Governance and Growth: A Panel VAR Approach

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Abstract

In this paper, we explore the dynamic relationship between economic growth and several measures of governance quality across a wide sample of countries. Using a panel VAR approach, which allow us to also account for time invariant characteristics intrinsic to each country, we show that, on average, shocks to governance quality exert a positive and significant impact to economic growth, one that is sustained for more than ten years after the initial shock. Accordingly, we also find that as much as 33% of the variation in GDP can be explained by variations in governance. Therefore, our results bring support to the institutional view of economic growth, with better governance fostering higher growth.

Keywords: Governance; growth; cross-country; panel var.
JEL Classification: O43, C33.

Resumo

Neste artigo, exploramos a relação dinâmica que há entre crescimento econômico e diversas medidas de qualidade de governança para uma ampla amostra de países. A partir de uma abordagem VAR em painel, que nos permite considerar características invariantes no tempo intrínsecas a cada país, mostramos que choques sobre a qualidade da governança exercem, em média, impactos positivos sobre o crescimento, cujos efeitos se mantém significativos por mais de dez anos após o choque inicial. Encontramos ainda que até 33% da variação do PIB nestes países pode ser explicada por variações na qualidade da governaça. Nossos resultados, portanto, trazem apoio à visão institucional de crescimento econômico, na qual uma melhor governaça fomenta um maior crescimento.

Palavras-chave: Governança; crescimento econômico; VAR em painel.
Classificação JEL: O43, C33.

Área ANPEC: 6 - Crescimento, Desenvolvimento Econômico e Instituições

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1 Introduction

Since the seminal work of North (1990), the debate about the determinants of long-run growth has acknowledged the important role played by political and economic institutions in the process of economic development. In fact, there is a belief that differences in institutions constitute one of the fundamental explanations for differences in economic growth across countries - a view that gained popular appeal from contributions such as Acemoglu, Johnson & Robinson (2001), among others. The institutional view shifts away from the traditional focus on elements such as innovation and capital factor accumulation, and centers on the incentive structures inherent to the way societies are organized. A complementary and, in some sense, opposing view is that geography also matters for economic development and it may also matter for the kind of institution implemented in a specific society (Bloom & Sachs, 1998; Gallup & Sachs, 2001; Sachs, 2003). However, authors like Rodrik et al. (2004) argue that once institutions are controlled for, measures of geography have little effect on economic growth.[1]

One of the ways societies are organized can be represented by its governance structure, which it can be defined, in a broad sense, as the traditions and practices carried out by political institutions in the exercise of their authority. Studying the different aspects of governance helps us to characterize how good or efficient the public administration of a country is and how influential it can be to the lives of ordinary citizens. The quality of public services, the implementation of sound public policies, the enforcement of property rights and the absence of corruption are some examples of measures of good governance. The extent to which these elements relate to economic growth and whether any causal relationship can be established has been a matter of discussion in recent literature (e.g. Kaufmann & Kraay, 2002; Kurtz & Schrank, 2007).

This paper aims to contribute to this debate by exploring the dynamic relationship among several measures of governance and economic growth across a wide sample of countries. In particular, we investigate how shocks to governance affect growth performance and vice-versa. Our measures of governance quality are taken from the database first presented in Kaufmann et al. (2000), which provides indicators on six dimensions of governance for 215 countries over a period of 18 years. As in Góes (2016), we implement a Panel Structural Vector Autoregression (Panel VAR) model to estimate the dynamic relationships and the effects of interest. Within that framework, we also promote an assessment on the effect of this relationship on the distribution of growth in these countries, by observing how a measure of inequality jointly evolves with the other variables during the period of analysis.

By relying on the panel VAR methodology we are able to investigate the dynamic structure of the existing relationship between governance and growth across countries and over time. One of the advantages over a traditional VAR is the possibility to include fixed effects coefficients to also account for time invariant characteristics intrinsic to each country in our sample. In addition, this methodology exploits the panel structure of the data (short T and large N) that would not be reliable in a traditional VAR estimation. As in the VAR methodology, we implement an identification scheme to recover structural impulse-response functions (IRFs) and assess the dynamic effects of exogenous shocks to each variable in the system.

Our results show that, on average, shocks to governance quality positively impact economic growth and that this effect remains significant for more than ten periods thereafter. We also find that as much as 33% of the variation in GDP growth can be explained by variations in

[1] Although we acknowledge the importance of this debate, in this paper, we take a different perspective by assuming that differences in geography are time invariant and thus are captured in our country-specific fixed effects estimates.

governance. However, when we account for inequality,the model is less able to map any significant influence from governance in the direction of either growth or inequality, although both variables continue to exert significant effects on governance in positive and negative directions, respectively.

Our findings are related, more directly, to the branch of the literature that investigates the relationship between economic growth and the various aspects that define good governance, an effort that extends both to theoretical (e.g. Gradstein, 2004) as to empirical grounds (e.g. Mauro, 1995; Kaufmann & Kraay, 2002). By considering how this relates to income distribution, we also join recent contributions investigating the effects of growth on inequality (e.g. Brueckner et al., 2015). From a methodological point of view, our work follows the innovative step of taking the VAR approach into the literature delving in the relationship between economics and institutions (e.g. Góes, 2016).

The remainder of the paper is organized as follows. In section 2 we give the details on the datasets used. In section 3 we present our empirical methodology. Section 4 discusses the results. Finally, conclusions are presented in section 5.

2 Data

Our main measures of governance are from the Worldwide Governance Indicators (WGI) project, which provides cross-country composite indicators on six broad dimensions of governance over the period of 1996 to 2014.[2] In our analysis, we treat each indicator as a separate variable and label them accordingly, as shown in Table 1. The table also presents a description of each variable as provided by the source.

[Table 1 about here.]

The WGI data is largely perception-based in the sense that it is a combination of different views on the quality of governance from survey respondents and public, private and non-government organization sector experts, compiled from more than than 30 individual data sources. Final estimates for each country are reported in units of a standard normal distribution (with mean zero and standard deviation of one) and run between approximately -2.5 to 2.5, with higher values corresponding to better governance. Standard errors for each value are also reported, reflecting the extent to which the underlying data sources agree with one another.

We choose "Government Effectiveness" (Gov^{GE}) as the indicator for which we will derive our baseline analyses, since its description includes what we consider as more observable measures of governance quality, such as: political independence, effectiveness in policy implementation and general quality of public services. Figure 1 shows OLS plots from pooled correlation between Gov^{GE} and the other variables, revealing a high degree of correlation between them.[3]

[Figure 1 about here.]

To measure differences in growth trends both within and between countries, we use figures for GDP per capita in constant 2005 U.S. dollars from the World Development Indicators.[4] For our measure of inequality, we use the Gini indexes compiled in the All the Ginis Dataset,

[2] Available at http://info.worldbank.org/governance/wgi/, retrieved on June the 1st, 2016.

[3] Alternatively, correlations using panel OLS with fixed effects yields the same results.

[4] Available at http://data.worldbank.org/data-catalog/world-development-indicators, retrieved on June the 1st, 2016.

the most comprehensive dataset on inequality available.[5] The final merged data with intersected information on growth and the six measures of governance comprises 2970 unbalanced observations for 208 countries and 16 years (between 1996 and 2002, the WGI reported its estimates once every two years and from 2003 on, reports are yearly). When we condition it to the available information on inequality, our sample drops to 906 observations.

3 Methodology

We construct a panel VAR model with $Y_{it} = [Growth_{it}, Gov_{it}]'$ as our vector of k endogenous variables for country i at time t. Each indicator presented in Table 1 will be analysed separately, so we refer to them in this section with a general term, Gov_{it}. In our main specification, $Growth_{it} \equiv \log(GDP)_{it}$ and thus $k = 2$. In our secondary specification, $Growth_{it} \equiv [\log(GDP)_{it}, Gini_{it}]'$ and $k = 3$, since we consider inequality as being a component of growth. The reduced form dynamic relationship among our endogenous variables can be described by:

$$Y_{it} = A_{0i} + A(\ell)Y_{t-1} + u_{it} \qquad i = 1, ..., 208 \quad t = 1996, ..., 2014 \tag{1}$$

where A_{0i} is a $k \times 1$ vector of time-invariant country-specific intercepts, $A(\ell)$ are $k \times k$ matrices of lagged coefficients, $A(\ell) \equiv \sum_{j=1}^{p} A_j \ell^{j-1}$, that collects the own- and cross-effects of the ℓth lag of the dependent variable on their current observations. Finally, u_{it}, is a $k \times 1$ vector of idiosyncratic disturbances where $\mathrm{E}(u_{it}) = 0$, $\mathrm{E}(u_{it}u_{it}') = \Sigma_u$ (being Σ_u a nonsingular matrix) and $\mathrm{E}(u_{is}u_{it}') = 0$ for $t \neq s$.

The country-specific intercepts, A_{0i}, in equation (1) are correlated with the error term, and thus estimation through OLS will lead to biased coefficients. A common strategy to deal with this, particularly in settings where N is large and T is fixed, is to implement a transformation in the model to eliminate the individual fixed-effects and then make use of GMM estimation methods using lagged observations as instruments. We follow the approach in Arellano & Bover (1995) and rewrite (1) in terms of forward orthogonal deviations. That is, for every element $y_{it} \in Y_{it}$,

$$y_{it}^{*} = (y_{it} - \overline{y_{it}}) \sqrt{\frac{T_{it}}{T_{it} + 1}} \tag{2}$$

where T_{it} is the number of available future observations for country i at time t and $\overline{y_{it}}$ is its average. This kind of transformation has some advantages over simple first-differences. By using deviations from an average instead of from another observation, forward orthogonal deviations reduces data loss and is less hampered by varying gaps between observations, which is the case in unbalanced panels. Following Holtz-Eakin, Newey & Rosen (1988), the instruments list is composed by observed realizations only, with missing observations substituted by zero.[6]

[5] Available at http://data.worldbank.org/data-catalog/all-the-ginis, retrieved on June the 1st, 2016. This dataset includes combined and standardized Gini data from eight different sources: Luxembourg Income Study (LIS), Socio-Economic Database for Latin America (SEDLAC), Survey of Living Conditions (SILC) by Eurostat, World Income Distribution (WYD), World Bank Europe and Central Asia dataset, World Institute for Development Research (WIDER), World Bank Povcal, and Ginis from individual long-term inequality studies.

[6] These steps were originally structured in Abrigo & Love (Abrigo & Love), who also provides the computational routine we use in this paper. As detailed in Roodman (2009), from the hypothesis that instruments are orthogonal to the error term, the GMM estimator for A_j in (1) takes the form $\hat{A}_j = (X^{*\prime}ZWZ'X^{*})^{-1}(X^{*\prime}ZWZ'Y^{*})$, where Y^{*} is a vector with transformed variables in the left-hand side for the model, X^{*} is a matrix with lagged

To identify the structural shocks, we impose a restriction on the variance-covariance structure of the residuals so that Σ_u takes the form of an lower-triangular matrix. This Cholesky ordering is based on two premises. First, we posit that a country's economic performance precedes the distribution of its resources, and therefore we set $Gini_{it}$ to have no contemporaneous influence on $\log(GDP)_{it}$. Second, because our measures of governance are perception-based measures, as discussed in section 2, we believe them to be the most endogenously-defined elements of our model, and so both variables in $Growth_{it}$ are able to contemporaneously impact Gov_{it} whereas the reverse is not allowed. Therefore, the entry ordering in our baseline model is given by $Y_{it} = [\log(GDP)_{it}, Gov_{it}]'$ while in the model that includes inequality the ordering is $Y_{it} = [\log(GDP)_{it}, Gini_{it}, Gov_{it}]'$.

For the purpose of recovering impulse response functions, we rewrite equation (1) as $B(\ell)Y_{it} = u_{it}$, where $B(\ell) = (I_k - A(\ell))$. As described in Lütkepohl (2005), if every eingenvalue in $A(\ell)$ is less than 1 in modulus, than $B(\ell)$ will satisfy the stability condition and be invertible. The calculated values $B(\ell)^{-1} = \Phi(\ell) = \sum_{j=0}^{\infty} \Phi_j \ell^j$ will then be the parameters of the MA representation of our model, $Y_{it} = \Phi(\ell)u_{it}$, where

$$\Phi_j = \begin{cases} I_k, & j = 0 \\ \sum_{j=1}^{i} \Phi_{t-j} A_j, & j = 1, 2, ... \end{cases} \tag{3}$$

Since the disturbances u_{it} are contemporaneously correlated, stochastic shocks to one variable are likely to be accompanied by shocks in other variables, which prevents us from drawing causal interpretations. However, the imposed Cholesky ordering allows the decomposition $\Sigma_u = P'P$, where P is also an lower-triangular matrix. It is then possible to orthogonalize disturbances as $P^{-1}u_{it}$ (which will have covariance matrix $P^{-1}\Sigma_u(P^{-1})' = I_k$) and transform the MA parameters into orthogonalized impulse-responses, $\Phi_i P$. That way shocks to one variable will independently provoke dynamic responses in the other variables of the system.

4 Results

Our results are presented in two parts. First we show our main results for what we define as our baseline model, conducting more thorough evaluations in this part. Then we broaden our discussion with alternative specifications in a subsequent section for robustness.

4.1 Baseline

Our baseline specification consists of two panel VAR's models built so to evaluate the interaction between economic growth and governance quality for a wide sample of countries. In our first model, the vector of endogenous variables is composed by $Y_{it} = [Log(GDP)_{it}, Gov_{it}^{GE}]'$, where $Log(GDP)_{it}$ and Gov_{it}^{GE} are our respective measures of economic growth and governance quality as described in sections 2 an 3. In choosing our model optimal lag length, we rely on a set of consistent moment and model selection criteria proposed by Andrews & Lu (2001) and recommended for Panel VAR models by Abrigo & Love (Abrigo & Love). According to those criteria, our models should be estimated using only one lag.[7]

transformed variables in its right-hand side and W is a weighting matrix assumed to be non-singular, symmetric and positive semi-definite, chosen so as to maximize efficiency.

[7] Values by criterion are reported in table 4, in appendix B. Andrews & Lu's (2001) criteria are based on Hansen's J statistic of over identifying restrictions and are analogous to various commonly used maximum likelihood-based model selection criteria such as the AIC, the BIC and the HQIC. As an alternative, we also

We also check the stability condition and observe that the eingenvalues of the matrix of estimated coefficients are strictly less than one.[8] After the estimation, we therefore proceed in calculating impulse-responses, whose plots are displayed in Figure 2. The results comply with the institutional view by showing that shocks to Gov^{GE}, our measure of governance, incur in a positive and statistically significant impact on $Log(GDP)$, remaining so after ten years from the shock. We also show that shocks in $Log(GDP)$ carry a positive effect to Gov^{GE}, which remains statistically significant up to ten periods after the initial shock.

[Figure 2 about here.]

In order to evaluate the relative cumulative contribution of each of the variables to the overall behaviour of our model, we complement our analysis by also performing forecast-error variance decompositions. Results are presented in table 3, with estimates separated in two-periods intervals and spanning a total forecast horizon of ten periods. Based on such estimates, we find that 8% of variation on Gov^{GE} can be explained by $Log(GDP)$. Most noticeably, we also find that as much as 33% of the variation in $Log(GDP)$ can be explained by variations in Gov^{GE}. Therefore, better governance plays an important role in explaining the course of a country's economic growth.

[Table 2 about here.]

Our next step will be to analyse how the variables of the first specification influence each country's figures for income inequality throughout the period of analysis. The resulting vector of endogenous variables will now be $Y_{it} = [Log(GDP)_{it}, Gini_{it}, Gov^{GE}_{it}]$, where $Gini_{it}$ is defined as our measure of inequality. As previously discussed, this secondary specification aims to improve our comprehension on how better governance also relates to income distribution across countries and over time. We must, however, take the care of assigning a lesser dimension to the following results, considering the greater unbalanceness and reduction of our sample size that comes as a consequence in this specification, as we pointed out in section 2.

Impulse-response plots in Figure 3 show that shocks to $Log(GDP)$ impact $Gini$ in a negative direction, meaning that, on average, inequality is reduced following a shock on $Log(GDP)$. As before, $Log(GDP)$ impacts Gov in a positive direction and both relationships remain significant up to ten periods after the shock. Shocks to $Gini$, that is, higher inequality, impact both $Log(GDP)$ and Gov^{GE} in a negative direction, translating into less growth and less governance quality. Finally, in this specification, the responses of $Log(GDP)$ and $Gini$ to an improvement Gov^{GE} are not statistically different from zero. Variance decomposition in Table 3 further shows that 17% of the variation in $Log(GDP)$ can be explained by variations in $Gini$, and that Gov^{GE} only marginally explains variations in other variables.

[Figure 3 about here.]

[Table 3 about here.]

report the overall coefficient of determination (CD) of the model. These criteria and their use for selecting optimal lag orders for panel VARs models are also outlined in, and suggested by, Abrigo & Love (Abrigo & Love).

[8] Figure 6 in appendix A graphically shows the estimated values of the roots for the companion matrix, which confirm that the model is stable.

4.2 Robustness

Our first robustness exercise is to replace the variable Gov_{it} in Y_{it} by one of the five other measures of governance not considered in the baseline model and evaluate how results deviate from their original specifications. In each case, results remain qualitatively unchanged, with shocks to both variables for growth and governance exerting positive and significant impacts in one another. Although the effect from a shock in $Log(GDP)$ more rapidly fades away when Gov_{it}^{RQ} and Gov_{it}^{CC} are the response variables, as we see in Figure 4.[9]

[Figure 4 about here.]

We proceed in the same way as before and expand our set of endogenous variables to account for income distribution in each of the alternative specifications. Figure 5 shows the resulting impulse-response plots between each of the variables included in each different system, where we vary between the definitions of Gov.[10] Overall, an improvement in governance, as represented by the alternative measures we use in this paper, has a positive impact on $Log(GDP)$, as in our baseline specification, except for regulatory quality. It is possible that better regulatory quality perception may be a result of tighter regulation, which may harm growth in the first years after the shock. However, over time the negative effect disappears completely. It is also interesting to notice that a shock to $Log(GDP)$ yields similar results to other governance measures, i.e., a positive shock to $Log(GDP)$ improves governance.

[Figure 5 about here.]

Our next exercise is to test for alternative Cholesky orderings for the two baseline specifications. For our first model, this consists on simply inverting the ordering between the two variables in the system, $Log(GDP)$ and Gov^{GE}. For the second model, we test for the five alternative orderings between variables $Log(GDP)$, Gov^{GE} and $Gini$. Results obtained for each specification and alternative ordering are virtually equivalent to the previous ones, bearing in mind the respective constraints that each different sorting imposes on the correlations between variables in the first periods. The previous interpretations are therefore also valid, and the impulse-response graphs are not reproduced for the purpose of saving space.

5 Conclusion

In this paper, we use a comprehensive cross-country dataset with perception-based measures of governance quality to study the relationship between governance and economic growth. We rely on a panel VAR approach to study this relationship, which allows us to account for country-specific fixed effects, and focus on impulse-response analysis to evaluate the effects of shocks to governance on economic growth.Variance decomposition is also performed in order to assess the importance of those effects.

We find that, on average, shocks to governance quality positively impact economic growth and this effect remains significant for more than ten years thereafter (the inverse relationship

[9] We reproduce plots for the system where Gov^{GE} is our governance variable to facilitate comparisons and, in order to save space, we do not show impulse-response plots within a same variable. Prior to calculating each plot, we check for the same modelling conditions regarding number of lags and system stability and see that both provide the same answers as before.

[10] As in table 4, we do not show plots of resulting effects within a same variable in order to save space and neither the effects between $Log(GDP)$ and $Gini$, since they do not bring new insights with respect to the baseline results.

is also observed). We also find that as much as 33% of the variation in GDP across countries and over time can be explained by variations in governance quality. Therefore, our results bring additional support to the institutional view of economic growth, with better governance fostering higher growth.

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Appendices

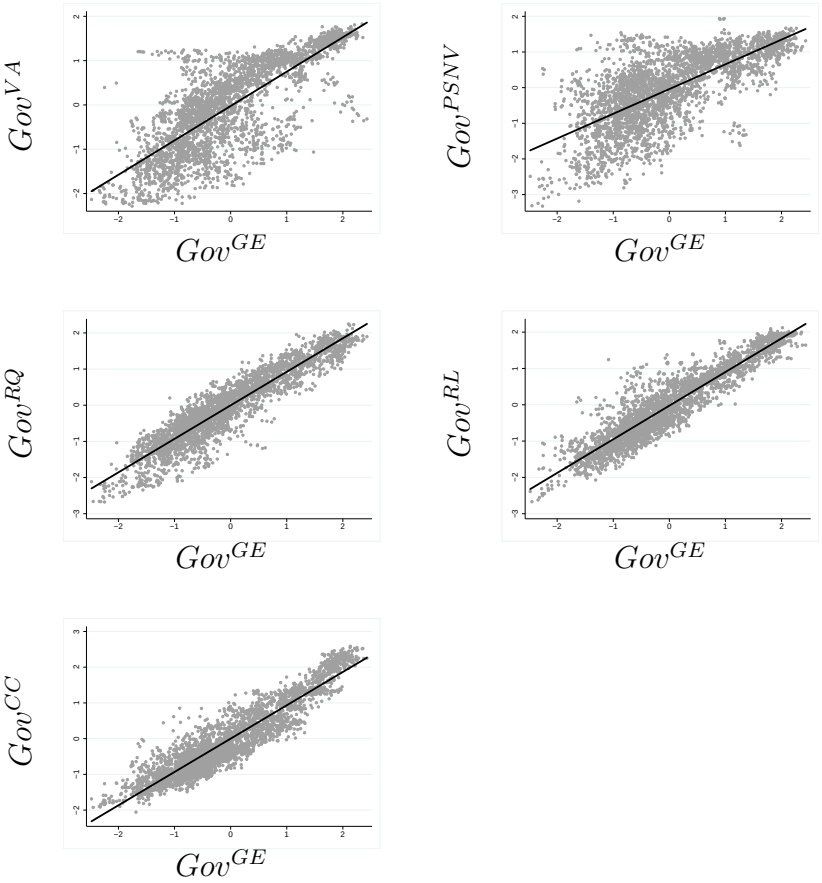
A Additional Figures

[Figure 6 about here.]

B Additional Tables

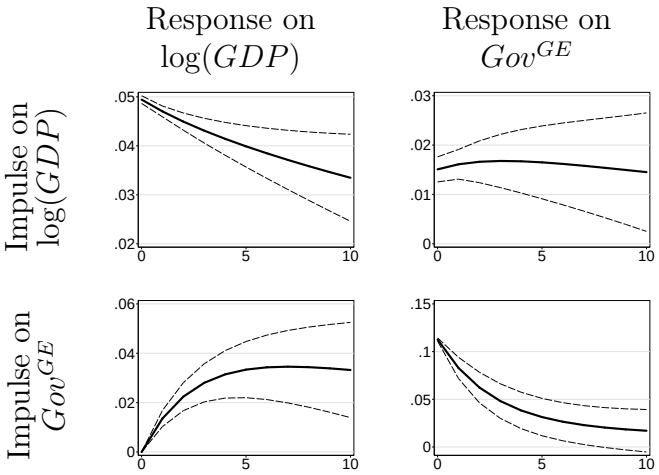
[Table 4 about here.]

Figure 1: Correlation Plots between Governance Estimates



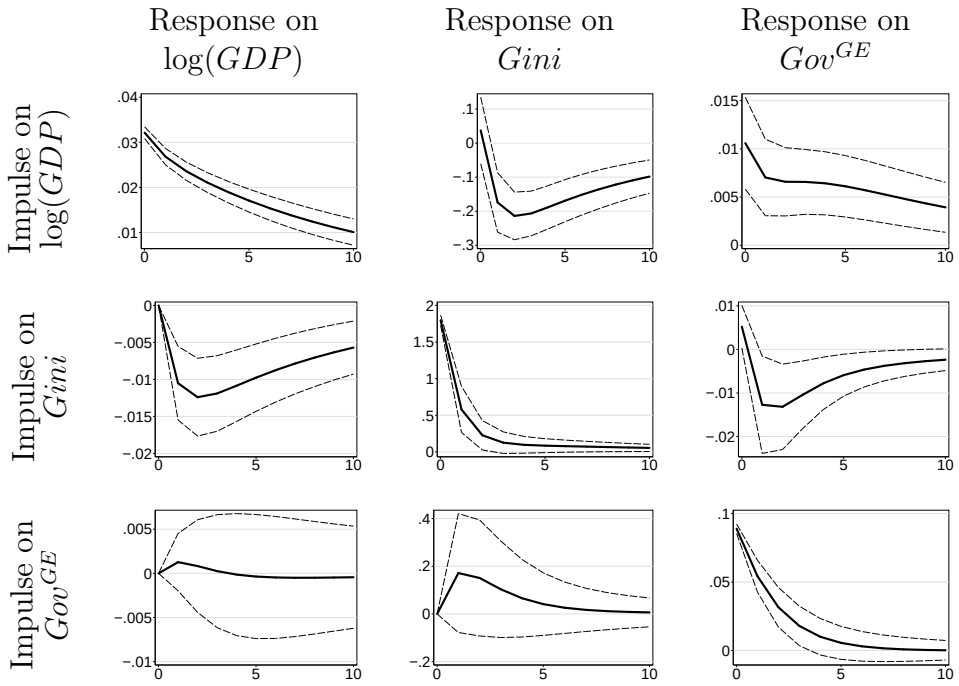
Notes: Each graph shows OLS plots from pooled correlation between Gov^{GE}, indicated in the x-axis, and the estimate indicated in the y-axis.

Figure 2: Growth and Governance: Impulse-Responses



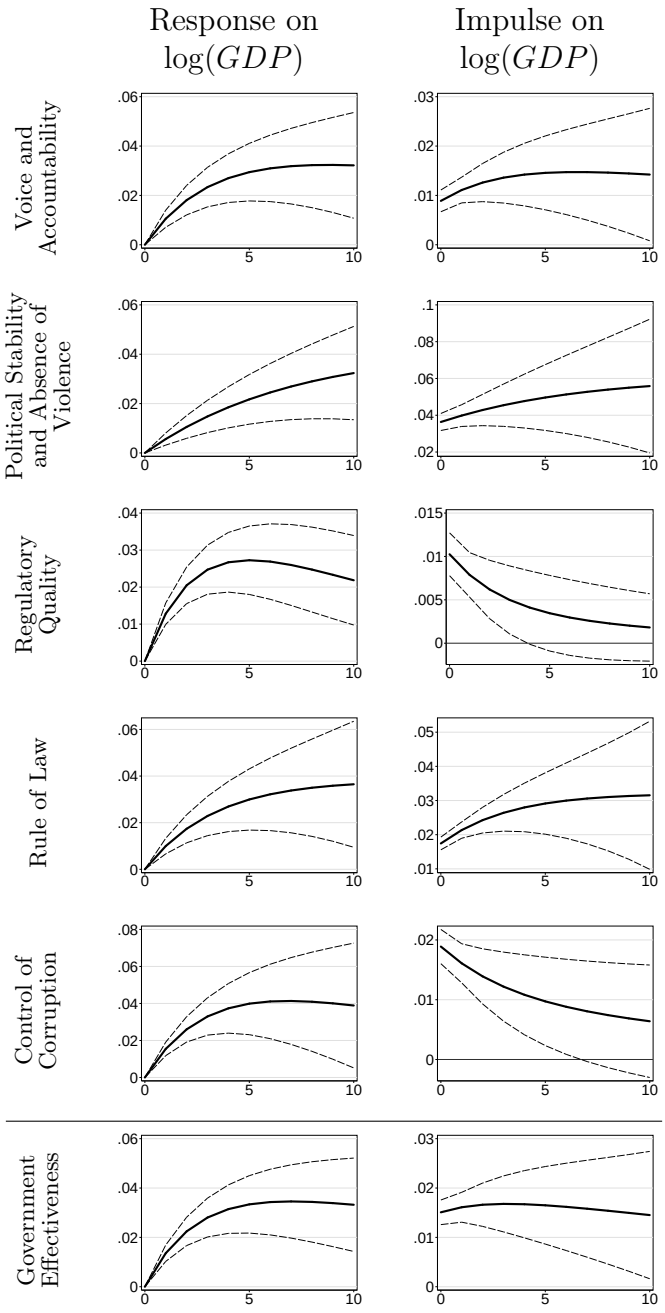
Notes: The column on the left contains the plots of the responses from $\log(GDP)$ to a shock of one standard deviation in each indicated variable. The column on the right are the responses from Gov^{GE} to a shock of one standard deviation in each indicated variable. The solid lines correspond to the median responses to the shocks in a ten period horizon and the dashed lines are 68% confidence interval.

Figure 3: Growth, Inequality and Governance: IRF Plots - Baseline



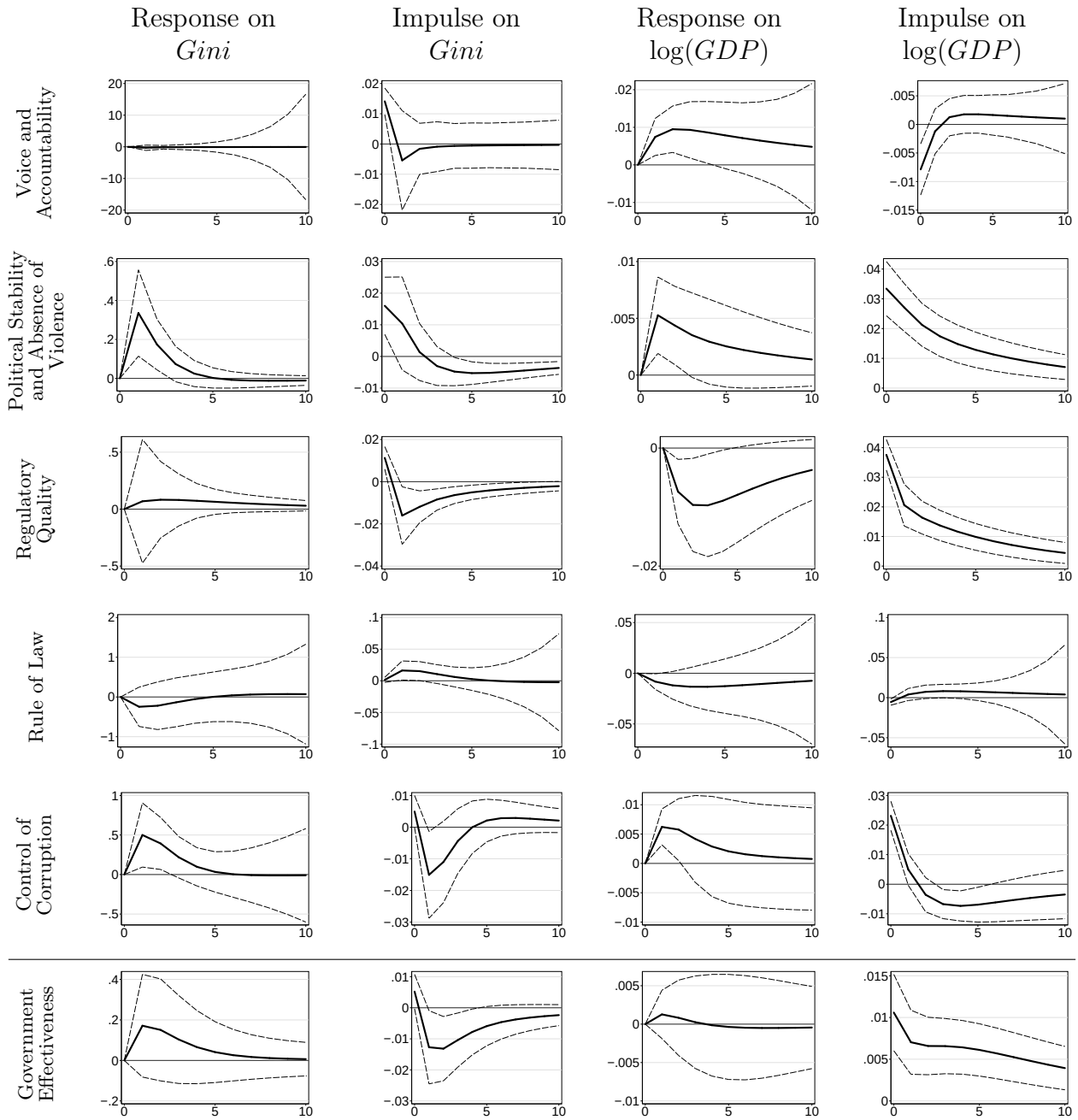
Notes: The column on the left contains the plots of the responses from $\log(GDP)$ to a shock of one standard deviation in each indicated variable. The column on the center contains the plots of the responses from $Gini$ to a shock of one standard deviation in each indicated variable The column on the right are the responses from Gov^{GE} to a shock of one standard deviation in each indicated variable. The solid lines correspond to the median responses to the shocks in a ten period horizon and the dashed lines are 68% confidence interval.

Figure 4: Growth and Governance: IRF Plots



Notes: The column on the left contains the plots of the responses from $\log(GDP)$ to a shock of one standard deviation in the Gov^{Index} referenced in each row. The column on the right are the responses from each Gov^{Index} to a shock of one standard deviation in $\log(GDP)$. For comparative purpsoes, we replicate the correspondent results from Figure 2 in the last row. The solid lines correspond to the median responses to the shocks in a ten period horizon and the dashed lines are 68% confidence interval.

Figure 5: Growth, Inequality and Governance: IRF Plots



Notes: The first column, from left to right, contains the plots of the responses from *Gini* to a shock of one standard deviation in the Gov^{Index} referenced in each row. The second column are the responses from each Gov^{Index} to a shock of one standard deviation in *Gini*. The two columns on the right repeat this same exercise between each Gov^{Index} and $\log(GDP)$. For comparative purpsoes, we replicate the correspondent results from Figure 3 in the last row. The solid lines correspond to the median responses to the shocks in a ten period horizon and the dashed lines are 68% confidence interval.

Figure 6: Roots of the companion matrix

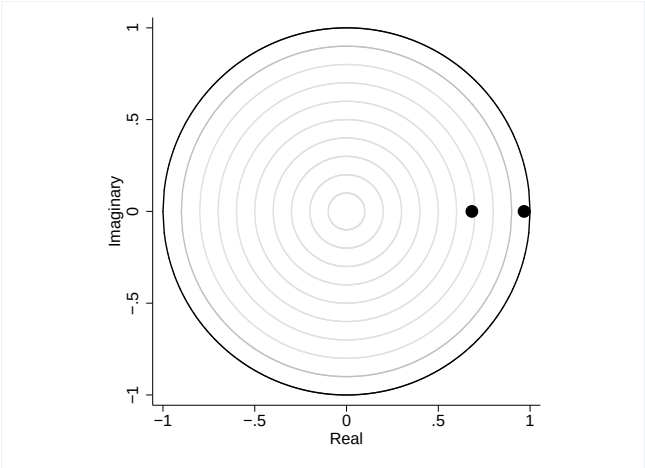


Table 1: Description of the Governance Variables

Variable Name	Governance Indicator	Description
Gov^{VA}	Voice and Accountability	*"Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media."*
Gov^{PSNV}	Political Stability and Absence of Violence	*"Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism."*
Gov^{GE}	Government Effectiveness	*"Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."*
Gov^{RQ}	Regulatory Quality	*"Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development."*
Gov^{RL}	Rule of Law	*"Reflects 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, and the courts, as well as the likelihood of crime and violence."*
Gov^{CC}	Control of Corruption	*"Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests."*

Note: data from Worldwide Governance Indicators. Available at http://info.worldbank.org/governance/wgi/.

Table 2: Growth and Governance: Variance Decomposition

Forecast	Impulse Variable	
Horizon	$Log(GDP)$	Gov^{GE}
	Panel A: Response on $Log(GDP)$	
2	.9618028	.0381972
4	.8526133	.1473866
6	.7678852	.2321148
8	.7118096	.2881903
10	.6748052	.3251948
	Panel B: Response on Gov^{GE}	
2	.0242963	.9757037
4	.0389727	.9610273
6	.053558	.946442
8	.0668315	.9331685
10	.0784127	.9215873

Note: Percent (in unitary values) of variation in the variable in each panel explained by column variable for 2, 4, 6, 8 and 10 periods ahead.

Table 3: Growth, Inequality and Governance: Variance Decomposition

Forecast	Impulse Variable		
Horizon	$Log(GDP)$	$Gini$	Gov^{GE}
	Panel A: Response on $Log(GDP)$		
2	.939777	.0593591	.0008638
4	.8707502	.1285049	.0007449
6	.8454966	.1538806	.0006227
8	.8343	.1650518	.0006482
10	.8284671	.1708381	.0006948
	Panel B: Response on $Gini$		
2	.008741	.9831522	.0081068
4	.0314705	.9520702	.0164592
6	.0471701	.935196	.0176339
8	.0569795	.9253812	.0176392
10	.0631912	.9192722	.0175366
	Panel C: Response on Gov^{GE}		
2	.0144331	.0168514	.9687156
4	.0192593	.0364725	.9442682
6	.0247818	.0428609	.9323574
8	.0291037	.0451906	.9257058
10	.0321083	.0462804	.9216113

Note: Percent (in unitary values) of variation in the variable in each panel explained by column variable for 2, 4, 6, 8 and 10 periods ahead.

Table 4: Criterias for lag order selection

	Lag		
	1	2	3
CD	.9999733	.9999713	.9999631
J	17.86431	12.61729	4.954458
J (p-value)	.119873	.1257135	.2920024
MBIC	-71.29706	-46.82362	-24.766
MAIC	-6.135687	-3.382711	-3.045542
MQIC	-30.26868	-19.47137	-11.08987