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The determinants of economic institutions and the knock-on effects on GDP per capita[*]

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Abstract

There have been only a small number of empirical studies assessing the determinants of economic institutions despite the development of several notable theories regarding their origins and their impact on economic development. In this article, we identify the key determinants of economic institutions highlighted in the theoretical literature and select empirical proxies that best represent them while also ensuring as large a sample of countries as possible. With economic institutions as the dependent variable, we use a dynamic panel data model which allows us to deal with endogeneity problems. Our results indicate that democratic political institutions, years of schooling and political regime duration have a positive and statistically significant effect, and income inequality has a negative and statistically significant effect on the quality of economic institutions. Our main results are robust to removing certain groups of countries from the sample. We also use an interaction term to evaluate if regime duration has a stronger effect on the quality of economic institutions in autocracies than democracies, however the results we found are not robust to the two democratic political institutions data sources used in this paper. In the second part of the article, we use the same dynamic panel data model but with GDP per capita as the dependent variable. When we control for the quality of economic institutions, the association between democratic political institutions and GDP per capita switches from positive to negative. This and other evidence support our hypothesis that democratic political institutions have a positive indirect effect on per capita income via economic institutions.

JEL classification codes: O1, C5, K1. Keywords: economic institutions, political institutions, law and economics.

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1

1 Introduction

While, there has been an emerging consensus that economic institutions are crucial to economic development, less is known about how they are determined. A raft of empirical studies have attempted to measure the effect of economic institutions on per capita income, but only a few have estimated the determinants of economic institutions, and many of these use simple ordinary least squares (OLS) regressions and therefore suffer from endogeneity problems. In this article, we identify the key determinants of economic institutions highlighted in the theoretical literature and select empirical proxies that best represent them while also ensuring as large a sample of countries as possible. With economic institutions as the dependent variable, we use a dynamic panel data model – the System Generalized Method of Moments estimator – to examine how economic institutions are affected by variations in political institutions, income inequality, education, regime duration among other variables. We then use the same dynamic panel data model but with GDP per capita as the dependent variable to assess how it is directly affected by changes in democratic political institutions and economic institutions.

Many of the studies on economic institutions emphasize the deep roots and persistence of economic institutions. North (1990) in his seminal work on the nature of institutions, argued that incremental changes create a trajectory of path dependence. Meanwhile, Acemoglu et al. (2001) traced global differences in quality of economic institutions back to the colonial origins of countries, and argued that disparities have persisted since then. The authors found a strong negative relation between settler mortality and the current quality of economic institutions and used the former as an instrumental variable for the latter. Additionally, in Acemoglu and Robinson (2008a) and Acemoglu and Robinson (2008b), using theoretical model and case studies, show how economic institutions can remain stable even after significant changes in political institutions.

While it is undeniable that that economic institutions tend to be persistent over time, it is also clear that several countries have experienced significant improvements in the quality of property and contract rights over the past 30 years. For example, countries such as Chile, South Korea, and the Czech Republic were able to significantly improve their economic institutions. North (1990) argued that although institutional changes are limited by path dependence, institutions are not an inevitable product of the past. "At every step along the way there were choices – political and economic – that provided real alternatives" (North, 1990, p.98). The aim of this study is to examine what can cause economic institutions to change in the medium term.

Alongside the emphasis on institutional persistence, theoretical studies have highlighted the impact of democratic political institutions on economic institutions. North (1990, p. 51) argued that *"democratic government gives a greater and greater percentage of the populace access to the political decision-making process, eliminates the capricious capacity of a ruler to confiscate wealth and develops third party enforcement*

of contracts with an independent judiciary". Additionally, Acemoglu et al. (2005) argue that democratic political institutions that distribute political power broadly in society and subject rulers to constraints are more likely to lead to economic institutions that guarantee property and contract rights for a broad cross-section of society.

Acemoglu et al. (2005) create a dynamic model in which economic institutions are determined by political institutions and the distribution of resources. The authors argue that economic institutions are a product of social conflict between different groups in society and are thus chosen by those who have the most political power. According to their model, political power comes in two forms: *de jure* political power, which is determined by political institutions, such as the constitution and the electoral rules, and *de facto* political power, which is determined by the distribution of resources. These two sources of political power determine the choice of economic institutions in the current period and political institutions in the next period. The economic institutions, in turn, determine economic performance in the current period and the distribution of resources in the next period. More equal distribution of resources will lead to a more equal distribution of *de jure* political power and better economic institutions. In this article, we test this theory, while also incorporating other explanatory variables that are highlighted in the theoretical literature.

A raft of empirical studies have found a positive impact of economic institutions on income per capita. However, the empirical literature is divided over the role of democratic political institutions on economic development. While many empirical studies have found a positive impact of democracy on income per capita, many others have found a negative effect. However, as argued by Acemoglu et al. (2005) and North (1990), democratic political institutions have a positive impact on economic institutions, therefore democracy can have an indirect knock-on effect on income per capita through economic institutions. As a result, our study distinguishes between the direct and indirect impact of democracy political institutions on income per capita. In the first section of the article, we estimate the effect of democratic political institutions, among other variables, on economic institutions, and in the second, we analyze the direct impact of democratic political institutions and of economic institutions, individually, on income per capita.

Despite the advances in the theoretical literature, empirical studies on the determinants of economic institutions have been limited by inadequate econometric methodologies and insufficient use of explanatory variables. Several studies use ordinary least squares regressions - including Borner et al. (2004), Keefer and Knack (2002), Sunde et al. (2008) and Gutmann and Voigt (2015) - and therefore face endogeneity problems. Using such a methodology, it is unclear whether economics institutions are a product of political institutions and other explanatory variables, or whether the causation is in the opposite direction. Additionally, these studies do not control for fixed effects and are thus likely to suffer from omitted variable bias stemming from omitting unobserved country-specific characteristics.

In one of the most influential empirical studies on the roots of the quality of economic institutions, Clague et al. (1996) estimated the determinants of the quality of property rights using grouped OLS and fixed effects estimator with time dummies. The authors found that democracy and regime duration had a positive effect on indicators for property and contract rights. However, there are significant empirical limitations to the study. Firstly, there is no treatment for reverse causality with respect to the relationship between regime type and property rights. Secondly, it omits variables that have been highlighted in the theoretical literature. For example, the study did not use income inequality because data for this was not available at the time, and regime duration was not used as a control variable when measuring the effect of regime type on the quality of property rights.

Baryshnikova et al. (2016) use a dynamic panel model to assess the impact of inequality, democracy and economic development on institutions. The article does not specifically aim to measure the determinants of economic institutions (the quality of property and contract rights) but instead uses several different indicators of institutional quality – for example law and order, government stability and investment profile – as dependent variables, and uses the same explanatory variables for all despite differences in the theoretical literature regarding the determinants of each of them. This is particularly problematic when the article analyzes the determinants of political rights and civil liberties – two democracy indicators from Freedom House – using Polity, another democracy indicator as an explanatory variable.

The conclusions of the above empirical literature is ambiguous for the effects of wealth and political institutions on economic institutions, however encounter stronger results for the negative effect of higher inequality. They also find evidence for non-linear effects.

Our study aims to show what causes economic institutions to change over time by carefully choosing explanatory variables that have been highlighted in the theoretical literature. We find the best available data to represent the theoretical dimensions of all our variables. In terms of our econometric methodology, we use a dynamic panel data model, with difference and system generalised method of moments (GMM), which allows us to address endogeneity problems and control for the unobserved heterogeneity of countries. GMM also allow us to investigate recent institutional changes, in contrast to the pursuit of the very long-run effects of historical facts - like different colonization policies in different colonies (as in Acemoglu et al. (2001)). We use this method to estimate the determinants of economic institutions. We then analyse their knock-on effects on income per capita by estimating the determinants of income per capita, including economic institutions and the direct effect, if any, of political institutions.

Our main conclusions are that democracy does have a significant, robust, but small effect on the determination of economic institutions, while persistence and the duration of the regime are the most relevant variables to explain their differences. Inequality also plays an important role. The interaction variables between the duration of the

regime and their types indicate that democracy needs time to build good economic institutions. Our conclusion is also that economic institutions play a more relevant directly role in determining per capita income than political institutions.

2 Theoretical Basis of Choice of Variables, and Data Sources

We use the following explanatory variables: Democratic political institutions, income inequality, regime durability, education, logged income per capita and lagged economic institutions. In this chapter, we clearly define all our terms, explain the theoretical basis for each of the explanatory variables, and outline the data we used to represent them. For a summary of data sources and definitions, see Box B1 in the Appendix B.

2.1 Economic Institutions (eco_inst)

We follow North by defining institutions as *"the rules of the game in a society, or more formally, are the humanly devised constraints that shape human interaction"* (North, 1990, p. 3). We define economic institutions as the formal rules, enforcement mechanisms and informal norms that govern the functioning of property and contract rights. While North (1990) did not specifically define economic institutions, he defined economic rules in terms of property rights and used the terms interchangeably. *"Economic rules define property rights, that is the bundle of rights over the use and the income to be derived from property and the ability to alienate an asset or a resource"* (North, 1990, p. 47).

Acemoglu and Johnson (2005), building on North (1981), distinguish between institutions that support private contracts and institutions constraining government and elite expropriation. Similarly, our conception of economic institutions contains both institutions that facilitate private contracts, and institutions that guarantee the security of private property. The latter component differs from Acemoglu and Johnson (2005) to account for violations of private property by individuals and groups that are not part of the government nor the elite (for example theft).

There are very few indicators that that have a global geographical coverage and a sufficiently long time series for dynamic panel data models. Our proxy for the quality of economic institutions is PRS Political Risk Services (PRS) ICRG indicator. It is one of the very few indicators used as a proxy for economic institutions that goes from the 1980s to the present.[1] We added together the scores of three PRS indicators: Investment Profile, Law and Order and Corruption.

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[1]Another source that contains data going back to the 1980s is the Business Environment Risk Intelligence (BERI). However, we did not use this source because it only has detailed data (with all the disaggregated indicators by subjects) and for the complete period (1980-2010) for 50 countries. The aggregated risk indicators for the period 1994 to 2003.

The Investment Profile indicator has three components – Contract Viability, Profits Repatriation and Payment Delays. Contract Viability measures the extent to which the government and the judicial system of the country uphold business contracts and discriminates against foreign individuals and firms, and therefore reflects the quality of contract rights. Profits repatriation measures the ability of firms to convert its profits to hard currency and to return these profits to the investors' home country, and thus affects the security of property rights for foreign investors. Payment delays – which measures *"the extent to which payments to foreign investors, whether in government contract or in direct sales are able to obtain cash payment for goods and services in a timely manner"* (Howell, 2007, p. 65) – can be considered a proxy for the enforceability of contracts because in countries where contracts are well enforced, payments are less likely to be delayed.

PRS's Law and Order indicators contains two sub components that are assessed separately: The strength and impartiality of the legal system ("law") and popular observance of the law ("order"). The former measures the extent of case precedent and the consistency of legal legislation and practice, which contribute to well specified and enforced property and contract rights. The latter subcomponent is an assessment of popular observance of the law, which is in part a willingness of the population to be self-regulating but also reflects the performance of law enforcement officials to uphold the laws of the country.

PRS's Corruption indicator is *"a measure of corruption within the political system"* (Howell, 2007, p. 10). It takes into account financial corruption in the form of demands for special payments, as well as other forms of corruption including excessive patronage, nepotism and secret party funding. Corruption undermines the security of property rights because although corruption arrangements may be predictable, the solicitation of bribes is often irregular and arbitrary, and thus can be considered a form of expropriation. Furthermore, even when corruption has an element of predictability, it is *"likely to be associated with greater uncertainty among economic actors, since corrupt arrangements are generally not legally enforceable"* (Keefer and Knack, 2002, p. 138).

2.2 Democratic Political Institutions (z_v_dem_pol or z_p4v_pol)

We define democratic political institutions as the formal rules, enforcement mechanisms and informal norms that guarantee the rights of citizens to participate in political decision making – through free and fair elections, free speech, and freedom of association and assembly – and place constraints on the use of power of the executive through checks and balances by the legislative and judiciary. In autocracies, there are severe restrictions on the ability of citizens to participate in political decision-making, and few, if any, constraints on the use of power by rulers. As outlined in the preceding chapter, democratic political institutions, by constraining the power of rulers, contribute to economic institutions that guarantee property and contract rights for a broad cross-section of society.

We highlight three components of democracy that determine the distribution of constraints on rulers and citizens. Two of these are vertical in the sense that they simultaneously affect the constraints on both rulers and citizens, and the other is horizontal, determining the constraints on the chief executive. Firstly, the right of citizens to choose their political representatives through free and fair elections allows citizens to participate indirectly in the political decision-making process, and acts as a constraint on chief executives and other elected representatives, who must rely on a degree of popular support. A second vertical component of democracy is political liberties, which include freedom of expression, freedom of association and freedom of assembly.[2] A third component of democracy is horizontal constraints on the power of the executive. In democracies, the executive constraints are usually imposed by the legislative and judiciary branches of government, and in autocracies, chief executives may be constrained by other types of "accountability groups" such as are the ruling party in a one-party system or the military in in a military dictatorship (Marshall et al., 2014).

We use two proxies for the quality of democratic political institutions from separate data sources that each cover different aspects of democratic political institutions. First, we use data from Varieties of Democracy (V-Dem Datatset v6.1), a recent project to conceptualize and measure democracy developed by a collaboration among more than 50 scholars worldwide which is co-hosted by the Department of Political Science at the University of Gothenburg, Sweden; and the Kellogg Institute at the University of Notre Dame, USA. Although it is new, it is also the most comprehensive database for democracy data. To represent executive constraints, we take an average of the scores of two composite indicators – Judicial Constraints on the Executive and Legislative Constraints on the Executive (representing 1/3 of our aggregated indicator). The Electoral Democracy index combines fives indicators (representing 2/3 of our aggregated indicator). Two of these are related to political liberties - Freedom of Association and Freedom of Expression, and the other three relate to electoral self-determination: Clean Elections, Suffrage and Elected Executive. We assign double the weighting to Electoral Democracy index because it represents two of our three components of democracy – political liberties and electoral self-determination. We take a weighted average of the scores of electoral self-determination and constraints on the executive to give a total democracy score.

The second data source we use is the Polity IV Project, which is often used democracy in the literature, but contains less information than the V_Dem database. We combine two of the three concept variables – Executive Recruitment (EXREC) and Executive Constraints (EXCONST).[3] The EXREC variable measures "how institu-

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tionalized, competitive and open the mechanisms are for selecting a political leader". The indicator EXCONST measures the "extent of institutional constraints on the decision-making powers of the chief executive". For information regarding how we assigned numerical scores to special codes used in the indicator, see Appendix C.

2.3   Income Inequality (gini)

As mentioned in the preceding chapter, according to Acemoglu et al. (2005), economic institutions that broadly protect property right are more likely to arise when political power (both *de jure* and *de facto*) is in the hands of a relatively broad group containing those with access to investment opportunities. The distribution of de facto political power is greatly influenced by the distribution of resources (i.e. the distribution of wealth and human capital) in society, as those with greater resources can command more power both through legitimate and illegitimate means. In countries where political power is held by a narrow elite, rulers will often avoid creating economic institutions that broadly protect property rights because they would enrich other groups within society, thus threatening the ruling groups hold on power and access to economic rents. Therefore, countries with greater inequality of resources are less likely to adopt economic institutions that protect property rights for a broad cross-section of the population.

There is a lack of cross-country data for wealth inequality, therefore we use income inequality as a proxy for this. We use the Gini indicator from the principal cross-country database for inequality, the World Income Inequality Database (WIID) of the United Nations University (UNU-WIDER). [4] The version of the database used in this paper, WIID3, was created in September 2015. Although WIID3 is a rich source of information, it must be treated carefully before it can be utilized for comparisons of inequality. WIID3 contains multiple data entries – often from different sources – for particulars country/year combinations. We filtered the data to ensure adequate coverage over time and across the whole population of each country, and to remove Gini estimates that were not rated by WIID3 as reliable (high quality and medium quality).[5] Subsequently extensive work was carried out to manually choose appropriate data for each country to ensure that the methodology for measuring Gini for each country did not change over time. Differences in methodologies for measuring Gini across countries that were constant over time were minimized by using data differencing with data panel methods. Additionally, data was adjusted to account for countries that unified or split up during the relevant time period. Lastly, the time coverage of was extended beyond 2013 (the last year of WIID3's database) to 2014 using sources cited by WIID3.

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our definition of democratic political institutions, such as barriers on religious practice, travel and choice of residence.

[4]Due to the low volatility of the Gini index and to the long sample period the series was interpolated for some years.

[5]We discarded observations rated as low quality and "memorandum items".

2.4 Regime duration (reg_dur)

Clague et al. (1996) argue that in democracies and autocracies, regime duration plays a crucial role in the development of property and contract rights. In autocracies, the longer an individual autocrat or ruling group perceives that they will remain in power, the better the incentives to guarantee property and contract rights, since they can collect more taxes if the country prospers economically. On the other hand, authoritarian regimes that do not expect to remain in power for long, can have incentives to obtain short-term gains by expropriating assets. They also argued that the age of a democratic system is positively linked to the development of property and contract rights because the mechanisms that support these rights work better the longer a democracy has been existed. Also, as the elapsed duration of democracy increases, the probability of coups decline and the more certainty there is that the democratic system, and the rights it provides, will last into the future.

The regime durability variable used in this paper is a normalized index based on the regime durability variable in in Marshal, Gurr and Jaggers' Polity IV Project (PIV). This variable is defined as the number of years since the last change of regime or since the end of a period of transition defined by a lack of stable political institutions. Regime change is defined as a change in the "polity" variable, a measure of how democratic a country is, of three points or more within years. Therefore a regime change consists of a country becoming significantly more or less democratic within a three year period.

Note that regime durability is not a measure of how democratic a country is both autocratic and democratic regimes can have highly durable regimes. The regime durability variable used here is also not a measure of the durability of individual leaders of democratic or autocratic countries. In a democratic regime, for example, the head of government is altered periodically by voters, but this would not represent a regime change.[6]

2.5 Schooling (L.school)

It can be argued that based on the dynamic model of institutions by Acemoglu et al. (2005), an increase in the level of schooling can lead to improved economic institutions. There is a natural upper limit on the amount of schooling a student receives, therefore it is reasonable to expect that an increase in a country's mean number of years of schooling would be accompanied by a shift to a more equal distribution of human capital. This is supported by an empirical study by Thomas et al. (2001), which found that inequality in education as measured by their education Gini index was negatively associated with average years of schooling. In line with the model by Acemoglu et al. (2005), the distribution of human capital is a component of the distribution of total resources, therefore, we would expect increases in schooling to lead to a more equal

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[6]The variable for regime duration used here is different to regime duration variables used in Clague et al. (1996). For example, their regime duration variables for autocracies measured the duration of an individual autocrat's rule, as well as the duration that a ruling group remained in power.

distribution of political power, and thus better economic institutions.

Additionally, education may have a positive effect on economic institutions because it improves people's capacity to obtain and process information, which can result in better choices, in aggregate terms North (1990). We suggest that imperfect information by political agents - be they voters, elected representatives or autocratic rulers – could lead to sub-optimal choices of economic institutions. A better educated population, therefore could make better choices of economic institutions either through elections or through the use of de facto political power.

Our schooling variable measures the average total years of schooling attained by those aged 25 or older in the previous period (t-1). The data on schooling come the Penn World Table (PWT) version 9.0, that uses the traditional Barro and Lee (2013) and Cohen and Leker (2014) - which is constructed in a similar fashion as the Cohen and Soto (2007).

2.6   Lagged per capita income (L.ln_ry)

We expect that lagged income per capita will have a positive effect on economic institutions because richer countries will be better able to pay the costs involved in enforcing property and contract rights. For lagged income per capita we use the natural logarithm of expenditure-side real GDP at chained population purchasing power parity rates (PPPs) in million 2011US\$ divided by the country's population. Both variables were obtained from Penn World Table version 9.0.

2.7   Lagged economic institutions

The theoretical models cited in this paper present several reasons for the durability of economic institutions. Firstly, economic institutions are partly determined by political institutions, which tend to be highly durable as those who hold political power are unlikely to change the political institutions that grant them de jure power. Secondly, wealthy elite groups in society can use their resources (de facto political power) to sustain economic institutions that are beneficial to their political and economic interests by blocking reforms that would enrich other groups in society and threaten their rent-seeking activities, both of which would threaten their de facto political power. As a result of the theoretical and empirical support for the durability of institutions, we are able to include lagged economic institutions as explanatory variables in the study. This allows us to treat for the problem of reverse causality.

3   Data and Metodology

This study uses analysis on 129 countries for the period from 1984 to 2014 (see Appendix A for country list). All the institutional and the regime duration data has been standardized (z-score), so these z-variables have been rescaled to have a mean

of zero and a standard deviation of one - as can be seen in Table D1 in the Appendix D.

The Figure 1 shows a positive relationship between economic institutions and the V-Dem democratic political institutions. When it comes to the Figure 2, which shows the Polity IV democratic political institutions instead of the V-Dem variable, it seems to have a more scattered pattern. A stronger positive relationship is observed between per capita income and economic institutions (see Figure 3).

Figure 1: Overall variation: economic vs V-Dem democratic political institutions
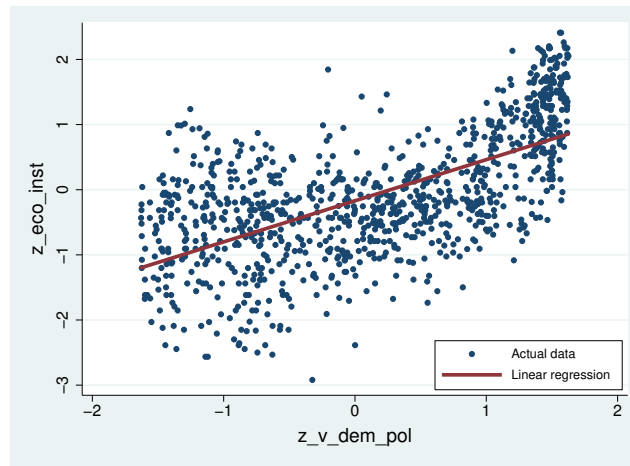
This study uses panel data analysis. We use the linear generalized method of moments estimator in a system containing both first-differenced and levels equations (GMM-SYS). Most of econometric models are subject to the problem of endogeneity. Another possible problem is that the explanatory variable of the model is determined at the same time as the dependent variable. To correct these problems we can use the Arellano and Bond (1991) model that makes use of a dynamic panel data structure. This method, besides eliminating the effects not observed in the regressions, generates reliable estimates even in the case of omitted variables. The general solution to the problem of endogeneity is the use of instrumental variables.

In particular, the GMM estimator allows the use of instruments that are sequentially exogenous, thus avoiding the problem of endogeneity. The use of instrumental variables allows a more consistent parameter estimation, even in the event of measurement errors and endogeneity in the explanatory variables (Bond et al., 2001).

The method proposed by Arellano and Bond (1991) consists of a dynamic panel data

11

Figure 2: **Overall variation: economic vs Polity V democratic political institutions**
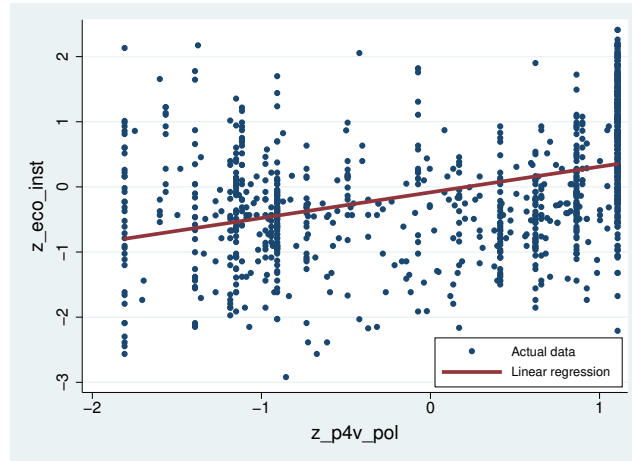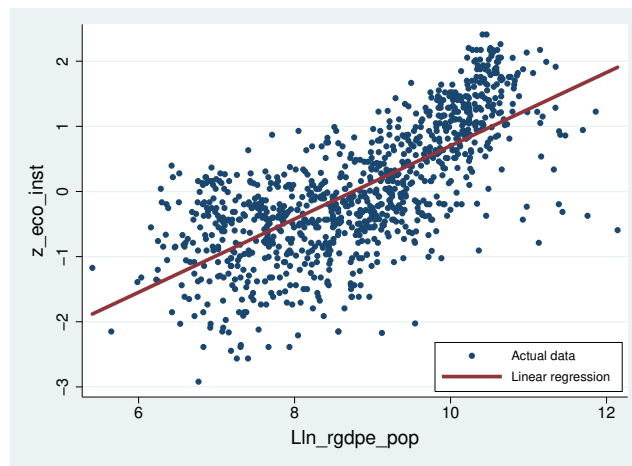

Figure 3: **Overall variation: economic institutions vs lagged per capita income**

model that considers the first difference to remove the unobserved effects. However, Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998) showed that dynamic GMM has a bias for infinite samples (large and small samples) and low precision. Futhermore, the use of lags can generate weak instruments (Staiger and Stock, 1997). Blundell and Bond (1998) found results that support the use of the systemic GMM method for panel data estimation, rather than the dynamic GMM.

In the model proposed by Arellano and Bover (1995) and Blundell and Bond (1998), regressions at levels and first differences are combined (Bond et al., 2001). As a result, the GMM-SYS combines regression equations in differences and in levels into one system and uses lagged differences and lagged levels as instruments. Although GMM-SYS estimates are suitable for a small number of time periods (t) and large numbers of individuals (i) in small samples, when the instruments are many, they tend to over-adjust the instrumental variables and bias the results (Roodman, 2009). Hence, in order to avoid the use of an excessive number of instruments in the regressions and therefore to lose the precision of the tests, the ratio of the number of instruments / number of cross-sections should be less than 1 in each regression. In addition, in order to confirm the validity of the instruments in the models, the Sargan over-identification test (statistics J), as suggested by Arellano (2003), should be used. The null hypothesis of the J statistic consists of the existence of over-identification in the regression.

In order to verify if the error terms are not serially correlated, one should use the first order (AR1) and second order (AR2) tests of serial correlation as highlighted by Arellano and Bond (1991). It is important to emphasize that a premise of systemic GMM models is the non-correlation of the first difference of endogenous regressors, which implies that unit root tests are not necessary.

Based on the variables described above, the first model is given by:

$$eco\_inst_{i,t} = \varphi_1 dem_{i,t} + \rho_1 reg\_dur_{i,t} + X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where eco_inst_(i,t), is the dependent variable and, it represents the economic institutions to the respective country at time t. The exogenous variables are: dem, which represents the democratic political institutions proxies used in the model: z_vem_dem_pol and z_p4v_pol; reg_dur which represents the regime duration. Moreover, $X\_(i,t)$ represent the vector of explanatory variables (Gini, L.school, L.ln_ry). The subscript i=1, 2,..., i is the country; t =1, 2,...; and t is the period. φ_1 and ρ_1 are a parameters that normalize the variables, and $\varepsilon_{i,t}$ is the disturbance.

The second model analyzed is given by:

$$ln\_Lry_{i,t} = \delta_1 eco\_inst_{i,t} + \eta_1 dem_{i,t} + X_{i,t} + \varepsilon_{i,t} \qquad (2)$$

Where, L.ln_ry is the dependent variable and, it represents per capita income to the respective country at time t. The independent variables are: eco_inst, which represents the economic institutions; Dem, which represents the democratic political

institutions proxies used in the model: z_vem_dem_pol and z_p4v_pol. X_(i,t) represent the vector of explanatory variables (school, open, csh_g). The subscript i=1, 2,..., i is the country; t =1, 2,...; and t is the period. δ_1 and η_1 are a parameters that normalize the variables, and $\varepsilon_{i,t}$ is the disturbance.

4 Results

In this section, we evaluate the findings of the estimates. Our results are in accordance with Acemoglu et al. (2005): political institutions affect economic institutions (4.1), which are determinants of differences in per capita income (4.2), although the strength of those links are weak.

4.1 Political institutions and economic institutions

The main results concerning the determinants of economic institutions are in Table 1, in which we display our main specifications, with both proxies for political institutions. Equations (1) and (2) use z_v_dem_pol as an independent variable, while equations (3) and (4) use the z_p4v_pol variable. Considering the high correlation between years of schooling and per capita income, we preferred to run separate equations with these independent variables. The other control variables are the duration of the regime, the lagged value of the economic institution variable and the gini index.

z_v_dem_pol and z_p4v_pol show the correct sign and are both significant (Table 1) implying that differences in political institutions determine differences in economic institutions, however the strength of their partial coefficients are not high. The country of China, in 2014, that showed the lowest value for z_v_dem_pol (-1.92) would have -0.147as its predicted value for the economic institution variable, below the baseline value (-0.233), while the United Kingdom, in 2012, the country with the highest value for z_v_dem_pol (1.46), would have a positive marginal impact of 0.112 (over the baseline variable of -0.233) in the economic institution variable.

The z_eco_inst variable varies from -2.63 to 3.98 (range of 6.61), and the marginal impact of z_v_dem_pol varies from -0.147 to 0.112 (absolute range of 0.259), implying that differences in democratic attributes would account for only 3.92% of differences in economic institutions (3% with z_p4v_pol variable – Table 2c), with similar results for Equations (2) and (4) of Table 1, which controls for per capita income instead of schooling (Table 2b and 2d).

Differences in income inequality, another important theoretical link in Acemoglu et al. (2005), could explain a minimum of 7% (Table 2a) and a maximum of 13% (Table2c) of the absolute range of the economic institution variable. These results call into question the strength of the links established in that paper. Inertia, on the other hand, is quite strong, differences in which account for 73% to 76% (with the z_v_dem_pol proxy) of differences in economic institutions, corroborating the importance of the recurrent

discussion of inertia in this literature.

Differences in the duration of the regime could explain between 35% (Table 2b) to 38% (Table 2a) of the absolute difference in the value of the economic institution variable. The past effect of schooling would affect only 4% of differences in economic institutions (Table 2a), while the modernization hypothesis could account for a maximum of 14% of them (Table 2b).

Similarly to Baryshnikova et al. (2016), we found that persistence is the main driver of institutions as captured in their work by the dependent variables: "investment profile" , "law and order" and "corruption", individually. They explain the effect of persistence as a reflection of the durable nature of beliefs, although both papers use annual data, calling into doubt that this could be the best explanation for these findings, since it is a short interval. We also found an important negative effect of inequality on economic institutions, while they found a significant but non-linear effect also only on "law and order" (not on "investment profile" or "corruption"). They did not find any strong or significant effect of human capital on those variables, which is a similar result as ours. Most importantly, the direct effect of income is important in our findings, as in Barro and Lee (2013).

Sunde et al. (2008), despite using only OLS, did reach results similar to ours, finding a strong correlation between inequality and economic institutions, but did not find a strong correlation between political institutions and economic institutions. In their work, political institutions only matter for the design of better economic institutions when inequality of a country is low, what they capture with an interaction term.

Our second aim was built upon Clague's work and was to investigate if differences in the duration of regime to economic institutions were mediated by differences in political institutions. In Table 3a and Table 3b, we can observe the results of our main specifications when we interact the variable reg_dur with an index for autocracy and for democracy.
    More precisely:

(a) Democracy (democ = 1) if democracy political institutions are from the highest 25% values of the sample;

(b) Autocracy (autoc = 1) if democracy political institutions are from the lowest 25% values of the sample.

    In Table 3a, we use a z_v_dem_pol as proxy for democracy while in Table 3b we use z_p4v_pol. In both tables, we control for years of schooling (Equations 1 and 2) and per capita income (Equations 3 and 4). A very important result is that the association of good political institutions with economic institutions, when we control for the interaction term, is stronger, since the coefficients of the proxies are higher in the equations 1 and 3 (0.45, 0.61 - Table 3a and 0.57 and 0.60 - Table 3b).

The coefficients of lagged per capita income are smaller, indicating that part of the persistence effect displayed in the previous results were due to the interaction between the type of the regime and its duration. The importance of this control is also shown in the coefficient of the gini variable. When we control for the interaction between the duration of the regime and democratic countries, its partial correlation drops, indicating that long democratic regimes have better income distribution. The opposite occurs when we control for autocratic regimes (Equations 2 and 4 of both tables), not surprisingly suggesting that durable autocratic regimes are associated with higher inequality.

The marginal impact of the duration of the regime (reg_dur) has now to be quantified by its direct value plus the value that we can retrieve trough the interaction term, which, by construction, captures non-linear relationships. In the best case scenario – the country with the best democracy score that lasted longer, *ceteris paribus*, we would have a country with economic institutions above the median value. We can observe, in Table 4a, that this scenario could account for 4.273 points (out of a maximum rage of 6.61 – 65%) of the economic institution variable.

In the worst case scenario - the country with the worst democracy score that lasts longer (Table 4b), the value of the economic institution variable still increases, *ceteris paribus*, by 0.701 points (11% of its range). On a hand, longer regimes have better economic institutions (the direct coefficient of reg_dur is positive), but autocracy encourages bad economic institutions if they are durable (the coefficient of the interaction term is negative when autoc = 1).

In the other two scenarios of Table 4c and 4d, in the most unstable countries, the effects of the type of the regime are weak. The lesson is that democracy takes time for building very prosperous economic institution and that stable institutions can encourage better economic institutions, even under the bad stimulus of autocratic regimes.

Our third aim was to test the robustness of the results when we exclude groups of countries: a group of high income OECD countries, a group of low-income countries or countries that are from OPEC [7]. Using both proxies for political institutions – z_v_dem_pol and z_p4v_pol, there are no strong differences in their association with economic institutions (Tables 5a and 5b), since their coefficients are quite similar to the previous results (Table 1).

Concluding, we can observe that: a) persistence is the main determinant of economic institutions; b) stability of rules – proxied by the duration of the regime, is the second most important variable correlated with economic institution; c) inequality has an important role in explaining economic institutions, but (d) political institutions have a significant but weak effect on them. Human capital and per capita income have positive, but small, effect on economic institutions.

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[7]See appendix A for a detailed definition of the groups.

Table 1: **The determinants of economic institutions - GMM-SYS two-step estimation estimator - with democratic political institutions - z_v_dem_pol or z_pv4_pol as explanatory variable - complete sample**

	(1) z_eco_inst	(2) z_eco_inst	(3) z_eco_inst	(4) z_eco_inst
z_v_dem_pol	0.07661*** (0,02379)	0.07060*** (0,01703)		
z_pv4_pol			0.06201*** (0,01017)	0.07326*** (0,00962)
L.z_eco_inst	0.72998*** (0,01364)	0.75846*** (0,01228)	0.72699*** (0,01302)	0.75649*** (0,01185)
reg_dur	0.39215*** (0,03287)	0.36355*** (0,03336)	0.41035*** (0,0369)	0.36325*** (0,03157)
gini	-0.86457** (0,45485)	-1.43695*** (0,45994)	-1.50657*** (0,4646)	-0.95611** (0,35953)
Lyr_sch	0.05385*** (0,00934)		0.04741*** (0,01001)	
Lln_rgdpe_pop		0.12865*** (0,02237)		0.13999*** (0,01823)
Overidentification Tests				
Observations	1763	1837	1723	1850
N.Instrum./N. Cross-Section	0,729	0,741	0,741	0,776
J-Stat	70,783	71,185	71,903	72,465
p-value (I)	0,104	0,115	0,104	0,149
AR(1)	-0,522	-0,518	-0,493	-0,497
p-value	0,000	0,000	0,000	0,000
AR(2)	-0,015	-0,021	-0,011	-0,013
p-value	0,600	0,460	0,699	0,614

Own Elaboration. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM—uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator— tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

17

Table 2a: **Marginal impact of political institutions - Results using Equation (1) of Table 1**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		variable's values			predicted values				**percentage**
	φ	**mean**	**min**	**max**	**mean value**	**lowest value**	**highest value**	**absolute range**	**of eco_inst rage (%)**
z_v_dem_pol	0,0766	0,00	-1,92	1,46	0,00	-0,15	0,11	0,26	3,92%
L.z_eco_inst	0,7298	0,00	-2,63	3,98	0,00	-1,92	2,90	4,82	72,98%
reg_dur	0,3922	0,00	-0,83	5,59	0,00	-0,33	2,19	2,52	38,09%
gini	-0,8646	0,38	0,19	0,74	-0,33	-0,16	-0,64	-0,48	-7,19%
Lyr_sch	0,0539	1,77	-2,22	2,61	0,10	-0,12	0,14	0,26	3,93%
			Fitted value		**-0,233**				

Own Elaboration.

Table 2b: **Marginal impact of political institutions - Results using Equation (2) of Table 1**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		variable's values			predicted values				**percentage**
	φ	**mean**	**min**	**max**	**mean value**	**lowest value**	**highest value**	**absolute range**	**of eco_inst rage (%)**
z_v_dem_pol	0,0706	0,00	-1,92	1,46	0,00	-0,14	0,10	0,24	3,61%
L.z_eco_inst	0,7585	0,00	-2,63	3,98	0,00	-1,99	3,02	5,01	75,85%
reg_dur	0,3636	0,00	-0,83	5,59	0,00	-0,30	2,03	2,33	35,31%
gini	-1,4370	0,38	0,19	0,74	-0,55	-0,27	-1,06	-0,79	-11,96%
Lln_rgdpe_pop	0,1287	8,86	4,96	11,98	1,14	0,64	1,54	0,90	13,66%
			Fitted value		**0,594**				

Own Elaboration.

Table 2c: **Marginal impact of political institutions - Results using Equation (3) of Table 1**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		variable's values			predicted values				percentage
	φ	mean	min	max	mean value	lowest value	highest value	absolute range	of eco_inst rage (%)
z_p4v_pol	0,0620	0,00	-2,03	0,94	0,00	-0,13	0,06	0,18	2,79%
L.z_eco_inst	0,7270	0,00	-2,63	3,98	0,00	-1,91	2,89	4,81	72,70%
reg_dur	0,4104	0,00	-0,83	5,59	0,00	-0,34	2,29	2,63	39,86%
gini	-1,5066	0,38	0,19	0,74	-0,57	-0,29	-1,11	-0,83	-12,54%
Lyr_sch	0,0474	1,77	-2,22	2,61	0,08	-0,11	0,12	0,23	3,46%
				Fitted value	**-0,489**				

Own Elaboration.

Table 2d: **Marginal impact of political institutions - Results using Equation (4) of Table 1**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		variable's values			predicted values				percentage
	φ	mean	min	max	mean value	lowest value	highest value	absolute range	of eco_inst rage (%)
z_p4v_pol	0,0733	0,00	-2,03	0,94	0,00	-0,15	0,07	0,22	3,29%
L.z_eco_inst	0,7565	0,00	-2,63	3,98	0,00	-1,99	3,01	5,00	75,65%
reg_dur	0,3633	0,00	-0,83	5,59	0,00	-0,30	2,03	2,33	35,28%
gini	-0,9561	0,38	0,19	0,74	-0,36	-0,18	-0,71	-0,53	-7,96%
Lln_rgdpe_pop	0,1400	8,86	4,96	11,98	1,24	0,69	1,68	0,98	14,87%
				Fitted value	**0,877**				

Own Elaboration.

Table 3a: **The determinants of economic institutions - GMM-SYS two-step estimation estimador - estimation with z_v_dem_pol democratic political institutions as explanatory variable and interaction variables**

	(1) z_eco_inst	(2) z_eco_inst	(3) z_eco_inst	(4) z_eco_inst
L.z_eco_inst	0.70256*** (0,01433)	0.73831*** (0,01542)	0.62837*** (0,01575)	0.69951*** (0,01034)
z_v_dem_pol	0.19293*** (0,01331)	0.10573*** (0,02427)	0.12988*** (0,02213)	0.12334*** (0,01903)
z_reg_dur	0.26759*** (0,03463)	0.45539*** (0,03014)	0.28581*** (0,04569)	0.50297*** (0,02641)
gini	-0.65372* (0,38827)	-1.03909** (0,41962)	-0.65445* (0,56024)	-1.16451*** (0,34342)
autoc_v_dem_dur		-0.29373*** (0,05768)		-0.32124*** (0,04499)
democ_v_dem_dur	0.44636*** (0,0451)		0.61218*** (0,05395)	
Lyr_sch	0.04094*** (0,00983)	0.04302*** (0,00885)		
Lln_rgdpe_pop			0.14900*** (0,02079)	0.14032*** (0,01939)
Overidentification Tests				
Observations	1794	1704	1741	1697
N.Instrum./N. Cross-Section	0,824	0,835	0,784	0,894
J-Stat	74,669	71,551	74,371	77,752
p-value (I)	0,170	0,167	0,155	0,246
AR(1)	-0,514	-0,516	-0,496	-0,509
p-value	0,000	0,000	0,000	0,000
AR(2)	-0,018	-0,018	-0,025	-0,022
p-value	0,519	0,541	0,397	0,464

Own Elaboration. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

Table 3b:**The determinants of economic institutions - GMM-SYS two-step estimation estimador - estimation with z_p4v_pol democratic political institutions as explanatory variable and interaction variables**

	(1) z_eco_inst	(2) z_eco_inst	(3) z_eco_inst	(4) z_eco_inst
L.z_eco_inst	0.66411*** (0,01328)	0.71887*** (0,01445)	0.64040*** (0,01294)	0.69910*** (0,0129)
z_pv4_pol	0.09217*** (0,00859)	0.09282*** (0,01133)	0.09362*** (0,0099)	0.09689*** (0,01099)
z_reg_dur	0.26060*** (0,03576)	0.44661*** (0,02821)	0.28433*** (0,03137)	0.48742*** (0,02588)
gini	-0.84733* (0,4414)	-0.67966* (0,36678)	-0.96072** (0,42329)	-1.35796*** (0,34994)
autoc_v_dem_dur		-0.28779*** (0,04079)		-0.32322*** (0,02483)
democ_v_dem_dur	0.57274*** (0,0517)		0.59584*** (0,04921)	
Lyr_sch	0.05106*** (0,00893)	0.05661*** (0,00901)		
Lln_rgdpe_pop			0.15217*** (0,01767)	0.15517*** (0,02196)
Overidentification Tests				
Observations	1698	1700	1698	1698
N.Instrum./N. Cross-Section	0,859	0,824	0,882	0,894
J-Stat	77,942	77,918	78,529	79,883
p-value (I)	0,170	0,113	0,202	0,196
AR(1)	-0,501	-0,514	-0,494	-0,507
p-value	0,000	0,000	0,000	0,000
AR(2)	-0,028	-0,020	-0,032	-0,025
p-value	0,339	0,503	0,276	0,399

Own Elaboration. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

Table 4a: **The marginal impact of the maximum duration of the regime in the country with the best democracy score - Results of regression (1) of Table 3a - Best case scenario**

	(1) φ	(2) variable's values		(3)	(4) (1)*(3)
z_v_dem_pol	0,19293	maximum value for z_v_dem_pol		1,46	0,282
z_reg_dur	0,26759	maximum value for z_reg_dur		5,59	1,496
democ_v_dem_dur	0,44636	maximum value for democ_v_dem_dur		5,59	2,495
Total impact of the country with the best democracy score with longer regime on z_eco_inst					4,273
Percentage of the impact on total range					64,64%

Own Elaboration.

Table 4b: **The marginal impact of the maximum duration of the regime in the country with the worst democracy score - Results of regression (2) of Table 3a - Worst case scenario**

	(1) φ	(2) variable's values		(3)	(4) (1)*(3)
z_v_dem_pol	0,10573	minimum value for z_v_dem_pol		-1,92	-0,203
z_reg_dur	0,45539	maximum value for z_reg_dur		5,59	2,546
autoc_v_dem_dur	-0,29373	maximum value for autoc_v_dem_dur		5,59	-1,642
Total impact of the worst democracy score and the longest regime duration on z_eco_inst					0,701
Percentage of the impact on total range					10,60%

Own Elaboration.

Table 4c: **The marginal impact of the minimum duration of the regime in the country with the best democracy score - Results of regression (1) of Table 3a**

	(1) φ	(2) **variable's values**	(3)	(4) **(1)*(3)**
z_v_dem_pol	0,19293	maximum value for z_v_dem_pol	1,46	0,282
z_reg_dur	0,26759	minimum value for z_reg_dur	-0,83	-0,222
democ_v_dem_dur	0,44636	minimum value for democ_ v_dem_dur	-0,83	-0,370
Total impact of the country with the best democracy score and the shortest regime duration on z_eco_inst				-0,311
Percentage of the impact on total range				-4,70%

Own Elaboration.

Table 4d: **The marginal impact of the minimum duration of the regime in the country with the worst democratic score - Results of regression (2) of Table 3a**

	(1) φ	(2) **variable's values**	(3)	(4) **(1)*(3)**
z_v_dem_pol	0,10573	minimum value for z_v_dem_pol	-1,92	-0,203
z_reg_dur	0,45539	minimum value for z_reg_dur	-0,83	-0,378
autoc_v_dem_dur	-0,29373	minimum value for autoc_ v_dem_dur	-0,83	0,244
Total impact of the worst democracy score and the shortest duration of the regime on z_eco_inst				-0,337
Percentage of the impact on total range				-5,10%

Own Elaboration.

Table 5a: **The determinants of economic institutions - robustness tests with alternative samples - GMM-SYS two-step estimation estimador - with z_v_dem_pol democratic political institution as explanatory variable**

	excluding Low Income (1) z_eco_inst	excluding OECD (2) z_eco_inst	excluding OPEC (3) z_eco_inst	excluding Low Income (4) z_eco_inst	excluding OECD (5) z_eco_inst	excluding OPEC (6) z_eco_inst
L.z_eco_inst	0.72943*** (0,01416)	0.69310*** (0,01139)	0.72909*** (0,01263)	0.71933*** (0,01607)	0.70378*** (0,01869)	0.70496*** (0,01332)
z_v_dem_pol	0.09360*** (0,03217)	0.06946** (0,03007)	0.02089* (0,02299)	0.06369** (0,02752)	0.08590*** (0,0296)	0.03238* (0,01925)
z_reg_dur	0.44205*** (0,04086)	0.06648*** (0,01282)	0.36849*** (0,02855)	0.45373*** (0,04578)	0.07427*** (0,02001)	0.43906*** (0,03759)
gini	-2.46366*** (0,50928)	-0.54057* (0,51191)	-0.67294* (0,38947)	-3.09513*** (0,72143)	-1.33215* (1,01432)	-0.66080* (0,39631)
Lyr_sch	0.03612*** (0,01208)	0.08572*** (0,01069)	0.07483*** (0,00754)			
Lln_rgdpe_pop				0.09854*** (0,0338)	0.17614*** (0,03138)	0.19170*** (0,02678)
Overidentification Tests						
Observations	1686	1083	1616	1705	1129	1616
N.Instrum./N. Cross-Section	0,744	0,839	0,840	0,765	0,712	0,840
J-Stat	69,737	45,586	73,439	72,987	47,245	73,687
p-value (I)	0,103	0,325	0,173	0,121	0,121	0,168
AR(1)	-0,510	-0,482	-0,519	-0,508	-0,488	-0,513
p-value	0,000	0,000	0,000	0,000	0,000	0,000
AR(2)	-0,020	-0,013	-0,020	-0,016	-0,003	-0,024
p-value	0,503	0,708	0,503	0,597	0,942	0,432

24

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM—uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator— tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

Table 5b: **The determinants of economic institutions - robustness tests with alternative samples - GMM-SYS two-step estimation estimador - with z_p4v_pol democratic political institution as explanatory variable**

	excluding Low Income (1) z_eco_inst	excluding OECD (2) z_eco_inst	excluding OPEC (3) z_eco_inst	excluding Low Income (4) z_eco_inst	excluding OECD (5) z_eco_inst	excluding OPEC (6) z_eco_inst
L.z_eco_inst	0.77208*** (0,01334)	0.70547*** (0,0138)	0.72770*** (0,01144)	0.71933*** (0,01607)	0.65990*** (0,02077)	0.70223*** (0,01146)
z_p4v_pol	0.06127*** (0,01059)	0.05282* (0,03208)	0.11370*** (0,01779)	0.06369** (0,02752)	0.05151* (0,02964)	0.02818* (0,0146)
z_reg_dur	0.40451*** (0,0316)	0.06570*** (0,01621)	0.40573*** (0,02873)	0.45373*** (0,04578)	0.06691*** (0,02075)	0.43862*** (0,03638)
gini	-1.41476*** (0,47142)	-0.39821* (0,59027)	-0.20982* (0,34167)	-3.09513*** (0,72143)	-1.56959* (0,90182)	-0.95115** (0,4022)
Lyr_sch	0.03771*** (0,0093)	0.08979*** (0,01126)	0.06511*** (0,00833)			
Lln_rgdpe_pop				0.09854*** (0,0338)	0.22638*** (0,035)	0.19930*** (0,02425)

Overidentification Tests

	(1)	(2)	(3)	(4)	(5)	(6)
Observations	1713	1092	1632	1705	1100	1616
N.Instrum./N. Cross-Section	0,771	0,750	0,840	0,765	0,746	0,864
J-Stat	72,339	41,748	74,369	72,987	44,335	75,055
p-value (I)	0,114	0,272	0,155	0,121	0,257	0,185
AR(1)	-0,496	-0,478	-0,495	-0,508	-0,488	-0,512
p-value	0,000	0,000	0,000	0,000	0,000	0,000
AR(2)	-0,008	-0,018	-0,013	-0,016	-0,003	-0,024
p-value	0,760	0,596	0,643	0,597	0,942	0,426

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM—uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator— tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

4.2 Economic institutions and per capita income

Now we discuss the results for per capita income as the dependent variable, which are displayed in Table 6. Equation 1 displays our main results: economic institutions have a positive and significant effect on (ln) of per capita income (0.0165). Political institution (z_v_dem_pol) still has a direct and positive effect on per capita income (0.01379). We control our main specification for inertia, the importance of human capital and openness, all of them with significant effects. Similar results hold for the proxy z_p4v_pol (Equation 2) instead of z_v_dem_pol (Equation 1).

Once again, despite the positive effect of both economic and political institutions, the endogenous path of per capita income shows the strongest effect on this variable. Current human capital has a higher impact (0.049) than institutions on the (ln of) per capita income.

The comparison between our results and the traditional ones (Acemoglu, 2001; Rodrik et al. 2004, as examples) highlights the importance of the inertia of the institutions (politic and economic ones), since they were found to be related to per capita income when the time span is long (estimating the coefficients with instrumental variable technique), but not when we considered a smaller time span (and using the GMM method). Institutions do change, but slowly, which implies greater difficult for countries that do not have pro-growth ones.

To test the robustness of these results, we estimated the models reported in the Table 7. The models (1) and (2) use samples that exclude low income countries 7 and indicate the same result. All the other restrict samples, excluding high income OECD countries [models (3) and (4)] and excluding the OPEC countries [models (5) and (6)], exhibiting similar results.

Table 6: **Effect of both economic and political institutions on (ln) per capita income - complete sample**

	(1) ln_rgdpe_pop	(2) ln_rgdpe_pop
z_eco_inst	0.01649***	0.01864***
	(0,00083)	(0,0011)
z_v_dem_pol	0.01379***	
	(0,00188)	
z_p4v_pol		0.02034***
		(0,00145)
L.ln_rgdpe_pop	1.00784***	1.07535***
	(0,00443)	(0,00419)
L2.ln_rgdpe_pop	-0.16314***	-0.25111***
	(0,00251)	(0,00378)
school	0.04626***	0.04930***
	(0,00125)	(0,00104)
open	0.01596***	0.00730*
	(0,00475)	(0,00339)
Overidentification Tests		
Observations	2529	2554
N.Instrum./N. Cross-Section	0,845	0,879
J-Stat	107,208	109,785
p-value (I)	0,133	0,159
AR(1)	-0,514	-0,541
p-value	0,000	0,000
AR(2)	-0,007	-0,008
p-value	0,745	0,687

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM—uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator— tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

Table 7: **Effects of economic and political intitutions on per capita income - robustness tests with alternative samples - GMM-SYS two-step estimation estimator**

	excluding Low Income (1) ln_rgdpe_pop	excluding Low Income (2) ln_rgdpe_pop	excluding OECD (3) ln_rgdpe_pop	excluding OECD (4) ln_rgdpe_pop	excluding OPEC (5) ln_rgdpe_pop	excluding OPEC (6) ln_rgdpe_pop
z_eco_inst	0.01366*** (0,00096)	0.01399*** (0,0009)	0.02736*** (0,00139)	0.02592*** (0,00154)	0.02006*** (0,00071)	0.01986*** (0,00077)
z_v_dem_pol	0.00186* (0,00216)		0.00400* (0,00276)		0.01172*** (0,00143)	
L.ln_rgdpe_pop	0.99815*** (0,00485)	0.98652*** (0,007)	0.99563*** (0,00872)	0.97618*** (0,00822)	1.07345*** (0,00493)	1.06733*** (0,00438)
L2.ln_rgdpe_pop	-0.14958*** (0,00254)	-0.14249*** (0,00364)	-0.16458*** (0,00593)	-0.14905*** (0,00525)	-0.21614*** (0,00256)	-0.20622*** (0,00243)
yr_sch	0.049357*** (0,00131)	0.04834*** (0,00151)	0.04853*** (0,00199)	0.04908*** (0,00209)	0.03721*** (0,00107)	0.03524*** (0,00092)
z_p4v_pol		0.01986*** (0,00201)		0.02133*** (0,00285)		0.01605*** (0,00124)
Overidentification Tests						
Observations	2481	2516	1892	1921	2330	2365
N.Instrum./N. Cross-Section	0,836	0,836	0,782	0,793	0,860	0,860
J-Stat	103,954	103,697	74,554	75,199	101,941	101,733
p-value (I)	0,104	0,107	0,151	0,160	0,131	0,134
AR(1)	-0,496	-0,496	-0,509	-0,507	-0,521	-0,524
p-value	0,000	0,000	0,000	0,000	0,000	0,000
AR(2)	-0,024	-0,024	-0,009	-0,032	0,025	0,003
p-value	0,226	0,226	0,692	0,152	0,266	0,878

Own Elaboration. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroskedasticity consistent covariance matrix was applied in regressions. Standard errors between parentheses. S-GMM—uses two-step of Arellano and Bover (1995) without time period effects. S-GMM estimator— tests for AR (1) and AR (2) check for the presence of first order and second-order serial correlation in the first-difference residuals. Constant and lagged ratings are omitted for convenience.

28

5 Conclusion

In this article, we identify the key determinants of economic institutions highlighted in the theoretical literature and select empirical proxies that best represent them. Our empirical findings are based on a comparatively large dataset that covers up to 129 countries over a period from 1984 to 2014.

With economic institutions as the dependent variable, we use a dynamic panel data model which allows us to deal with endogeneity problems. Using two different measures of democratic political institutions, our results indicate that democratic political institutions, years of schooling and political regime duration have a positive and statistically significant effect, and income inequality has a negative and statistically significant effect on the quality of economic institutions. Our main results are robust to removing certain groups of countries from the sample.

In the second part of the article, we use the same dynamic panel data model but with GDP per capita as the dependent variable. When we control for the quality of economic institutions, the association between democratic political institutions and GDP per capita is positive. This and other evidence support our hypothesis that democratic political institutions have a positive indirect effect on per capita income via economic institutions.

The main conclusion is that institutions do not vary enough for us to find any significant partial correlation between them and per capita income when considering changes over a time span of 20 years. Inertia is also crucial for the path of per capita income.

References

Acemoglu, D. and Johnson, S. (2005), 'Unbundling Institutions', *Journal of Political Economy* **113**(5), 949–995.

Acemoglu, D., Johnson, S. and Robinson, J. A. (2001), 'The colonial origins of comparative development: an empirical investigation', *The American Economic Review* **91**(5), 1369–1401.

Acemoglu, D., Jonhson, S. and Robinson, J. A. (2005), Institutions as a fundamental cause of long-run growth, *in* P. Aghion and S. N. Durlauf, eds, 'Handbook of economic growth', Vol. 1, North Holland, Amsterdam, chapter 6, pp. 385–472.

Acemoglu, D. and Robinson, J. A. (2008*a*), 'Persistence of power, elites, and institutions', *American Economic Review* **98**(1), 267–293.

Acemoglu, D. and Robinson, J. A. (2008*b*), 'The persistence and change of institutions in the Americas', *Southern Economic Journal* **75**(2), 282–299.

Alonso-Borrego, C. and Arellano, M. (1999), 'Symmetrically normalized instrumental-variable estimation using panel data', *Journal of Business & Economic Statistics* **17**(1), 36–49.

Arellano, M. (2003), *Panel Data Econometrics*, Oxford University Press, New York.

Arellano, M. and Bond, S. (1991), 'Some tests of specification for panel data', *Review of Economic Studies* **58**, 277–297.

Arellano, M. and Bover, O. (1995), 'Another look at the instrumental-variable estimation of error-components models', *Journal of Econometrics* **68**, 29–51.

Barro, R. J. and Lee, J. (2013), 'A new data set of educational attainment in the world, 1950-2010', *Journal of development economics* **104**, 184–198.

Baryshnikova, N. V., Pham, N. T. and Wihardja, M. M. (2016), 'Does Political and Economic Inequality Affect Institutional Quality?', *Economic Record* **92**(297), 190–208.

Blundell, R. and Bond, S. (1998), 'Initial conditions and moment restrictions in dynamic panel data models', *Journal of Econometrics* **87**, 115–143.

Bond, S., Hoeffler, A. and Temple, J. (2001), 'GMM Estimation of Empirical Growth Models', *CEPR Discussion Paper* p. 33.
URL: *http://economics.ouls.ox.ac.uk/14464/*

Borner, S., Bodmer, F. and Kobler, M. (2004), *Institutional efficiency and its determinants: the role of political factors in economic growth*, Organisation for Economic Co-operation and Development, Paris.

Clague, C., Keefer, P., Knack, S. and Olson, M. (1996), 'Property and contract rights in autocracies and democracies', *Journal of Economic Growth* **1**, 243–276.

Cohen, D. and Leker, L. (2014), 'Health and Education: Another Look with the Proper Data'.
URL: *http://www.parisschoolofeconomics.eu/docs/cohen-daniel/cohen-leker-health-and-education-2014.pdf*

Cohen, D. and Soto, M. (2007), 'Growth and human capital: Good data, good results', *Journal of Economic Growth* **12**(1), 51–76.

Gutmann, J. and Voigt, S. (2015), *The rule of law: Measurement and deep roots*, CESifo Working Paper n. 5670.

Howell, L. D. (2007), *The handbook of country political risck analysis*, The PRS Group, Easty Syracuse.

Keefer, P. and Knack, S. (2002), 'Polarization, Politics, and Property rights', *Public Choice* **111**(August), 127–154.

Marshall, M. G., Gurr, T. R. and Jaggers, K. (2010), *Polity IV Project - Political regime characteristics and transitions, 1800-2009: Dataset users' manual*, Center for Systemic Peace, Vienna.

Marshall, M. G., Gurr, T. R. and Jaggers, K. (2014), *Polity IV Project - Political regime characteristics and transitions, 1800-2013: Dataset users' manual*, Center for Systemic Peace, Vienna.

North, D. (1990), *Institutions, institutional change and economic performance*, Cambridge University Press, New York.

North, D. C. (1981), *Structure and Change in Economic History*, W. W. Norton & Company, New York.

Roodman, D. (2009), 'How to do xtabond2: An introduction to difference and system GMM in Stata', *The Stata Journal* **9**(1), 86–136.

Staiger, D. and Stock, J. H. (1997), 'Instrumental variables regression with weak instruments', *Econometrica, Econometric Society* **65**(May(3)), 557–586.

Sunde, U., Cervellati, M. and Fortunato, P. (2008), 'Are all democracies equally good? The role of interactions between political environment and inequality for rule of law', *Economic Letters* **99**, 552–556.

Thomas, V., Wang, Y. and Fan, X. (2001), *Measuring education inequality: Gini coefficients of education*, Policy Research Working Papaer 2525, The World Bank, Washington, D.C.

A Country list

Sample

- **All countries**

    Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Democratic Republic of Congo (Kinshasa) – Zaire, Republic of Congo (Brazzaville), Costa Rica, Cote D'Ivoire (Ivory Coast), Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gabon, Gambia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, South Korea, Kuwait, Latvia, Lebanon, Liberia, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar (Burma), Namibia, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uruguay, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

Sub-sample

- **High income OECD countries**

    Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, South Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States of America.

- **Low income countries**

    Ethiopia, Liberia, Madagascar, Mali, Mozambique, Niger.

- **OPEC countries**

    Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, Venezuela.

B   Variables and sources

Box B1: **Summary of data sources and definitions.**

Variable	Code	Data Sources	Indicator used
Economic Institutions	eco_inst	PRS' International Country Risk Guides	- Investment Profile - Law and Order - Corruption
Democratic Political Institutions	z_v_dem_pol	Varieties of Democracy (V-Dem Datatset v6.1)	- Judicial Constraints on the Executive plus Legislative Constraints on the Executive (1/3) - Electoral Democracy index (2/3)
	z_p4v_pol	Polity IV Project dataset version	- Executive Recruitment (1/2) - Executive Constraints (1/2)
Regime Duration	reg_dur	V (2013)	- Regime Durability
Income Inequality	gini	World Income Inequality Database of the United Nations University (version WIID3)	- Gini index
Schooling	school	Barro and Lee (2012)	Average total years of schooling attained by those aged 25 or older
Lagged schooling	L.school	and Cohen and Leker (2014)	Average total years of schooling attained by those aged 25 or older in the previous period
Lagged Income per Capita	L.ln_ry	Penn World Table 9.0	Natural logarithm of expenditure-side real GDP at chained population purchasing power parity rates (PPPs) in million 2011US$ divided by the country's population
Government consumption	csh_g		Share of government consumption at current PPPs
Trade openness	open		Share of merchandise exports and imports at current PPPs

C Special codes of Polity IV

Each of the two conceptual variables used in this paper (EXREC and EXCONST) are quantified by different scores which can vary from 1 to 8, wherein the higher the score, the better the quality indicator for the country / year. However, there are other three special codes, "-66", "-77", and "-88", which indicate, respectively, periods of interruption of power; complete collapse periods of central political authority ("interregnum" or anarchy); and periods of transition of power - as detailed by (Marshall et al., 2010, p. 19-20). As it was done for the original composite variable (Polity2) - present in the fourth edition of the Polity project and not used here - periods of power outage (-66 code) are treated as missing data since, in these situations, there is no independent political power in the country and institutions suffer direct interference of foreign powers. Where there is a complete collapse of the central political authority (-77 code), this paper has reclassified the countries with the minimum score (1) in each of the three variables. Already in periods of transition of power (-88 code), we chose to follow similar criteria to that proposed by Marshall et al. (2010) for Polity2 variable, softening the score changes over the transition period. When -88 code is given to the last of the series of each country, it is considered that there is no data for the country that year. Finally, when the code -88 is followed by the code -66 or -77, it is replaced by the minimum score (1).

D Descriptive analysis

Table D1: Descriptive analysis

	Mean	Median	Maximum	Minimum	Std. Dev.
Sample					
eco_inst	0.00	-0.18	3.98	-2.63	1.00
z_v_dem_pol	0.00	0.11	1.46	-1.92	1.00
z_p4v_pol	0.00	0.45	0.94	-2.03	1.00
gini	0.38	0.36	0.74	0.19	0.10
reg_dur	0.00	-0.33	5.59	-0.83	1.00
school	7.03	7.08	13.55	0.11	3.40
L.school	1.77	1.96	2.61	-2.22	0.71
L.ln_ry	8.86	8.96	11.98	4.96	1.26
open	0.52	0.39	6.09	0.00	0.47
csh_g	0.19	0.17	1.78	0.02	0.09
democ_v_dem_dur	0.21	0.00	5.59	-0.83	0.84
democ_p4v_dur	0.22	0.00	5.59	-0.83	0.84
autoc_v_dem_dur	-0.05	0.00	2.46	-0.83	0.34
autoc_p4v_dur	-0.04	0.00	2.46	-0.83	0.34
Sample without high income OECD countries					
eco_inst	0.00	-0.06	4.25	-2.93	1.00
z_v_dem_pol	0.00	-0.01	2.00	-1.83	1.00
z_p4v_pol	0.00	0.25	1.22	-1.79	1.00
gini	0.43	0.43	0.74	0.23	0.10
reg_dur	0.00	-0.30	4.85	-0.97	1.00
school	5.77	5.84	12.68	0.11	2.82
L.school	1.57	1.76	2.54	-2.22	0.70
L.ln_ry	8.45	8.47	11.98	4.96	1.13
open	0.43	0.32	6.09	0.00	0.44
csh_g	0.19	0.17	1.78	0.02	0.10
democ_v_dem_dur	0.04	0.00	4.30	-0.97	0.57
democ_p4v_dur	0.03	0.00	4.30	-0.97	0.54
autoc_v_dem_dur	0.10	0.00	4.85	-0.97	0.69
autoc_p4v_dur	0.07	0.00	4.63	-0.97	0.61
Sample without low income countries					
eco_inst	0.00	-0.02	3.95	-2.48	1.00
z_v_dem_pol	0.00	0.13	1.43	-1.93	1.00
z_p4v_pol	0.00	0.46	0.92	-2.04	1.00
gini	0.38	0.35	0.74	0.19	0.10
reg_dur	0.00	-0.32	5.51	-0.85	1.00
school	7.30	7.33	13.55	0.11	3.25
L.school	1.84	1.99	2.61	-2.22	0.62
L.ln_ry	8.97	9.03	11.98	5.82	1.18
open	0.53	0.40	6.09	0.00	0.48
csh_g	0.19	0.17	1.78	0.02	0.09
democ_v_dem_dur	0.21	0.00	5.51	-0.85	0.85
democ_p4v_dur	0.22	0.00	5.51	-0.85	0.84
autoc_v_dem_dur	-0.04	0.00	1.88	-0.85	0.32
autoc_p4v_dur	-0.06	0.00	1.82	-0.85	0.33
Sample without OPEC countries					
eco_inst	0.00	-0.12	3.92	-2.65	1.00
z_v_dem_pol	0.00	0.13	1.41	-2.00	1.00
z_p4v_pol	0.00	0.41	0.89	-2.22	1.00

Continued on next page

Table D1 – continued from previous page

	Mean	Median	Maximum	Minimum	Std. Dev.
gini	0.38	0.35	0.74	0.19	0.10
reg_dur	0.00	-0.33	5.47	-0.82	1.00
school	7.20	7.38	13.55	0.11	3.45
L.school	1.79	2.00	2.61	-2.22	0.72
L.ln_ry	8.81	8.92	11.46	4.96	1.25
open	0.52	0.39	6.09	0.00	0.49
csh_g	0.19	0.17	0.95	0.02	0.09
democ_v_dem_dur	0.23	0.00	5.47	-0.82	0.85
democ_p4v_dur	0.23	0.00	5.47	-0.82	0.84
autoc_v_dem_dur	-0.06	0.00	2.40	-0.82	0.30
autoc_p4v_dur	-0.07	0.00	2.40	-0.82	0.31

See Appendix B for summary of data sources and definition.