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**Greece and the Euro Area: The cost of weak institutions**

**Nicos Christodoulakis**

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**Greece and the Euro Area:  
The cost of weak institutions**

**Nicos Christodoulakis<sup>1</sup>**

**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 slowdown after the global financial crisis caused asymmetric losses in per capita income. The most pronounced divergence took place between Greece and its Euro Area peers as prolonged austerity measures imposed in exchange of 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 serious blows in Government effectiveness and political stability to market distortions and a serious weakening of the rule of law. To assess the impact of such effects on convergence, an empirical growth model with the relevant World Bank indicators as explanatory variables is estimated. 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 with 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.

**Key words:** Euro Area, Growth, Institutions and Growth

**JEL:** H11, G28, H83, O43

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<sup>1</sup> Athens University of Economics & Business, and Hellenic Observatory, LSE.  
email: nchris@aueb.gr; N.Christodoulakis@lse.ac.uk.

## 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 popular 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. This could happen because the European Central Bank (ECB) was, in the absence of a fiscal union, likely to accentuate – rather than subsidize – 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 viability of the central monetary policy. Extensive empirical research has established that a ‘Great Moderation’ of business cycle prevailed during the first decade of EMU and forged the confidence of the viability 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.

Such optimism, however, proved to be short-lived and 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. Fears of a possible collapse reached boiling temperatures when economies at the periphery with large external and/or fiscal deficits – such as Greece, Ireland, Portugal, Spain and Cyprus – were suffering a sudden stop in credit financing and faced the prospect of debt-defaults<sup>2</sup>. The eventuality of some of them exiting the Euro was finally avoided, but only after the Euro Area authorities in coordination with the IMF organized massive bailouts in exchange of front-loaded consolidation

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

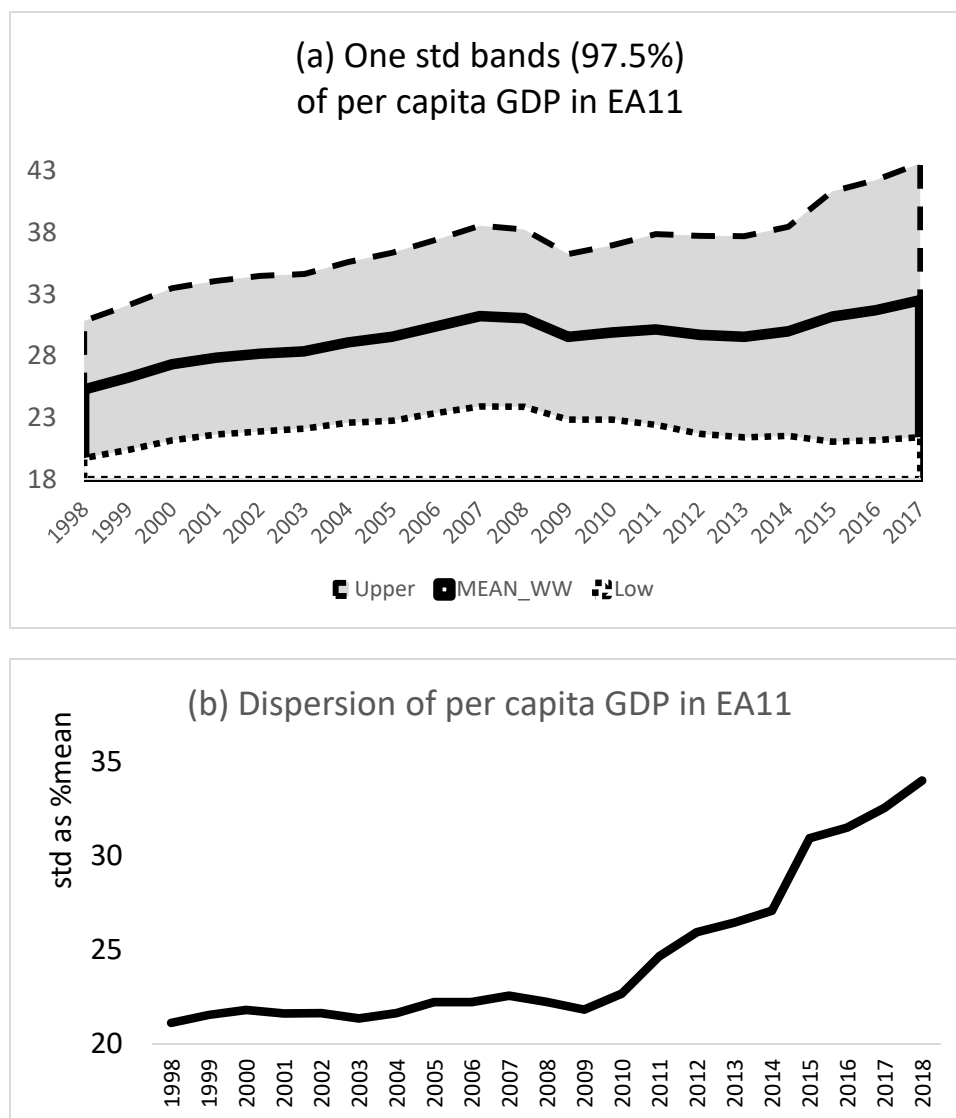
programs. To enhance competitiveness while keeping the common monetary policy intact, each country had to implement extensive austerity measures combined with an internal devaluation process of cutting wages and removing labour market protections.

Though serious losses in per households' incomes were recorded in most of the EA economies after 2008, the front-loaded character of adjustment caused a much deeper and prolonged recession in bailout countries, with Greece being the most severe case. The result was that most of the countries in the periphery 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 adopted as a key policy for the Euro Area, and a strong pledge was included in the founding Treaties. The Maastricht Treaty in 1992 had clearly 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), convergence of per capita income levels is not a prerequisite for a functioning monetary union per se, but is *an important objective of the economic integration process*; (my italics). In the same spirit, Diaz et al (2017) recognize that achieving economic convergence is a crucial condition for sustainability of Euro Area membership.

In practice, however, a policy of closing the gap was never made a central one and per capita income differentials between the most and least affluent members of the EA did not seriously 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 of faster real convergence, little convergence, if any, has taken place 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 in fact widened, albeit to an extent that at that time seemed to be reversible if certain policies were implemented. Not only such corrective action was never undertaken at the scale required for the process to be reversed, but the gap was 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). One standard deviation reached €11,097 in 2018, almost twice as large the amount of €5,555 in the beginning of the EMU in 1998<sup>3</sup>, as depicted in the first panel of Fig. 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 members of the Euro Area weakened significantly during the previous decade.

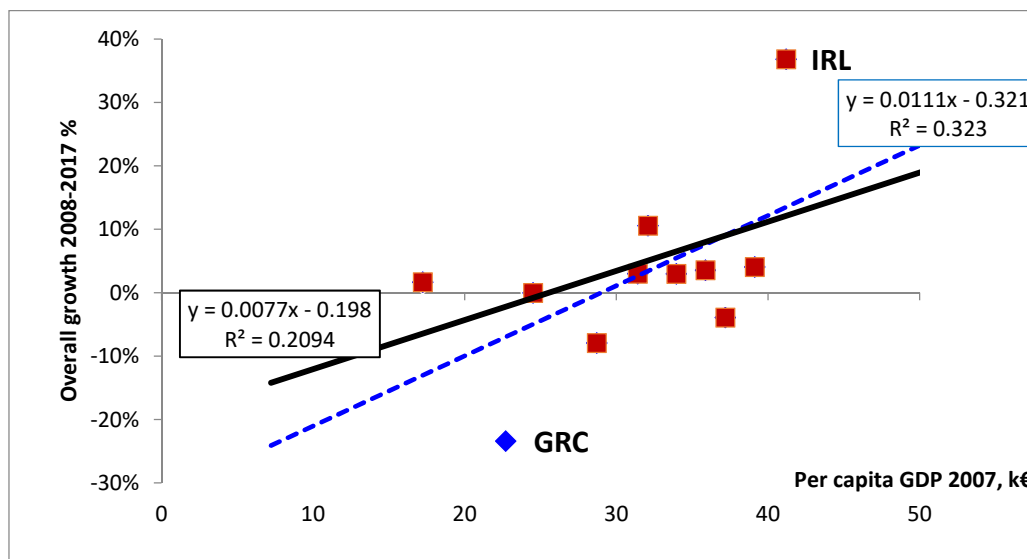


**Fig. 1. Dispersion of per capita GDP in the initial EA11 (excl. Lux)**

Note: Dispersion is given by standard deviation as percent of mean. EA11 stands for the initial EA members, excluding Luxembourg. Source: Ameco database

<sup>3</sup> Both expressed in constant 2010 prices.

A similar picture emerges by juxtaposing cumulative growth over a specific time span versus per capita GDP in the beginning of the period. A negative and statistically significant relationship would have implied that the gap between poorer and richer members was diminished during that period. However, Figure 2 shows that the relationship among the EA11 members has actually turned to be positive in the post-crisis period, indicating that a process of divergence is under way.



**Fig. 2. Divergence in post-crisis EA11**

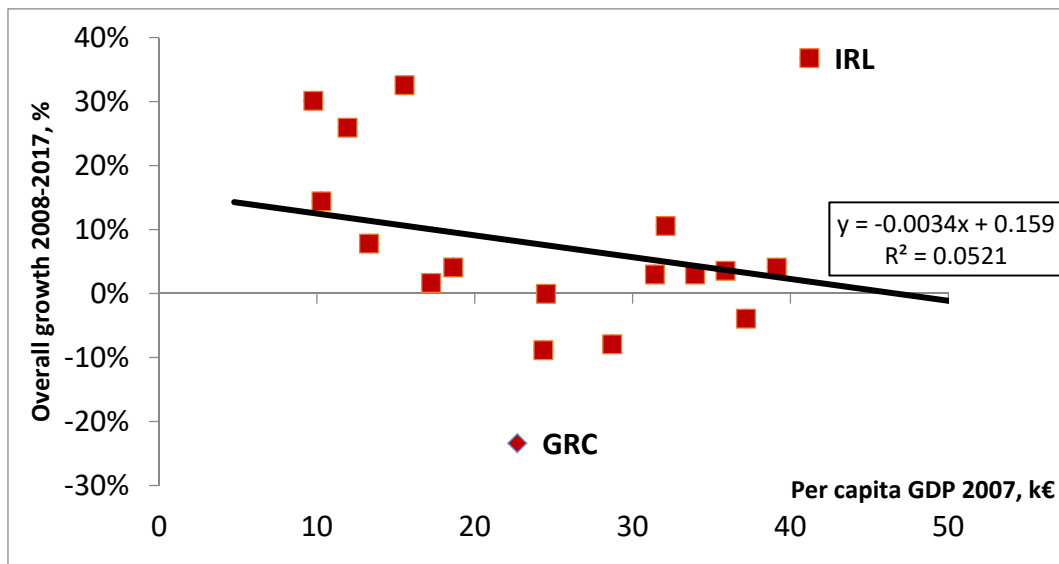
The solid line is for EA10, excl. Greece and Luxembourg.

The dotted line is for EA11, excl. only Luxembourg. 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 strong catching-up process but only prior to the global crisis. According to Franks et al (2018), even for the new accession countries, convergence slowed down 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).

This constitutes a major 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 Growth Strategy<sup>4</sup> (LGS for short), was launched in 2000 as the key to improve competitiveness and enhance growth in the post-EMU era. 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".

<sup>4</sup> 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 failure of the plan 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 that had to be seriously pursued. A new strategy drafted in 2005 put more focus on the simplification and national ownership via national action plans as the key elements to revitalize the reforms agenda.

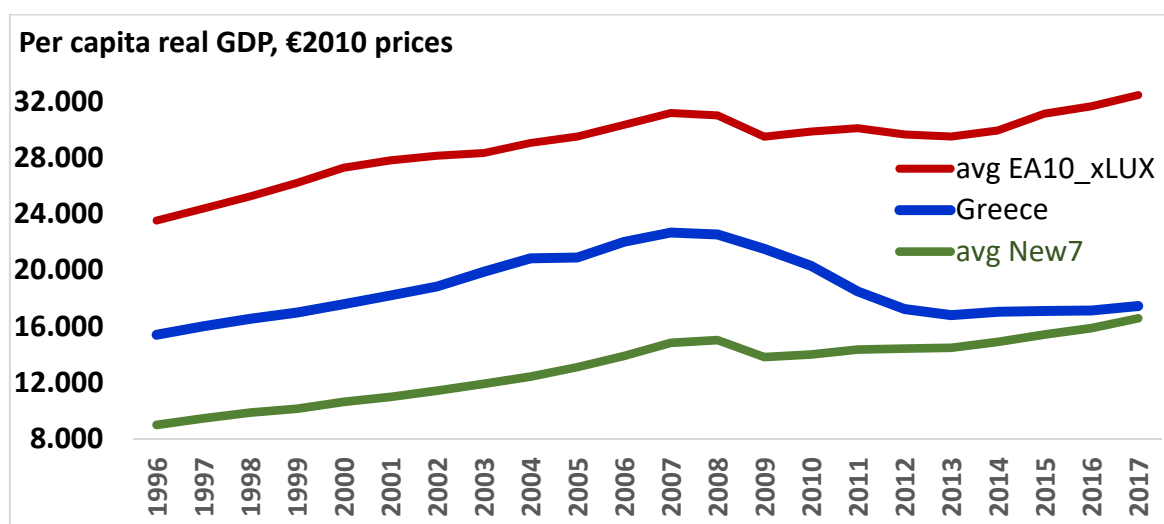
Nevertheless, with the global crisis approaching, the revised plan proved to be equally incapable of steering the EU toward a course of strong growth and somewhat closing the convergence gap. A few years after the second launch, Wyplosz (2010) declared that the Lisbon strategy for making the EU the world's 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 flavor 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 obvious limitations, the LGS 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 rather unique case. The Greek economy has experienced by far the deepest recession, with its growth serially collapsing throughout 2008-2014 and then remaining at very low levels. The fall in per capita income has been so devastating that the country seems as being disconnected from the initial Euro Area group and rather looks as an emergency market closer to the new accession countries of the EA; see Fig. 4.

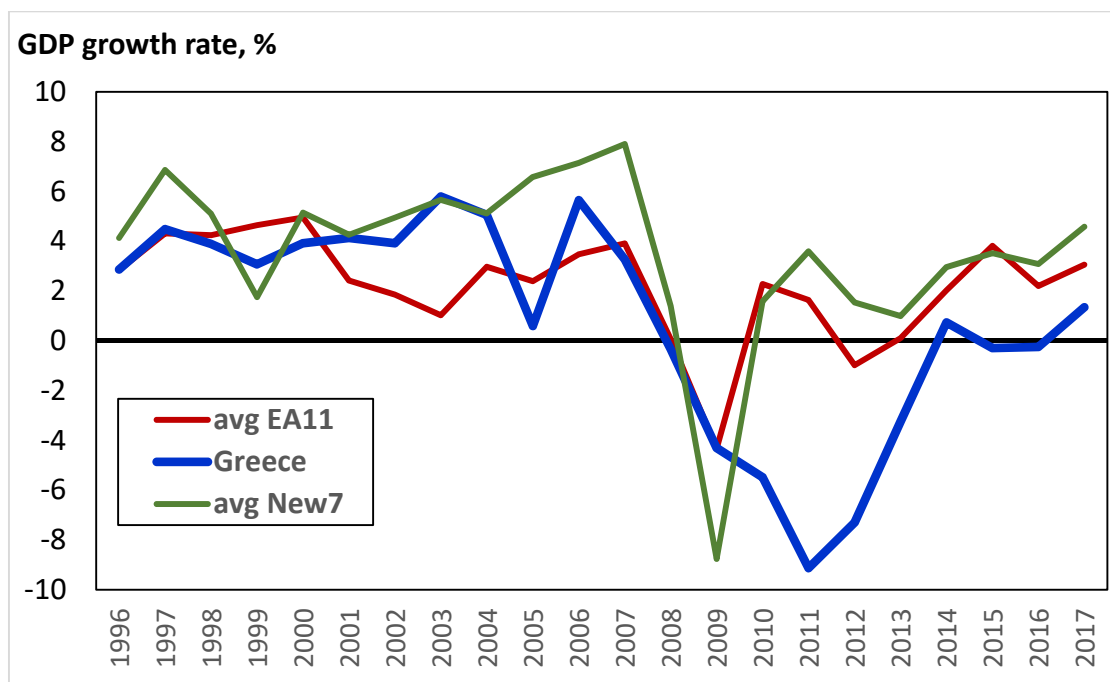


**Fig. 4. Per capita GDP paths in Greece and Euro Area subgroups**

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 in comparison 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. Prior to the crisis, the new accession countries were growing faster than the old EA members and Greece was growing at 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.

To explain the vast asymmetries in growth rates, the economic analysis typically points to (a) differences in fiscal positions that affect the cost of borrowing, (b) different patterns of competitiveness that lead to serious external imbalances, and (c) the intensity of investment activity that determines the accumulation of capital and future growth. Developments in each of these fronts were particularly adverse for Greece, and definitely contributed to the post-crisis collapse. However, the persistence of recession had such a strong and long-lasting impact that other explanatory factors should be searched too.



**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 existing institutional rigidities and impediments to the efficient use and allocation of production factors facilitates growth and enhances the economic structure of a country in the Euro Area. The implementation and functioning of EMU did indeed streamline some key macroeconomic policies – notably in the monetary and financial sector – though to a lesser extent in the fiscal stance and to an even lesser in the labour markets and the real economy. In fact, evidence by Diaz et al (2017) suggests that, after 2010, divergence has increased with regard to certain dimensions of institutional quality. A

possible reason is the ‘reform fatigue’ that prevailed in EMU countries after the introduction of the common currency and delayed or obstructed further adjustments toward 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. No doubt, the derailment of public finances, the lack of competitiveness and the collapse of fixed investment made the growth rate to 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 rather than other type of economic fundamentals. In its latest country report, OECD (2018) finds that weak and uncertain institutions systematically undermined economic recovery ever since the debt crisis in 2010. Social unrest and political upheavals against the bailout programs played a key role in making several institutions unworkable and Greece to be drifting apart its Euro Area peers. In turn, this increased country risks, thwarted foreign investment and made the implementation of market reforms even more confrontational, thus 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 some ways to mitigate their shortcomings. Section 4 discusses various episodes in crisis-ridden Greece that might help to explain the deterioration of institutions and their inability to accelerate recovery. An econometric model linking institutions with economic growth is discussed 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 is used to measure in GDP terms 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, as well as cross-country differences in economic performance, goes back in history to the origin of economics. The relevant

literature is too vast to be summarised here but a concise examination of ‘...*the central causal role of economic institutions and their importance relative to other factors*’ can be found in Acemoglu et al (2005), followed by extensive empirical research over different historical periods to the present.

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 analysis in the Euro Area.

(b). Lengthy and cumbersome procedures in socio-economic 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 also between long term and short term investment.

The above channels manifest themselves by undercutting the non-exhaustible factor in the endogenous growth models. Therefore, by adopting a quantitative measure of the quality and efficiency of institutions, 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 is multiplied 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, a variety of indicators has to be used to ensure 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 the realms of finance, innovation, the organization of firms, the labor 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 how institutions are linked to 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) conclude that institutions have such a significant impact on per capita GDP that the effort of improving their functional and quality aspects quickly pays off and should be a major 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 can be used as a key determinant of ascribing sovereign default probabilities in third-world countries, on top of more traditional measures 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 in comparison 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 growth performance of the European economies 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 as listed below. 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 are able to participate in selecting and assessing their government, as well as 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 ability of the government to formulate and implement sound policies and regulations that permit and promote private sector activities and developments.

5. Rule of law (RLAW) – capturing perceptions of the extent to which agents have confidence in, and abide by, the rules of 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) – capturing perceptions of how effectively malpractices including both petty and grand forms of corruption are checked, as well as avoiding 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 the position of each country 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 can be meaningfully used to compare countries’ relative positions in a given year and relative positions over time but are not informative about trends. However, by reviewing the time series of the individual sources over the past several updates of the WGI, there is very little evidence of trends in global averages of the individual underlying data sources. Moreover, fixing the global average to equal zero does not prevent the analysis of trends in regional or other group averages of countries. Also, fixing the global average to be the same in each period does not seem to be unreasonable, 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 judgements may be preoccupied by previous developments.
- (ii) *Observability*: An actual development in improving certain 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 scope, of institutions relevant to growth. Other international organizations, such as the OECD, the World Economic Forum, the Euro-Barometer, etc., produce indicators that might be used as well.
- (iv) *Cross-correlation*: The six WB indicators are not independent of each other but rather 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 strong 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 are expected to improve (reduce) per capita GDP in each country but 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**

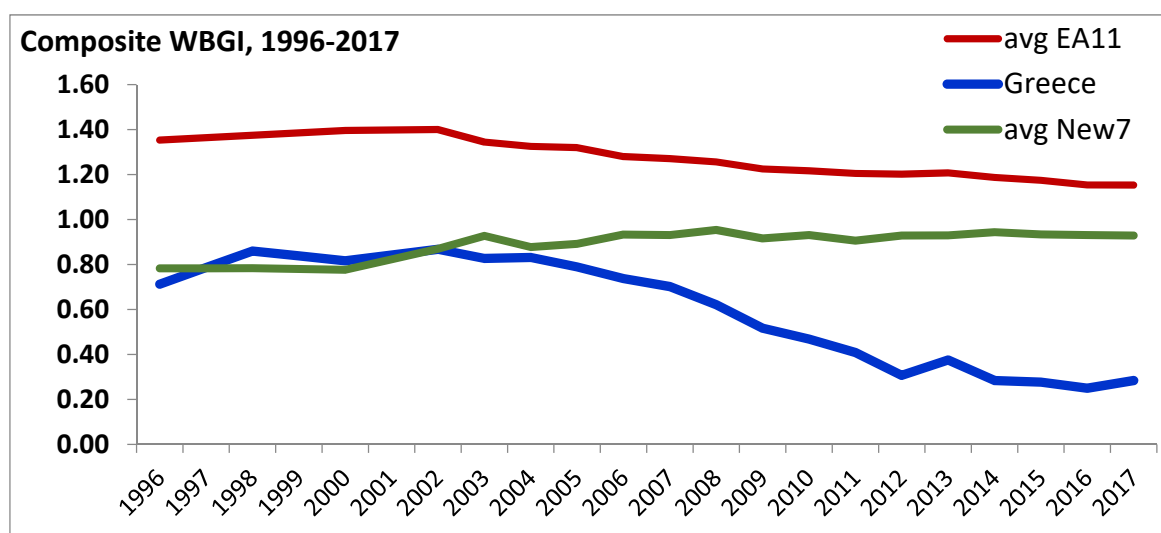
Note: Definitions as in Section 3. Source: World Bank

	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 correlation 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 crime rate, or a deterioration of PSAV is recorded after a prolonged period of weak governability, due – for example – to successive elections or disagreements on the formation of Government.

Third, the reason for preferring the WB indicators to alternatives is that they are widely used and this makes 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 a number of actions are taken to confront its possible implications as 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 in



average during the last twenty years in the older EA members (excluding Greece) and the new accession countries. It is remarkable that the latter group seriously improved institutions in full accordance with stronger performance in GDP growth, thus 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 in comparison with either group in the Euro Area. Although deterioration in certain socio-economic and political developments was to some extent noticeable before 2008, it further intensified since the outbreak of the crisis with serious consequences on the functioning of the economy and, ultimately, on 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 Fig. 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, two factors 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 perceptual nature of WBGI indicators and the lack of knowledge on how they are actually compiled.

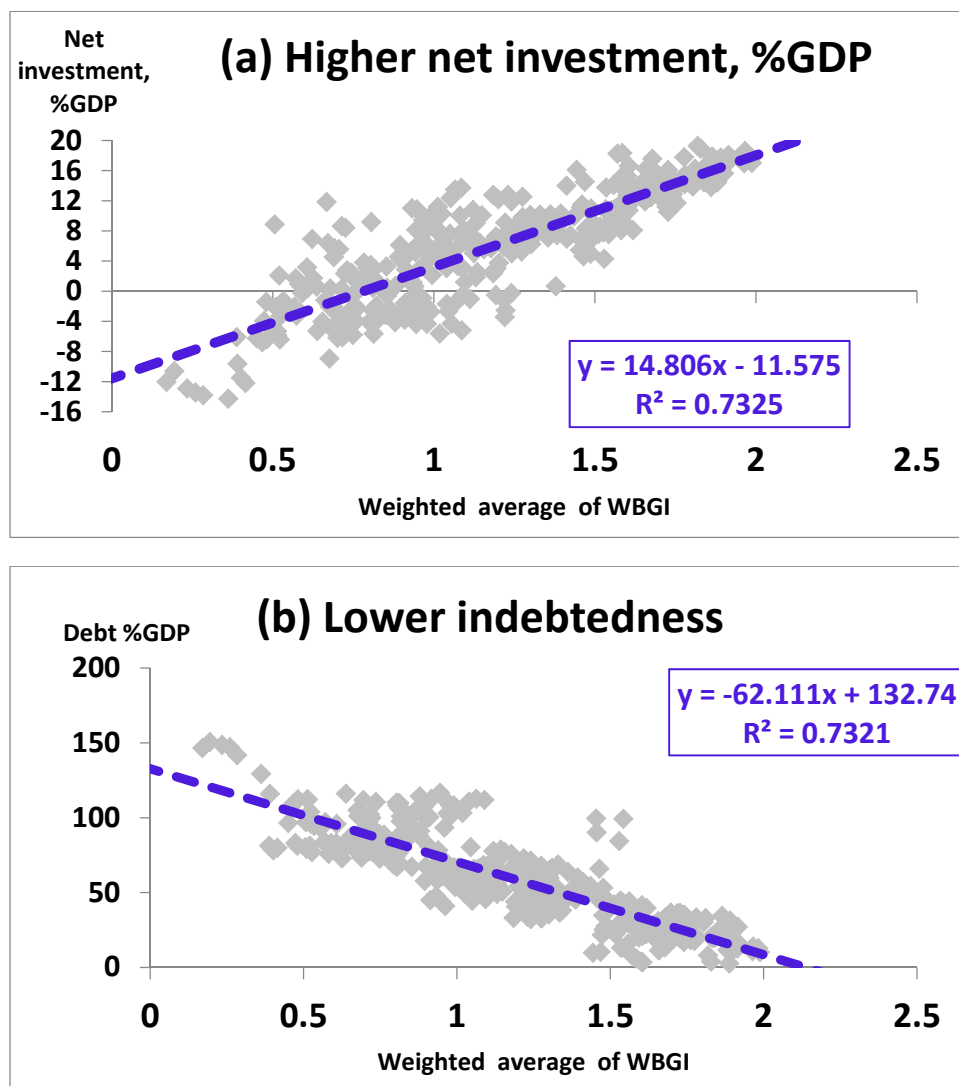
The interconnection between economic growth and trust in institutions – or in fact the absence of both - is by now widely recognized in Greece, not just by academic research but increasingly so in public debates at large. For example, a corporate report by PWC (2015) argued that deterioration of both during the last decade Greece had reached such a crucial point, where any further weakening of institutions may lead to long 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 recorded perceptions of institutions are influenced by the socio-economic process is simply impossible. However, a substitute could be supplied by the vast anecdotal evidence on institutional failures in Greece and the consequences they had on growth collapsing. A non-exhaustive list of institutional drawbacks that took place in Greece in the course of the crisis is shown in Table 2 and briefly described below:

**Table 2: Areas of institutional deterioration in Greece**

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

*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. (e) World Bank, 2018. (e) Katsikas et al. (2018). (f) Incl. caretaker Governments, Wikipedia.



**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

(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 own pre-electoral pledges. As noted by Schmidt (2015), 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 incessant 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 occupied their place.

A discussion of disintegration dynamics in Greek politics may be found in, among others, Vasilopoulou (2018) for the rise of Eurosceptic politics; Roumanias *et al* (2018) 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 political risk. To indicate how remarkable the change was, 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.<sup>5</sup>

(ii). Concomitant 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, the inability of households 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 are inefficient. As documented in EC (2018, Fig. 7), Greece is now the country among the EU with the longest interval for a litigation case to conclude. Furthermore, it is the only one where the length of time to conclude increased sharply since 2010. From an average of 190 days required to settle a civil or a commercial litigation in the beginning of the crisis, the time needed rose to 670 days in 2016. At this level, it's nearly three times longer when compared with the average of 236 days in the other Euro Area countries.<sup>6</sup> 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 functioning of the economy, mainly in the banking sector. In combination with ineffective Government regulations and other bank governance problems, it has led to the problem of Non-Performing-Loans (NPL) to explosive levels, currently at nearly half of total credit in the economy. Loan restructuring and foreclosure proceedings

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<sup>5</sup> Source: <https://www.credendo.com/country-risk/greece>

<sup>6</sup> Calculations based on EC (2018, Fig. 7, p 3). Data for Belgium, Cyprus and Ireland non-available.

are especially slow compared to most OECD countries, despite the fact the legal regime has been somewhat improved since 2010; (*OECD, 2018*). Compared with the Euro Area record in the respective periods, the pre-crisis Greek NPL burden was less than twofold 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 wider disappointment on the functioning of the state when is most needed. The far right was quick enough to exploit the vacuum by organizing *vigilante* groups in the poorer neighborhoods of big cities, thus provoking further clashes and violence with other activist groups.

(iii). Regarding economic efficiency, the regulatory quality was markedly diminished during the crisis, (indicator REGQ). Although a key condition for post-crisis Greece to resume growth was to implement extensive market reforms, affected groups confronted most initiatives with such resistance that several of them were turned down. As a result, product markets in Greece 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 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 questioned 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, vested interests 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 burden of adjustment in Greece has been borne largely 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 diminishing work incentives was the decline in the quality of public management. In some cases, civil services became demoralized

and performance deteriorated, no matter how adequately was a department 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 in average in comparison to other Southern European countries with similar distributions of wildfires. Given that fire-fighting equipment and personnel training are considered to be at a similar state-of-the-art, the poor outcome should be 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). Thus the fact that the index is perceived to deteriorate since the outbreak of the crisis, might have been detrimental for long-term economic growth. A definite reason for a fall in CCOR was that the exposure of several economic scandals of the past made the public opinion to suspect that Greek politics are dominated by sleazy practices to a much larger extent 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 are frequently bent in favor of special groups, despite the fact that the elimination of such practices was considered as a priority in the consolidation program. However, instead of being diminished, special-groups and clientilistic arrangements were actually multiplied after the crisis. As documented by Sotiropoulos and Christopoulos (2016), transitional and case-specific provisions in law-making increased from an average of 150 per year during 2002-2008 to 232 per year in the post-crisis period 2009-2015. A likely explanation is that Governments tried to protect their most favorite groups from the consequences of fiscal consolidation, in the hope that the impact on their falling popularity would be softer. Ordinary citizens felt as being marginalized and exploited by the pressure groups, and this created a deep disappointment for the lack of transparency and equity of laws, raising the relevant index<sup>7</sup>.

The enormous rise in taxation provided further motivation. As payment cumulated in order to ensure the high primary surplus required by the bailout program, several households and firms panicked after realizing that were unable to meet obligations in time. To avoid further political backlash, Greek governments introduced various schemes of payments facilitation in order to reduce pressure on the lowest-income

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<sup>7</sup> 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).

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. According to Nobel-Prize winner Paul Romer (2018), the inefficient management of economic affairs by the state amounts to a corruption-like tax on all firms operating in Greece's formal sector and argues that this is especially onerous for start-ups and foreign firms that would like to invest there.

(vi). In the course of implementing the bailout programs there have been some serious blows in the voice and accountability record, (indicator VACC). In passing the extensive and complicated bailout legislation, governments frequently had to enact laws without prior consultation with competent and independent authorities. Frequently, 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 class action. In several cases, the incomes policy crafted in the annual Budget for the public sector is quickly overturned by court decisions, most of the times 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 by far 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 as opposed to an average of 3.7 in the rest of 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***

Taking into account 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 the capital stock, employment and technology. Therefore, 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.<sup>8</sup>

To measure the economic impact of failed institutions in Greece, a counterfactual scenario with an alternative growth path must be constructed in the hypothetical case there was no erosion in their effectiveness after the crisis. As deterioration in both income and institutions in post-crisis Greece is extremely large in comparison 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 under-estimate the effect of institutional quality on GDP growth in Greece and requires 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) in order to assess the impact of the separatist armed struggle in the Basque region in Spain by, first, estimating a model for the conflict-free regions and then calibrating it to depict the dynamics of the conflict region. The cost of the conflict is obtained by performing a counterfactual analysis in which some key factors in the area in question are assumed to behave in a manner similar to those in the other areas. In a similar vein, one may think of the institutional failures in Greece as 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 global economy, outside the Euro Area.
- Net fixed capital formation, as percent of GDP.
- General Government primary balance, as 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

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<sup>8</sup> 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 the cost of crumbling institutions is quantified for Greece.



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 the 18 EA countries, excluding Greece. The weighted-average index of WBGI is put with a double lag to avoid any notion of causality from current macroeconomic factors to past institutions.

(ii). In account of contemporaneous correlation between the institutional term and the other explanatory variables, an alternative Model II is estimated along the 18 EA countries. Instead of 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. Coefficients on the explanatory variables seem to be close across the three models, though the different lag structure does not allow a formal test. Comparing Models I and III, it is apparent that coefficients on all explanatory variables are similar at the 5% level, thus suggesting that there is no bias detected between Greece and the EA18. If anything, estimated values are stronger in Model III, thus the hypothetical scenario based on Model I would probably underestimate the effect of institutions in Greece.

The analysis 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 global economy outside the Euro Area as this raises the demand for exports to the rest of the world. Similarly, a rise in net fixed investment augments the capital stock, thus raising 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 longer run.

**Table 3: Model estimates**

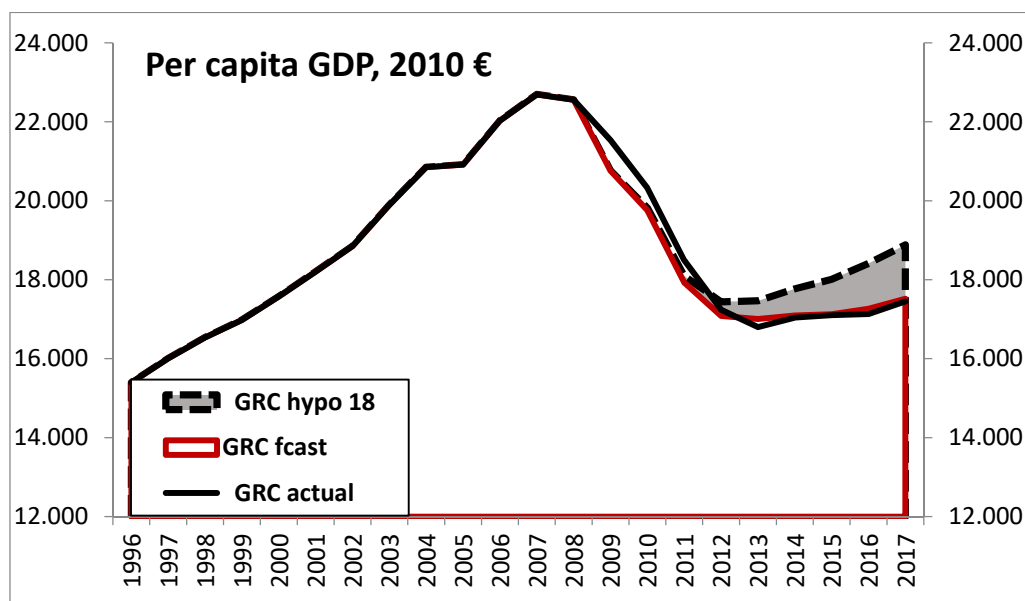
MODEL	I.EA18 excl. Greece		II. Residuals EA18, excl. Greece		III. EA19 incl. Greece	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<i>growthpc(t)</i>						
<i>const</i>	<b>22.51***</b>	4.853	<b>23.00***</b>	5.307	<b>23.558</b>	4.678
<i>growthpc(-1)</i>	<b>0.241***</b>	0.042	<b>0.264***</b>	0.047	<b>0.247</b>	0.040
<i>grworld_xea</i>	<b>0.504***</b>	0.081	<b>0.612***</b>	0.096	<b>0.491***</b>	0.078
<i>Δnetfi</i>	<b>0.506***</b>	0.055	<b>0.511***</b>	0.063	<b>0.512***</b>	0.052
<i>Δprims</i>	<b>0.190***</b>	0.047	<b>0.172***</b>	0.052	<b>0.175***</b>	0.043
<i>Δrulc</i>	<b>-0.525***</b>	0.044	<b>-0.509***</b>	0.051	<b>-0.519***</b>	0.042
<i>Log [ypc(-1)]</i>	<b>-4.845***</b>	1.392	<b>-4.816***</b>	1.376	<b>-5.292***</b>	1.350
<i>netfi(-1)</i>	<b>0.072*</b>	0.040	<b>0.085</b>	0.049	<b>0.086**</b>	0.037
<i>prims(-1)</i>	<b>0.137**</b>	0.043	<b>0.172***</b>	0.048	<b>0.121**</b>	0.039
<i>rulc(-1)</i>	<b>-0.133***</b>	0.033	<b>-0.113**</b>	0.035	<b>-0.142***</b>	0.031
<i>Δ(WBGI(-1))</i>	<b>5.248**</b>	2.087	<b>3.948*</b>	2.320	<b>6.147***</b>	1.976
<i>WBGI(-2)</i>	<b>3.261**</b>	1.386	<b>4.470***</b>	1.610	<b>4.077**</b>	1.247
<i>Trend</i>	<b>0.052</b>	0.036	<b>0.095**</b>	0.042	<b>0.064*</b>	0.035
<i>dum_PSI(2011)</i>	<b>-6.50</b>	(added, no stats.)	<b>-7.50</b>	(added, no stats.)	<b>-6.26***</b>	1.843
Period	1998-2017		1999-2017		1998-2017	
Cross-sections	18		18		19	
Obs:	360		342		380	
Adj R-squared	0.723		0.735		0.735	
S.E.R.	1.960		1.941		1.938	
Hannan-Quinn	4.380		4.382			
DW stat	1.813		1.842		1.837	

Notes: One, two or three stars indicate significance at 10%, 5% and 1% level respectively.

Finally, the weighted index of WBGI is found to exert a significant and positive impact, again in both the short and the longer run. The EA average value of the WBGI is 1.20, thus an improvement by 10% corresponds to an absolute rise by 0.12 units. 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. To assess the loss due to the erosion of institutional capacity after 2009, one has simply 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.



**Fig. 8. Forecasted and hypothetical path of per capita GDP in Greece**  
 Source: Historical values by Ameco data. Dynamic forecasts by the author.

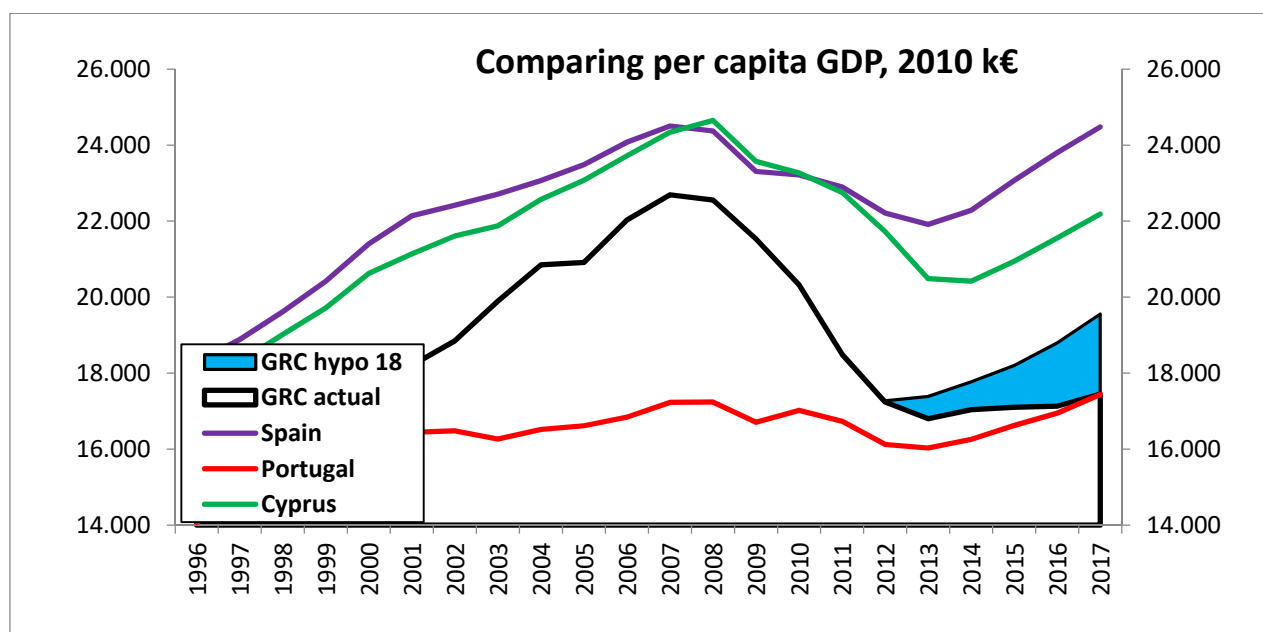
The benefit from keeping institutions stable is expressed by the difference between the hypothetical and the dynamically forecasted trajectory of per capita GDP for the period 2010-2017, as shown by the shaded area in Fig. 8. The following remarks are made:

(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 actually had in 2017.

(iii) The cumulative loss in present value for the period 2009-2017 is calculated as shown in the Appendix. By setting the discount rate at 5% per annum, cumulative output losses for the period 2010-2018 are found to be at the tune of €44 billion in 2010 prices or around 18% of 2009 GDP.

For comparison, per capita GDP of other peripheral EA countries is also included in Fig. 9. In the case of the hypothetical run, the pattern of Greek GDP recovery would have looked much more similar to the trajectories of other peripheral economies, rather than being in a stagnation trap as it is actually today.



**Fig. 9. Path of per capita GDP in peripheral EA economies**  
 Source: Historical values by Ameco data. Dynamic forecasts by the author.

## 6. Conclusions

The paper demonstrates that, after the financial crisis, the convergence process of per capita GDP growth has been significantly weakened in the Euro Area in general, and Greece in particular where it vastly diverged from its peers. Investigating the reasons,

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. In fact, Greece is pointed out as the country with simultaneously the most severe recession after the global crisis and the most pronounced fall in all World Bank Governance indicators. The crumbling of institutions accelerates at the advent of the crisis and may explain the inability of the consolidation programs to adequately implement a number of reforms capable of speeding the exit from recession.

To assess the effect of institutions in terms of economic growth, a model of per capita GDP growth is first estimated for the rest of the Euro Area countries and found that there exists a strong and statistically significant connection. The model is then applied to Greece and a counterfactual path of per capita GDP is calculated on the assumption of institutions hypothetically avoiding 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 by the years.

These findings should be taken into account in 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 important in the post-bailout era, for otherwise Greece is expected to 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 so as to ensure that all are completed as soon as possible”*.

A tentative and non-exhaustive list of actions that are capable of improving each particular indicator is given by the following examples:

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 favoring consensual politics. To cancel the necessity of going to the polls at the occasion of the parliament failing to elect a new President of the Republic, the option of a final 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 making regulations binding for all participants. Voice and accountability improve by regularly publishing policy assessments, easing public inquiries and auditing on questionable 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. A 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 by using different data series of institutional quality, and investigate robustness. Moreover, results obtained in other countries will be compared with the present ones. Using all relevant results, the issue of how institutional convergence should be implemented and monitored is going to be addressed as a possible complement to the other two policy frameworks of the *Fiscal Compact* and the *Europe2020 Strategy* that are currently under way 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 shown in Table A1. The indication is that that a both-way causality is detected 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, and then an

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

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

**Table A2: Residual estimates for WBGI**

WBGI			
Variables	Coefficient	Std. Error	Prob.
constant	<b>-0.072</b>	0.164588	0.6594
<i>Growth_pc</i>	<b>0.2316</b>	0.032871	0
Net investment	<b>0.0058</b>	0.001365	0
Primary surplus	<b>0.0053</b>	0.001759	0.0024
Real ULC	<b>0.0054</b>	0.001223	0
Period	1998-2017		
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 period of examination. The quality of institutions is expressed by vector  $W=[w^k, k=1...18]$ . With  $\varepsilon^k$  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, ( $k=1, \dots, 18$ )<sup>9</sup>:

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

**Step 4.** To obtain the 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

<sup>9</sup> If scaled by per capita GDP at the beginning of the estimation period, these constants denote convergence effects towards the control group of neutral countries.

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

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

### ***Step 5: Model specification***

Dependent and explanatory variables are defined for ( $k=1 \dots 18$ ) as follows:

$y$  = per capita GDP at 2010 constant prices

$c$  = constant adjustment

$grw\_xea$  = growth rate of 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

In view of 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  $\Delta \ln$  and keeping only the explanatory variables with the best estimation record, the following cross-section equation is specified for the EA18 group:

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

In an alternative estimation, residuals  $\{\xi^k, k = 1, \dots, 18\}$  from equation (2) are used in the estimation of (5) instead of the data series  $\{wbgi^k, k = 1 \dots 18\}$ . Both estimated models are shown in Table 3, as discussed in the main text, Section 4.

***Step 6. An assessment of counterfactual scenaria***

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 cumulative loss in present value for the period  $[N1, N2]$  is calculated by the formula:

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