins, Rodrigo, 2021. Economic liberalization, political regimes and ideology. Kyklos 74 (4), 463–487.
Cavaliere, Giuseppe, Xu, Fang, 2014. Testing for unit roots in bounded time series. J. Econom. 178, 259–272. Part 2.
Chen, Chao, Xi, Andrew, 2018. Does democracy cause trade policy liberalisation? Unpacking the black box of trade policy. J. Int. Relat. Dev. (Ljubl) 21 (4), 1014–1037.
Choi, In, 2001. Unit root tests for panel data. J. Int. Money Finance 20 (2), 249–272.
Chortareas, Georgios, Kapetanios, George, 2009. Getting PPP right: identifying mean-reverting real exchange rates in panels. J. Bank Financ. 33 (2), 390–404.
Collier, Paul., 2007. The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done About It. Oxford University Press, Oxford.
Comeau Jr., Ludovic, 2003. The political economy of growth in Latin America and East Asia: some empirical evidence. Contemp. Econ. Policy 21 (4), 476–489.
Coppedge, Michael, Gerring, John, Henrik Knutsen, Carl, Lindberg, Staffan I., Teorell, Jan, Alizada, Nazifa, Altman, David, Bernhard, Michael, Cornell, Agnes, Fish, M. Steven, Gastaldi, Lisa, Gjerløw, Haakon, Glynn, Adam, Grahn, Sandra, Hicken, Allen, Hindle, Gerry, Ilchenko, Nina, Kinzelback, Katrin, Krusell, Joshua, Marquardt, Kyle L., McMann, Kelly, Mechkova, Valeriya, Medzihorsky, Juraj, Paxton, Pamela, Pemstein, Daniel, Pernes, Josefine, Ryden, Oskar, Römer, Johannes von, Seim, Brigitte, Sigman, Rachel, Skaaning, Svend-Erik, Staton, Jeffrey, Sundström, Aksel, Tzelgov, Eitan, Wang, Yi-ting, Wig, Tore, Wilson, Steven, Ziblatt, Daniel, 2022. V-Dem Codebook v12. Varieties of Democracy (V-Dem) Project.
Coyne, Christopher J., 2008a. After War: The Political Economy of Exporting Democracy. Stanford University Press, Stanford.
Coyne, Christopher J., 2008b. The politics of bureaucracy and the failure of post-war reconstruction. Public Choice 135 (1), 11–22.
Coyne, Christopher J., Sobel, Russell S., 2010. How are institutions related? In: Gwartney, James, Lawson, Robert, Hall, Joshua (Eds.), Economic Freedom of the World. Fraser Institute, Vancouver, pp. 163–174 by.
Dawson, John., 1998. Institutions, investment, and growth: new cross-country and panel evidence. Econ. Inq. 36 (4), 603–619.
Dawson, John., 2003. Causality in the freedom-growth relationship. Eur. J. Polit. Econ. 19 (3), 479–495.
De Haan, Jakob, Sturm, Jan-Egbert, 2003. Does more democracy lead to greater economic freedom? New evidence for developing countries. Eur. J. Polit. Econ. 19 (3), 547–563.
De Soysa, Indra, Vadlammanati, Krishna Chaitanya, 2013. Do pro-market economic reforms drive Human rights violations? An empirical assessment, 1981-2006. Public Choice 155, 163–187.
Dorsch, Michael T., Maarek, Paul, 2015. Inefficient predation and political transitions. Eur. J. Polit. Econ. 37, 37–48.
Dreher, Axel., 2006. Does globalisation affect growth? Evidence from a new index of globalization. Appl. Econ. 38 (10), 1091–1110.
Dreher, Axel, Gassebner, Martin, Siemers, Lars-H.R., 2012. Globalization, economic freedom, and Human rights. J. Conflict Resol. 56 (3), 516–546.
Dutta, Nabamita, Claudia, R., Williamson, 2016. Aiding economic freedom: exploring the role of political institutions. Eur. J. Polit. Econ. 45, 24–38.
Easterly, William., 2005. "What did structural adjustment adjust? The Association of Policies and Growth with repeated IMF and World Bank adjustment loans. J. Dev. Econ. 76 (1), 1–22.
Easterly, William., 2008. Institutions: top down or bottom up? Am. Econ. Rev. 98 (2), 95–99.
Freedom House. 2022. "Freedom in the World 2022." www.freedomhouse.org.
Firdrmuc, 2003. Economic reform, democracy and growth during Post-Communist transition. Eur. J. Polit. Econ. 19 (3), 583–604.
Friedman, Milton., 1962. Capitalism and Freedom. University of Chicago Press, Chicago.
Fukuyama, Francis., 1992. The End of History and the Last Man. Penguin, New York.
Galor, Oded., 2022. The Journal of Humanity: The Origins of Wealth and Inequality. Dutton, New York.
Gilens, Martin., 2012. Affluence and Influence: Economic Inequality and Political Power in America. Princeton University Press, Princeton.
Giuliano, Paola, Mishra, Prachi, Spilimbergo, Antonio, 2013. Democracy and reforms: evidence from a new dataset. Am. Econ. J.: Macroecon. 5 (4), 179–204.
Glaeser, Edward L., 2008. Inequality. In: Wittman, Donald A., Weingast, Barry R. (Eds.), The Oxford Handbook of Political Economy. Oxford University Press, Oxford, pp. 624–641.
Góes, Carlos., 2016. Institutions and growth: a GMM/IV panel VAR approach. Econ. Lett. 138, 85–91. January.
Grosjean, Pauline, Senik, Claudia, 2011. Democracy, market liberalization, and political preferences. Rev. Econ. Statis. 93 (1), 365–381.
Gwartney, James, Lawson, Robert, Hall, Joshua, Murphy, Ryan H., 2022. Economic Freedom of the World. Fraser Institute, Vancouver.

Gygli, Savina, Haelg, Florian, Potrafke, Niklas, Sturm, Jan-Egbert, 2019. The KOF globalisation index – revisited. Rev. Int. Org. 14, 543–574.
Harris, Richard D.F., Tzavalis, Elias, 1999. Inference for unit roots in dynamic panels where the time dimension is fixed. J. Econom. 91 (2), 201–226.
Hayek, F.A., 1944. The Road to Serfdom. University of Chicago Press, Chicago.
Huntington, Samuel P., 1968. Political Order in Changing Societies. Yale University Press, New Haven.
Im, Kyung So, Hashem Pesaran, M., Shin, Yongcheol, 2003. Testing for unit roots in heterogeneous panels. J. Econom. 115 (1), 53–74.
Jochem, Torsten, Murtazashvili, Ilia, Murtazashvili, Jennifer, 2016. Establishing local government in fragile states: experimental evidence from Afghanistan. World Dev. 77, 293–310.
Jones, Garett., 2021. 10% Less Democracy: Why You Should Trust Elites a Little More and the Masses a Little Less. Stanford University Press, Stanford.
Karlsson, Sune, Lothgren, Mickael, 2000. On the power and interpretation of panel unit root tests. Econ. Lett. 66 (3), 249–255.
Klein, Naomi., 2007. The Shock Doctrine: The Rise of Disaster Capitalism. Picador, New York.
Kodila-Tedika, Oasis, Khalifa, Sherif, 2023. Official visits and economic freedom. J. Econ. Integrat. 38 (2), 219–246.
Krieger, Tim, Meierrieks, Daniel, 2016. Political capitalism: the interaction between income inequality, economic freedom, and democracy. Eur. J. Polit. Econ. 45, 115–132. December.
Landemore, Helene., 2012. Democratic Reason: Politics, Collective Intelligence, and the Rule of the Many. Princeton University Press, Princeton.
Lawson, Robert A., Clark, J.R., 2010. Examining the Hayek-Friedman hypothesis on economic and political freedom. J. Econ. Behav. Organ. 74 (3), 230–239.
Lawson, Robert A., Miozzi, Vincent, Tuszynski, Meg, 2024. Economic Freedom and growth, income, investment, and inequality: a quantitative summary of the literature. South Econ. J. 90 (4), 1099–1135.
Lawson, Robert A., Murphy, Ryan H., Powell, Benjamin, 2020. The determinants of economic freedom: a survey. Contemp. Econ. Policy 38 (4), 622–642.
Levin, Andrew, Lin, Chien-Fu, Chu, Chia-Shang James, 2002. Unit root tests in panel data: asymptotic and finite-sample properties. J. Econom. 108 (1), 1–24.
Lipset, S., 1959. Some social requisites of democracy: Economic development and political legitimacy. Am. Polit. Sci. Rev. 53 (1), 69–105.
Lundstrom, Susanna., 2005. The effects of democracy on different categories of economic freedom. Eur. J. Polit. Econ. 21 (4), 967–980.
MacLean, Nancy., 2017. Democracy in Chains: The Deep History of the Radical Right's Stealth Plan For America. Penguin, New York.
Marshall, Monty., Gurr, Ted, 2020. Polity 5: Political Regime Characteristics and Transitions, 1800-2018. Center for Systemic Peace. https://www.systemicpeace.org/.
Murphy, Ryan H., 2019. Governance and the dimensions of autocracy. Constitut. Politic. Econ. 30, 131–148.
Murphy, Ryan H., Lawson, Robert A., 2018. Extending the economic freedom of the world index to the cold war era. Cato J. 38 (1), 265–284.
Murphy, Ryan H., O'Reilly, Colin, 2019. Applying vector autoregression to institutions, Human capital, and output. Empir. Econ. 57, 1633–1652.
Murstazashvili, Ilia, Murstazashvili, Jennifer, 2015. Anarchy, self-governance, and legal titling. Public Choice 162 (3), 287–305.
Murstazashvili, Ilia, Murstazashvili, Jennifer, 2016a. The origins of private property rights: states or customary organizations? J. Inst. Econ. 12 (1), 105–128.
Murstazashvili, Ilia, Murstazashvili, Jennifer, 2016b. Can community-based land adjudication and registration improve household land tenure security? Evidence from Afghanistan. Land use policy 55, 230–239.
North, Douglass C., 1990. Institutions, institutional change and economic performance. Political Economy of Institutions and Decisions. Cambridge University Press, Cambridge.
North, Douglass C., Joseph Wallis, John, Weingast, Barry R., 2009. Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History. Cambridge University Press, Cambridge.
O'Reilly, Colin, Zhang, Yi, 2018. Post-genocide justice: the Gacaca Courts. Develop. Policy Review 36 (5), 561–576.
Pedroni, Peter., 2004. Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. Econ. Theory 20 (3), 597–625.
Pesaran, M.Hashem, 2007. A simple panel unit root test in the presence of cross-section dependence. J. Appl. Econ, 22 (2), 265–312.
Pesaran, M.Hashem, 2012. On the interpretation of panel unit root tests. Econ. Lett. 116 (3), 545–546.
Pesaran, M.Hashem, 2021. General diagnostic tests for cross sectional dependence in panels. Empir. Econ. 60 (1), 13–50.
Persyn, Damiaan, Westerlund, Joakim, 2008. Error-correction-based cointegration tests for panel data. Stata J. 8 (2), 232–241.
Pryor, F.L., 2010. Capitalism and freedom? Econ. Syst. 34 (1), 91–104.
Przeworski, Adam., 1991. Democracy and the Market: Political and Economic Reforms in Eastern Europe and Latin America. Cambridge University Press, Cambridge.
Rode, Martin, Gwartney, James D., 2012. Does democratization facilitate economic liberalization? Eur. J. Polit. Econ. 28 (4), 607–619.
Savoia, Antonio, Easaw, Joshy, McKay, Andrew, 2010. Inequality, democracy, and institutions: a critical review of recent research. World Dev. 38 (2), 142–154.
Scott, James C., 1998. Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed. Yale University Press, New Haven, CT.
Sobel, Russell S., Coyne, Christopher H., 2011. Cointegrating institutions: the time-series properties of country institutional measures. J. Law Econ. 54 (1), 111–134.
Wagner, Martin, Hlouskova, Juroslava, 2007. The performance of panel cointegration methods: results from a large scale simulation study. Econ. Rev. 29 (2), 182–223.
Westerlund, Joakim., 2007. Testing for error correction in panel data. Oxf. Bull. Econ. Stat. 69 (6), 709–748.
Westerlund, Joakim, Breitung, Jorg, 2013. Lessons from a decade of IPS and LLC. Econom. Rev. 32 (5–8), 547–591.
Williamson, Oliver E., 2000. The New institutional economics: taking stock, looking ahead. J. Econ. Lit. 38 (3), 595–613.
Young, Andrew, Sheehan, Kathleen, 2014. Foreign aid, institutional quality, and growth. Eur. J. Polit. Econ. 36, 195–208. https://doi.org/10.1016/j.ejpoleco.2014.08.003.
Zakaria, Fareed., 2003. The Future of Freedom: Illiberal Democracy at Home and Abroad. W.W. Norton & Company, New York.