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Institutional change and persistence

What does the long-run evidence tell us?

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Abstract: There is a broad agreement that political and economic institutions matter for long-term development. Yet relatively little is known as to how to adopt good quality institutions and reform weak or poor institutions, for which one needs to know how institutions change. This paper provides a systematic econometric investigation of long-run patterns of institutional change, offering panel time series evidence that allows for different forms of country-specific heterogeneity and cross-section dependence. We use variables that capture the quality of four key political and economic institutions over 200 years for a sample of 161 countries from the V-Dem database: electoral democracy and executive constraints, for political institutions; and the rule of law and property rights, for economic institutions. We focus on two core hypotheses: (i) institutions display inertia, hence measures are stationary and, if a shock occurs, it is reabsorbed after a while; (ii) political and economic institutions tend to co-evolve. We find that political and economic institutions are non-stationary, suggesting that institutional change is more the norm than the exception. We also find that the long-run dynamic relationship between economic and political institutions may be different for different institutions and in different contexts, because their interplay may depend on country-specific factors.

Key words: institutions, institutional change, rule of law, property rights, constraints on the executive

JEL classification: O1, P1, P5

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1 Introduction

There is a broad agreement that institutions matter. Most of existing research has focused on how they affect economic development and long-term economic growth (e.g. Acemoglu and Robinson 2012), perhaps paying less attention to the consequences for other important development outcomes. Although there is still disagreement on which institutions matter and how (Bardhan 2005), there is a convergence of interest on two clusters of institutions: political and economic institutions. Yet relatively little is known as to how to adopt better quality institutions and reform poor quality institutions, for which one needs to know how they change.

From a theoretical standpoint, there is a compelling argument that institutions are likely to persist over long periods. Institutions feature a self-sustaining set of social interactions and can be considered as equilibria in a game-theoretic framework, leading to institutional persistence (Aoki 2007). If institutional change were to occur endogenously, it would be slow and incremental, rather than through large-scale change. Similarly, following North (1990: chapter 9), Kingston and Caballero (2009) argue that 'the process of institutional change is also path-dependent because individuals learn, organizations develop, and ideologies form in the context of a particular set of formal and informal rules'. On the other hand, Acemoglu and Robinson (2012) refer to the notion of 'critical junctures' where, after a period of statis, institutional change is likely to occur, driven in part by exogenous shifts such as changes in the global economy. Williamson (2000) also argues that inefficient institutions will be replaced by efficient institutions, due to the opportunism and bounded rationality of agents. Therefore, as theory provides no clear guidance, the debate on whether institutions persist or change is far from settled.

More evidence in this area is particularly valuable, for at least three reasons. First, as we have noted, the literature on the origins and evolution of institutions offers some guidance on institutional change, but whether its predictions are reflected in the data is something we do not yet know. For example, are institutions persistent and, if so, to what extent? Are changes permanent or temporary? Is there an equilibrium level of institutions? Second, since political institutions and economic institutions both matter for long-term growth, the type and nature of their dynamic interrelationships is an important and understudied question. Do we expect co-movement of political and economic institutions, or are they likely to follow divergent paths? Third, quantitative research has provided very limited evidence. Existing work has mainly focused on explaining institutional variation across countries and, when exploring dynamic aspects, has relied on fairly short temporal variation. Documenting the stylized facts on institutional change, especially on the dynamics of institutions, will therefore provide a useful basis for further research.

Indeed, the existing empirical literature on institutional change has largely focused on case-study evidence of institutional change drawn from a few selected countries. For example, Acemoglu et al. (2005b) show that in 17th-century England, major institutional change occurred in the form of stronger property rights and limits on the monarch's power after the Civil War of 1642 and the Glorious Revolution of 1688. This phenomenon was mostly related to the expansion of Atlantic trade in the 16th and 17th centuries, which led to a powerful economic bourgeoisie that could oppose the absolutist tendencies of the kings. While case-study evidence of the type proposed by Acemoglu et al. (2005b) provides nuanced and deep insights into the historical processes and political economy factors that underpin large-scale institutional change in certain country contexts, they do not tell us much about the evolution of political and economic institutions across very different country and regional contexts over long periods. We complement the small-N approach of much of the previous empirical literature with a large-N analysis, which uses panel data for over two centuries for a large number of countries (see Appendix Table A1).

In this paper we provide new empirical evidence on how institutions change or persist. To do this, we draw on modern panel time series methods, allowing for cross-sectional dependence so as to accommodate local and global spillover effects of institutional change, where changes in political and economic institutions in one country can trigger similar changes in neighbouring countries (for example, Acemoglu et al. 2019 show that democratization episodes in one country can lead to similar episodes in neighbouring countries). We also allow for unobserved heterogeneity at country level of different forms, to take into account time-invariant effects related to cultural norms and geography, and to accommodate the possibility that the dynamic relationship between institutions may be different in different countries with different economic structures and different levels of economic development.

To undertake the analysis, we use variables from the V-Dem database capturing the quality of political and economic institutions over 200 years for a sample of 161 countries (see Appendix Table A2). Our measures of political institutions are electoral democracy and executive constraints, and our measure of economic institutions are the rule of law and property rights. The analysis posits two core hypotheses: (i) institutions display inertia, hence measures are stationary and, if a shock occurs, it is reabsorbed after a while; (ii) political and economic institutions tend to co-evolve. First, therefore, we test whether institutional quality measures are stationary. Second, we look at the long-run dynamic relationship between economic and political institutions and hence test for cointegration, providing evidence on whether political and economic institutions are in a long-run equilibrium. We also assess whether changes in political institutions are likely to cause changes in economic institutions, or whether the causal relationship between the two sets of variables is more likely to be in the opposite direction.

The results offer four findings. First, we find that non-stationarity cannot be rejected for measures of the rule of law, property rights, executive constraints, or electoral democracy, implying that institutions change in the long run. This may reflect the possibility that institutions change following *critical junctures*, which act as negative or positive shocks (Acemoglu and Robinson 2012), or following the outcome of the distributive conflict between elites or between elites and the people (Acemoglu et al. 2005a). Second, we find that economic and political institutions are cointegrated: there is a long-run relationship between the two. While in the short-run they can drift apart, this will be temporary because they tend to co-evolve. Third, the existence and nature of a long-run relationship may be different for different types of institutions: evidence of cointegration is strong between the rule of law and measures capturing constraints on executive and electoral democracy—less so when looking at property rights protection and political institutions. Finally, long-run causality runs mostly from political institutions to economic institutions.

The paper proceeds as follows. In Section 2, we discuss why institutions may persist or change and whether political and economic institutions tend to co-evolve. Sections 3 and 4 discuss measurement issues and the variables. Section 5 presents the methodology and Section 6 the results. Section 7 summarizes and discusses possible future research.

2 Review of the literature

Although a lively debate continues on the extent and significance of their role, political and economic institutions are generally seen as important conditions for long-term development. On political institutions, part of the debate originally focused on whether, and how, political democracy affects economic growth. The literature has seen those arguing that there is an unambiguously positive effect (Acemoglu et al. 2019; Rodrik 2000) and others arguing for a more nuanced relationship (Bardhan 1999; Przeworski and Limongi 1993). The recent empirical

literature has challenged the idea that political democracy measures have a large and robust positive effect on economic growth (Eberhardt 2022; Paldam 2024; Sen et al. 2017). Rather than looking at democracy as a whole, indistinct body, a promising avenue for current research is 'unpacking' political regimes so as to look at the role of specific types of political institutions. One such type is institutions that place limits on executive power, which are now regarded as an important driver of long-run economic development. One argument suggests that they are central to building effective states, being capable of providing and funding public goods and services that support economic growth. Executive constraints, for example, create the conditions for investing in fiscal capacity (Besley and Persson 2011).[1] A second argument suggests that the existence of significant checks and balances on executive power is central to creating *inclusive institutions*, i.e. institutions that grant economic opportunities to a broad cross-section of the population (Acemoglu et al. 2005a).

On economic institutions, the consensus is that property rights protection and following the rule of law are important for igniting growth (e.g. Rodrik 2000). But, while protected property rights allow agents to secure a return on their investment and observance of the rule of law provides a stable contractual environment for transactions, important questions remain. For example, whose property rights should be protected and how (Chang 2011)? Acemoglu and Robinson (2019) propose a distinction between *extractive* and *inclusive* institutions, where the latter type grants opportunity to a broad cross-section of society. However, while this is another point that sees a broad consensus, there is much less agreement on what *inclusive* (political and economic) institutions means, i.e. how they can be defined in a way that is conceptually distinct from other types of institutions and that is amenable to measurement.[2]

Be that as it may, existing quantitative research has provided many studies on the effects of institutions on economic growth, mostly supportive of the idea that institutions matter (e.g., Acemoglu et al. 2001; Flachaire et al. 2014; Rodrik et al. 2004). There is, however, very limited econometric evidence on how institutions change. The literature on the origins and evolution of institutions offers evidence on institutional change, but this is often qualitative and based on case studies.[3] A systematic econometric investigation would therefore complement existing qualitative accounts and, above all, would be useful to reveal whether any generalizations can be made on patterns of institutional change. Since institutions are long-run phenomena, resulting from historical processes, new econometric evidence in this area would be particularly valuable if it could document the evolution of institutions using measures that show substantial time series variation.[4] But should we expect institutions to change, and how?

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[1] The emergence of taxation, in turn, creates the conditions for strengthening constraints on the executive, as governments face increasing pressure to become more accountable. Savoia et al. (2023) show that political institutions that place constraints on the executive and taxation tend to reinforce each other, in the long run.

[2] There has also been a revival of interest in states. Lin and Nugent (1995) and Bardhan (2005) were among the first in the context of the economics debate to highlight the importance of states in delivering key public goods and resolving coordination failures. This idea has gained momentum. Besley and Persson (2011) have given impetus to the analysis of why states contribute to long-term prosperity, highlighting the role of the fiscal and legal capacity of the state. The former refers to the state's ability to raise revenues and the latter to its ability to provide a basic legal framework to resolve disputes.

[3] See Acemoglu et al. (2005a) and Kingston and Caballero (2009) for theoretical accounts of institutional change and persistence. See Tylecote (2015) and Van Bavel (2015) for accounts and critiques of historical evidence.

[4] Sobel and Coyne (2011) made the first econometric study documenting the dynamic properties of the Freedom House democracy index and various components of the Economic Freedom of the World index. Savoia and Sen

Next, we look at what kind of guidance the literature offers. We focus on three questions. Do we see institutional persistence or do institutions change? If they change, do different types of institutions tend to move together? If they do, do political institutions cause economic institutions, or vice versa?

2.1 Institutional persistence and change

Let us start with the possibility of institutional persistence. This may arise because of commitment problems: agents are unable to commit to any compensation for those who stand to lose. 'Bad' institutions can persist because the rich (poor) cannot commit to compensate the poor (rich) after old rules have been replaced with new ones (Acemoglu 2003; Bardhan 2005). Taking this further, Acemoglu and Robinson (2006, 2008) argue that institutional reforms may be hindered by elites who benefit from existing economic institutions. Political elites who hold power may always have an incentive to maintain the political institutions that give them political power and the economic institutions supporting a distribution of resources that favours them. Therefore, economies may see a persistence of sub-optimal economic and political institutions, since the elites who benefit from these institutions would not have any incentives to change them (Acemoglu and Robinson 2019; Acemoglu et al. 2005a). This implies that institutional measures are stationary and, if a shock occurs, it is reabsorbed after a while. Hence, changes are temporary.

However, although institutions may remain stable for prolonged periods, changes can occur at *critical junctures* (Acemoglu and Robinson 2012). These can act as negative or positive shocks. Major technological, demographic, geopolitical, or historical events can 'accidentally' force institutional change. One mechanism could be a significant alteration of relative prices (Bardhan 1989: chapter 1). Another could be a colonization strategy (e.g. Acemoglu et al. 2001), such as that of European colonizers, who were likely to set up 'extractive institutions' that were detrimental to economic development in colonies where they did not settle (such as in Africa and Asia), but 'European-like' institutions in colonies where they did settle (such as North America). A third mechanism is suggested by La Porta et al. (2008: 327), whereby institutional change may occur as a result of increasing global economic integration, leading to an increasing exchange of ideas and to higher competition for Foreign Direct Investment (FDI), which will stimulate the adoption of 'good' economic institutions. Finally, the incidence of external conflicts—as argued by Besley and Persson (2011)—stimulates the demand for common-interest public goods (e.g. defence) and, in turn, increases the incentive for groups competing for power to invest in fiscal and legal institutions. Consequently, one would expect to observe non-stationary measures following a critical juncture. Hence, such 'shocks' may result in permanent changes.

2.2 The long-run relationship between political and economic institutions

Turning to the second question—assuming institutions are not stationary, do they tend to co-evolve?—we see that they could co-evolve because political institutions may tend to support economic institutions. Some democratic attributes—free and fair elections, separation of powers, and political checks and balances—tend to avert rent-seeking and thus prevent political and business elites from predating the economy (see Acemoglu et al. 2005; North and Weingast 1989, when discussing 17th-century England). This may be specifically the case with respect to property rights. According to Acemoglu (2008), property rights can be either 'democratic' or 'oligarchic'. In a democratic society, political power is more equally distributed, and, unlike oligarchic societies, poorer agents have the possibility to prevent the elite from erecting entry barriers and exploiting

(2016) empirically explore the possibility of institutional convergence. One common feature of such studies is that they rely on measures presenting a fairly short temporal dimension.

markets via monopoly power. The case of many developing economies is one where, reflecting the unequal balance of the political and economic power, market-economy institutions have not provided equal access to economic resources for a broad cross-section of the population. The type of institutions an economy develops and how they evolve may depend on the distribution of power and resources that a country has, so that a relatively equal distribution of resources can create virtuous cycles where different institutions reinforce each other (see Acemoglu and Robinson 2019).[5]

The experience of developed, capitalist democracies does suggest that democracy is hospitable to the rule of law, to fair tax systems, and to accountable management of the economy, and that it is associated with property rights protection for all citizens. Gerring et al. (2005) argue that democracy has 'historical' effects, meaning that such effects materialize over a long period. The accumulated democratic stock fosters growth by delivering better governance, for example, via effective bureaucracies, opening up markets and institutions to previously excluded groups. In addition, in contexts where electoral accountability is imperfect, constraints to the executive can provide a 'robust control' mechanism to ensure that elites do not subvert the rule of law (Besley 2006; Besley and Mueller 2018). Further, weaker checks and balances on the executive are likely to be associated with more clientelist political systems, along with violations of the rule of law. In such systems, politicians are more likely to lean on law-enforcement authorities to selectively 'adjust' the rules in favour of specific groups of voters or potential voters (Lindberg et al. 2022). Hence, both greater electoral democracy and stronger executive constraints can go hand in hand with stronger rule of law.

Similarly, the idea of democracy delivering broad access to property rights, rather than a narrow one, is appealing. Nevertheless, democratization and property rights do not always go hand in hand. Their relationship is complex. If one is trying to explain the stability and predictability of property rights systems, it is useful to reconsider the role of democratic attributes in relation to the existence and intensity of distributive conflict. As Przeworski and Limongi (1993) and Bardhan (1999) have noted, the poor majority can use the diffusion of political rights to change the distribution, thus threatening the property rights of the rich minority. This can be the case especially in unequal societies displaying significant income or assets concentration. This implies that agents do not necessarily need political democracy to feel that their investments are secure. Historically, strong protection of property rights has often been granted by autocratic regimes in East Asian economies (e.g. Indonesia), as well as by European fascist regimes. Bardhan (1999) illustrates how, in the South Korea and Taiwan cases, the state was a powerful catalyst for industrialization, being organised as a competent technocratic structure insulated from clientelist ties, while Latin America and India did not have the same type of organization recruiting effective bureaucracies. This implies that, among economic institutions, the rule of law is more likely than

[5] Acemoglu et al. (2005) develop the idea of distributive conflict further, distinguishing between *de jure* and *de facto* political power. The *de jure* distribution of political power reflects the political institutions present in a society, including the form of government (democracy vs autocracy), and the extent of constraints on political elites is key. This idea is formalized in Acemoglu and Robinson (2006), where it is argued that rich agents can offset changes in *de jure* political power (allocated by political institutions) by changes in *de facto* power. Other things being equal, democracy is more likely to be associated with social stability and market-supporting institutions. However, the *de facto* distribution of political power may be somewhat different if resources are unequally distributed, such that elites are able to buy off other groups (through lobbying or outright bribery) or coerce them by force. This, in turn, may shape the evolution of political institutions. High inequality may thus have an adverse impact on economic institutions through its direct impact on the distribution of political power, and 'indirectly' by shaping future political institutions. *De jure* and *de facto* distinctions can also be made regarding judicial independence; Hayo and Voigt (2019) show that *de jure* independence has a positive, albeit quantitatively small, effect on *de facto* independence.

property rights to have a long-run relationship with electoral democracy. This is a testable hypothesis, which we will investigate in the empirical analysis later.

The above discussion suggests that there are reasons to expect economies to see both persistence and change in political and economic institutions and that, similarly, these two types of institutions can move together in the long run or one can act as a 'fetter' so that the other displays inertia. Ultimately, as the literature suggests, we may expect different outcomes, and this is an empirical matter.

2.3 Do changes in political institutions cause changes in economic institutions?

If political and economic institutions have a long-run relationship where both co-evolve over time, is the relationship bi-directional or will changes in political (economic) institutions trigger changes in economic (political) institutions? The extant literature suggests that it is more likely that changes in political institutions will cause changes in economic institutions than the other way around. For example, Acemoglu and Robinson (2019) put forward a theory of why changes in political institutions drive changes in economic institutions. Economic institutions are not distribution-neutral: they not only determine the aggregate growth potential of the economy but also the distribution of resources in the country. This implies that economic institutions are politically determined, as the prevalent power relations will determine which set of economic institutions is more likely to emerge (Sen 2013). As Acemoglu and Robinson (2019: 24) argue: 'politics drives economics and what leads to transition in economic institutions is change in political institutions, typically through the collective action of those who are excluded by extractive political institutions'. Again, this provides a testable hypothesis, which we will examine later.

3 Measuring economic and political institutions

Several measures of institutional quality, drawn from different data sources, have been proposed in the literature. In this section, we briefly describe the measures and databases used in the institutions literature, and then propose our preferred measures of economic and political institutions.

A commonly used database for measures of institutions is the ICRG database (ICRG 2012), constructed by Political Risk Services, covering over 100 countries starting in 1984.[6] The ICRG variables are the most commonly used measures of institutional quality in the empirical literature on institutions and growth (e.g., Acemoglu et al. 2001; Hall and Jones 1999; Knack and Keefer 1995). The data come from subjective assessments of foreign investors and business experts. They include three continuous variables (rescaled to range between 0 and 10): *Rule of Law*, *Corruption in Government*, and *Bureaucratic Quality* indices. The first is an indicator of the legal capacity of the state; the last two capture its bureaucratic and administrative quality.[7] However, the limitation of the ICRG database for our purpose is the short time-series component of the data (only 25 years).

[6] To be precise, this database starts in 1984, but observes fewer countries in that year (106) than in 1985 (124).

[7] A criticism of the ICRG and other databases on institutional quality made by Glaeser et al. (2004) is that these measures are conceptually ambiguous *de facto* assessments of institutional outcomes, and do not adequately capture the rules and laws that constrain economic and political behaviour. While we accept this criticism of perceptions-based measures of institutions, there are equally challenging issues in measuring the quality of *de jure* institutions such as the laws and rules in a particular society, given the weak enforcement of these rules and laws in developing countries (Savoia and Sen 2014).

Another source of data on institutional quality, especially of economic institutions, is the Fraser Institute database, which provides measures of economic institutions such as the *Quality of Legal Structure and Security of Property Rights* index (Gwartney et al. 2013). The database goes back to 1970—every five years from 1970 until 2000 (and every year from 2001 on)—but it samples fewer countries than the ICRG database, and between 1970 and 1975 only 50 countries are observed. The lack of data for a large number of countries in the 1970–75 period does not make the Fraser Institute database suitable for our purpose.

Studying institutional change and persistence means documenting long-run phenomena that may originate from structural changes unfolding over the course of history, and hence are best observed with measures spanning many decades. Our analysis focuses on measures that have substantial time series variation (as well as covering a large sample of countries). We use the Varieties of Democracy (V-Dem) dataset, which provides multidimensional and disaggregated data on the measures of institutional quality that capture the core characteristics of economic and political institutions (Coppedge et al. 2020), presenting higher degrees of internal consistency (as shown in Boese 2019) and hence greater reliability in terms of cross-country and temporal comparisons. One of the major advantages of the V-Dem dataset is that it typically uses 25 experts per country and 5 experts per topic. This addresses a common criticism of institutional quality measures that they are affected by 'coder bias', i.e. one expert coding many or all institutions of a country may have negative or positive views of institutional functioning and so artificially under- or over-rate institutions in different areas. The data are available from 1789 to 2020 at an annual frequency for up to 197 countries.[8] We now discuss our measures of economic and political institutions.

3.1 Economic institutions

We use two measures of economic institutions: the rule of law and property rights. The *Rule of Law* index in V-DEM addresses the following questions: 'to what extent are laws transparently, independently, predictably, impartially, and equally enforced, and to what extent do the actions of government officials comply with the law?'. This measure is widely seen as a proxy for contractual stability (see Aidt 2009). The index is formed by taking the point estimates from a Bayesian factor analysis model of the indicators for: compliance with high court, compliance with judiciary, high court independence, lower court independence, executive respects constitution, rigorous and impartial public administration, transparent laws with predictable enforcement, access to justice for men, access to justice for women, judicial accountability, judicial corruption decision, public sector corrupt exchanges, public sector theft, executive bribery and corrupt exchanges, executive embezzlement and theft. The index ranges from 0 to 1, with a higher value indicating a better rule of law.

The second measure of economic institutions that we use is the stability of property rights. The V-Dem on property rights measures the extent to which citizens enjoy the right to private property, where private property includes the right to acquire, possess, inherit, and sell private property, including land. Limits on property rights may come from the state, which may legally limit rights or fail to enforce them; from customary laws and practices; or from religious or social norms. The V-Dem measure concerns the right to private property, not actual ownership of property.

[8] See https://www.v-dem.net/en/data/archive/previous-data/v-dem-dataset/ for details. See Coppedge et al. (2021) for methodological aspects.

3.2 Political institutions

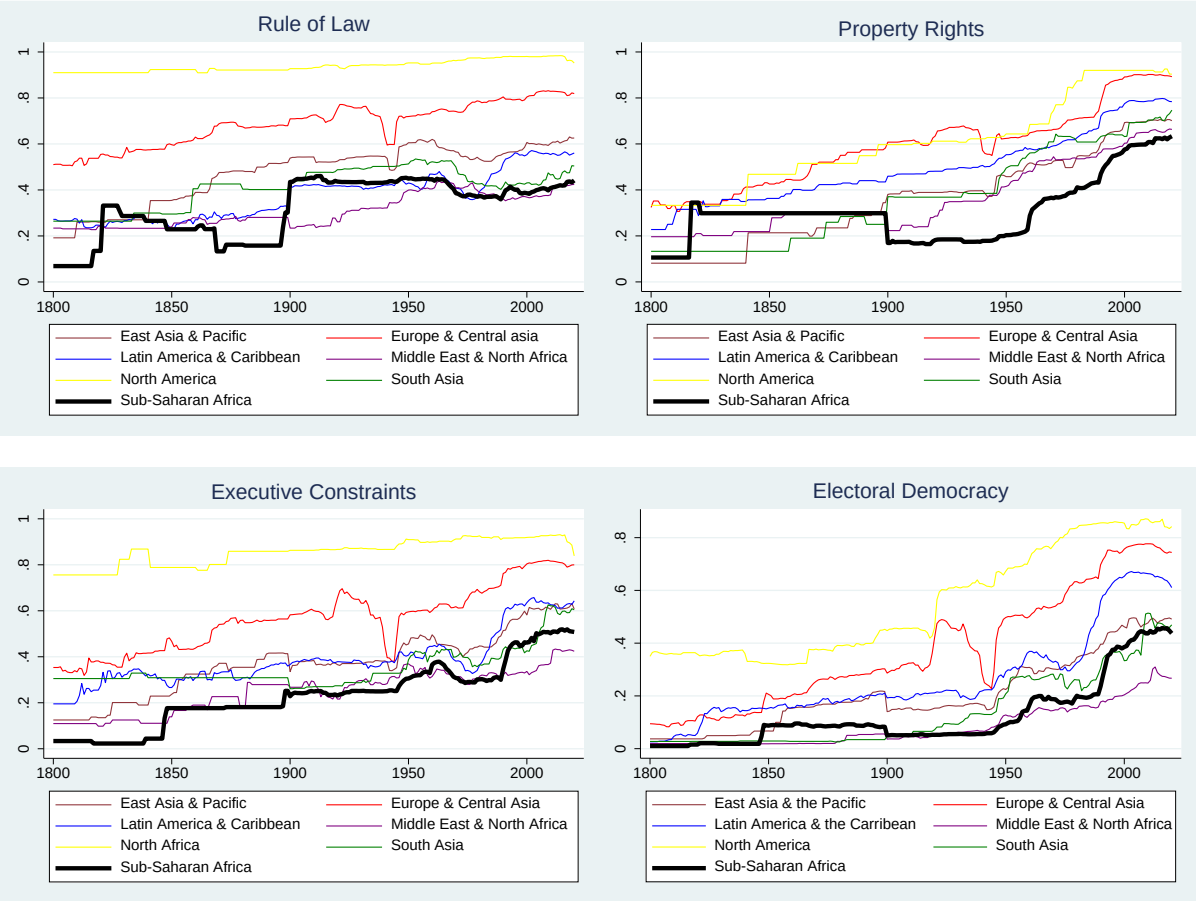
We study political institutions using two measures: constraints on the executive and the extent to which electoral democracy prevails. With respect to executive constraints, checks and balances can operate through the legislative and judicial branches. The former works through parliamentary systems, which institutionally oversee and audit the state budget, and the latter through independent judicial systems enforcing the rule of law. The two types of limits on executive power can work concurrently and complement each other (Persson et al. 1997). In practice, no country relies only on judicial or only on legislative constraints. The V-Dem dataset provides variables for measuring each aspect. The *Judicial Constraints on the Executive* index (*v2x_jucon*) addresses the following questions: 'To what extent does the executive respect the constitution and comply with court rulings, and to what extent is the judiciary able to act in an independent fashion?'. In contrast, the *Legislative Constraints on the Executive* index (*v2xlg_legcon*) addresses the question: 'To what extent are the legislature and government agencies, e.g., controller general, general prosecutor, or ombudsman, capable of questioning, investigating, and exercising oversight over the executive?'. We combine these two measures in a single index, labelled *Executive Constraints*, which is the arithmetic mean of the legislative and judicial constraints. Lower values indicate lower constraints on the power of the executive (hence more executive discretion) and vice versa.

Our second measure of political institutions from V-Dem is the *Electoral Democracy* measure, which captures the extent to which the ideal of electoral democracy in its fullest sense is achieved. The electoral principle of democracy seeks to embody the core value of making rulers responsive to citizens, achieved through electoral competition for the electorate's approval under circumstances when suffrage is extensive; political and civil society organizations can operate freely; elections are clean and not marred by fraud or systematic irregularities; and elections affect the composition of the chief executive of the country. In between elections, there should be freedom of expression and an independent media capable of presenting alternative views on matters of political relevance. In the V-Dem conceptual scheme, electoral democracy is understood as an essential element of any other conception of representative democracy, including liberal, participatory, deliberative, and egalitarian.

4 How do economic and political institutions behave over time?

We begin our empirical analysis by looking at the time-series plots of institutions, one by one, and by World Bank region—East Asia and the Pacific; Europe and Central Asia; Latin America and the Caribbean; Middle East and North Africa; North America; South Asia; and sub-Saharan Africa. We plot the evolution of the rule of law, property rights, executive constraints, and electoral democracy across the regions in Figure 1. With respect to the rule of law, we see an improvement in all regions over the 200 years of the data, except in sub-Saharan Africa, where there is virtually no improvement after 1900. However, in the case of property rights, we do see improvements across all regions, including sub-Saharan Africa, especially after 1950. With respect to executive constraints, all regions show steady increases in the measure over the two centuries. In contrast, with respect to electoral democracy, improvements occur most noticeably since 1950, especially for Middle East and North Africa and sub-Saharan Africa. In general, institutional quality is highest for both economic and political institutions in East Asia and the Pacific, Europe and Central Asia, and North America, and lowest for Middle East and North Africa, South Asia, and sub-Saharan Africa. There is little evidence of substantial changes in rank ordering of institutional quality across regions in the long timespan of our data.

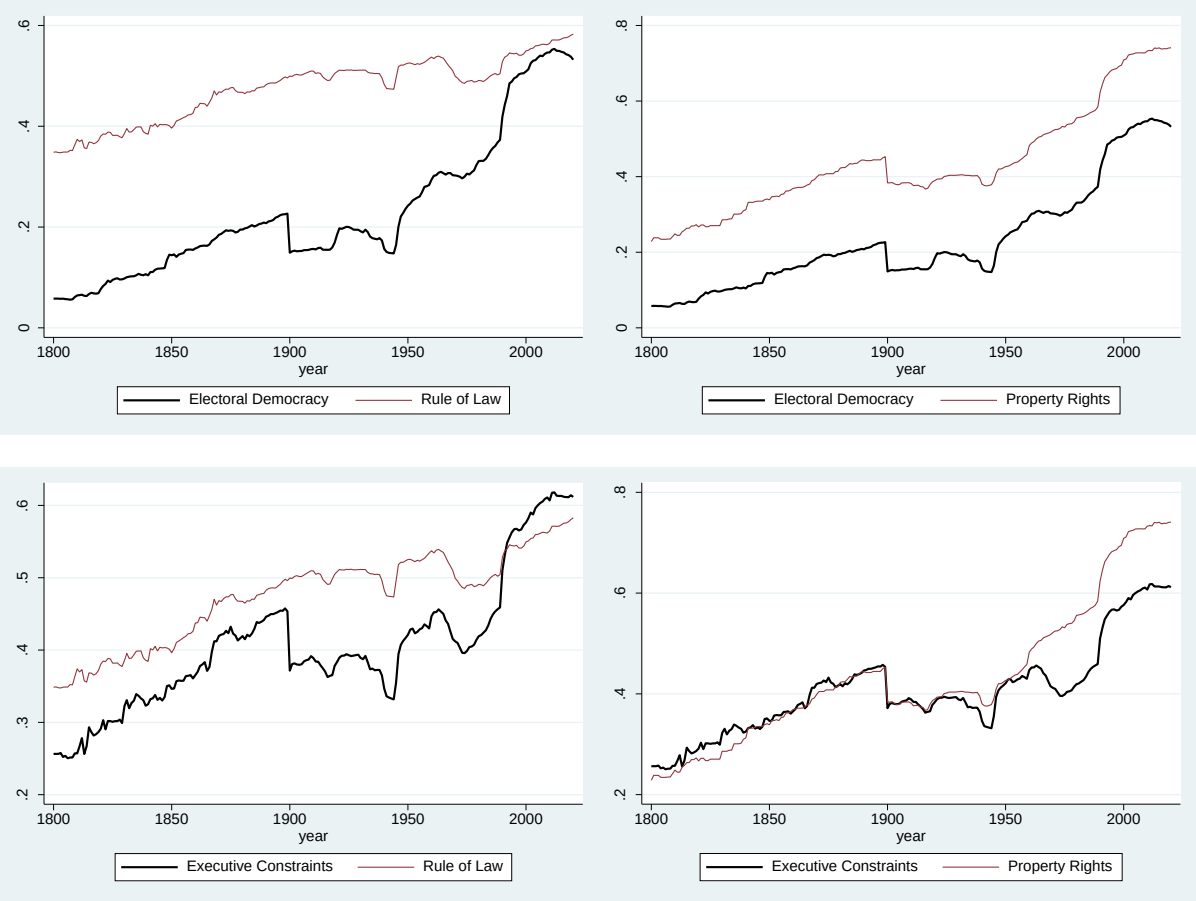
Figure 1: Political and economic institutions: 1800–2020, by region



Source: authors' construction using V-Dem data (Coppedge et al. 2020).

Next, we present bivariate time-series plots of economic versus political institutions. We plot, for the entire sample, the rule of law against executive constraints and electoral democracy, respectively, and then property rights against electoral democracy and executive constraints, respectively. The time-series plots are presented in Figure 2. There is evidence of co-movement of economic and political institutions, for the different pairs of institutions. This is most evident for electoral democracy and property rights (top-left graph) and for executive constraints and property rights (bottom-right graph). On the other hand, with respect to electoral democracy and the rule of law, and executive constraints and the rule of law, we find evidence of divergence between economic and political institutions, especially in the first half of the 19th century, with convergence in the second half of the 19th century.

Figure 2: Political and economic institutions: 1800–2020, all countries



Source: authors' construction using V-Dem data (Coppedge et al. 2020).

5 Empirical strategy

To investigate non-stationarity, we employ the 'CIPS' test, a panel unit root test that allows for cross-section correlation. Panel unit root tests are applied to the variable series following the procedure given in Pesaran (2007). The test is based on a standard Augmented Dickey-Fuller (ADF) regression, augmented with cross-section averages of the dependent and independent variables to account for cross-section dependence. We report the Ztbar statistic (and its associated p-value) for the null hypothesis of non-stationarity in all countries' variable series against the alternative hypothesis of stationarity in some countries' variable series.

To establish whether there is bivariate cointegration between economic and political institutions, a suitable test—one which allows for greater flexibility in cross-sectional dependence—is provided by Gengenbach et al. (2009). The test is based on a conditional Error Correction Model (ECM) of the form:

$$\Delta EI_{it} = \alpha_i EI_{it-1} + \gamma'_{1i} PI_{it-1} + \gamma'_{2i} f_{it-1} + \sum_{s=0}^{p_i} \pi'_{1is}\, \Delta PI_{it-s} + \sum_{s=1}^{p_i} \pi'_{2is}\, \Delta EI_{it-s} + \sum_{s=0}^{p_i} \pi'_{3is}\, \Delta f_{it-s} + \varepsilon_{it} \quad (1)$$

where EI can be the rule of law or property rights and, in turn, PI can be executive constraints or electoral democracy. The procedure in Equation (1) is based on the common correlated effects

mean group (CCEMG) estimator (Pesaran 2006), whereby common factors f are approximated by cross-section averages, including cross-section averages of lagged ΔPI_{it} and ΔEI_{it}, depending on the lag length p_i. The test is for a null hypothesis of no error correction (hence no cointegration) against an alternative of error correction (cointegration). The test statistic $\bar{\tau}^*$ is the average of the t-ratios for $\hat{\alpha}_i$, from country regressions. The individual t-ratios, as well as their averages, have non-standard distributions under the null hypothesis, so Gengenbach et al. (2009) provide simulated critical values. The test is run for each CCEMG model with different deterministic terms (neither intercept nor trend; intercept; intercept and trend). Equation (1) models unobserved heterogeneity through country-fixed effect (α_i) and time-varying common factors (f_i), with factor loadings that can differ across countries. The country-specific heterogeneity captured by fixed effects may reflect time-invariant characteristics: social and cultural norms that facilitate or impede the adoption of developmental institutions (Berkowitz et al. 2003; Roland 2004), or colonial heritage and geographical factors, including natural resource endowment and disease environment (e.g. Acemoglu et al. 2001). The common factors address the presence of strong cross-section dependence: a form of unobserved, time-varying heterogeneity, distinct from weaker forms of dependence (e.g. spatial correlation), which may be a source of endogeneity, leading to biased and inconsistent estimates (see Kapetanios et al. 2001). The common factors can be represented by a combination of a limited number of 'strong' factors and an unlimited number of 'weak' factors (Chudik et al. 2011). The former are global effects, which affect all countries irrespective of their location and (initial) level of institutional development, while the latter are local spillover effects, which may occur through geographic proximity, as well as social or economic interaction.[9] Geopolitical pressures and conflicts (regional or global), economic integration (e.g. trade agreement), pressure from international organizations to reform domestic institutions (e.g. via structural adjustment programmes), and financial crises (regional or global) are examples of common factors that may be at the origin of cross-section dependence and can affect both political and economic institutions. The impacts of these shocks and countries' ability to respond differ across countries.

Apart from allowing us to test for cointegration, the ECM specification enables us to investigate the dynamic relationship between political and economic institutions. In particular, it allows a distinction between short-run and long-run effects and can easily encapsulate feedback effects between the two types of institutions. Moreover, the ECM specification allows us to investigate long-run causality. This is of particular interest here, since economic and political institutions may reinforce each other. If there exists a co-integrating relationship between the two, the Granger Representation Theorem (Granger 1988) states that long-run causality must run in at least one direction (equivalent to at least one variable adjusting to maintain an equilibrium relation) and the variables can be represented in the form of a dynamic ECM.

6 Results

This section presents the results of the tests for non-stationarity with regard to the existence of a long-run equilibrium relationship between the variables, its dynamics, and the direction of long-run causality.

[9] For example, Bonhomme and Manresa (2015) find that, even conditioning on GDP, transitions to democracy are correlated within regions. Acemoglu et al. (2019) use regional waves in democratization as a source of exogenous variation to estimate the causal effect of democracy on economic growth.

6.1 Unit root tests

Table 1 presents the panel unit root test results. We find that, for variables in levels, non-stationarity cannot be rejected once the ADF equation is augmented with a sufficient number of lags and/or a linear trend, except in the case of electoral democracy. Non-stationarity is rejected for all variables in first differences. The finding of non-stationarity in levels implies that any shocks to the institutional variables would have persistent effects. Going back to our review of the literature on institutions, our finding that shocks to institutions are permanent, and not temporary, provides some support to theories of institutional change that highlight the role of critical junctures such as colonization, internal/external conflict, and economic crises in causing permanent shifts in institutions.

Table 1: Panel unit root tests

Levels: CIPS test with intercept only								
Variable	**Electoral democracy**		**Rule of law**		**Property rights**		**Executive constraints**	
Lags	***Ztbar***	***p***	***Ztbar***	***p***	***Ztbar***	***p***	***Ztbar***	***p***
0	-4.98	0.00	3.72	1.00	1.04	0.85	-8.65	0.00
1	-11.25	0.00	-0.33	0.37	1.12	0.87	-9.39	0.00
2	-7.71	0.00	0.86	0.81	1.85	0.97	-6.36	0.00
3	-6.79	0.00	0.84	0.80	1.32	0.91	-5.87	0.00
4	-5.83	0.00	2.02	0.98	2.69	0.996	-3.10	0.00
5	-4.28	0.00	2.30	0.99	2.83	0.998	-1.90	0.03
6	-3.09	0.00	4.02	1.00	3.21	0.999	-0.56	0.29
Levels: CIPS test with intercept & trend								
Variable	**Electoral democracy**		**Rule of law**		**Property rights**		**Executive constraints**	
Lags	***Ztbar***	***p***	***Ztbar***	***p***	***Ztbar***	***p***	***Ztbar***	***p***
0	-2.77	0.00	4.91	1.00	2.92	0.998	-5.44	0.00
1	-9.94	0.00	-0.57	0.28	2.81	0.998	-6.67	0.00
2	-5.95	0.00	0.86	0.80	3.58	1.00	-3.07	0.00
3	-4.84	0.00	0.64	0.74	2.87	0.998	-2.81	0.00
4	-4.08	0.00	1.67	0.95	4.43	1.00	0.30	0.62
5	-2.55	0.01	2.21	0.99	4.90	1.00	1.46	0.93
6	-1.05	0.15	4.21	1.00	5.74	1.00	2.96	0.998
Differences: CIPS test with drift								
Variable	**Electoral democracy**		**Rule of law**		**Property rights**		**Executive constraints**	
Lags	***Ztbar***	***p***	***Ztbar***	***p***	***Ztbar***	***p***	***Ztbar***	***p***
0	-60.20	0.00	-60.27	0.00	-59.84	0.00	-60.37	0.00
1	-58.98	0.00	-57.69	0.00	-57.66	0.00	-58.47	0.00
2	-54.83	0.00	-52.77	0.00	-53.76	0.00	-54.55	0.00
3	-49.41	0.00	-47.97	0.00	-47.64	0.00	-49.80	0.00
4	-44.94	0.00	-43.05	0.00	-41.78	0.00	-44.55	0.00
5	-40.15	0.00	-38.50	0.00	-37.03	0.00	-39.43	0.00
6	-34.59	0.00	-32.77	0.00	-31.59	0.00	-33.66	0.00

Note: H_0: non-stationarity in all countries' variable series; H_1: stationarity in some countries' variable series.

Source: authors' calculations based on V-Dem data (Coppedge et al. 2020).

6.2 Cointegration

Table 2 reports results of the bivariate cointegration tests between economic institutions (measured by rule of law and property rights) and political institutions (measured by electoral democracy and executive constraints). The results are based on the Gengenbach et al. (2009)

cointegration test with one lag.[10] Model 1 has no deterministic terms (no intercept or trend), model 2 includes only an intercept, and model 3 includes an intercept and a linear trend. Gengenbach et al. (2009) tabulate critical values for different combinations of N (number of countries), T (number of years) and m (number of regressors). Inference is based on comparing the test statistic, $\bar{\tau}^*$, with the simulated critical values: if the absolute value of the test statistic is larger than the absolute value of the simulated critical values, we reject the null hypothesis of no error correction (hence no cointegration).

Table 2: Gengenbach et al. (2009) cointegration test

Test Statistic, $\bar{\tau}^*$	10%	5%	1%
Panel A: Rule of law			
Electoral democracy and rule of law			
Model 1	-2.103**	-1.995	-2.065	-2.190
Model 2	-2.729***	-2.458	-2.517	-2.611
Model 3	-2.981**	-2.875	-2.925	-3.010
Executive constraints and rule of law			
Model 1	-2.057*	-1.995	-2.065	-2.190
Model 2	-2.556**	-2.458	-2.517	-2.611
Model 3	-3.006**	-2.875	-2.925	-3.010
Panel B: Property rights			
Electoral democracy and property rights			
Model 1	-1.726	-2.048	-2.133	-2.287
Model 2	-2.327**	-2.530	-2.601	-2.735
Model 3	-2.768***	-2.875	-2.925	-3.010
Executive constraints and property rights			
Model 1	-1.696	-1.995	-2.065	-2.190
Model 2	-2.654***	-2.458	-2.517	-2.611
Model 3	-2.940**	-2.875	-2.925	-3.010

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Significance will indicate rejection of the null hypothesis. H_0: no error correction, hence, no cointegration; H_1: error correction, hence cointegration. Models 1, 2, and 3 refer to an ECM without any deterministic terms, with intercept, and with intercept and trend, respectively. Critical values at 10%, 5%, and 1% are obtained from Table 3 of Gengenbach et al. (2009). For the results on electoral democracy and property rights (in Panel B), significance is based on the proportion of country-specific error correction terms, across all countries, that are statistically significant.

Source: authors' construction.

We find a clear rejection of the null hypothesis for electoral democracy and the rule of law, and for executive constraints and the rule of law. Similarly, we see evidence of cointegration for executive constraints and property rights and electoral democracy and property rights. This implies that there is a long-run equilibrium between economic and political institutions irrespective of the measure of economic institutions we use. However, the case of electoral democracy and property rights deserves closer scrutiny because, although we find evidence of cointegration, this does not imply that there is always or everywhere a long-run equilibrium between the two variables. We look at the error correction terms at country level, instead of the test statistic $\bar{\tau}^*$, which is calculated as an average from country regressions (see Appendix Table A3). The results show that the country-specific error correction terms, across all 161 countries, are statistically significant in most cases, but not all. This means that heterogeneity can still be relevant and that a long-run equilibrium

[10] This follows standard practice in time series analysis. Including more lags results in a loss of degrees of freedom and the number of parameters increases more than proportionally. Besides, the consensus in the time-series literature is to follow specific-to-general modelling: that is, starting from lower lags and successively including more lags.

between electoral democracy and property rights may not always materialize, depending on the country context.

6.3 Short- and long-run effects

Next, we focus on the dynamics of the relationship between political and economic institutions. Having found evidence of cointegration, we want to see how economic institutions behave when deviating from the long-run equilibrium. The results are shown in Table 3.

Table 3: ECM estimates

Panel A: Electoral democracy and economic institutions		
	Rule of law	**Property rights**
Long run		
Electoral democracy	0.299***	0.206***
	[0.055]	[0.054]
Short run		
Electoral democracy	0.283***	0.119***
	[0.028]	[0.015]
EC coefficient		
y_{it-1}	-0.138***	-0.097***
	[0.009]	[0.008]
t-statistic	-15.27	-11.87
RMSE	0.023	0.023
CD test	-4.610	-3.708
(p-value)	(0.000)	(0.000)
Observations (N)	22,522 (161)	22,639 (161)

Panel B: Executive constraints and economic institutions		
	Rule of law	**Property rights**
Long run		
Executive constraints	0.456***	0.232***
	[0.061]	[0.040]
Short run		
Executive constraints	0.334***	0.110***
	[0.045]	[0.014]
EC coefficient		
y_{it-1}	-0.136***	-0.118***
	[0.009]	[0.008]
t-statistic	-14.85	-14.75
RMSE	0.020	0.023
CD test	-4.103	-3.815
(p-value)	(0.000)	(0.000)
Observations (N)	22,571 (161)	22,601 (161)

Note: results based on ECM for 161 countries with the respective economic institutional variables as dependent variable. The long-run and short-run averages are reported, with standard errors reported below the averages. RMSE is the root mean square error. CD test is the Pesaran (2015) test distributed N(0,1) under the null of weak cross-section independence (*p*-values reported below). *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Source: authors' construction.

Without exception, Error Correction (EC) coefficient estimates are negative and significant, reflecting the fact that political and economic institutions are cointegrated. The EC coefficient captures the adjustment toward the long-run equilibrium, i.e. what proportion of the disequilibrium in the dependent variable in one period is corrected in the next period. In the case

of political institutions constraining the executive power, this means that a deviation in the rule of law or property rights from the long-run equilibrium will be corrected by approximately 14 or 12 per cent in next period, respectively. A hypothetical shock to executive constraints would bring effects on the rule of law and property rights that are slowly absorbed. Such relatively slow adjustment of economic institutions gives an appreciation of how persistent such institutions are.

ECM estimates also allow us to see how political institutions impact the rule of law and property rights. In addition to the strong evidence of error correction, the long- and short-run coefficients of executive constraints and electoral democracy are statistically significant throughout. These estimates represent *average* effects (short- and long-run) across the global sample of countries.[11] Their sign is positive and implies that, after accounting for the presence of heterogeneity across countries due to fixed effects or heterogeneous parameters, both types of political institutions are important to support economic institutions in the short and long run.[12]

There is one remaining concern: the CD test results signal that cross-sectional dependence may still be present. Hence, we extend the analysis by including two historical macroeconomic variables: historical GDP and trade openness measures. Per capita GDP data are from the Maddison project database (Bolt and van Zanden 2014, 2020). The measure of trade openness is the ratio of the total value of a country's exports and imports (in 2014 US$ millions) and GDP, using data from Barbieri and Keshk (2016), as published in the V-Dem dataset. Table A4, in the Appendix, reports ECM estimates including such variables. The statistical significance across specifications of the ECM term supports the hypothesis of cointegration and so confirms our earlier results. Short- and long-run estimates of executive constraints and electoral democracy, representing average effects, are also in this case significant. The noticeable difference is that the cross-sectional dependence test results now do not reject the null of cross-sectional independence.

6.4 Causality tests

Table 4 presents tests for the direction of long-run causality. The Group Mean (GM) test[13] allows us to ask whether the long-run causal effect is zero, on average, for the panel. The test statistic is for the null of 'no long-run causal impact', which in our case can be interpreted as the variable not adjusting to maintain long-run equilibrium. While primary interest is in the GM statistic, we also report the robust $\hat{\theta}_i$ estimate and its associated *t*-statistic. At best, the panel robust $\hat{\theta}_i$ complements the GM statistic. A combination of a high *t*-statistic on the average $\hat{\theta}_i$ coefficients and a low *t*-statistic (below 1.96) in the 'reverse causality' equations can be interpreted as evidence of a long-run causal relationship from political to economic institutions.

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[11] We provide Long-Run Average (LRA) estimates, obtained by averaging ECM coefficients first before computing the long-run average. LRA estimates are preferred to Average Long-Run (ALR) estimates, obtained by computing the long-run coefficient in each country before averaging them, since this is more sensitive to outliers.

[12] Two robustness checks confirm our results when using alternative measures of executive constraints. First, we run ECM estimates when using the Polity IV measure of executive constraints (*Xconst*). The results, shown in Table A5, are similar. Second, as four components (out of 16) of the rule of law measure are in common with the judicial constraints component of our executive constraints measure, we run ECM estimates when excluding that component (i.e. using only the legislative constraints measure) of the executive constraints index. The results (Table A6) are again similar to those in Table 3.

[13] GM denotes the group-mean statistic (which is the average of country-specific *t*-ratios on the disequilibrium term, distributed as *N(0,1)*).

Table 4: Weak exogeneity tests

	GM	*p*-value	Mean $\hat{\theta}_i$	*t*-stat
Electoral democracy				
Electoral democracy to rule of law	-2.136**	0.033	-0.143	-13.992
Rule of law to electoral democracy	*-0.313*	*0.754*	*0.033*	*3.958*
Electoral democracy to property rights	-1.801*	0.072	-0.095	-11.007
Property rights to electoral democracy	*0.480*	*0.631*	*0.018*	*2.476*
Executive constraints				
Executive constraints to rule of law	-1.635	0.102	-0.121	-11.177
Rule of law to executive constraints	0.483	0.629	0.051	3.486
Executive constraints to property rights	-2.272**	0.023	-0.141	-12.379
Property rights to executive constraints	0.247	0.805	0.031	3.323

Note: we report the GM statistic from Canning and Pedroni (2008). GM is the group-mean statistic, which is the average of the country-specific *t*-ratios on the disequilibrium term and is distributed N(0,1). The null hypothesis is of 'no causal impact' and is interpreted as the political institutions variable not having a long-run causal impact on the economic institutions variable. The rows in italic are for 'reverse causality': where causality runs from economic institutions to political institutions. We also report the robust $\hat{\theta}_i$ and its associated *t*-statistic. A high *t*-statistic on the average $\hat{\theta}_i$ is expected for the equations with economic institutions as dependent variable: i.e. the rows not in italic. Conversely, a low *t*-statistic is expected in the 'reverse causality' equations.

Source: authors' construction.

There is clear evidence that long-run causality runs from constraints on the executive to property rights and from electoral democracy to the rule of law. In contrast, we find very little evidence that causality runs from economic to political institutions. In sum, the results favour the hypothesis that causality runs from political to economic institutions. However, we cannot rule out the possibility of bi-directionality. The lack of clear evidence of causality, in weak exogeneity tests, running from economic to political institutions may not imply the absence of any significant long-run causality; it may rather reflect the presence of pervasive heterogeneity across countries, where a feedback effect from economic to political institutions may or may not materialize depending on context-specific conditions.

7 Conclusions

This paper provides historical panel time-series evidence on institutional change for a global sample of countries using V-Dem variables. All regions are on a long-run upward trend: institutional quality across four key measures of the quality of political and economic institutions has historically improved everywhere since 1800. We also find for the same four measures that non-stationarity cannot be rejected. This implies that institutions change, in the long run. Furthermore, we find evidence supporting the existence of a long-run relationship between political and economic institutions. This is particularly evident for the rule of law, but less so for property rights. Finally, we find that long-run causality runs mainly from political to economic institutions. This points to the possibility that the dynamic relationship between economic and political institutions depends also on country-specific conditions and that the nature of their long-run relationship may be heterogeneous.

Our paper has four key implications for the literature on institutional change. First, it shows that institutional persistence is not as common as has often been portrayed in the literature: institutions do change, and institutional change may well be the norm rather than institutional statis, at least in the long term. This also opens up the possibility for policy to move a country from bad institutional quality to a better level of institutional quality and, consequently, shape the future path of economic and political development. Second, the fact that political and economic institutions co-evolve

suggests that political and economic institutions may have strong complementarities (Hall and Gingerich 2009): changes in one set of institutions can have far-reaching effects on another set of institutions. Third, our finding of a closer co-movement of electoral democracy and executive constraints with the rule of law than with property rights suggest that not all institutions move together, and that movement may depend on regional and country-specific contexts. Finally, our finding of long-run causality from political to economic institutions complements the argument of Acemoglu and Robinson (2019): that inclusive economic institutions are unlikely to emerge in contexts where political institutions remain extractive in nature. Therefore, economic reforms that keep an extractive political equilibrium in place are unlikely to succeed in bringing about inclusive economic development (Acemoglu et al. 2005a).

Future research should extend the analysis in two ways. First, it should take a closer look at what drives institutional change by investigating the possibility of structural breaks in institutional measures at *critical junctures*. A further question is whether the general improvement in institutional quality documented here has also translated into a reduction of differences in institutional quality across countries, i.e. whether there has been long-run convergence.

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Appendix

Table A1: The 161 countries

East Asia and the Pacific: Australia, Cambodia, China, Fiji, Hong Kong, Indonesia, Japan, Laos PDR, Malaysia, Mongolia, Myanmar, New Zealand, Papua New Guinea, Philippines, Singapore, Solomon Islands, South Korea, Thailand, Timor-Leste, Vanuatu, Viet Nam
Europe and Central Asia: Albania, Armenia, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Uzbekistan
Latin America and the Caribbean: Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Venezuela
Middle East and North Africa: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen
North America: Canada, United States of America
South Asia: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
Sub-Saharan Africa: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Congo Democratic Republic, Côte d'Ivoire, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, The Gambia, Togo, Uganda, Zambia, Zimbabwe

Source: authors' construction.

Table A2: V-Dem variables

Variable name	Definition
Legislative constraints	Question: 'To what extent are the legislature and government agencies e.g., comptroller general, general prosecutor, or ombudsman, capable of questioning, investigating, and exercising oversight over the executive?' Aggregation: The index is formed by taking the point estimates from a Bayesian factor analysis model of the indicators for: legislature questions officials in practice (*v2lgqstexp*); executive oversight (*v2lgotovst*); legislature investigates in practice (*v2lginvstp*); and legislature opposition parties (*v2lgoppart*). – *v2lgqstexp*: In practice, does the legislature routinely question executive branch officials? – *v2lgotovst*: If executive branch officials were engaged in unconstitutional, illegal, or unethical activity, how likely is it that a body other than the legislature, such as a comptroller general, general prosecutor, or ombudsman, would question or investigate them and issue an unfavourable decision or report? – *v2lginvstp*: If the executive were engaged in unconstitutional, illegal, or unethical activity, how likely is it that a legislative body (perhaps a whole chamber, perhaps a committee, whether aligned with government or opposition) would conduct an investigation that would result in a decision or report that is unfavourable to the executive? – *v2lgoppart*: Are opposition parties (those not in the ruling party or coalition) able to exercise oversight and investigatory functions against the wishes of the governing party or coalition?
Judicial constraints	Question: 'To what extent does the executive respect the constitution and comply with court rulings, and to what extent is the judiciary able to act in an independent fashion?' Aggregation: The index is formed by taking the point estimates from a Bayesian factor analysis model of the indicators for: executive respects constitution (*v2exrescon*); compliance with judiciary (*v2jucomp*); compliance with high court (*v2juhccomp*); high court independence (*v2juhcind*); and lower court independence (*v2juncind*). – *v2exrescon*: Do members of the executive (the head of state, the head of government, and cabinet ministers) respect the constitution? – *v2jucomp*: How often would you say the government complies with important decisions by other courts with which it disagrees? – *v2juhccomp*: How often would you say the government complies with important decisions of the high court with which it disagrees? – *v2juhcind*: When the high court in the judicial system is ruling in cases that are salient to the government, how often would you say that it makes decisions that merely reflect government wishes regardless of its sincere view of the legal record?

	– *v2juncind*: When judges not on the high court are ruling in cases that are salient to the government, how often would you say that their decisions merely reflect government wishes regardless of their sincere view of the legal record?
Executive constraints	The arithmetic mean of *legislative* and *judicial constraints* on the executive.
Electoral democracy	Question: 'To what extent is the ideal of electoral democracy in its fullest sense achieved?' The electoral principle of democracy seeks to embody the core value of making rulers responsive to citizens, achieved through electoral competition for the electorate's approval under circumstances when suffrage is extensive, political and civil society organizations can operate freely, elections are clean and not marred by fraud or systematic irregularities, and elections affect the composition of the chief executive of the country. In between elections, there is freedom of expression and an independent media capable of presenting alternative views on matters of political relevance. In the V-Dem conceptual scheme, electoral democracy is understood as an essential element of any other conception of representative democracy—liberal, participatory, deliberative, egalitarian, or some other. Aggregation: The index is formed by taking the average of, on the one hand, the weighted average of the indices measuring freedom of association thick (*v2x_frassoc_thick*), clean elections (*v2xel_frefair*), freedom of expression (*v2x_freexp_altinf*), elected officials (*v2x_elecoff*), and suffrage (*v2x_suffr*) and, on the other, the five-way multiplicative interaction between those indices. This is halfway between a straight average and strict multiplication, meaning the average of the two. It is thus a compromise between the two best-known aggregation formulas in the literature, both allowing partial 'compensation' in one sub-component for lack of polyarchy in the others, but also punishing countries not strong in one sub-component according to the 'weakest link' argument. The aggregation is done at the level of Dahl's subcomponents with the one exception of the non-electoral component. The index is aggregated using this formula: v2x_polyarchy = .5 ∗ MPI + .5 ∗ API = .5 ∗ (v2x_elecoff ∗ v2xel_frefair ∗ v2x_frassoc_thick ∗ v2x_suffr ∗ v2x_freexp_altinf) + .5 ∗ ((1/8) ∗ v2x_elecoff + (1/4) ∗ v2xel_frefair + (1/4) ∗ v2x_frassoc_thick + (1/8) ∗ v2x_suffr + (1/4) ∗ v2x_freexp_altinf)
Rule of law	Question: 'To what extent are laws transparently, independently, predictably, impartially, and equally enforced, and to what extent do the actions of government officials comply with the law?' Aggregation: The index is formed by taking the point estimates from a Bayesian factor analysis model of the indicators for compliance with high court (*v2juhccomp*); compliance with judiciary (*v2jucomp*); high court independence (*v2juhcind*); lower court independence (*v2juncind*); executive respects constitution (*v2exrescon*); rigorous and impartial public administration (*v2clrspct*); transparent laws with predictable enforcement (*v2cltrnslw*); access to justice for men (*v2clacjstm*); access to justice for women (*v2clacjstw*); judicial accountability (*v2juaccnt*); judicial corruption decision (*v2jucorrdc*); public sector corrupt exchanges (*v2excrptps*); public sector theft (*v2exthftps*); executive bribery and corrupt exchanges (*v2exbribe*); executive embezzlement and theft (*v2exembez*).
Property rights	Question: 'Do citizens enjoy the right to private property?' Private property includes the right to acquire, possess, inherit, and sell private property, including land. Limits on property rights may come from the state, which may legally limit rights or fail to enforce them, from customary laws and practices, or from religious or social norms. This question concerns the right to private property, not actual ownership of property. Aggregation: the index is estimated by averaging two indicators: property rights for men (*v2clprptym*) and property rights for women (*v2clprptyw*).

Source: table's content from Coppedge et al. (2020b).

Table A3: Country-specific ECM coefficients for electoral democracy and property rights

Country	Model 1	Model 2	Model 3	Country	Model 1	Model 2	Model 3
Afghanistan	-0.067**	-0.070**	-0.247***	Lesotho	-0.063**	-0.104*	-0.136**
Albania	-0.044	-0.052	-0.082**	Liberia	-0.039**	-0.048**	-0.048**
Algeria	-0.102**	-0.237***	-0.245***	Libya	-0.045	-0.044	-0.094**
Angola	-0.082**	-0.078**	-0.093**	Lithuania	-0.385**	-0.569***	-0.579***
Argentina	0.003	-0.007	-0.095***	Luxembourg	-0.179***	-0.281***	-0.699***
Armenia	-0.109	-0.133	-0.803***	Madagascar	-0.005	-0.028*	-0.082***
Australia	-0.049*	-0.054*	-0.047	Malawi	-0.191***	-0.262***	-0.279***
Austria	-0.024**	-0.041***	-0.047***	Malaysia	-0.219***	-0.390***	-0.399***
Bahrain	-0.048*	-0.057**	-0.115***	Maldives	-0.058	-0.061	-0.229***
Bangladesh	0.007	-0.086	-0.165	Mali	-0.035	0.003	-0.002
Barbados	-0.158***	-0.171***	-0.174***	Malta	-0.078*	-0.191***	-0.218***
Belgium	-0.019	-0.045**	-0.051**	Mauritania	-0.077**	-0.159***	-0.165***
Benin	-0.151***	-0.198***	-0.198***	Mauritius	-0.083***	-0.287***	-0.298***
Bhutan	-0.012	-0.021	-0.045	Mexico	-0.018	-0.017	-0.087***
Bolivia	-0.063	-0.066	-0.064	Mongolia	-0.054	-0.042	-0.081
Botswana	-0.220*	-0.218*	-0.229**	Montenegro	-0.001	-0.017***	-0.016**
Brazil	0.001	-0.013	-0.034*	Morocco	-0.001	0.001	-0.109***
Bulgaria	-0.048**	-0.051**	-0.072***	Mozambique	-0.206***	-0.207***	-0.202***
Burkina Faso	0.013	0.085	0.093	Namibia	-0.383***	-0.367***	-0.385***
Burma	-0.008	-0.006	-0.017	Nepal	-0.030**	-0.040***	-0.038***
Burundi	-0.149***	-0.348***	-0.350***	Netherlands	-0.005	-0.033**	-0.023
Cambodia	-0.152***	-0.213***	-0.248***	New Zealand	-0.078**	-0.081**	-0.081**
Cameroon	-0.091*	-0.286**	-0.239**	Nicaragua	-0.010	-0.074	-0.097*
Canada	-0.018	-0.018	-0.019	Niger	-0.158**	-0.303***	-0.333***
Cape Verde	-0.013	-0.091**	-0.124**	Nigeria	-0.060	-0.047	-0.118*
Central Africa	0.004	-0.023	-0.023	Norway	-0.070***	-0.067**	-0.073**
Chad	-0.262***	-0.317***	-0.334***	Oman	-0.100**	-0.222***	-0.264***
Chile	-0.040*	-0.048*	-0.050**	Pakistan	-0.012	-0.370***	-0.566***
China	-0.026**	-0.026**	-0.033**	Panama	-0.129*	-0.147*	-0.192**
Colombia	-0.063**	-0.063**	-0.097***	Papua New Guinea	-0.051**	-0.257***	-0.258***
Comoros	-0.029	-0.063	-0.107**	Paraguay	-0.058**	-0.104***	-0.103***
Costa Rica	-0.031	-0.033	-0.095***	Peru	-0.047*	-0.038	-0.037

Country	Model 1	Model 2	Model 3	Country	Model 1	Model 2	Model 3
Côte d'Ivoire	-0.154***	-0.210***	-0.210***	USA	-0.034*	-0.078***	-0.081***
Croatia	-0.196	-0.329*	-0.448**	Philippines	-0.052*	-0.055*	-0.096***
Cuba	-0.009	-0.008	-0.091***	Poland	0.001	-0.002	-0.036
Cyprus	-0.043	-0.104***	-0.128***	Portugal	-0.020	-0.032	-0.107***
Czech Republic	-0.277***	-0.276***	-0.308***	Qatar	-0.052	-0.213***	-0.212***
Denmark	-0.064**	-0.066**	-0.093***	Rep. Congo	-0.148***	-0.198***	-0.223***
Djibouti	-0.058*	-0.067*	-0.077**	Romania	-0.092***	-0.096***	-0.097***
Dominican Republic	-0.010	-0.012	-0.056*	Russia	0.001	0.003	-0.063***
DRC	-0.039	-0.043	-0.071	Rwanda	-0.054	-0.052	-0.058
Ecuador	-0.007	0.002	0.011	Sao Tome	-0.020	0.167***	-0.174***
Egypt	-0.028	-0.024	-0.046**	Saudi Arabia	-0.061**	-0.060**	-0.065***
El Salvador	-0.304***	-0.318***	-0.318***	Senegal	-0.073*	-0.057	-0.058
Equatorial Guinea	-0.025	-0.065	-0.064	Serbia	-0.015	-0.008	-0.034
Eritrea	-0.050*	-0.194***	-0.211***	Seychelles	-0.007	-0.081**	-0.099**
Estonia				Sierra Leone	-0.082**	-0.201***	-0.201***
Eswatini	-0.039	-0.077*	-0.087*	Singapore	-0.167***	-0.263***	-0.263***
Ethiopia	-0.016	-0.027	-0.034	Slovakia			
Fiji	0.089*	0.040	0.057	Slovenia	0.035		
Finland	-0.026	-0.026	-0.031*	Solomon Islands	-0.149***	-0.174***	-0.189***
France	-0.025*	-0.328***	-0.329***	Somalia	-0.080	0.107*	-0.184**
Gabon	-0.108**	-0.111*	-0.112*	South Africa	-0.233***	-0.243**	-0.250**
Georgia	-0.386**	-0.631***	-0.789***	South Korea	-0.009	-0.008	-0.045***
Germany	-0.026	-0.034*	-0.034	Spain	-0.023	-0.044	-0.039
Ghana	-0.113**	-0.104**	-0.113**	Sri Lanka	-0.099**	-0.165***	-0.191***
Greece	0.001	0.001	-0.047	Sudan	-0.022	-0.008	-0.138
Guatemala	-0.113***	-0.119***	-0.127***	Suriname	-0.053	-0.300***	-0.379***
Guinea	-0.072**	-0.079**	-0.074*	Sweden	-0.007	-0.094***	-0.094***
Guinea-Bissau	-0.025	-0.133***	-0.136***	Switzerland	-0.003	-0.076***	-0.082***
Guyana	-0.065***	-0.286***	-0.309***	Syria	-0.049	-0.191*	-0.179*
Haiti	-0.067***	-0.099***	-0.098***	Tanzania	-0.040	-0.043	-0.569
Honduras	-0.037	-0.097**	-0.120**	Thailand	-0.017	-0.015	-0.048*
Hong Kong	-0.063**	-0.175***	-0.177***	The Gambia	-0.071	-0.084*	-0.084
Hungary	-0.021	-0.038	-0.044*	Timor-Leste	-0.267***	-0.549***	-0.743***

Country	Model 1	Model 2	Model 3	Country	Model 1	Model 2	Model 3
Iceland	-0.035*	-0.073***	-0.173***	Togo	-0.046**	-0.036	-0.047
India	-0.021	-0.031*	-0.059**	Trinidad & Tobago	-0.043	-0.083**	-0.121***
Indonesia	-0.025	-0.029	-0.075***	Tunisia	-0.009	-0.017	-0.030*
Iran	-0.060**	-0.031	-0.070*	Turkey	-0.018	-0.017	-0.035
Iraq	-0.008	-0.189**	-0.217***	UAE	-0.182	-0.089	-0.088
Ireland	-0.046	-0.064	-0.094*	Uganda	-0.216***	-0.212***	-0.263***
Israel	-0.006	-0.273***	-0.283***	UK	-0.010	-0.041**	-0.041**
Italy	-0.021	-0.008	-0.112**	Uruguay	-0.052**	-0.053**	-0.061**
Jamaica	-0.016	-0.038	-0.109***	Uzbekistan	-0.210	-0.229	-0.187
Japan	-0.006	-0.010	-0.053*	Vanuatu	0.031*	-0.110	0.149**
Jordan	-0.148***	-0.148**	-0.241***	Venezuela	-0.073***	-0.073***	-0.111***
Kenya	-0.032	-0.046	-0.074*	Viet Nam	-0.042	-0.065	-0.065
Kuwait	0.009	-0.138***	-0.139***	Yemen	-0.141**	-0.144**	-0.200***
Laos PDR	-0.067	-0.167***	-0.182***	Zambia	-0.069*	-0.237***	-0.236***
Latvia	-0.369***	-0.451***	-0.626***	Zimbabwe	-0.068**	-0.108***	-0.117***
Lebanon	-0.066	-0.070	-0.150***				
% countries significant ECMs (out of total)					48%	63%	80%

Note: results based on ECM cointegration tests from Gegenbach et al. (2009). Estonia and Slovakia drop out because of missing data.

Source: authors' construction.

Table A4: ECM estimates: institutions, GDP, and trade openness

Panel A: Electoral democracy and economic institutions		
	Rule of law	**Property rights**
Long run		
Electoral democracy	0.306***	0.162**
	[0.086]	[0.075]
GDP per capita	0.020	-0.007
	[0.022]	[0.024]
Trade openness	0.001	0.001
	[0.001]	[0.001]
Short run		
Electoral democracy	0.318***	0.125***
	[0.057]	[0.030]
GDP per capita	0.037	0.001
	[0.041]	[0.022]
Trade openness	-0.001	-0.001
	[0.001]	[0.001]
EC coefficient		
y_{it-1}	-0.394***	-0.313***
	[0.045]	[0.041]
t-statistic	-8.67	-7.68
RMSE	0.017	0.015
CD test	0.432	-0.471
(p-value)	(0.665)	(0.638)
Observations (N)	4,122 (161)	4,122 (161)

Panel B: Executive constraints and economic institutions		
	Rule of law	**Property rights**
Long run		
Executive constraints	0.281***	0.163***
	[0.081]	[0.062]
GDP per capita	0.030	0.041
	[0.030]	[0.026]
Trade openness	0.002	0.001
	[0.001]	[0.001]
Short run		
Executive constraints	0.271***	0.060***
	[0.041]	[0.023]
GDP per capita	0.050	0.017
	[0.032]	[0.030]
Trade openness	-0.001	0.001*
	[0.001]	[0.001]
EC coefficient		
y_{it-1}	-0.408***	-0.331***
	[0.039]	[0.036]
t-statistic	-10.42	-9.28
RMSE	0.015	0.015
CD test	-0.229	-0.649
(p-value)	(0.819)	(0.517)
Observations (N)	4,183 (161)	4,183 (161)

Note: results based on ECM for 161 countries with the respective economic institutions variables as dependent variable. The long-run and short-run averages are reported, with standard errors reported below the averages. RMSE is the root mean square error. CD test is the Pesaran (2015) test distributed N(0,1) under the null of weak cross-section independence (*p*-values reported below). *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Source: authors' construction.

Table A5: ECM estimates: Polity IV executive constraints and economic institutions

	Rule of law	**Property rights**
Long run		
Executive constraints	0.025*** [0.005]	0.009* [0.005]
Short run		
Executive constraints	0.005*** [0.002]	0.003 [0.001]
EC coefficient		
y_{it-1}	-0.158*** [0.025]	-0.108*** [0.019]
t-statistic	-6.25	-5.63
RMSE	0.022	0.020
CD test (*p*-value)	0.391 (0.696)	-0.524 (0.600)
Observations (*N*)	6,564 (*161*)	6,564 (*161*)

Note: see Table A4.

Source: authors' construction.

Table A6: ECM estimates: legislative constraints and economic institutions

	Rule of law	**Property rights**
Long run		
Legislative constraints	0.277*** [0.058]	0.190*** [0.052]
Short run		
Legislative constraints	0.165*** [0.019]	0.073*** [0.013]
EC coefficient		
y_{it-1}	-0.139*** [0.011]	-0.143*** [0.012]
t-statistic	-12.69	-12.15
RMSE	0.021	0.022
CD test (*p*-value)	-1.714 (0.087)	-1.546 (0.122)
Observations (*N*)	16,813 (*161*)	16,813 (*161*)

Note: see Table A4.

Source: authors' construction.