Greece and the Euro Area: The cost of weak institutions

Nicos Christodoulakis

Working Paper Series

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Abstract: In the second decade of the Economic and Monetary Union, the convergence process between the less and the more developed members of the Euro Area weakened significantly, as disparities in the growth slow-down after the global financial crisis caused asymmetric losses in per capita income. The most pronounced divergence was between Greece and its Euro Area peers as prolonged austerity measures imposed in exchange for a debt bailout led to a serial collapsing of growth. At the same time, Greece had suffered from a dramatic deterioration of institutions, ranging from severe blows in Government effectiveness and political stability to market distortions and the weakening of the rule of law. An empirical growth model to assess the impact of such effects on convergence is estimated using the relevant World Bank indicators as explanatory variables and considering the other Euro Area economies as control countries. The model is then used to calculate the cost of crumbling institutions in Greece in terms of per capita GDP foregone. The estimate is so significant that Greece - alongside macroeconomic stabilization - should urgently focus on improving institutions if a convergence process toward the more developed nations of the Euro Area is to set off again.

Keywords: Euro Area, Growth, Institutions.
JEL: H11, G28, H83, O43

November 2019

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1.Introduction

In its first twenty years after its creation in 1998, the Economic and Monetary Union (EMU) of the European Union (EU) may rightly boast that has survived various predictions of collapsing – though not always untarnished. The most famous critique of the EMU was that the common anti-inflationary monetary policy would put such pressure on the most fragile members facing asymmetric shocks that, eventually, may force some of them to break up. Such an outcome could happen because the European Central Bank (ECB) was, in the absence of a fiscal union, likely to accentuate – rather than subside – adverse idiosyncratic disturbances leading the country under pressure to resume policy autonomy as the only option for eventually containing them.

Hence, achieving 'nominal convergence' across member states of the Euro Area was viewed as the litmus test for the central monetary policy's viability. Extensive empirical research has established that a 'Great Moderation' of business cycle prevailed during the first decade of EMU and forged confidence on the sustainability of the common currency; for an extensive discussion, see González and Ruscher (2008). Among many others, De Grauwe and Ji (2016) found that but their amplitude business cycle movements were relatively well synchronized, while Belke et al. (2016) reached a similar conclusion. Following the alternative approach of concordance analysis, Franks *et al.* (2018) also concluded that business cycles have had become increasingly synchronized across Euro Area countries.

However, such optimism proved to be short-lived, as synchronization was shattered in the aftermath of the global crisis. Belke et al. (2016) established that the output co-movement between core and peripheral countries decreased markedly in the wake of the financial crisis, with a significantly more pronounced drop in synchronization for those belonging to the periphery than to the core.

A similar shift in the confidence regarding the sustainability of EMU took place over the same time. The threat of debt-default reached boiling temperatures when the periphery economies with large external and/or fiscal deficits – such as Greece, Ireland, Portugal, Spain, and Cyprus – suffered a sudden stop in credit financing.[2] The eventuality of some of them exiting the euro was avoided only after the Euro Area authorities in coordination with the IMF organized massive bailouts in exchange for front-loaded consolidation programs. In their struggle to enhance

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[2]. As noted by Barrios *et al.* (2009), the explosion of sovereign spreads that sparked the European periphery crises took place in countries with large external deficits even if their fiscal position looked healthy. For a relevant discussion, see Christodoulakis (2016).

competitiveness, while keeping the common monetary policy intact, bailout countries had to implement extensive austerity measures combined with an internal devaluation process of cutting wages and removing labour market protections.

Though almost all EA economies after 2008 suffered severe losses in households' incomes, bailout countries experienced a much deeper and prolonged recession due to the front-loaded character of adjustment. Greece was by far the most severe case. The result was that most of the periphery countries saw their prospects of per capita income converging with the EA peers to severely weakening, if not altogether reversed. This had a shattering effect on the 'real convergence' process, the other key pillar of the European project. The pursuit of convergence in per capita GDP of member-states was a crucial policy for the Euro Area, and a firm pledge entered the founding Treaties. The Maastricht Treaty in 1992 had urged member states to attain the objectives set out in Article 130a, according to which "…*the Community shall aim at reducing disparities between the levels of development of the various regions*"; see (EC, 1992). As noted by Franks et al. (2018), the convergence of per capita income levels is not a prerequisite for a functioning monetary union per se but is *an essential objective of the economic integration process*; (my italics). In the same spirit, Diaz et al. (2017) recognized that achieving economic convergence is essential for the sustainability of Euro Area membership.

In practice, however, a policy of closing the gap never became a central one. Per capita income differentials between the most and least affluent members of the EA did not noticeably diminish in the first decade following the inception of EMU. According to Diaz et al. (2017), it is striking that so little convergence has occurred among the early euro adopters, despite their differences in GDP per capita. They note that, in contrast to some initial expectations that the establishment of the euro would act as a catalyst for faster real convergence, little convergence has occurred for the whole period 1999-2016. In a study for the old members of the Euro Area, Christodoulakis (2009) employed various convergence indicators to show that the gap had widened, albeit still reversible if specific policies still applied. As such corrective action never applied at the scale required, the gap further exacerbated after the global financial crisis in 2008.

A simple indication of the chronic gap is obtained by comparing the standard deviation in per capita incomes during 1998-2018 for the initial group of joining the Euro Area, excluding outlier Luxembourg, (henceforth, group EA11). Standard deviation reached €11,097 in 2018, almost twice the size of €5,555 at the beginning of EMU in 1998; expressed in constant 2010 prices in Figure 1. The second panel shows

that the income dispersion index among the EA11 countries has had slightly declined in the early 2000s but then rose abruptly since the financial crisis. These are strong indications that the convergence process between less and more developed Euro Area members weakened significantly during the previous decade.
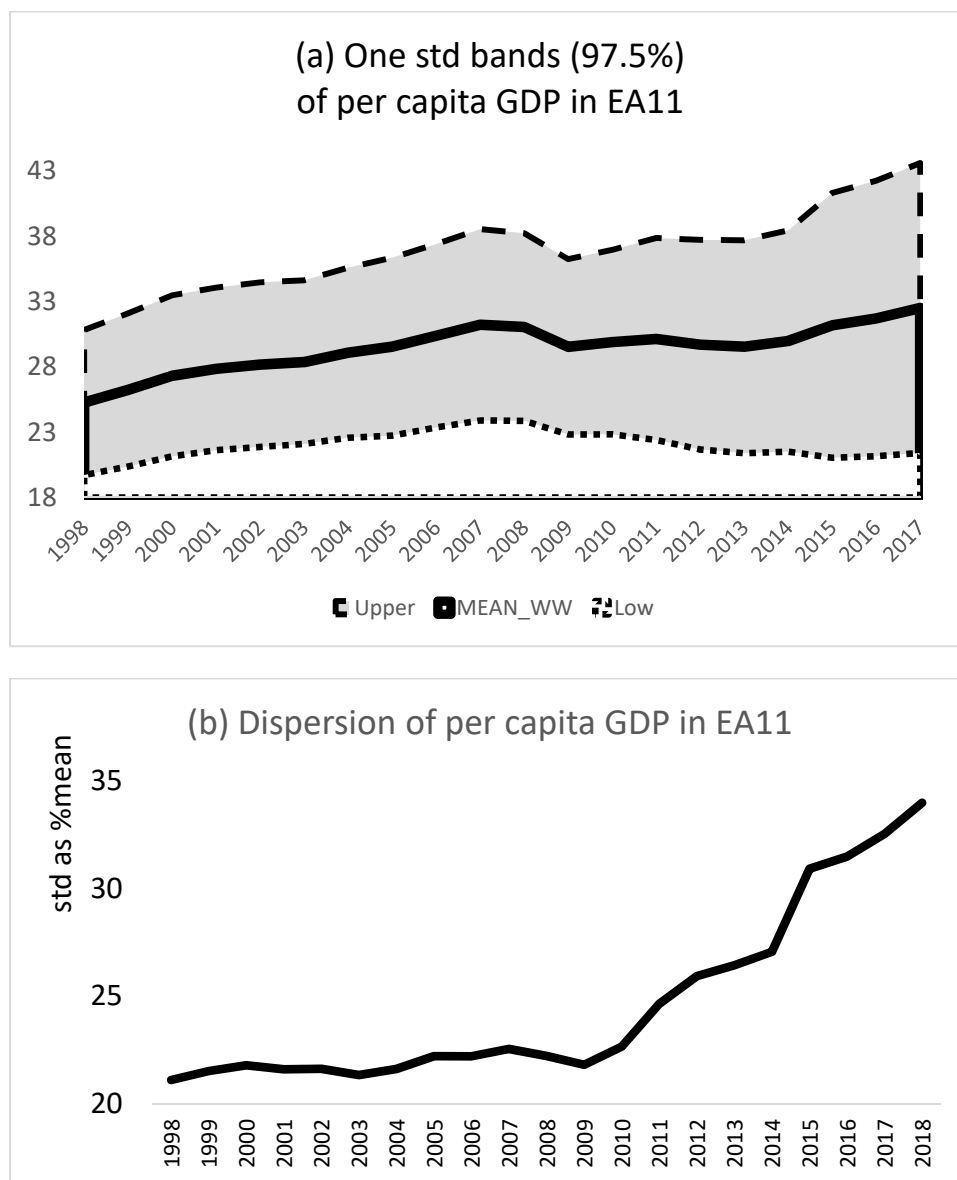

Fig. 1. Dispersion of per capita GDP in the initial EA11 (excl. Lux)
Note: Dispersion is one standard deviation as a percent of the mean. EA11 stands for the initial EA members, excluding Luxemburg. Source: Ameco database

A similar picture emerges by juxtaposing cumulative growth over a specific period versus per capita GDP at the beginning of the period. A negative and statistically significant relationship would have implied that the gap between poorer and richer members diminished during that period. However, Figure 2 shows that the

relationship among the EA11 members has turned out to be positive in the post-crisis period, indicating that divergence is underway.
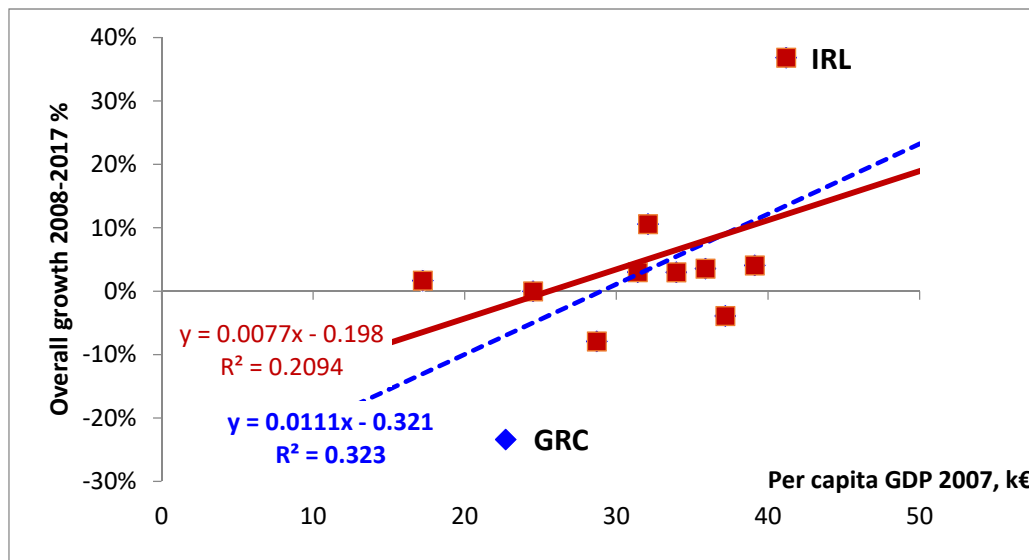

Fig. 2. **The divergence process in post-crisis EA11**
The solid line is for EA10, excl. Greece and Luxemburg.
The dotted line is for EA11, excl. only Luxemburg. Source: Ameco database

The extent of divergence is somewhat mitigated by including the seven new accession countries that joined the EU in 2004. They indeed followed a robust catching-up process but only before the global crisis. According to Franks et al. (2018), convergence slowed down even for the new accession countries since the financial crisis, while for the EA19 as a whole, it has stalled. Fig. 3 depicts the slow-down for the group EA18, (by excluding outlier Luxembourg).

The above findings may constitute a significant handicap for the EMU process, as it undermines the concept of all eventually converging to the most developed members. A framework of actions and reforms, known as the Lisbon Strategy for Growth (LSG for short), was launched in 2000 as the key to improve competitiveness and enhance growth in the post-EMU era.[3] The ambition was to make the European Union "the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010".

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[3] Approved by the European Council in Lisbon, March 2000; see EC (2000).
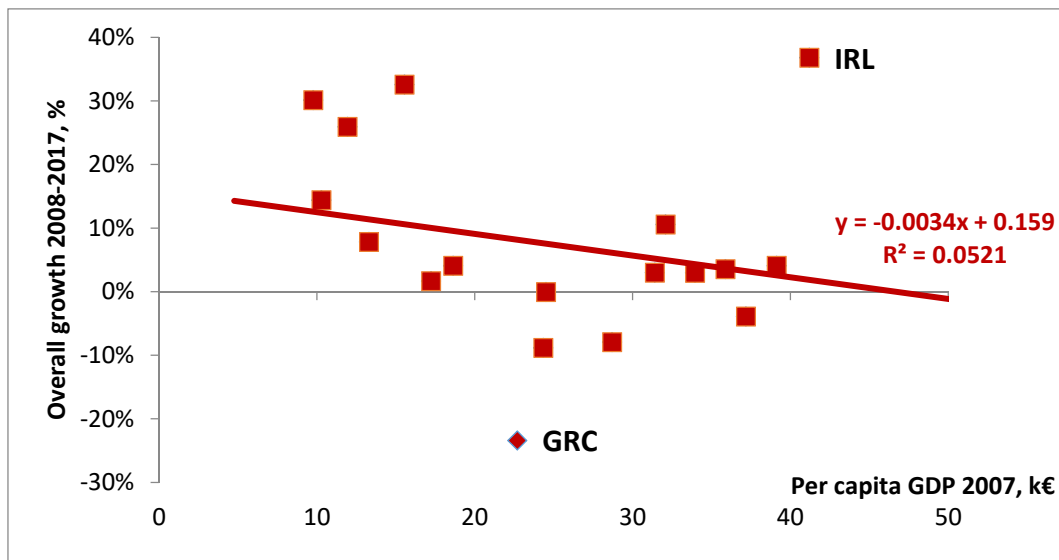
Fig. 3. Weak convergence in post-crisis Euro Area (excl. Lux)
Greece included, Luxemburg excluded. Excluding Greece has a negligible effect.
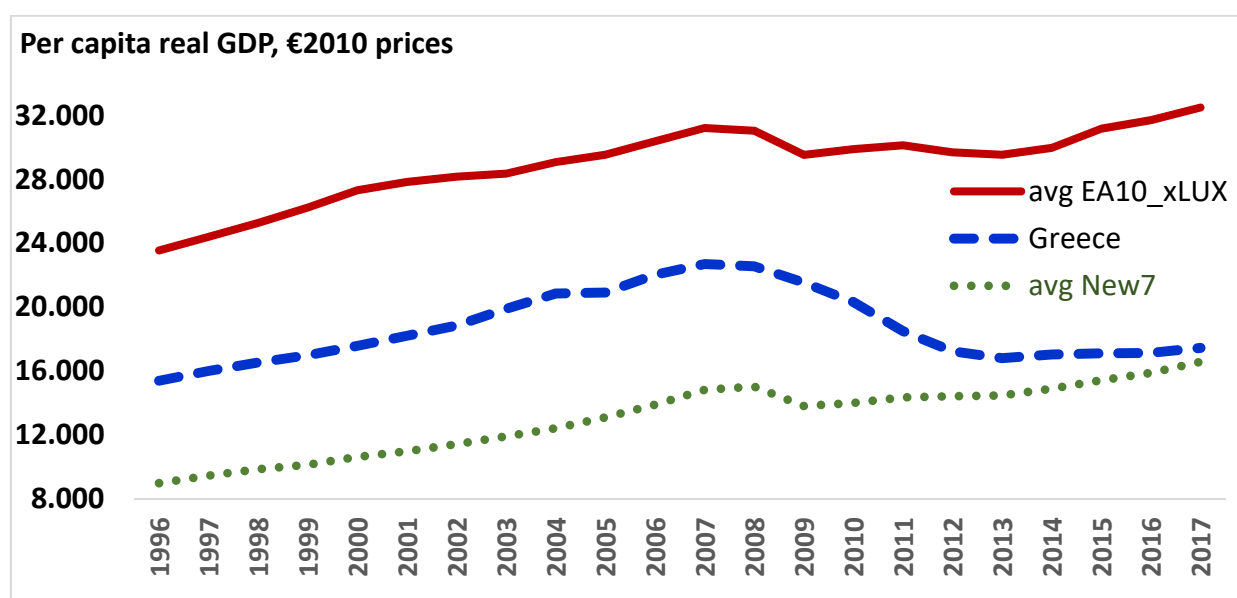Source: Ameco database

Grand words notwithstanding, it soon became evident that the complexity of goals and the lack of strong incentives or clear-cut national obligations would drive the whole effort to a deadlock. Pisani-Ferry (2005) argued that the main reason for the plan's failure was that it rested on the belief that member countries have a common interest in coordinating structural reform policies. The absence of enforcement mechanisms and the lack of appropriate financing, finally made them look as tentative policy inspirations rather than rigorous targets pursued seriously. A new strategy drafted in 2005 put more focus on simplifying the aims and urging for national ownership via national action plans to revitalize the reform agenda.

Nevertheless, with the global crisis approaching, the revised plan proved to be equally incapable of steering the EU toward a course of steady growth and somewhat closing the convergence gap. A few years after the second launch, Wyplosz (2010) declared that the Lisbon strategy for making the EU the world's most competitive economy was (again) a failure. Among the reasons was the fact that "the overall unreachable objective, backed by tens of detailed commitments painfully listed in the annual reports, ha[d] a Soviet-style flavour to it," thus impeding a thorough revision and restructuring. The only effect of the concept of exercising peer pressure for its implementation has turned into mutual congratulations!

Despite repeated warnings on its apparent limitations, the LSG continued to form the basis of yet another ambitious launch for EU growth, this time aiming to get the economies out of the crisis and prepare them for the next decade of globalization; EC

(2010). The current framework, known as the *Europe 2020 Strategy*, pays particular attention to the revival of competitiveness and calls for the early adoption of new production techniques branded as the fourth industrial revolution. Its real effect on mobilizing growth in the post-crisis Euro Area remains to be seen.

Among the EA economies that failed to cope with the global crisis, Greece stands out as a unique case. The Greek economy has experienced the deepest recession by far, with its growth serially collapsing throughout 2008-2014 and then remaining at deficient levels. The fall in per capita income was so devastating that the country seems disconnected from the initial Euro Area group. Instead, it looks like an emergency market closer to the new accession countries of the EA; see Fig. 4.

Fig. 4. Per capita GDP paths in Greece and Euro Area subgroups
Note: Subgroup EA10 consists of the initial EA members, except Greece and Luxemburg. The New7 include those joined EU in 2004 and the EA later. Source: Ameco database

Hence, it is worth exploring which particular factors have caused Greece's unprecedented fall in GDP terms compared to the much milder effects the same crisis had on other EA economies. Obviously, behind the unequal fall of per capita incomes lie the asymmetric patterns in GDP growth rates, as shown in Fig. 5. Before the crisis, the new accession countries were growing faster than older EA members, while Greece kept a rate between the two groups, steadily converging to its peers. In the aftermath of the crisis, both groups experienced a temporary fall in GDP growth but quickly recovered afterwards and resumed growth, albeit at a lower level than before.

In trying to explain the vast asymmetries in growth rates, the economic analysis typically points to differences in one of the following areas:

(a) in the fiscal positions that affect the cost of borrowing,

(b) in the patterns of competitiveness that may lead to large external imbalances,

(c) in the intensity of investment activity that determines the accumulation of capital and future growth.

Developments in each of these fronts had been particularly adverse for Greece and contributed to the post-crisis collapse. However, the persistence of recession had such a profound and long-lasting impact that additional explanatory factors should be considered.
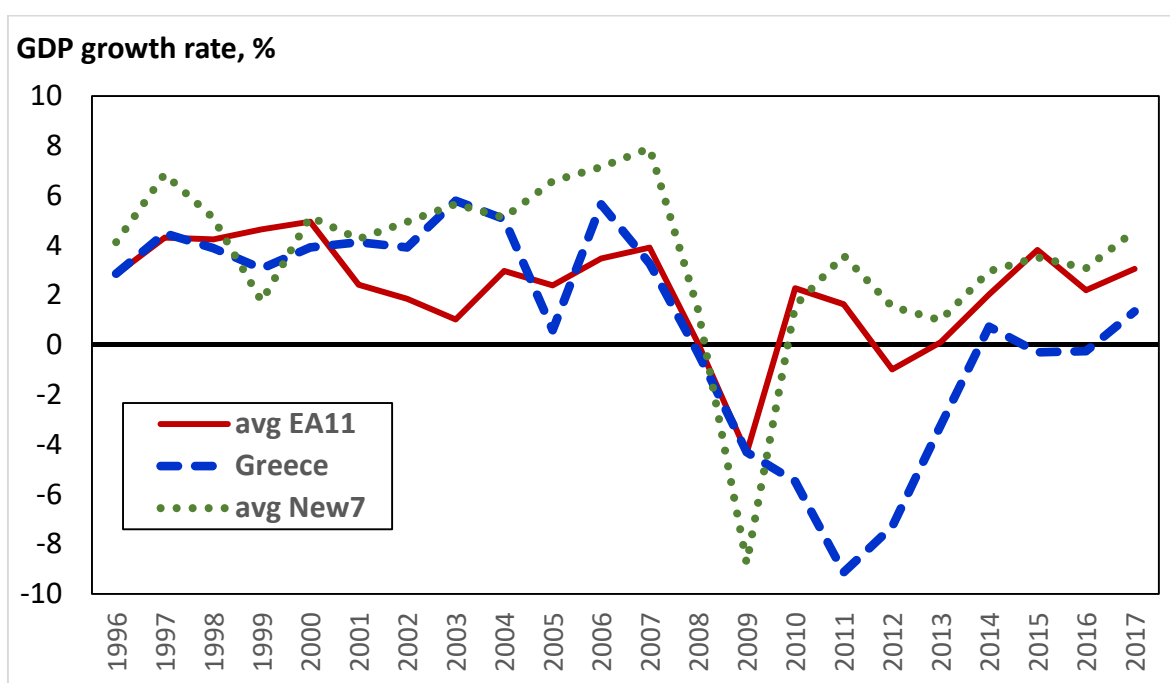
Fig. 5. GDP growth rates in Greece and Euro Area subgroups
Note: As in Fig. 4. Source: Ameco database

A possible reason for explaining growth discrepancies in a group of countries might be the gap in the quality and effectiveness of institutions operating in each particular economy. It is worth reminding that the viability of the common currency was critically relying on the gradual assimilation of several economic institutions between member-states, especially concerning the adjustment after idiosyncratic shocks. According to Diaz et al. (2017), removing institutional rigidities and impediments to the efficient use and allocation of production factors enhances the economic structures of a country in the Euro Area, thus facilitating growth. The implementation and functioning of EMU did streamline some key macroeconomic policies, notably in the monetary and financial sectors. However, the extent was narrower in the fiscal

stance and even lesser in the labour markets and the real economy. Evidence by Diaz et al. (2017) suggests that, after 2010, the divergence concerning institutional quality increased. A possible reason is the 'reform fatigue' that prevailed in EMU countries after introducing the common currency and either delayed - or altogether prevented - further adjustments toward more competitiveness and growth.

The assumption investigated in this paper is that by including developments in key institutions might enhance our understanding in explaining economic growth and help to answer why the convergence process weakened so much in the Euro Area, while completely collapsing in Greece. Undoubtedly, the derailment of public finances, the lack of competitiveness, and the collapse of fixed investment made the growth rate shrink in Greece. However, as a prolonged weakness of bouncing-back follows the abysmal fall of GDP, it seems more likely to be associated with institutional erosion than other types of economic fundamentals. In its latest country report, OECD (2018) finds that weak and uncertain institutions have systematically undermined economic recovery since the debt crisis in 2010. Social unrest and political upheavals against the bailout programs played a crucial role in making several institutions unworkable and Greece to be drifting apart its Euro Area peers. In turn, this thwarted foreign investment and made market reforms even more confrontational, thus increasing country risk and further undermining economic recovery.

The rest of the paper is organized as follows: Section 2 briefly discusses the role of institutions on economic growth. Section 3 describes the data measuring their quality and effectiveness in various countries. It also highlights the most popular criticism in using institutional data and suggests ways to mitigate their shortcomings. Section 4 discusses multiple episodes in crisis-ridden Greece that might explain the deterioration of institutions and their inability to accelerate recovery.

An econometric model linking institutions with economic growth is considered and estimated in Section 5. A counterfactual scenario is then calculated for the hypothetical case that no deterioration of institutions had taken place in Greece in the aftermath of the crisis. This offers a measure in GDP terms of the cost of crumbling institutions, and then conclusions are discussed in Section 6. An Appendix describes the model specification and the estimation process in more detail.

2. Growth and institutions

The hypothesis that institutions play a vital role in explaining economic developments in a particular country and cross-country differences in economic performance goes back in history to the origin of economics. The relevant literature is too vast to summarise it here but a concise examination of '...*the central causal role of economic institutions and their importance relative to other factors'* can be found in Acemoglou et al. (2005), followed by extensive empirical research over different historical periods.

Low-quality or malfunctioning institutions may cause a significant loss of social welfare through a variety of channels. For example:

(a). Inefficient institutions create opportunities for rent-seeking activities by pressure groups at the expense of competitive markets and consumers; see Masuch et al. (2018) for an extensive analysis in the Euro Area.

(b). Lengthy and cumbersome procedures in socioeconomic institutions raise transaction costs, fuel uncertainty, and increase risks. This may jeopardize investment projects and infrastructures, and thus lowers the provision of public goods and services.

(c). Higher transaction costs distort the intertemporal allocation of resources between investment and consumption and between long-term and short-term investments.

The above channels manifest themselves by undercutting the non-exhaustible factor in the endogenous growth models. Therefore, by adopting a quantitative measure of institutions' quality and efficiency, one could empirically estimate the effect they exert on economic growth. A crucial issue in the empirical applications is the availability of appropriate and sufficient data for the quality of institutions and their measurable interactions with economic performance.

In several cases, the problem intensifies by the difficulty of disentangling their causal effects in cross-country estimations with few observations. For example, a recent study by Docquier (2014) suggests that long-run data series are more promising in explaining the differences in the historical evolution of initially similar countries. By using them, he established a strong correlation between economic and institutional developments among various countries that were under the colonial yoke of western powers.

In other cases, using a variety of indicators ensures the robustness of the findings. In this vein, Algan and Cahuc (2014) employ several alternative measures of trust in societies and then document its interactions with economic developments in finance, innovation, the organization of firms, the labour market, and product markets.

The systematic compilation of Governance indicators by the World Bank (in short WBGI) since 1996 has led to a plethora of quantitative research examining if and how institutions affect economic performance in various countries and country groups. For example, in an IMF study on the importance of institutions in developing countries, MacFarlan *et al.* (2013) find that institutions significantly affect per capita GDP. Hence, they conclude that the effort of improving functionality and quality of institutions pays off quickly and should become a priority in growth-promoting policies.

Institutions may also affect economic performance in a more general way as their adequacy and credibility may play a crucial role in a country's assessment and rating by foreign investors. To that effect, Fournier and Bétin (2018) establish that the measure of Government Effectiveness as recorded by the World Bank is a critical determinant of ascribing sovereign default probabilities in third-world countries, on top of more traditional indicators of indebtedness and deficits. The main argument behind such reasoning is that Governments that are more effective tend to be more credible in their commitments to international lenders. Investors are eager to view such governments as more likely to spur growth and regularly repay debt, thus reducing the default risk compared with other similarly indebted countries with an inferior institutional framework.

Studies based on the same data series of WB have also tried to explain the discrepancies in the European economies' growth in the context of the recent debt crisis. In a study conducted by the ECB, Masuch et al. (2016) find that initial conditions of institutions and the level of public debt can help to explain the different patterns average real GDP growth in Europe during the last 20 years, which, in turn, are responsible for the real convergence lagging so far behind. The present paper employs a similar framework with some modifications in setting up the model and conducting the estimation process, as described in Section 5.

3. Data and shortcomings

3.1. Data series

The World Bank publishes six governance indicators (WBGI, for short) at an annual frequency. According to Kaufmann *et al.* (2011), the first two indicators qualify the process by which governments are selected and monitored. The next two measure the capacity of governments to effectively formulate and implement sound policies. The final two show the respect of citizens and the state for the institutions that govern economic and social interactions. The indicators are the following:

1. Voice and accountability (VACC, in short) – capturing perceptions of the extent to which a country's citizens can participate in selecting and assessing their Government and freedom of expression, association, and press media.

2. Political stability and absence of violence/terrorism (PSAV) – capturing perceptions of the likelihood that the political system will survive in the face of fragile governments, partisan challenges, an eventual power vacuum or extensive protests, including politically motivated violence and terrorism.

3. Government effectiveness (GEFF) – capturing perceptions about the quality of public goods and services, the readiness of civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of Government's commitment to such policies.

4. Regulatory quality (REGQ) – capturing perceptions of the Government's ability to formulate and implement sound policies and regulations that permit and promote private sector activities and developments.

5. The rule of law (RLAW) – capturing perceptions of the extent to which agents have confidence in, and abide by, the legal provisions of the society and, in particular, the quality of contract enforcement, property rights, the police, the functioning of courts, as well as the frequency and intensity of crime and violence.

6. Control of corruption (CCOR) – encompassing perceptions of how effectively malpractices, including both petty and grand forms of corruption, are checked and avoid the 'capturing' of the state by elites and private interests.

3.2. Criticism

The six WBGI indicators take values in the interval [-2, +2], determined by each country's position relative to the others. As Kaufmann *et al.* (2011) note, a key feature of such a choice of units is that the world average remains the same in each year. The implication is that indicators are meaningfully to compare countries' relative positions in a given year and relative positions over time but not informed

about trends. However, by reviewing the original time series over the several past updates of the WGI, there is very little evidence of trends in global averages of the underlying data sources. Moreover, fixing the global mean to equal zero does not prevent the analysis of trends in regional or other group averages of countries. In addition, it does not seem unreasonable to keep the global mean constant, since changes in countries' relative positions are unlikely to be very different from changes over time in countries' absolute positions.

Nevertheless, the WB indicators are not immune from caution regarding their completeness and suitability in assessing the quality of institutions. The most popular criticisms are summarized and commented below:

(i) *Subjectivity:* All the WB indicators are compiled through a combination of perceptions based on measurable performance and judgemental values. Information on the former may not be complete, and judgments may be preoccupied with previous developments.

(ii) *Observability:* An actual development in improving individual institutions may not be promptly taken into account by those expressing their perceptions in the WB surveys.

(iii) *Completeness:* The WB indicators may only partially reflect the quality or cover the institutions' scope relevant to growth. Other international organizations, such as the OECD, the World Economic Forum, the Euro-Barometer, etc., produce indicators that might be used.

(iv) *Cross-correlation*: The six WB indicators are not independent of each other but somewhat mutually influenced. This is reasonable since high standards in one area of state functions are likely to affect other institutions in a similar way. As shown in Table 1, all cross-correlations among the six WBGI data series for the Euro Area are high and positive.

(v) *Causality:* Another shortcoming in using WB indicators as explanatory variables for growth is the direction of causality between them. The central assumption is that better (worse) institutions improve (reduce) per capita GDP in each country. Still, it may also be the case that institutions get better or deteriorate according to the overall economic performance.

Table 1. Cross-correlations of WB indicators

Note: Definitions as in Section 3. Source: World Bank

	PSAV	CCOR	RLAW	VACC	GEFF	REGQ
PSAV	1.00					
CCOR	0.67	1.00				
RLAW	0.67	0.95	1.00			
VACC	0.72	0.89	0.87	1.00		
GEFF	0.64	0.92	0.91	0.84	1.00	
REGQ	0.66	0.89	0.89	0.87	0.83	1.00

3.3. Response

The first criticism is moderated by examining the correlation between economic performance and current or recent values of WBGI. A strong relationship is indicative that perceptions of institutions are updated by actual developments and/or influence them within a reasonable length of time. The second point is partly alleviated by comparing WBGI data with other direct measurements of institutional practices and checking that they are mutually compatible. For example, an improvement in the Rule of Law is detected alongside an actual fall of the crime rate. Similarly, a deterioration of PSAV is recorded after a prolonged period of weak governability, due – for example – to successive elections or disagreements on government formation.

Third, the reason for preferring the WB indicators to alternatives is that they are used widely in the literature, making the results comparable with other studies. By spanning a reasonably long period from 1996 to date, they allow panel estimations to be meaningful by avoiding the problem of causal effects as mentioned by Docquier (2014) for cross-country studies with few observations each, as mentioned in the previous Section 2. Fourth, instead of employing separate indicators, a weighted average is constructed through principal component analysis. Finally, the issue of causality is empirically tested, and several actions to confront its possible implications are described in the Appendix.
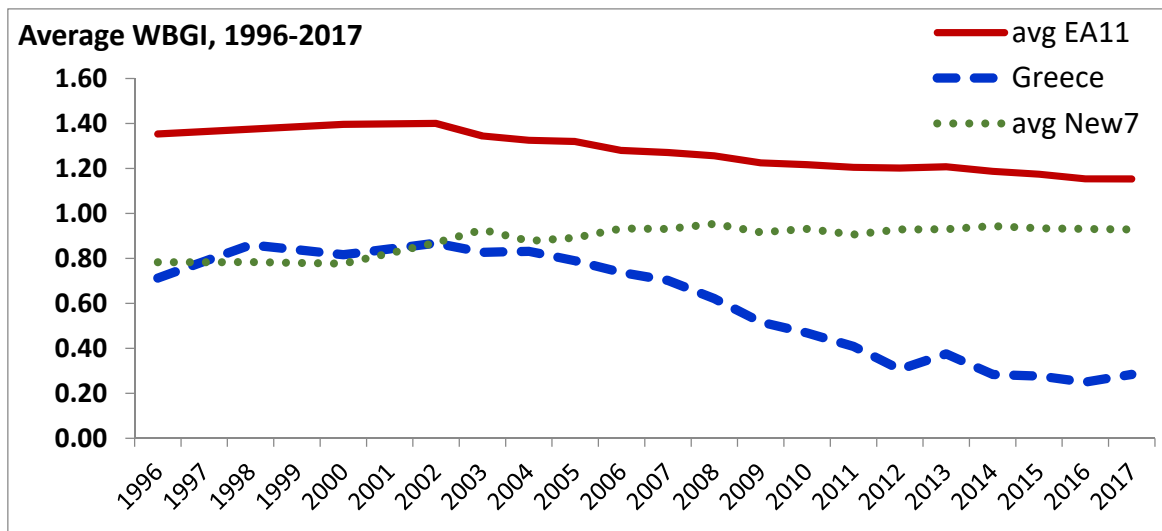
Fig. 6. Quality of institutions in Greece and Euro Area subgroups
Note: As in Fig. 4. Source: Ameco database

4. The crumbling of institutions in Greece

Focusing on the role of institutions in explaining the path of economic growth looks particularly relevant for Greece. Fig. 6 shows how the WBGI indicators evolved on average during the last twenty years in the older EA members (excluding Greece) and the new accession countries. It is remarkable how markedly the latter group improved institutions, thus achieving a robust performance in GDP growth and speeding up convergence to the Euro Area peers both before and after the global crisis. In contrast, post-crisis Greece appears to have suffered the most pronounced deterioration in institutional capacity compared with either group in the Euro Area. Although the decline in certain socioeconomic and political developments was noticeable before 2008, it further intensified since the crisis. There have been severe consequences on the functioning of the economy and, ultimately, its capacity to recover.

Linking institutions with economic growth requires the specification of an appropriate economic model. Some suggestions are already in hand. For example, the two panels in Figure 7 show how strongly a composite of WBGI in the Euro Area is positively correlated with new investment and negatively so with public indebtedness, respectively. Both of these factors are expected to influence the growth rate.

By looking at the graphs, it is no wonder that institutional failure in Greece coincided with a collapse in investment activity and an explosive rise in indebtedness, both of them eroding GDP growth. However, a more systematic analysis of the facts that led to the demise of institutions might prove cumbersome or outright impossible, given the perceptional nature of WBGI indicators and the lack of knowledge on how they are compiled.

The interconnection between economic growth and trust in institutions – or the absence of both - is by now widely recognized in Greece, not just by academic research but increasingly so in public debates at large. For example, a corporate report by PWC (2015) argued that deterioration of both during the last decade Greece had reached such a crucial point, where any further weakening of institutions may lead to large and substantial loss of wealth and prosperity. In a sequel, PWC (2017) repeated that building trust in political processes and institutions is the cornerstone of economic growth.

Of course, an analytic account of how the socioeconomic process influences institutions' perceptions is not possible. A substitute is perhaps the vast anecdotal evidence of Greece's institutional failures and the consequences they had on growth collapsing. A non-exhaustive list of institutional drawbacks in Greece in the course of the crisis is shown in Table 2 and briefly described below:

(i). Perhaps the most critical development was the post-crisis erosion of political stability (indicator PSAV). As successive governments were trying to enact the austerity measures dictated by the bailout agreements, they faced internal political revolts to an unprecedented extent and in open disagreement with their pre-electoral pledges. Schmidt (2015) noted that the citizens' response to such perceived disenfranchisement has been to punish the ruling parties with *'blows of growing frequency and intensity'*, leading to shorter life cycles of incumbent governments.

Due to the continuous social and partisan protests all over Greece, the two mainstream political parties shrank dramatically after decades of occupying more than 80% of the electorate. Soon, anti-systemic movements and new party formations growing at both ends of the political spectrum held their place.

A discussion of disintegration dynamics in Greek politics is found in, among others, Vasilopoulou (2018) for the rise of Eurosceptic politics; Roumanias *et al.* (2020) for the far-right formations; Milios (2016) for the political consolidation of the radical left. Party disintegration led to more frequent elections and government reshuffles,

thus complicating decision making and raising the political risk. To indicate how remarkable the change was, it suffices to say that in the period 2008-2017, there have been seven prime ministers and ten ministers of finance, as opposed to two and three respectively the decade before. According to a country risk analysis, Greece in 2017 scored the highest degree of political uncertainty at 5.0 points versus an EU average of 1.6 points.[4]
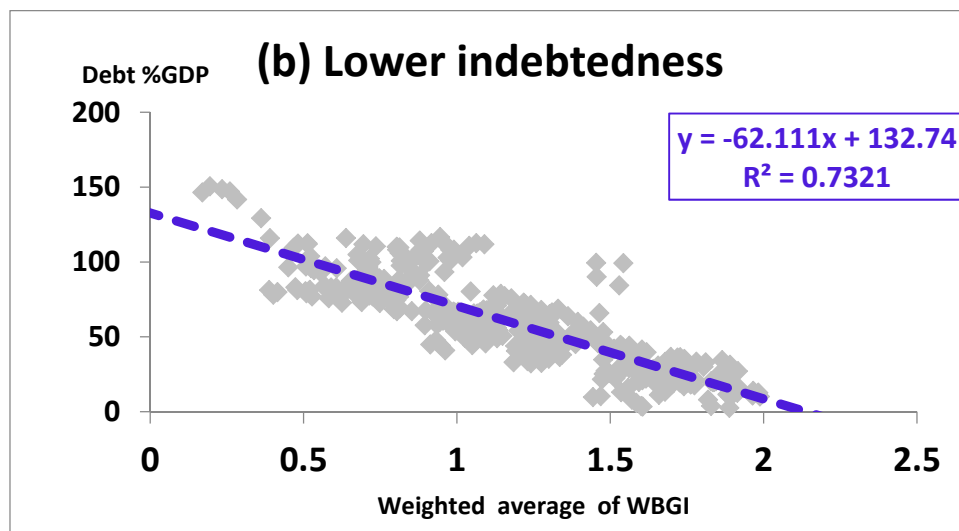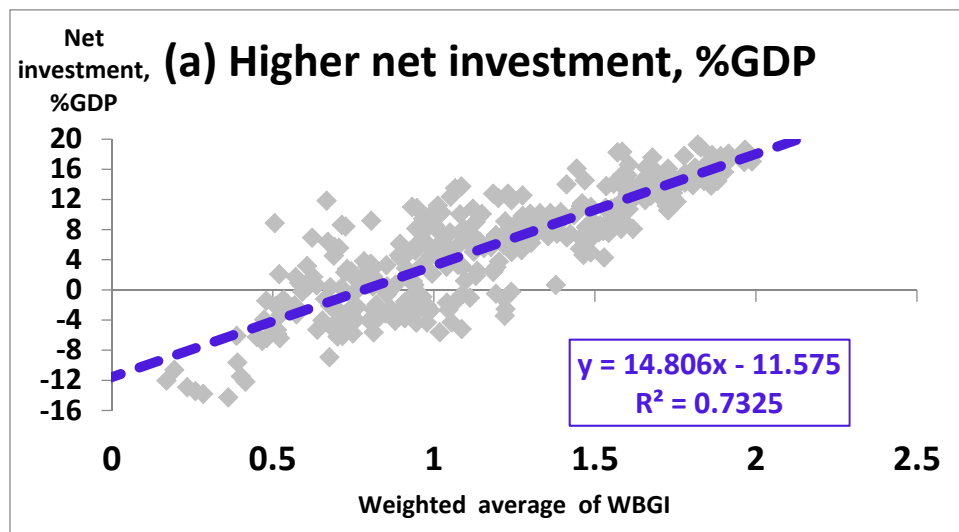
Table 2: Areas of institutional deterioration in Greece

Area (and affected WBGI)	Pre-crisis Period	Post-crisis Period	Compare
Property crime (a) RLAW, GEFF	1998-2008	2009-2017	
Burglaries	51,062	79,581	+56%
Car theft	20,188	28,694	+42%
Armed robberies	2,219	5,051	+128%
Special Laws (b) RLAW, CCOR, VACC	2002-2008	2009-2015	
Transitional provisions	150	232	+55%
Amendments, % Laws	15%	17%	+ 2 p.u.
Litigious civil & commercial cases (c) REGQ	2010	2016	
Time to settle	190 days	640 days	+237%
Non-Performing Loans (d) % of total Gross Loans GEFF, REGQ	2010	2017	
Greece	9.12%	45.57%	+36.5 pu
Euro area	5.60%	3.20%	-2.4 pu
Strikes (e) PSAV, VACC	2010	2011-2014	
General	2	10	+8
Industry level	0	28	+28
Political stability (f) PSAV, GEFF	1998-2008	2009-2017	
General elections	3	5	+2
Finance ministers	3	10	+7
Prime ministers	2	6	+4

Note: Periods before and after the crisis may differ.

Sources: (a) Greek Police, ELAS (2018). Aggregate crime data, various years. (b) Sotiropoulos and Christopoulos (2016). (c) The 2018 EU Justice Scoreboard: Quantitative Data. Brussels, May. (d) World Bank, 2018. (e) Katsikas et al. (2018). (f) Incl. caretaker Governments, Wikipedia.

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[4] Source: https://www.credendo.com/country-risk/greece

(a) Higher net investment, %GDP

$y = 14.806x - 11.575$
$R^2 = 0.7325$

(b) Lower indebtedness

$y = -62.111x + 132.74$
$R^2 = 0.7321$

Fig. 7. Institutional quality vs. economic indices in the Euro Area

Notes: Investment is net of amortization and in % of GDP. Public debt is % of GDP.
Source: Ameco database

(ii). Concurrent to the front-loaded implementation of austerity measures was a rise in public disputes that deeply tarnished the perception of equity in applying the rule of law, (indicator RLAW). For example, households' inability to meet financial obligations multiplied disputes with banks and other public agencies and led to massive payment refusals and litigations. This caused long delays in dispute resolution and led to an overwhelming feeling that the arbitration system or even the judiciary is inefficient.

As documented in EC (2018, Fig. 7), Greece is now the country among the EU with the most prolonged interval for a litigation case to conclude. Furthermore, it is the only one where the length of time to complete increased sharply since 2010. At the beginning of the crisis, on average, 190 days were required to settle civil or commercial litigations. Nevertheless, in 2016, the period required rose to 670 days, nearly three times longer in comparison with the average of 236 days in the other Euro Area countries.[5] Regarding the economy as a whole, the enforcement of contracts remains weak, and the relevant indicator in Greece is now the lowest among the developed countries, as documented in a recent report by OECD (2018, Fig. 42).

The lack of a quick resolution process in financial disputes exerts a definite cost in the economy's functioning, mainly in the banking sector. In combination with ineffective Government regulations and other bank governance problems, it has led Non-Performing-Loans (NPL) to reach dangerous levels, currently occupying nearly half of total credit in the economy. Loan restructuring and foreclosure proceedings are unusually slow compared to most OECD countries, despite the fact the legal regime has somewhat improved since 2010; (*OECD, 2018*). Compared with the Euro Area record, the pre-crisis Greek NPL burden was less than twofold of the EA ratio to total credit but then rose to more than 14-fold, asphyxiating the credit system, hurting Banks' solvency, and tying the economy on a low-growth path.

An even worse deterioration concerns the provision of social services, as extensive spending cuts in the public sector, led to inadequate infrastructure and shorter working schedules, including policing and public safety. Hence, the crime rate against property rose sharply, feeding a broader disappointment on the state's functioning when it is most needed. The far right was quick enough to exploit the vacuum by organizing *vigilante* groups in the more impoverished areas of big cities, thus provoking further clashes and violence with other activist groups.

(iii). Regarding economic efficiency, the regulatory quality markedly diminished during the crisis (indicator REGQ). Although a critical condition for post-crisis Greece to resume growth was to implement extensive market reforms, affected groups confronted most initiatives with such resistance, which made several of them turn down. As a result, Greece's product markets continue to have the most sclerotic regulation among the OECD countries, as described by Katsoulacos *et al.* (2015). In explaining the inability of the bailout program to mobilize the business sector and

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[5] Calculations based on EC (2018, Fig. 7, p 3). Data for Belgium, Cyprus, and Ireland are non-available.

spurn growth, Christodoulakis (2017) has argued that the lack of institutional credibility prevents the realization of reforms and deters foreign investors.

(iv). Government effectiveness was severely criticized on the issue of equally distributing the burden sharing of fiscal adjustment (indicator GEFF). Taking advantage of their success in resisting reforms as discussed above, stakes in various sectors managed to alleviate part of their own cost and shift the burden elsewhere. An IMF Mission (2016) noted that, in the absence of product-market reform implementation, the cost of adjustment in Greece had been borne mainly by wage earners. In turn, this sparked a wave of resistance to wage-cuts and labour market reforms, leading to a sharp rise of industrial action against the implementation of consolidation programs, after many years in dormant. Katsikas et al. (2018, p. 147) report that in 2013 there have been 16 general strikes and 51 industry-level picketing against a total of only two in 2010.

A collateral damage of wage cuts and diminished work incentives was the decline in the quality of public management. In some cases, civil services became so demoralized that performance deteriorated, no matter how adequately a department was equipped at a technical level. A case in point is the lack of effectiveness in combating wildfires, bleakly confirmed by the high human toll in the Attiki fires in July 2018. A study by PWC (2018) revealed that Greece suffers a far more extensive area burnt on average compared to other Southern European countries with similar distributions of wildfires. Given that fire-fighting equipment and personnel training are at the same state-of-the-art, the unfortunate outcome should be mainly attributed to coordination failures and lack of effectiveness.

(v). Control of corruption (indicator CCOR) is positively associated with the capacity to innovate and retain talent in a country (OECD, 2018). The index is perceived to deteriorate since the crisis's outbreak, and this might have been detrimental for long-term economic growth. A definite reason for a fall in CCOR was that the exposure of several financial scandals of the past made the public opinion to suspect that sleazy practices dominate Greek politics to an extent much more extensive than previously imagined.

Another reason was that citizens and economic players were increasingly disturbed by discovering that rules enforced in the name of the bailout agreements frequently bend in favour of particular groups, even though the elimination of such practices was a priority in the consolidation program. However, instead of being diminished, special-groups and clientelistic arrangements were multiplied after the crisis. Transitional and case-specific provisions in law-making increased from 150 per year

during 2002-2008 to 232 per year in the post-crisis period 2009-2015, as documented by Sotiropoulos and Christopoulos (2016). A likely explanation is that Governments tried to protect their most favourite groups from the consequences of fiscal consolidation, hoping that their impact on their falling popularity would be softer. Ordinary citizens felt marginalized and exploited by the pressure groups, and this created a profound disappointment for the lack of transparency and equity of laws, raising the relevant index[6].

The enormous rise in taxation provided further motivation for evasion. As the burden was ever-rising to ensure the high primary surplus required by the bailout program, several households and firms panicked for not meeting obligations in time. To avoid further political backlash, Greek governments introduced various schemes of payment facilitation to reduce pressure on the lowest-income households and firms. But as the system operates on a means-tested basis, it opens up opportunities for corruption through false income statements and tax avoidance, increasing distortions in the economy. The state's inefficient management of economic affairs amounted to a corruption-like tax on all firms operating in the formal sector. Nobel-Prize winner Paul Romer (2018) argues that this had been especially troublesome for start-ups and foreign firms that would like to invest in Greece.

(vi). There have been some severe blows in the voice and accountability record, in the course of implementing the bailout programs (indicator VACC). In passing the extensive and complicated bailout legislation, governments frequently had to enact laws without prior consultation with competent and independent authorities. Often, they bypassed the parliamentary procedure altogether and ruled through legislative fiats. Various groups further exploited the resulting ambiguities and lack of formalism in law making in their plans to block or challenge government decisions.

Massive litigations on salary and pension cuts by now have become a frequent judicial practice, undertaken either directly by individuals or as a class action. In several cases, the incomes policy crafted in the annual Budget for the public sector is overturned by court decisions, mostly retroactively. Other disputes may range from the calculation of pensions to the pricing of public utilities, and from investment subsidies to building permissions. Greece has become a country with the highest rate of disputes *vs*. the state among the EU. In 2016, there were 22 pending administrative disputes per 1,000 inhabitants in Greece compared to an average of 3.7 in the rest of

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[6]. Ancient Greek orator and philosopher Isocrates, speaking on corrupt practices in public life in fourth century BCE, had warned that 'a multitude of case-specific laws … is a sign that the state is badly governed', in *Aeropagiticus* (42-43).

the Euro Area; see EC (2018, Fig. 17). In several cases, such practices led higher courts to the annul legislation, eventually setting in motion a vicious circle of law-enactment and law-challenges.

5. Estimation

5.1. The empirical growth model

With all the caveats described in Section 3, an empirical growth model is estimated in a framework similar to that developed by Barro & Sala-i-Martin (1995, Ch. 12). Intrinsically, their model is a production function for output based on capital stock, employment and technology. The growth rate of per capita GDP is regressed on a set of variables that are expected to influence the accumulation of the relevant production factors. Explanatory variables range from the fiscal stance to competitiveness indicators and from quality indices of human capital to institutional factors, such as political stability. [7]

The economic impact of failed institutions in Greece is measured by constructing a counterfactual scenario with an alternative growth path in the hypothetical case of no erosion in effectiveness after the crisis. As deterioration in both income and institutions in post-crisis Greece is extremely large compared to same-period developments in the other Euro Area countries, it is preferable to treat it as an outlier by excluding Greece's data from the estimation group. This leads to coefficient estimates that may over- or underestimate the effect of institutional quality on GDP growth in Greece and require some preliminary investigation of its possible magnitude.

Finally, a growth model is estimated for the other 18 Euro Area members and then Greece is obtained as a 'synthetic country.' This is essentially similar to the method developed by Abadie and Gardeazabal (2003) to assess the impact of the separatist armed struggle in the Basque region in Spain by estimating a model for the conflict-free areas and then calibrating it to depict the dynamics of the conflict region.

The cost of conflict is obtained by performing a counterfactual analysis in which some critical factors in the area in question are assumed to behave similarly as

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[7] To the best of my knowledge, this is the first time that a model with those particular explanatory variables is estimated for the Euro Area, and used to determine the cost of crumbling institutions for Greece.

elsewhere. In a similar vein, one may think of Greece's institutional failures as a major civil disruption and evaluate the cost through a comparative analysis vis-à-vis the rest of the Euro Area countries.

The model framework for the EA18 economies is broadly similar to that followed by Masuch *et al.* (2016), though with a different set of explanatory variables that are considered more appropriate in explaining the growth patterns in the Euro Area. After a long series of regressions and comparisons, the final choice includes first-differences and one-period-lagged values of the following explanatory variables:

- The growth rate of the global economy outside the Euro Area.
- Net fixed capital formation as a percent of GDP.
- General Government primary balance, as a percent of GDP.
- Index of unit labour cost in constant prices (set equal to 100 in 2000).
- A weighted average of World Bank Governance Indicators

Three model versions are estimated, and details are given in the Appendix. The specific structure and purpose of each model is briefly outlined below:

(i). Model I is estimated along with the 18 EA countries, excluding Greece. The weighted-average index of WBGI is put with a second lag to avoid any notion of causality from current macroeconomic factors to past institutions.

(ii). In account of the contemporaneous correlation between the institutional term and the other explanatory variables, an alternative Model II is estimated along with the 18 EA countries. Instead of the WBGI data series, it employs the residuals obtained by regressing the composite indicator on the other explanatory variables.

(iii). To examine the magnitude and direction of possible bias on the institutional effect between Greece and the other EA countries, Model III is estimated by including Greece and otherwise specified as Model I.

Table 3 includes the results of the three estimated models. All coefficients appear to be statistically significant and correctly signed. The explanatory variables' coefficients seem to be close across the three models, though the different lag structure does not allow a formal test.

By comparing Models I and III, it is apparent that coefficients on all explanatory variables are similar at the 5% level, suggesting that there is no bias detected between

Greece and the EA18. If anything, estimated values are more substantial in Model III; therefore, the hypothetical scenario based on Model I would probably underestimate the effect of institutions in Greece.

The closeness of the approximation by Model I is shown in Fig. 8. The analysis below is based on Model I, as it is more comprehensive by including direct measures of the composite institutional quality. Per capita GDP growth rate is positively affected by a rise in the global economy outside the Euro Area, as this raises the demand for exports to the rest of the world. Similarly, a surge in net fixed investment augments the capital stock, thus increasing output, while a higher primary surplus reduces borrowing costs, thus inducing further investment activity. A rise in the real unit labour costs negatively affects the growth rate as it undermines competitiveness and cuts exports. All these effects apply in both the short and the long run.

Finally, the weighted index of WBGI is found to exert a significant and positive impact, again in both the short and the long run. The EA average value of the WBGI is 1.20; thus, a 10% improvement corresponds to a rise by 0.12 units in absolute terms. This would augment the annual growth rate by 0.63% in the short run and by 0.39% in the long run.

5.2. Assessing the impact of institutions in Greece

As described in the Appendix, the estimated model is calibrated for Greece and subsequently used to generate a counterfactual trajectory of per capita GDP by assuming that the institutional variables take a course different from history, as shown in Figure 9. To assess the loss due to the erosion of institutional capacity after 2009, one has to assume that the World Bank indicators for Greece freeze at the level of that year, i.e., $wbgi^{GR}(t) = wbgi^{GR}(2008), t = 2009 \dots 2017$. The other explanatory variables enter with their historical values, and the hypothetical per capita GDP is obtained for the period 2009-2017.

Table 3: Model estimates

| MODEL	I. EA18 excl. Greece			II.EA18 Residuals, excl. Greece		
growthpc(t)	*Coeff.*	S.E.	*p-value*	*Coeff.*	S.E.	p-value
const	**22.515**	4.853	*0*	**23.004**	5.307	*0*
growthpc(-1)	**0.241**	0.042	*0*	**0.264**	0.047	*0*
grworld_xea	**0.504**	0.081	*0*	**0.612**	0.096	*0*
Δnetfi	**0.506**	0.055	*0*	**0.511**	0.063	*0*
Δprsur	**0.190**	0.047	*0.0001*	**0.172**	0.052	*0.0011*
Δulc	**-0.525**	0.044	*0*	**-0.509**	0.051	*0*
Log [ypc(-1)]	**-4.845**	1.392	*0.0006*	**-4.816**	1.376	*0.0005*
netfi(-1)	**0.072**	0.040	*0.07*	**0.085**	0.049	*0.0827*
prsur(-1)	**0.137**	0.043	*0.0015*	**0.172**	0.048	*0.0004*
ulc(-1)	**-0.133**	0.033	*0.0001*	**-0.113**	0.035	*0.0016*
Δ(WBGI(-1)	**5.248**	2.087	*0.0124*	**3.948**	2.320	*0.0899*
WBGI(-2)	**3.261**	1.386	*0.0192*	**4.470**	1.610	*0.0058*
dum _PSI(2011)	**-6.500**			**-7.50**		
Trend	**0.052**	0.036	*0.149*	**0.095**	0.042	*0.0236*
Period	1998-2017			1999-2017		
Cross-sections	18			18		
Obs:	360			342		
Adj R-squared	0.723			0.735		
S.E.R.	1.960			1.941		
Hannan-Quinn	4.380			4.382		
DW stat	1.813			1.842		
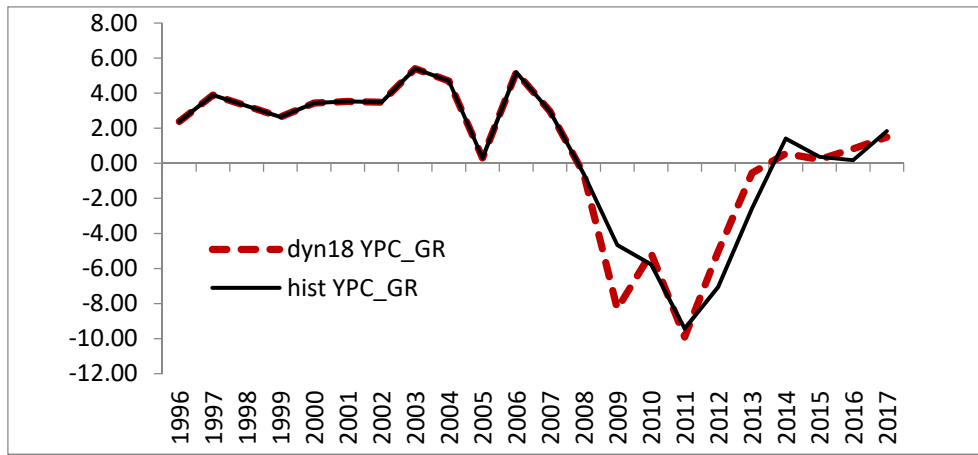
Fig. 8. Forecasted and hypothetical path of per capita GDP in Greece
Source: Historical values by Ameco data. Dynamic forecasts by the author.

The benefit from keeping institutions stable is expressed by the difference between the hypothetical and the dynamically forecasted trajectory of per capita GDP for the period 2010-2017, as shown by the shaded area in Fig. 10. The following remarks are made:

(i) In 2017, GDP per head would have been €1,435 or 8.2% above the actual level. The gap will keep widening in the coming years.

(ii) Total GDP would have reached €192 billion, a rise by €15 billion higher than the level it had in 2017.

(iii) The cumulative loss in present value for the period 2009-2017 is obtained in the Appendix. By setting the discount rate at 5% per year, cumulative output losses for 2010-2018 are at the tune of €44 billion in 2010 prices or around 18% of 2009 GDP.
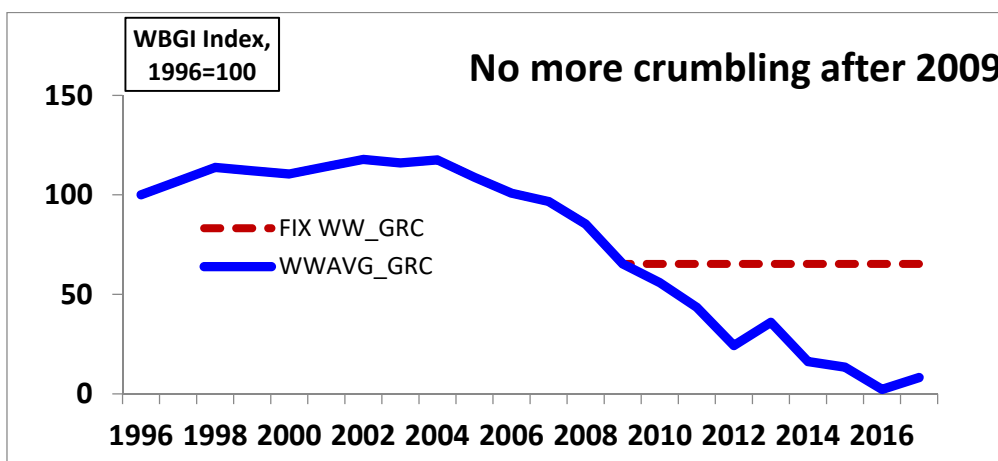
Fig. 9. Actual and hypothetical path of WBGI in Greece
Note: The WBGI adjusted to base index 100 in 1996.
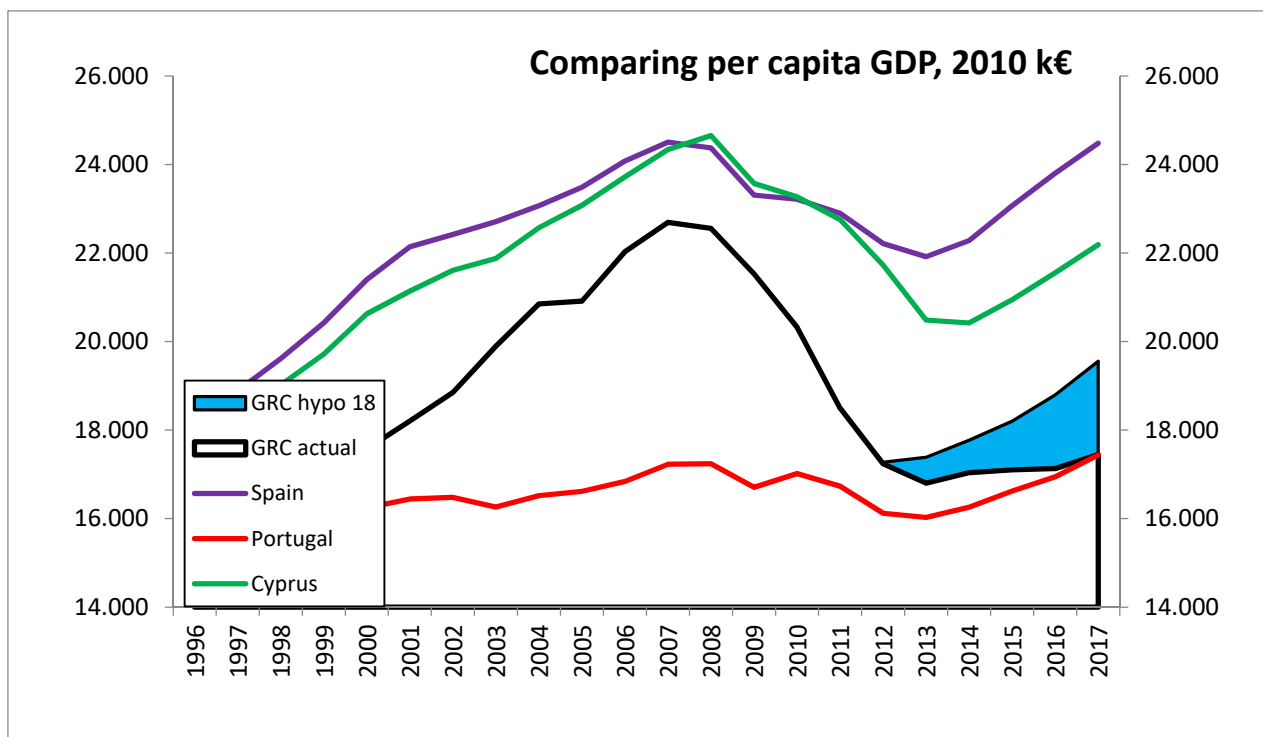
Fig. 10. Path of per capita GDP in peripheral EA economies
Source: Historical values by Ameco data. Dynamic forecasts by the author.

For comparison, the per capita GDP of other peripheral EA countries is also included in Fig. 10. In the case of the hypothetical run, the pattern of Greek GDP recovery would have looked much more similar to other peripheral economies' trajectories, rather than being in a stagnation trap as it is today.

6. Conclusions

After the financial crisis, the paper demonstrates that the convergence process of per capita GDP growth had been significantly weakened in the Euro Area in general, and in Greece in particular where it vastly diverged from its peers. The paper finds that - the deterioration of relevant macroeconomic variables notwithstanding – there has been an extensive malfunction of institutions that further slowed growth and undermined economic recovery. Greece appears as a country simultaneously experiencing the most severe recession after the global crisis and the most pronounced fall in all World Bank Governance Indicators. The crumbling of institutions accelerated at the advent of the crisis. It may partly explain the inability of the consolidation programs to implement reforms and speed the exit from recession.

To assess the cost of weak institutions in terms of economic growth, a control model of per capita GDP growth is first estimated for the rest of the Euro Area countries. A strong and statistically significant connection is found to hold for Greece; thus it can be used as a synthetic model. A counterfactual path of per capita GDP is then calculated on the assumption that the institutions avoid any further deterioration after the crisis. The comparison shows that in 2017, GDP per head would have been €1,435 higher than or 8% above the actual level, and the gap widens ever since.

These findings should enter the policy debate regarding economic recovery in Greece. With growth lagging behind its Euro Area peers, the need to address the effectiveness of institutions becomes all the more critical in the post-bailout era. Otherwise, Greece will further diverge in the future. To that effect, the bailout lenders have issued a series of warnings. In a recent statement, the IMF (2018) foresees that Greece's growth rate will drop sharply after a short-lived rebound as *"risks are tilted to the downside.*" In the same tune, the EU attributes the slowness of Greece's growth to the resistance in implementing reforms and suggests *"delays for several specific reform commitments ... to be addressed with urgency to ensure that all are completed as soon as possible".*

 The following examples give a tentative and non-exhaustive list of actions that are capable of improving each particular indicator:

The Rule of Law requires higher judicial effectiveness, law rationalization and simplification, and better enforcement. Political stability and avoidance of violence would benefit from a stabler electoral system producing clear governing majorities and favouring consensual politics. To cancel the obligation of going to the polls after the parliament fails to secure an enhanced quorum, choosing a new President of the Republic through a simple majority should be drafted in the Constitution.

Achieving a higher regulatory quality requires that governments have to enact market reforms, strengthen competition authorities, and make regulations binding for all participants. Voice and accountability improve by regularly publishing policy assessments, easing public inquiries and auditing on controversial policy issues, and facilitating citizens' feedback on the consequences of law enactment. Controls of corruption strengthen if governments follow stable rules on procurement, raise transparency in public contracts, and impose effective sanctions on offenders. Reform of corporate governance is also necessary to respond to the rising frequency of private-sector scandals and malpractices. Overall effectiveness improves by the

Government and public agencies adopting a lean structure with fewer decision layers while following best practices to the maximum extent possible.

Future research will address the problem of using indicators that are not directly measurable, experiment with alternative estimations using different data series of institutional quality, and investigate robustness. Moreover, the results obtained in other countries will be compared with the present ones. The issue of how institutional convergence should be implemented and monitored is a possible complement to the other two policy frameworks, namely those of the *Fiscal Compact* and the *Europe2020 Strategy* currently underway in the Euro Area and the European Union, respectively.

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Appendix A: The synthetic control model

The following steps are taken for the estimation:

Step 1. All six indicators are used in the estimation for maximum information available. However, they happen to be highly and positively inter-correlated in the Euro Area, thus using them as separate explanatory variables would raise serious problems of collinearity. The solution is to employ a Principal Components Analysis and obtain a weighted average with equalized variances. The first component amounts to explaining 82% of the indicators, is linear and given as a weighted average by:

$$WBGI = 0.180CCOR + 0.175GEFF + 0.122PSAV + 0.168REGQ + 0.179RLAW + 0.176VACC \quad (1)$$

Table A1: Causality Test

Period 1998-2017	Lag 1	Lag 2	Lag 3
	Dumitrescu-Hurlin (2002) Homogeneous tests		
WBGI does not G-Cause Log(YPC)	0.0001***	0.0293**	0.224
Log(YPC) does not G-Cause WBGI	0.00005***	0.112	0.10*
	Pairwise Granger Causality tests		
WBGI does not G-Cause Log(YPC)	0.003***	0.023**	0.053*
Log(YPC) does not G-Cause WBGI	0.0001***	0.018**	0.0078***

Next is to check for the direction of causality between institutions and growth rates. Both tests of pairwise causality and the Dumitrescu-Hurlin (2002) homogeneous causality test are conducted. Results are in Table A1. The indication is that that a two-way causality holds between per capita GDP and WBGI. An appropriate lag-structure in the model specification helps to alleviate the problem from growth rates to institutions.

Step 2. A similar problem of collinearity stems from the fact that the quality of institutions, as measured by the WB indicators, are found to be strongly correlated with other growth-explaining variables, such as investment activity, competitiveness, fiscal balances, etc. To circumvent this type of collinearity, the levels of WB indicators are first regressed against other macroeconomic variables. Then an

alternative ECM estimation takes place by feeding the residuals of the regression. The following equation is estimated, and the results are in Table A2.

$$wbgi^k = \beta_1 netfi^k + \beta_2 prsur^k + \beta_3 ulc^k + \xi^k \qquad (2)$$

Table A2: Residual estimates for WBGI

Variable	Coefficient	Std. Error	Prob.
WBGI			
Const	**-0.072**	0.164588	0.6594
Growth_pc	**0.2316**	0.032871	0
NETFI	**0.0058**	0.001365	0
Primary surplus	**0.0053**	0.001759	0.0024
Real ULC	**0.0054**	0.001223	0
Adj R2	0.951378		
S.E.R	0.088		
Hannan-Quinn	-0.1872		
DW stat	0.425139		

Step 3. A vector $Y=[y^k, k=1...18]$ measuring per capita GDP of the 18 Euro Area countries other than Greece is considered first. A number of *(m)* explanatory variables expressed by matrix $Z=[z^{kj}, k=1...18, j=1...m]$ is employed, while the group is supposed to face common shocks (x) stemming from the international environment throughout the examination. The quality of institutions is expressed by vector $W=[w^k, k=1...18]$. With ε^k expressing the error term and c^k a country-specific effect, the following cross-sectional model is specified for the GDP growth rates g^k of the 18 Euro Area countries, $(k=1,.., 18)$[8]:

$$g^k = c^k + \lambda x + \sum_{j=1}^{j=m} \beta_j \cdot ln[z^{kj}] + \delta \cdot w^k + \varepsilon^k \qquad (3)$$

Step 4. To obtain a hypothetical trajectory for Greece, the model is cross-sectionally estimated, and then the constant adjustment is determined. A dynamic forecast of per capita GDP trajectory (f^{GR}) for the pre-crisis period 1998-2007 is

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[8] If scaled by per capita GDP at the beginning of the estimation period, these constants denote the convergence-effect towards the control group.

obtained first by substituting the variables in (3) with historical values for Greece and the constant effect for Greece (c^{GR}) is chosen to minimize the residuals:

$$c^{GR} = \text{argmin} \quad \sum_{t=1998}^{t=2007} \left[f_t^{GR}(c^{GR}) - y_t^{GR} \right]^2 \tag{4}$$

Step 5: Model specification

Dependent and explanatory variables are defined for (*k=1…18)* as follows:

y = per capita GDP at 2010 constant prices
c = constant adjustment
grw_xea = growth rate of the global economy, excluding the Euro Area.
netfi = net fixed investment, as percent of GDP
prims = General Government primary balance as percent of GDP
rulc = index of unit labour cost, (in year 2000 the index is set to 100).
wbgi = the composite of World Bank Governance Indicators
trend = a time trend

Given the weak convergence dynamics described in Section 2, the model is specified in the form of an error-correction mechanism (ECM) for the GDP growth rates. This includes a lagged effect of per capita GDP level rather than the initial values at the beginning of EMU. Denoting the log-difference operator by *Δln* and keeping only the explanatory variables with the best estimation record, the following cross-section equation is specified for the EA18 group:

$$\Delta \ln y^k = c^k + trend +$$
$$+ \gamma_1 \Delta lny^k(-1) + \gamma_2[grw\_xea] + \alpha_1 \Delta netfi^k + \alpha_2 \Delta prims^k - \alpha_3 \Delta rulc$$
$$- \lambda \cdot lny^k(-1) + \beta_1 netfi^k(-1) + \beta_2 prims^k(-1) - \beta_3 rulc^k(-1)$$
$$+ \theta_1 \Delta wbgi^k(-1) + \theta_2 wbgi^k(-2) + \varepsilon^k \tag{5}$$

In an alternative estimation, residuals $\{\xi^k, k = 1, …, 18\}$ from equation (2) are used in estimati   ng (5), mated models are shown in Table 3, as discussed in the main text, Section 4.

Step 6. An assessment of counterfactual scenarios

A counterfactual trajectory of per capita GDP (h^{GR}) is then obtained from (5) for a specific period by inserting hypothetical values for the quality of institutions and keeping the other explanatory variables at their historical levels.

Denoting the discount rate by *(r)*, the difference (h^{GR}-f^{GR}) between the hypothetical and the dynamic forecast of per capita GDP (f^{GR}), is taken as a proxy for the annual cost of crumbling institutions. The formula finally calculates the cumulative loss in present value terms over the period *[N1, N2]*:

$$LOSS = \sum_{t=N1}^{t=N2} \frac{h_t^{GR} - f_t^{GR}}{(1+r)^{t-N1}} \qquad (6)$$