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Institutions, growth and economic stability

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Abstract

This paper investigates the effects of institutions on the countries economic performance, controlling for some macroeconomic policies and disaggregating the impacts by income levels. The empirical analysis considers a balanced panel of 118 countries from 2002 to 2016 and estimates impulse response functions by a Panel VAR model. A positive shock in institutional efficiency increases GDP per capita, reduces government consumption over GDP, and decreases the volatilities of these variables. Institutional improvements raise public spending efficiency, leading to a drop in government size and a simultaneous rise in GDP. Fiscal policy is more sensitive to institutional improvement, constituting an important channel of transmission of the effects of institutions for economic performance. Under all scenarios, the gain in institutional efficiency is more relevant for countries with lower levels of income.

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1. Introduction

The economic performance of countries exhibits peculiarities that differentiate them throughout history, whether in the context of institutions, technology, natural resources and other intrinsic aspects. Emphasizing the role of institutions, North (1981) argues that their effects on economic performance vary widely, so that some economies develop institutions that promote growth and development, while other economies develop institutions that produce stagnation. This indicates that it is important to incorporate institutional analysis into the study of countries' economic growth.

This view has received wide support over the last few decades, when a number of papers have sought to investigate the role of institutions for the economic growth of countries, especially Jones (1981), Olson (1982), Krusell and Rijos-Rull (1996), Hall and Jones (1999), Acemoglu, Johnson and Robinson (2002) and Acemoglu et al. (2003).

This paper investigates the relationship between institutions and countries' economic performance through the estimation of a panel vector autoregressive (PVAR) model, using the GMM approach. Recently, Góes (2016) estimated a panel structural vector autoregression (SVAR) model and provided evidence of bi-causality between institutions and economic growth. We contribute to the literature by investigating the effects of institutional improvements on economic stability, in addition to economic growth and variables related to fiscal and monetary policies. We disaggregate the effects by groups of countries according to income levels. The analysis considers a balanced panel of 118 countries for the period from 2002 to 2016. The PVAR methodology allows estimating impulse-response functions that show the effects of a positive shock on institutions to the economic performance and other macroeconomic variables of the countries.

The inclusion of variables related to macroeconomic policies allows investigating whether fiscal and monetary policies, commonly considered as causes of instabilities and low economic performance when mismanaged, are influenced by improvements in the institutional efficiency. Moreover, this modeling strategy might reveal if these policies could work as channels of transmission for the effects of institutions on the economic performance.

Our identification strategy is based on the argumentation provided by Acemoglu et al (2003), who claimed that distortionary macroeconomic policies are more related to institutional weakness than to economic volatility and that the effects of institutional differences on volatility are not mediated by any standard macroeconomic variable. Acemoglu et al (2003) used the constraint on the executive variable from the Polity IV dataset as measure of institutional efficiency and estimated ordinary least square (OLS) and two-stage least square (2SLS) regressions to illustrate how institutions and macroeconomic policies might affect macroeconomic performance.

The efficiency of institutions is intrinsically related to the government's ability to formulate and implement policies and regulations effectively. Regulatory quality, government integrity, judicial effectiveness and property rights are some dimensions that reflect the level of institutional efficiency. In this sense, we consider the indicator of regulatory quality, developed by Kaufmann et al. (2011) and available from the World Bank, as the proxy representative of the efficiency of the institutions.

The results show that a positive shock on institutional efficiency increases GDP per capita, leading to a peak of 1.17% in the second year after the shock, and this effect is even greater for low-income countries. For economic stability, the institutional efficiency shock reduces GDP per capita volatility, leading to a drop of 8.15% in the third year after the shock. Institutional improvement also has a more significant impact on the variable government spending over GDP than on the inflation rate. Thus, fiscal policy seems to be a more effective channel through which institutions affect economic performance.

2. Methodology

The dynamic relationship between the endogenous variables of the empirical model might be described by:

$$Y_{i,t} = A_{0i} + A(l)Y_{i,t-j} + f_i + u_{i,t} \quad (1)$$

where:
i = {1,...,118} and t = {2002,...,2016}
$Y_{i,t} = \{X_{i,t},\ I_{i,t}\ , Q'_{i,t}\}$
$Y_{i,t-j} = \{X_{i,t-j},\ I_{i,t-j}\ , Q'_{i,t-j}\}$, where j = 1, 2, ..., p

In this reduced form PVAR, $Y_{i,t}$ and $Y_{i,t-j}$ correspond to the sets of vectors of contemporary and lagged endogenous variables, respectively; f_i is the unobserved fixed effect and $u_{i,t}$ consists of the vector of random errors, where $E(u_{i,t}) = 0$, $E(u'_{i,t}u_{i,t}) = \sum_u$ and $E(u'_{i,t}u_{i,s}) = 0$ for $t >$s.[1] The matrices $A(l)$ capture the own and cross effects of the lagged variables, while A_{0i} is a diagonal matrix of intercepts.

Vector $X_{i,t}$ is composed by representative series of economic performance, where $X_{i,t}$ = log of annual per capita GDP in the first model specification, and $X_{i,t}$ = log of standard deviation of annual per capita GDP in the second specification. Vector $I_{i,t}$ is the indicator of regulatory quality, representing the efficiency of institutions. Variables related to the macroeconomic policies compose vector $Q'_{i,t}$.

Considering that f_i is correlated with the lagged dependent variables in dynamic panels and following Arellano and Bover (1995), the Helmert transformation is applied. This transformation allows the removal of fixed effects, preserving the orthogonality between the transformed variables and the lagged regressors, which are used as instrumental variables in GMM consistent estimation (Love and Zicchino 2006).

The impulse response functions are estimated using the Cholesky decomposition to identify the structural errors. Based on the argumentation provided by Acemoglu et al. (2003), the following ordering was considered: institutional efficiency, macroeconomic policies and economic performance. This identification strategy reflects the claim that the efficiency of institutions affects contemporaneously macroeconomic policies that, in turn, influence macroeconomic performance. As argued by Acemoglu et al. (2003), the macroeconomic performance reflects not only effects of distortionary macroeconomic policies but also institutional problems that might lead to those misleading policies.

The GMM approach has some important advantages, which includes estimating unbiased fixed-effects average coefficients that controls for time-invariant characteristics, calculating unbiased impulse response functions (IRFs), and avoiding reversal causality issues because the PVAR assumes endogeneity of all variables in the system. Some concerns, however, might refer to the possible omitted variable biases originated by shocks due to natural disasters, civil wars, political variables, and others. In our case, however, this is not an issue because some of these effects are country specific and, as such, are captured by the unbiased estimation of the fixed effect component. One shortcoming of the PVAR approach is the imposition of homogeneous dynamics across individuals. We will overcome this limitation by splitting the sample in groups of countries according to the level of income, as will be detailed later.

[1] These assumptions on the error vector are standard in the literature and are satisfied as long as the PVAR is well specified concerning the number of lags. Please, see footnote #4 for details on the lag selection criteria we have applied.

3. Results

3.1 Data

The balanced panel consists of 118 countries in the period from 2002 to 2016 on annual basis. The variables were extracted from the World Bank database.[2]

i. GDP per capita: log of annual GDP per capita at constant prices of 2010, in US dollar.
ii. GDP per capita volatility: standard deviation of the log of GDP per capita considering a rolling window of 5 years.[3]
iii. Inflation: annual percentage change in the consumer price index.
iv. Government consumption as a proportion of GDP: used as proxy for the government size.
v. Institutional efficiency: proxy given by the regulatory quality indicator, which captures the perception of government capacity to formulate and implement policies and regulations that promote private sector development. Developed by Kaufmann et al. (2011), this indicator is expressed in units of a standard normal distribution, with higher values indicating institutions that are more efficient.

Table 1 reports some descriptive statistics for the series of the panel. Each variable has 1,770 observations, except macroeconomic volatility because it is computed by the standard deviation of the log of GDP per capita for each country using a rolling window of 5 years.

Table 1*:* Descriptive Statistics

Variable	Observ.	Average	Std. Dev.	Min.	Max.
Regulatory quality indicator	1,770	0.144	0.870	-1.720	2.261
GDP per capita (US$)	1,770	13,258.01	19,275.09	177.82	119,172.70
Inflation (% p.a.)	1,770	5.424	6.062	-35.837	59.220
Gov. consumption (% GDP)	1,770	15.105	4.948	2.736	30.003
Macroeconomic volatility	1,298	6.376	1.549	2.601	9.713

Source: Authors' elaboration based on the World Bank data.

[2] We applied the Levin et al. (2002) (LLC) and Im et al. (2003) (IPS) panel data unit root tests and the results indicated that the panel is stationary. This means that structural breaks that might have affected specific countries during the sample period have not compromised the stationarity of the panel. In addition, the calculated eigenvalues were inside the unit circle, meaning that the PVAR is stable and shocks converge to zero over the long run. Therefore, shocks are temporary and the series return to their deterministic trends in the long run.

[3] The volatilities of inflation and government consumption over GDP were also calculated as the standard deviation of these series considering a rolling window of 5 years. Acemoglu et al. (2003) also uses the series standard deviation as proxy for volatility.

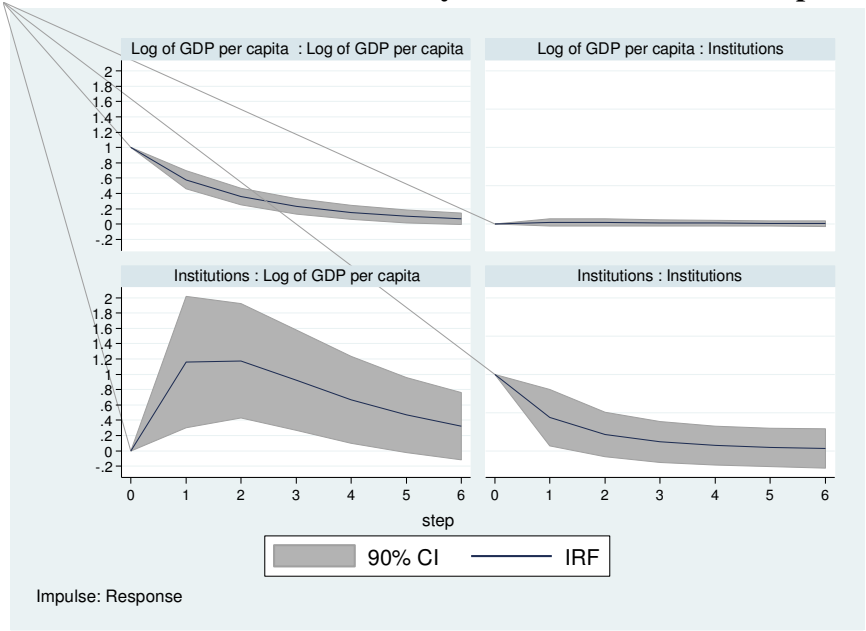
3.2 Impulse Response Functions

The impulse response functions estimated by the PVAR models showed the effects of a positive shock on institutions to the economic performance and other macroeconomic variables, after controlling for time-invariant characteristics of countries.[4]

3.2.1 Institutions and Economic Growth

The impulse response functions reported in Figure 1 show that, on average, a shock of 1 standard deviation (or unity) in efficiency of institutions raises GDP per capita immediately after the shock, leading to a peak of increase of 1.17% in the second year after the shock.[5] This effect remains positive and statistically significant until the fifth year after the shock. A positive shock on GDP, however, does not have any significant effect on institutional efficiency.

Figure 1: IRF for shocks on efficiency of institutions and GDP per capita



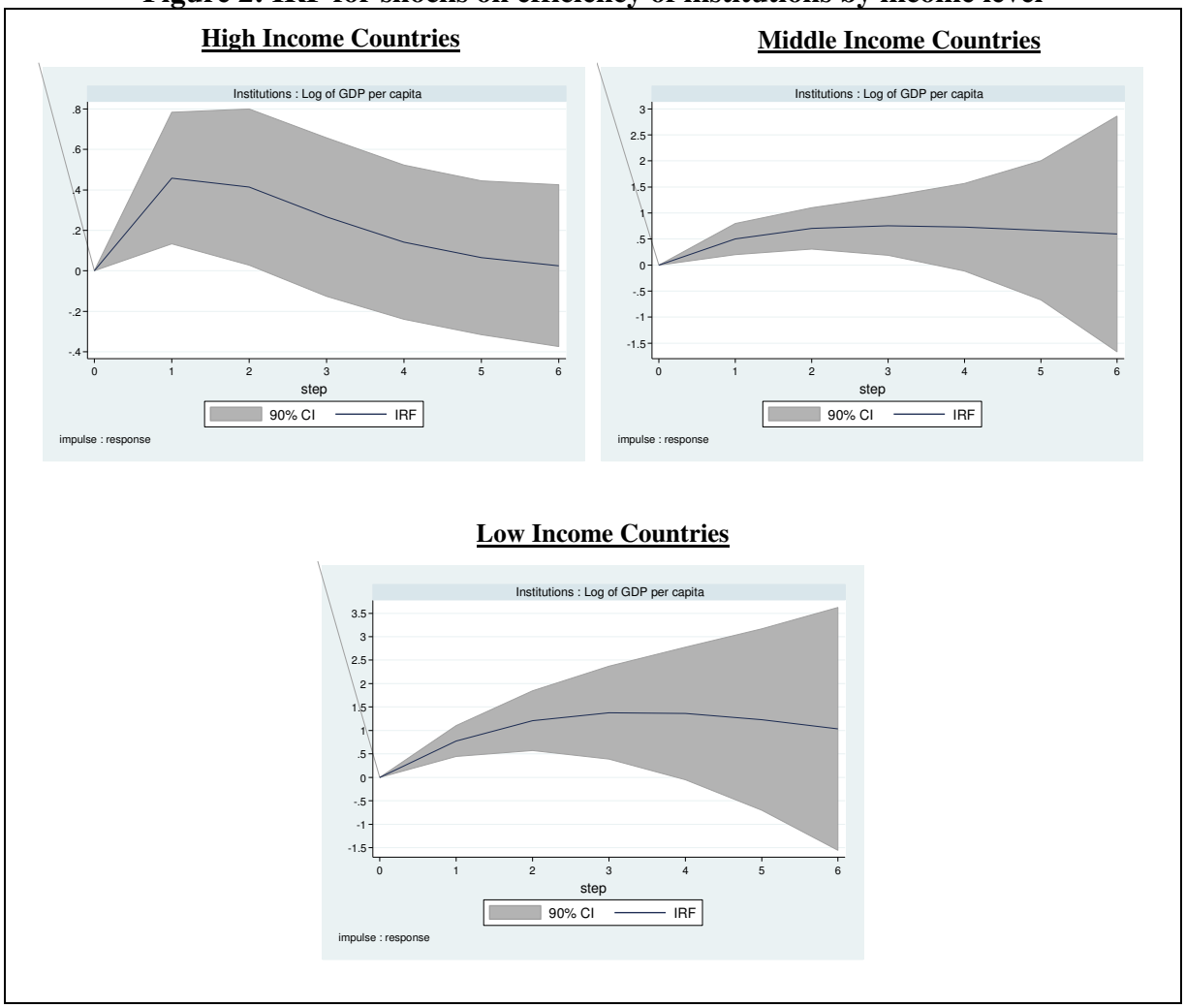
In order to analyze whether this dynamic differs between countries, the sample was splitted in groups of high, middle and low-income countries according to the classification established by the World Bank. As shown in Figure 2, for the group of high-income countries, the effects of an improvement in institutional efficiency on economic growth are significantly lower than the effects found in the full sample, with a peak increase of 0.46% in the first year after the shock. On the other hand, the responses for low-income countries are higher, with a peak of increase of 1.38%, and more persistent, lasting up to the fourth year after the occurrence of the shock. For middle-income countries, the most heterogeneous group, there is a peak of increase of only 0.75% in the GDP per capita path.

[4] The selection of the lag order of the PVAR models followed Andrews and Lu (2001), who proposed consistent selection criteria for GMM models, based on Hansen's (1982) H statistic, and Akaike's information criteria (AIC), Schwarz (SIC) and Hannan-Quinn (HQIC). The stability condition of PVAR was verified through the analysis of the inverse roots of the AR characteristic polynomial.

[5] We used Stata Version 13.0 software and codes developed by Abrigo and Love (2016) in the estimations.

Countries with higher levels of income are more developed and have stronger institutions. The improvement in the efficiency of the institutions generates smaller impacts on the economic growth of these countries compared to low and middle income countries that have weaker institutions. In this way, the effects of institutional improvement tend to be more relevant and significant for lower income countries with relatively weaker institutions.

Figure 2: IRF for shocks on efficiency of institutions by income level

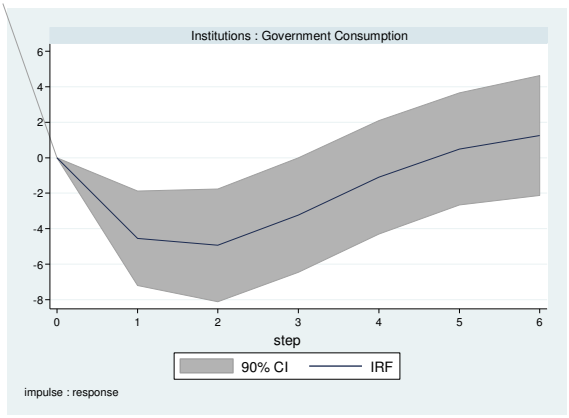


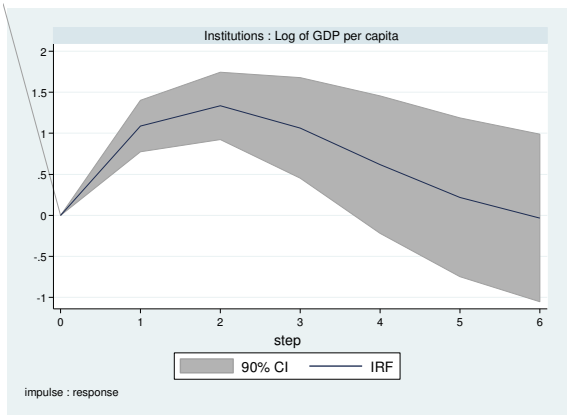
3.2.2 Institutions and Macroeconomic Policies

A positive shock on institutional efficiency, as shown in Figure 3, reduces overall government consumption over GDP significantly and persistently, peaking at 4.93% in the second year after the shock. On the other hand, this same shock does not generate statistically significant effects on inflation, considering the full sample of countries. Thus, by comparing the effects on these macroeconomic variables, one might infer that fiscal policy is more sensitive to institutional improvement, revealing an important channel through which institutions might affect economic performance.

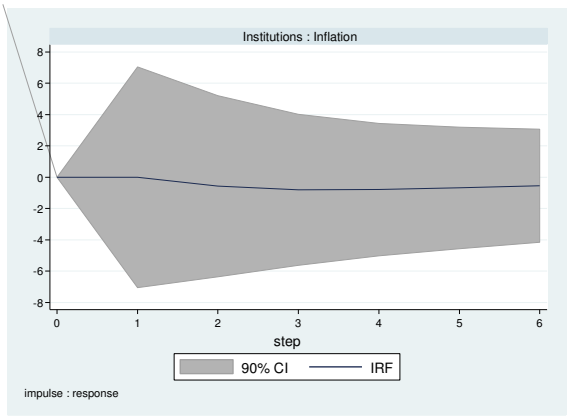
Figure 3: IRF for shocks on efficiency of institutions

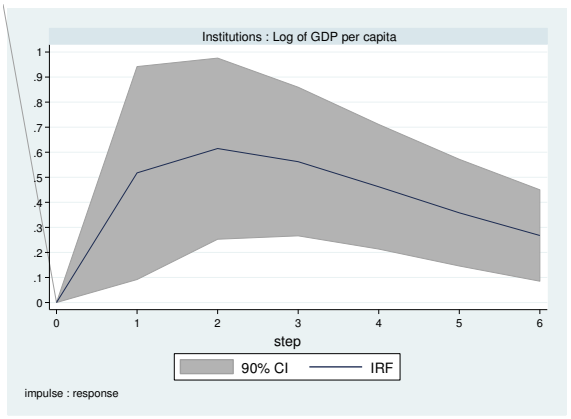
Response of government consumption and GDP per capita to a shock on efficiency of institutions





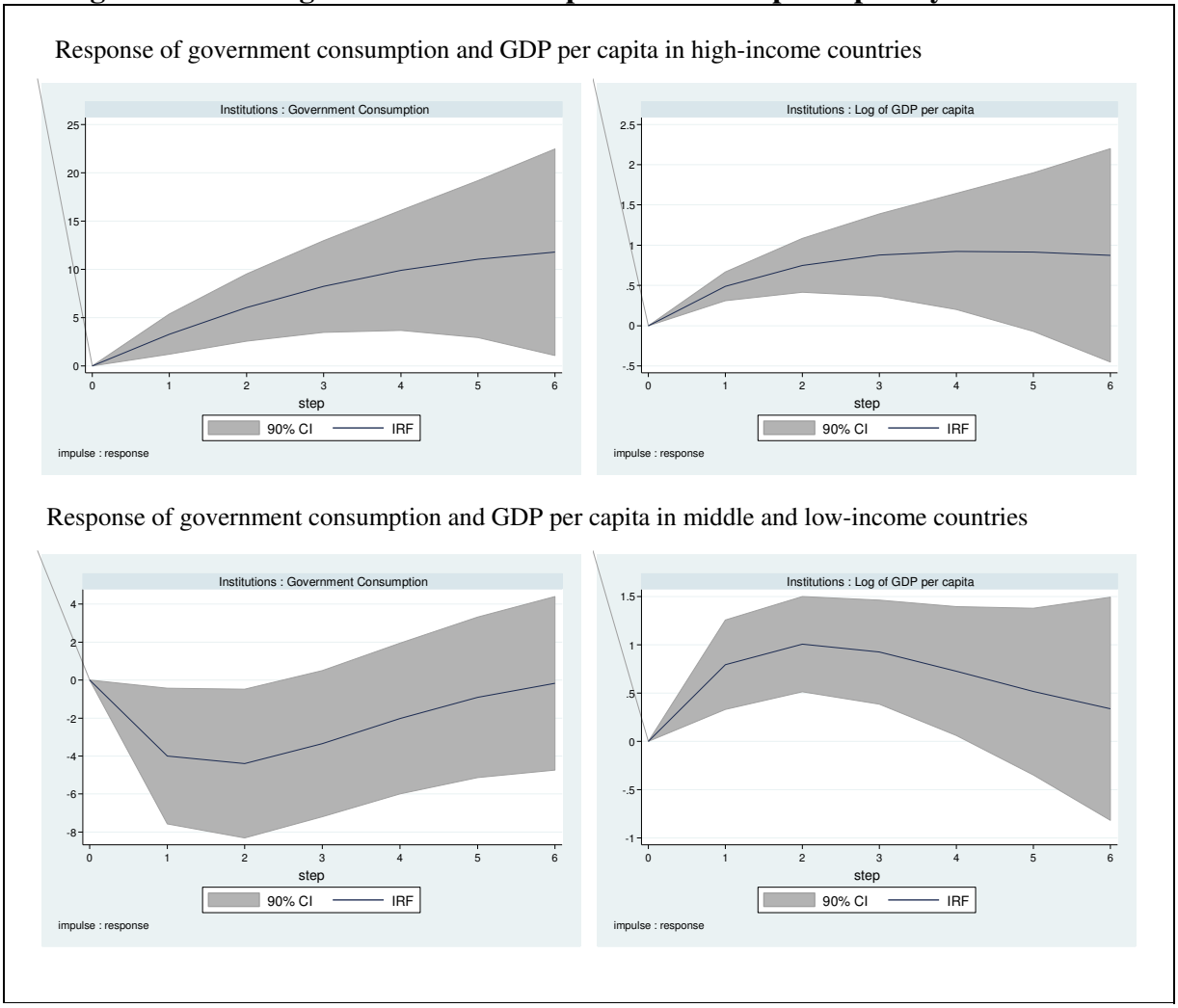
Response of inflation and GDP per capita to a shock on efficiency of institutions





Disaggregating countries by income levels, Figure 4 reveal that a shock on institutions produces positive effects on the variable government consumption over GDP for the group of high-income countries and negative effects for the group low and middle-income countries. According to Acemoglu et al. (2003), government consumption over GDP is usually used as proxy for government size and countries with larger government sectors have weaker institutions and are more volatile in terms of economic performance. The results indicate that an institutional improvement is associated with a reduction in the government size in low and middle-income countries. The explanation is due to differences in the composition and quality of public spending between high-income countries and low and middle-income ones. Institutional improvements raise the efficiency of public spending in low and middle-income countries, which simultaneously allows for a drop in the government size and an increase in economic growth. For high-income countries, where government spending is more efficient and government size smaller, the institutional improvement leads to an increase in both government size and economic growth.

Figure 4: IRF for government consumption and GDP per capita by income level



3.2.3 Institutions and Economic Stability

Figure 5 shows that a shock on institutional efficiency reduces GDP volatility in the immediate post-shock period, peaking at 8.15% in the third year after the shock. This relationship remains negative and statistically significant until the fifth year after the shock.

Controlling for volatilities of inflation and government consumption over GDP and grouping countries according to income level, Figure 6 reveals that the institutional improvement reduces macroeconomic volatility in all scenarios. However, the magnitudes of the responses suffer great variation between groups of countries. For the high-income countries, the peak response is 1.90% in the second year after the shock. For the most heterogeneous group of middle and low-income countries, the peak fall corresponds to 6.77% in the third year after the shock.[6]

This result reinforces what occurred with GDP per capita. Countries with higher levels of income have stronger institutions and are able of dealing more effectively with

[6] Figure 6 combines middle and low-income countries because of convergence problems presented by the estimation of IRFs for middle-income countries in separate. This might be due to the high economic volatility of these countries in the sample period.

macroeconomic volatility resulting from any kind of crisis or economic downturns. Low and middle-income countries, which usually present more fragile institutions, have greater difficulty in dealing with such instabilities. This reflects in the bigger fall in economic volatility for the latter group resulting from the same institutional improvement.

Figure 5: IRF for a shock on efficiency of institutions and effects on GDP volatility

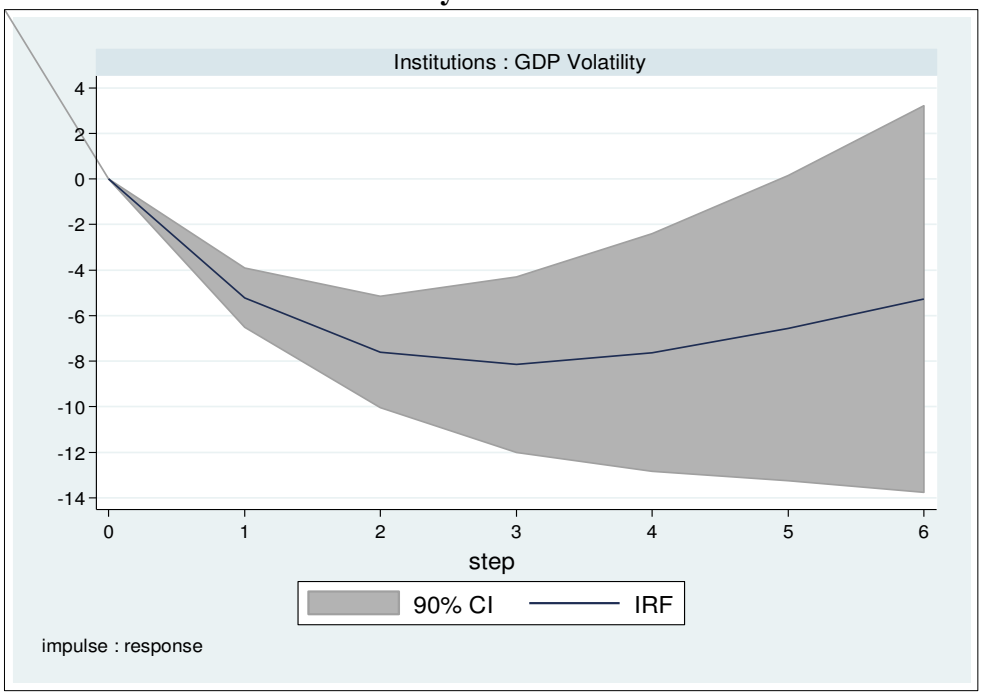
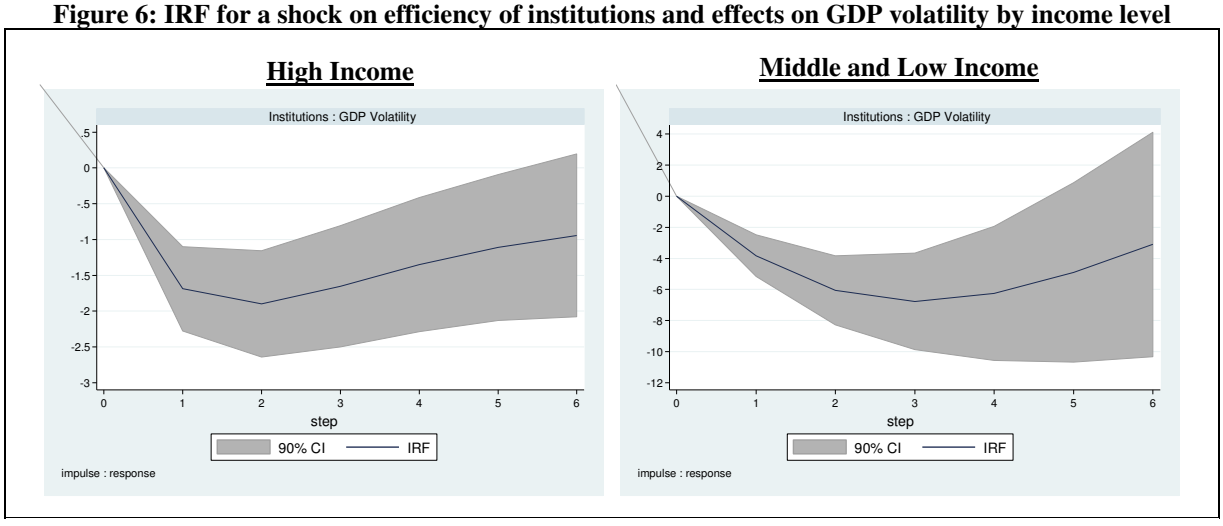


Figure 6: IRF for a shock on efficiency of institutions and effects on GDP volatility by income level



4. Conclusion

The results indicate that institutional efficiency positively affects economic performance, contributing to a path of growth and economic stability of the countries. On average, a one unit temporary shock in efficiency of institutions generates positive effects on GDP per capita, leading to a peak of 1.17% increase in the second year after the shock. The effect of institutional

improvement also appears in the volatility of per capita GDP, which peaks at 8.15% reduction in the third year after the shock.

An institutional shock also reduces government consumption over GDP simultaneously to an increase in GDP per capita, but has no effect on the rate of inflation, considering the full sample of countries. This suggests that fiscal policy is more sensitive to institutional improvement and constitutes an important channel through which institutions might affect economic performance.

The effects of institutions on GDP per capita, government consumption, inflation, and volatilities of these variables are affected by the countries' levels of income. For high-income countries, which generally have stronger institutions, those effects are lower than for low and middle-income countries, which have weaker institutions and are more sensitive to any institutional improvement. Thus, under all analyzed dimensions, the gains resulting from improvements in institutional efficiency are more relevant for countries with lower levels of income.

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