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Forms of Democracy and Economic Growth Volatility

Clément Mathonnat[#] and Alexandru Minea^{*}

Abstract: Using a panel of 140 countries over the 1975-2007 period, we disaggregate democracies across five institutional dimensions (government forms, electoral rules, state forms, number of veto players, and age of democracies), to study the precise forms of democracy that may explain the lower economic growth volatility (EGV) in democracies compared to dictatorships, usually emphasized by the literature. We find that, while all government forms decrease EGV to the same extent, proportional electoral rules outperform majoritarian and mixed electoral rules, suggesting a role for a more inclusive political decision-making process. In addition, EGV is significantly lower in unitary states, suggesting a role for a limited separation of power between the central government and the local authorities, while the effect of the number of veto players and the age of democracies is significant only in developed countries. Consequently, the choice between various forms of democracy may not be neutral for EGV, and, possibly, for countries' development path.

Keywords: Forms of Democracy; Economic Growth Volatility; Economic Development.

JEL classification codes: H11; O43; P51; O11.

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I. Introduction

A large literature investigates the effect of democracy on economic growth. Theoretical analyses lead to ambiguous predictions. On the one hand, democracy can discourage economic growth, because of the distortionary effect of redistributive policies, and the possibility of political gridlock and interest-group politics. On the other hand, democracy can promote economic growth, through fostering investment in education and public goods, and more constraints on political leaders that limit the ability of politically-powerful groups to absorb most of the lucrative economic opportunities (see Acemoglu et al., 2014, for a recent discussion). In the context of conflicting theoretical results, empirical studies did not manage to reach a consensus about the effect of democracy on economic growth, as pointed out by the meta-analysis of Doucouliagos & Ulubasoglu (2008).¹

On the contrary, there is a much larger consensus for a stabilizing effect of democracies, which were found to reduce economic growth volatility (EGV) compared to dictatorships (e.g. Acemoglu et al., 2003; Mobarak, 2005; Klomp & de Haan, 2009; Edward & Thames, 2010). Such a favorable effect may be explained by the ability of democracies to ensure a stronger control over political leaders' decisions, limiting the implementation of distortive public policies and as a result the occurrence of internal shocks (for example, high inflation episodes, see Acemoglu et al., 2003), and to better manage redistributive conflicts caused by external shocks (for example, trade shocks, see Rodrik, 1999; 2000).

However, to the best of our knowledge, no study focused so far on assessing the precise political institutions that could explain the stabilizing effect of democracies. This issue is important since Acemoglu (2005) and Acemoglu and Johnson (2005) show that the concept of democratic regimes indiscriminately gathers a set of economic institutions (e.g. the limitation of government's expropriation power, as related to property rights) and political institutions (e.g. the various constitutional rules in place). To have a better understanding of the political institutions channels linking democracies to EGV, a more in-depth approach of democratic regimes is necessary.

The goal of this paper is to go beyond the simple opposition between democracies and dictatorships, in order to evaluate what are the specific democratic political institutions that

¹ Among the 483 regressions reviewed in their meta-analysis covering 84 empirical studies, Doucouliagos & Ulubasoglu (2008) show that only 27% are associated with a positive and significant effect of democracy on economic growth, whereas in the remaining studies the effect is negative and significant (15%), negative and not significant (21%), and positive and not significant (37%). Such conflicting effects are emphasized in the pioneering work of Barro (1996), and they equally emerge in the political science literature (see the discussion in Edward & Thames, 2010). Relatedly, Narayan et al. (2011) analyze the direction of causality between democracy and economic growth.

matter the most to explain the favorable effect of democracies on EGV emphasized by the existing literature. According to constitutional economics and political science literature, different institutional setups of democracies lead to differences in the extent of constraints faced by political leaders when implementing public policies, and in the inclusiveness of the political decision-making process (see e.g. Persson & Tabellini, 2003). In turn, this can have significant macroeconomic implications, especially regarding the way democracies are able to deal with economic shocks. Therefore, we might expect that different institutional configurations of democracies could lead to differences in their capacity to reduce EGV compared to dictatorships.

The relevance of studying the relationship between forms of democracy and EGV stems from the importance for countries to experience stable economic performances, particularly from the standpoint of their development path. Indeed, previous research emphasized that strong EGV significantly reduces economic growth (Ramey & Ramey, 1995). This echoes the finding of lower and more unstable economic growth rates in developing countries compared to developed countries (Lucas, 1988; Pritchett, 2000). Consequently, by assessing the role of different forms of democracy in reducing EGV, our paper may contribute to a better understanding of the institutional determinants of countries' economic growth stability, and, possibly, provide insights about the institutional design of democratic regimes that could support their development path.

We draw upon a large panel of 140 countries over the 1975-2007 period, and disaggregate the overall effect of democracies on EGV along five institutional dimensions that are considered so far in the constitutional economics literature among the most representative institutional features of democratic regimes, namely government forms, electoral rules, state forms, the number of veto players, and the age of democracies (see e.g. Voigt, 2012). While we confirm that democracies significantly decrease EGV compared to dictatorships, our results show that institutional details are of crucial importance to understand the stabilizing effect of democratic regimes.

First, although parliamentary and semi-presidential governments are associated with the strongest reduction in EGV compared to dictatorships, their effects are not statistically different from presidential governments. This suggests limited gains in terms of EGV reduction from the precise constitutional arrangements associated with government forms: the extent of separation between the Executive and the Legislative powers is not found to additionally reduce EGV compared to dictatorships. Second, the reduction in EGV related to proportional electoral rules is significantly stronger than the stabilizing effect of majoritarian

and mixed electoral rules, suggesting that a strong inclusiveness of the political decision-making process is particularly relevant regarding EGV. Third, contrary to federal states, unitary states are associated with a significant decrease in EGV compared to dictatorships. Consequently, a limited separation of power between the central government and the local authorities appears to matter for reducing EGV with respect to dictatorships. Fourth, an increase in the number of veto players and the age of democracies are not found to be significantly correlated with EGV, suggesting that the number of political actors involved in the political decision-making process and a long-lasting experience of democratic institutions might probably not be among the institutional features that help understanding why democracies display less EGV compared to dictatorships. These results are confirmed by a large set of robustness tests that consider alternative measures of EGV and political regimes, different sources of unobserved heterogeneity, the presence of EGV outliers, and the influence of additional EGV determinants.

Finally, using these results as benchmark, we explore an important source of heterogeneity in the relationship between forms of democracy and EGV, related to countries' level of economic development. We find that the size of the stabilizing effect of the various forms of democracy is stronger in developed countries compared to developing countries. Moreover, whereas results for developing countries are fairly comparable to those for the full sample, we show that in developed countries both unitary and federal states significantly reduce EGV by a comparable size, and the number of veto players and the age of the democracy are associated with a significant decrease in EGV compared to dictatorships.

Overall, our analysis emphasizes the importance of considering the specific institutional features of democracies that might explain their favorable effect on EGV defended by the existing literature. Indeed, not all forms of democracy are associated with a significant reduction in EGV compared to dictatorships, and, when they do, the magnitude of their effect may display significant differences. Therefore, the institutional setup of democracies might not be neutral for the stability of economic growth, and, possibly, for countries' development path.

The rest of the paper is organized as follows. Section 2 reviews the related literature, section 3 describes the data and the methodology, section 4 presents our main results, section 5 analyzes the robustness of our findings, and section 6 concludes.

II. Literature review

In this section, we first briefly review the literature linking political regimes and EGV. Then, we discuss some theoretical mechanisms that could help understanding how different forms of democracy might result into differences in the stabilizing effect of democracies compared to dictatorships.

2.1. Political regimes and EGV

Several empirical studies highlight lower EGV in democracies compared to dictatorships. (e.g. Acemoglu et al., 2003; Mobarak, 2005; Klomp and de Haan, 2009; Edwards & Thames, 2010). This stabilizing effect of democracies is explained mainly on two grounds.

On the one hand, stronger control over political leaders' decisions limits the implementation of distortive public policies, and, as a result, the occurrence of internal shocks, such as e.g. high inflation episodes (Acemoglu et al., 2003). According to Quinn and Woolley (2001), in democracies political leaders implement policies consistent with the preferences of the median voter, because of potential electoral sanctions arising from policies that could raise agents' income fluctuations. Similarly, Henisz (2000) emphasizes that democracies include more actors involved in the political decision-making process compared to dictatorships. This decentralization of political power yields more constraints over political decisions, and results in more inertia in policy-making, thus favoring greater economic growth stability. Fatas and Mihov (2003, 2006) support this argument by showing that fewer constraints on the Executive power result in more volatility of fiscal policies used at political purposes.

On the other hand, democracies perform better in reducing the magnitude of external shocks. According to Rodrik (1999, 2000), democracies manage more appropriately redistributive conflicts caused by external shocks, through promoting cooperation between interest groups, restricting unequal wealth redistribution toward small elites close to the political power, and favoring repeated interactions between political actors. The empirical analysis of Yang (2007) goes along with this theory, by showing that democracies are associated with less EGV in countries with significant ethno-linguistic fractionalization.

Keeping these two arguments in mind, we now explore the way various forms of democracy may have different effects on EGV compared to dictatorships.

2.2. Political governance theories: a closer look at political institutions

According to Persson and Tabellini (2003), political institutions can be viewed as the institutional framework constraining the political decision-making process. As such, they ultimately explain the nature and quality of implemented policies in a given political system.² In this paper, we deal with five main institutional features of democratic regimes consider so far in the constitutional economics literature. Three of them, i.e. government forms, electoral rules, and state forms, are related to their constitutional arrangements. The remaining two, i.e. the number of veto-players, and the age of democracies, aim at assessing the current and historical functioning of democracies.

As emphasized in section 2.1, the ability of democracies to reduce EGV compared to dictatorships is mainly related to the extent of constraints faced by political leaders when implementing public policies, and to the inclusiveness of the political decision-making process. To explore this issue more in-depth, and link the forms of democracy to EGV, we draw upon comparative politics theories on political governance. Interestingly, the literature on the political regimes-EGV nexus explains the stabilizing effect of democracies based on institutional mechanisms similar to those highlighted in political science for characterizing the nature of political governance in a given political system, namely the degree of (i) authority and (ii) inclusion of the political decision-making process (Gerring et al., 2005). Linking these two concepts to the institutional determinants of EGV could enable us to better understand what specific forms of democracy may support the stabilizing effect of democratic regimes.

The (i) degree of authority of the political decision-making process reflects the extent of constraints faced by political leaders when they define and implement policies. It represents an upstream dimension of political governance, i.e. related to the management of policies at the state level. Based on Gerring et al. (2005), constitutional arrangements characterizing this authority dimension in democracies are government and state forms.³ We discuss the macroeconomic effects of these two forms of democracy from the perspective of two policy objectives, namely the stability and the flexibility of the political decision-making process.

On the one hand, to provide a stable macroeconomic environment, political leaders' behavior should be the most predictable possible (Henisz, 2000, 2004; Stasavage and Keefer,

² Comprehensive literature reviews on the economic and political effects of political institutions include Persson and Tabellini (2003), and Voigt (2011).

³ Government forms determine how political power is exerted by elected political leaders, and how conflicts of interests between different political groups are solved (Persson and Tabellini, 2003), whereas state forms determine the distribution of political power between the central government and local authorities (Blume and Voigt, 2012).

2003), with emphasis on the separation, diffusion, and fragmentation of political power. As a result, political systems would be more able to avoid internal shocks if they involve a stable political decision-making process, limiting the risk of implementing distortive public policies. In this case, as pointed out by Henisz (2000, 2004), Stasavage and Keefer (2003), Persson and Tabellini (2003), and Voigt (2011), presidential governments and federal states seem the most relevant constitutional arrangements. Indeed, these two forms of democracy involve a strong separation between the Executive and the Legislative powers, and between the central government and the local authorities, respectively. However, such institutional setups may equally reduce the ability of democracies to cope with external shocks, given the high inertia of the political decision-making process (Tsebelis, 2002).

On the other hand, to adapt to changes in the macroeconomic environment, emphasis must be placed on the concentration of political power, with a flexible government having a strong leadership and being able to fight significant conflicts of interests (Olson, 1982; Gerring et al., 2005, 2009). As Rodrik (1999, 2000) suggests, political systems more efficiently mitigate the consequences of external shocks if they include a flexible decision-making process that enables the implementation of good macroeconomic stabilization policies. Following Gerring and Thacker (2004) and Gerring et al. (2005, 2009), parliamentary governments and unitary states seem the most relevant constitutional arrangements since these two forms of democracy entail a limited separation between the Executive and the Legislative powers, and between the central government and the local authorities, respectively. Nevertheless, such institutional configurations can equally result in less constraints on political leaders' discretion, which could increase the probability of internal shocks arising from the implementation of distortive public policies (Fatas and Mihov, 2003; Acemoglu et al., 2003).

Consequently, when dealing with EGV, government and state forms might be subject to an institutional trade-off between flexibility (parliamentary governments and unitary states) and stability (presidential governments and federal states) in the political decision-making process. From this perspective, regarding government forms, one may equally argue that, by being an intermediate institutional setup between presidential and parliamentary governments, semi-presidential governments could be associated with an appropriate compromise between flexibility and stability in the political decision-making process, and, as a result, may be more adequate to reduce EGV.

Turning to the (ii) degree of inclusion of the political decision making-process, it represents the ability of political leaders to account for the widest views, interests, and ideas,

when defining and implementing public policies. It reflects a downstream dimension of political governance, i.e. related to the extent of citizens' preferences integration in the definition and implementation of public policies. As emphasized by Gerring et al. (2005), constitutional arrangements in democratic regimes characterizing the inclusiveness of the political decision-making process are electoral rules,⁴ and state forms. When it comes to EGV, more inclusive political institutions would mitigate political and social instability induced by the intensification of redistributive conflicts arising from external shocks (Rodrik, 1999, 2000), and limit the effects of internal shocks through the implementation of public policies reflecting the preferences of a broad spectrum of voters (Acemoglu et al., 2003). Following Gerring et al. (2005), we may consider that the constitutional arrangements allowing a strong inclusion of the political decision-making process are proportional electoral rules, and federal states. Indeed, under proportional electoral rules, voters' preferences are aggregated in a more representative way compared to majoritarian and mixed electoral rules, whereas federal states induce more decentralization of the political power that allows local authorities to have more prerogatives to define and implement policies in line with the preferences of voters living in each state.

In addition, Tsebelis' (1995, 1999, 2002) veto-players theory may add to our understanding of the link between political institutions and EGV. Since veto-players represent the number of political actors involved in the political decision-making process, more (less) constrained and highly (weakly) inclusive political systems are associated to a large (limited) number of veto players. Therefore, by affecting the degree of authority and inclusion of the political decision-making process, more veto players in democratic regimes may be associated with less EGV.

Finally, Brender and Drazen (2004, 2007) find that the age of democracies significantly matters for explaining differences in the implementation of public policies. From this perspective, a long-lasting experience of democratic institutions may enable democracies to adapt more efficiently their political decision-making process, in terms of both authority and inclusion, and, as a result, may represent an important additional institutional feature to understand the stabilizing effect of democratic regimes with respect to dictatorships.

Consequently, in light of the existing literature, we expect democracies to enjoy less EGV compared to dictatorships, due to a stronger control over political leaders' decisions and a better inclusion of the political decision-making process. However, since the precise

⁴ Electoral rules determine the way voters' political preferences are aggregated, and how political power is acquired (Persson and Tabellini, 2003).

institutional configuration of democratic regimes affects the degree of authority and inclusion of the political decision-making process, we may expect differences in the effect of various forms of democracy on EGV. In what follows, we will assess the institutional channels that may explain why democracies display less EGV compared to dictatorships.

III. Data, and methodology

3.1. Data

We explore the relationship between forms of democracy and EGV using a large panel of 140 countries over the 1975-2007 period.⁵ We use three-year averaged data as a compromise between two conflicting issues. On the one hand, the use of panel data allows accounting for within-countries dynamics of EGV and its determinants.⁶ On the other hand, the Random-Effects (RE) model we draw upon is typically suited for panels with relatively large cross-section and small time dimensions.

Regarding EGV, we follow Acemoglu et al. (2003), Fatas and Mihov (2003, 2006) and Yang (2007), and measure it as the standard deviation of GDP per capita growth by three-year period, with GDP per capita coming from the Penn World Table 7.1 of Heston et al. (2013).⁷ Regarding political institutions, we create a binary indicator of political regimes based on the Polity2 index from the PolityIV database of Marshall and Jaggers (2010). Consistent with the classification of Przeworski et al. (2000), Persson and Tabellini (2003), Persson (2005), Giavazzi and Tabellini (2005), and Acemoglu et al. (2014), this variable equals 0 (1) for autocratic (democratic) regimes, namely when the Polity2 index is negative (positive).⁸ Since our data are three-year averaged, a country is considered as democratic for the corresponding period if it has a democratic regime during all three years, and as autocratic if not.

⁵ Countries and time periods in our sample were selected based on data availability (Table A in the supplementary material presents the list of countries in our sample). In particular, we stopped in 2007 for our results not to be polluted by the recent crisis, which is associated with a large increase in EGV in many countries in our sample. Besides, due to lack of data on some forms of democracy and control variables, the final number of countries may be lower (for example, 131 countries when considering the various forms of democracy in Table 1).

⁶ This is particularly important when measuring EGV, since a comparable average EGV among different countries in a cross-sectional setting may cover rather different dynamics over time (see Yang, 2007).

⁷ An alternative measure is the ratio between the standard deviation of GDP growth and the absolute value of average economic growth, namely the relative standard deviation, as suggested by Klomp & de Haan (2009). However, since this variable computed in our analysis based on three-year period seems unrelated to the traditional measure of EGV (their correlation is fairly weak), we stick to the latter variable to allow our results to be comparable to the existing literature.

⁸ Giavazzi and Tabellini (2005) show that using a zero threshold for the Polity2 variable to differentiate between democracies and dictatorships is particularly relevant, as crossing it is usually consistent with a significant improvement of institutions in the short-run, followed by a more gradual improvement.

However, this variable only provides an aggregated view of democracies. To go beyond the existing literature, we follow Voigt (2012) and consider five essential features of democratic regimes: government forms, electoral rules, state forms, the number of veto-players, and the age of democracies, as detailed in the following.

First, eight of our political institutions variables are related to constitutional arrangements of democracies. In line with Persson (2005), observations for democracies characterized by a specific constitutional arrangement (e.g. parliamentary governments) are equal to 1, while observations for democracies with the alternative constitutional arrangement (e.g. semi-presidential and presidential governments) and dictatorships are equal to 0. This way, we obtain three sets of constitutional arrangements variables:

- (i) three binary variables of government forms, equal to 1 if in a democracy the government form is parliamentary, semi-presidential, or presidential, respectively; and equal to 0 otherwise (data used to create these variables come from the database of Cheibub et al., 2009);
- (ii) three binary variables of electoral rules, equal to 1 if in a democracy the electoral rule for electing members of the Lower House of Parliament is majoritarian, mixed, or proportional, respectively; and equal to 0 otherwise (data used to create these variables come from the database of Bormann and Golder, 2013);⁹
- (iii) two binary variables of state forms, equal to 1 if in a democracy the state form is unitary, or federal, respectively; and equal to 0 otherwise (data used to create these variables come from the overlap of two sources: the 2013 World Factbook database from the CIA, and political data from each country sheet from the website Perspective Monde of Sherbrooke University).

In addition to these constitutional arrangements variables, we use the same logic to build two additional political institutions variables, related to the current and historical functioning of democracies:

- (iv) a veto-players variable, equal to the average number of veto-players by three-year period if the political regime is democratic; and equal to 0 otherwise (data used to create this variable come from the Database of Political Institutions of Keefer, 2010);

⁹ Since countries do not necessarily have a unicameral structure of their Legislative power, we focus on the electoral rule for the elections of the members of the Lower House of Parliament to allow comparability across countries.

- (v) an age of democracies variable, equal to the average number of years by three-year period since a political regime is democratic and was not reversed until the end of our sample (data used to create this variable come from Persson and Tabellini, 2003, and from our calculations based on the Polity2 index, for old and recent democracies, respectively).

To summarize, the use of these ten political institutions variables allows disaggregating the overall effect of democracies, with the goal of assessing which political institutions channels might matter for explaining differences in EGV between democracies and dictatorships.

3.2 Political institutions: non-random selection, and high inertia in panel data

According to Persson and Tabellini (2003, 2004), assessing the effects of political institutions faces two major challenges: non-random selection, and high inertia.

Non-random selection is related to the fact that both political institutions and EGV differ along several geographical, historical, and economic development dimensions, such as regions, income levels, periods, and colonial and legal origins (see Table B in the supplementary material). Thus, drawing upon panel data to account for unobserved country and temporal heterogeneity allows better tackling the potential non-random selection of political institutions, compared to cross-section analyses.

As for high inertia, it refers to the choice of the most appropriate estimator to assess the relationship between forms of democracy and EGV. Table A in the supplementary material shows that, among the 140 countries in our sample, only 65 experienced at least one political transition from autocracy to democracy (or vice versa) over the 1975-2007 period. The same institutional inertia prevails regarding constitutional reforms in democracies: only 9 constitutional reforms in permanent democracies (of which 7 are related to electoral rules), and only 10 constitutional reforms in countries with political transitions (of which 8 are related to electoral rules).

Given non-random selection and high inertia of political institutions, we are left with few appropriate panel data methods. Regarding non-random selection, the use of Propensity Score Matching (see Persson and Tabellini, 2007) is inappropriate for our analysis focusing on different institutional features of democracies. For example, in the case of constitutional arrangements variables, a matching estimator would require the use of eight treatment variables. In addition, although the instrumental variables commonly used so far in the

literature represent relevant determinants of a wide institutional concept such as democracy (Acemoglu, 2005), they could hardly be used as instruments for the precise constitutional arrangements in place in a given democratic regime. As a result, finding different instruments for each of the ten forms of democracy variables we account for would represent a fairly challenging exercise. Regarding inertia, the traditional within-estimator would limit our analysis to the narrow subset of countries having experienced at least one political transition over the 1975-2007 period, while a Least Square Dummy Variable (LSDV) estimator would absorb most of the effects of the highly-inertial political institutions variables.¹⁰

Taking into account these limitations, a viable strategy is to resort to a Random-Effects (RE) model. However, although the RE model is appropriate for estimating the effects of highly inertial variables, one challenging underlying assumption is the orthogonality between political institutions variables and random effects. Since the traditional Hausman test is not relevant in our context, because the estimates from a fixed-effects model would be derived only from the subset of countries that experienced at least one political transition, we implement an alternative procedure to evaluate this orthogonality hypothesis: after each estimate, we compute a bilateral correlation test between predicted random effects and each political institutions variable to test the relevance of our RE model.

3.3. *The econometric model*

To estimate the relationship between forms of democracy and EGV, we consider the following RE model

$$Y_{it} = \alpha + \sum_{k=1}^K \beta_k X_{kit-1} + \gamma W_{it-1} + \delta P_{it-1} + \mu_i + \nu_t + \varepsilon_t, \quad (1)$$

with Y the EGV, X the political institutions variables (with K the number of variables for each category of forms of democracy tested), W a set of controls, and P a set of variables accounting for correlations with forms of democracy other than those included in the vector X . Given a potential simultaneity bias, all political institutions and control variables are one-period lagged. Finally, α is a constant term, μ_i and ν_t are country random effects and time dummies respectively, and ε is the error term.

¹⁰ Besides, unlike studies focusing on the aggregate effect of democratic regimes (see e.g. Yang, 2007; Klomp and de Haan, 2009; Edwards and Thames, 2010), we cannot draw upon a System-GMM estimator in our analysis devoted to disaggregated democratic political institutions variables, since the latter display much lower within-country variability. Conversely, the Fixed Effect Vector Decomposition (FEVD) estimator of Plumper and Troeger (2007) is unlikely to provide relevant inference, since, given that 46% of countries in our sample experienced at least one political transition, the within-country variability of political institutions variables is not low enough to carry out a relevant vector decomposition of country fixed effects.

The two set of controls W and P are as follows. Regarding W , based on Bekaert et al. (2006), Raddatz (2007), and Klomp & de Haan (2009), we determined a set of thirteen potential EGV determinants. Then, following Klomp & de Haan (2009), we estimated a RE model including these variables, but without the political institutions variables. The six variables that were significant at least at the 10% significance level were selected to form the vector W , namely: the log of per capita GDP (Log_GDP_pc), economic growth ($Growth$), the log of public spending (Log_gvt_sp), the volatility of terms of trade ($Sdterm_trade$), the log of population (Log_pop), and the number climate shocks ($Climate\ shocks$).¹¹

Regarding the set of controls P , Table C in the supplementary material shows the presence of strong correlations between the various forms of democracy we account for. This may raise an omitted-variable bias if these variables are not jointly controlled for. However, jointly accounting for them would raise serious collinearity issues. One way to overcome this latter difficulty is to draw upon three polytomic variables:¹²

- (i) *Poly_gvt_forms* is defined as: 0=dictatorship, 1=parliamentary democracy, 2=semi-presidential democracy; 3=presidential democracy. Allowing the introduction of only one, instead of three variables (parliamentary, semi-presidential, and presidential), this coding is consistent with an increase in the stability dimension of the political decision-making process;
- (ii) *Poly_elec_rules* is defined as: 0=dictatorship, 1=majoritarian electoral rule democracy, 2=mixed electoral rule democracy; 3=proportional electoral rule democracy. Again, allowing introducing only one, instead of three variables (majoritarian, mixed, and proportional), this coding reflects an increase in the inclusion dimension of the political decision-making process;
- (iii) *Poly_state_forms* is defined as: 0=dictatorship, 1=unitary state democracy, 2=federal state democracy. Allowing the introduction of only one, instead of two variables (unitarism, and federalism), this coding is consistent with an increase in both the stability and the inclusion dimensions of the political decision-making process.

To these three polytomic variables, we add in vector P the remaining forms of democracy, namely: (iv) *Veto Players*, and (v) *Age democracies*. Consequently, the vector P controls for all forms of democracy variables (i)-(v), except for those whose effect on EGV we want to

¹¹ Tables D and E in the supplementary material provide the definitions and sources of all variables, and descriptive statistics, respectively. In the robustness analysis we introduce the seven remaining control variables that did not make it to the baseline specification.

¹² The theoretical underpinning of their respective ordering is based on the analysis performed in section 2.

assess, which are included in the vector X . For example, when evaluating the effect of government forms (parliamentary; semi-presidential; presidential) on EGV, we control for the other forms of democracy through the variables *Poly_elec_rules*, *Poly_state_forms*, *Veto Players*, and *Age democracies*. This strategy allows assessing the relationship between each form of democracy and EGV, while controlling for the remaining institutional features of democratic regimes.

IV. Results

Our main results are reported in Table 1. Regression (1) shows that democracies significantly decrease EGV compared to dictatorships. Consistent with previous empirical findings (e.g. Acemoglu et al., 2003; Mobarak, 2005; Klomp and de Haan, 2009; Edwards & Thames, 2010), this estimated effect is sizeable: EGV is lower by 1.3 percentage points (roughly 30% of world average in our sample) in democracies compared to dictatorships. Indeed, compared to dictatorships, democratic regimes provide more control over political leaders' decisions and enable more participation in the political decision-making process. This in turn limits the occurrence of internal shocks and the magnitude of external shocks, through the implementation of less distorsive public policies (Quinn & Woolley, 2001; Acemoglu et al., 2003), and because of less socio-political conflicts (Rodrik, 1999; 2000).

Regarding control variables, except economic growth (and, most of the time, climate shocks), they are significant and display the expected sign in all specifications. Besides, the share of the variance explained by the country random effects (ρ) is fairly low (at most 8%, see the bottom of Table 1), suggesting that correlations between our political institutions variables and random effects are not significant, which supports the relevance of a RE model to estimate the relationship between forms of democracy and EGV.

Table 1. Forms of Democracy and Economic Growth Volatility

	Political Regimes	Government Forms	Electoral Rules	State Forms	Veto Players	Age Democracies
	(1)	(2)	(3)	(4)	(5)	(6)
Democracy	-1.320*** [0.258]					
Parliamentary		-2.224*** [0.794]				
Semi-Pres		-2.146*** [0.783]				
Presidential		-1.722** [0.832]				
Majoritarian			-3.055*** [0.775]			
Mixed			-2.359*** [0.838]			
Proportional			-3.636*** [0.780]			
Unitarism				-1.753** [0.712]		
Federalism				-1.002 [0.753]		
Veto Players					0.0311 [0.0766]	
Age democracies						-0.00537 [0.00397]
Log_GDP_pc	-0.633*** [0.161]	-0.563** [0.239]	-0.577** [0.240]	-0.564** [0.239]	-0.550** [0.239]	-0.550** [0.239]
Growth	0.0356 [0.0314]	0.0309 [0.0339]	0.0319 [0.0338]	0.0313 [0.0339]	0.0304 [0.0342]	0.0304 [0.0342]
Log_gvt_sp	1.045*** [0.398]	1.099** [0.470]	1.063** [0.468]	1.089** [0.468]	1.067** [0.468]	1.067** [0.468]
Sdterm_trade	3.332*** [1.217]	2.891** [1.142]	2.918** [1.148]	2.916** [1.147]	3.108*** [1.195]	3.108*** [1.195]
Log_pop	-0.672*** [0.138]	-0.706*** [0.168]	-0.730*** [0.168]	-0.708*** [0.168]	-0.684*** [0.169]	-0.684*** [0.169]
Climate shocks	0.0271* [0.0142]	0.0171 [0.0152]	0.0200 [0.0151]	0.0177 [0.0152]	0.0198 [0.0154]	0.0198 [0.0154]
Control gvt. forms	No	No	Yes	Yes	Yes	Yes
Control elec. rules	No	Yes	No	Yes	Yes	Yes
Control state forms	No	Yes	Yes	No	Yes	Yes
Control V-P	No	Yes	Yes	Yes	No	Yes
Control Age Dem	No	Yes	Yes	Yes	Yes	No
Obs./Countries	1168/135	1073/131	1072/131	1073/131	1073/131	1073/131
R-squared/Rho	0.19/0.05	0.20/0.08	0.20/0.07	0.20/0.07	0.19/0.07	0.19/0.07
Wald test p-value	0.00	0.00	0.00	0.00	0.00	0.00
Correlation tests between predicted random effects and political institutions variables						
Corr ui Dem	-0.024					
Corr ui Parl		-0.018				
Corr ui Semi-Pres		-0.017				
Corr ui Pres		0.004				
Corr ui Maj			-0.019			
Corr ui Mix			-0.017			
Corr ui Prop			0.004			
Corr ui Uni				-0.028		
Corr ui Fed				0.01		
Corr ui V-P					-0.035	
Corr ui Age Dem						-0.023
Tests of significant differences in coefficients within categories of political institutions (p-values)						
Parl vs Semi-Pres		0.83				
Parl vs Pres		0.21				
Semi-Pres vs Pres		0.30				
Maj vs Mixed			0.15			
Maj vs Prop			0.10			
Mixed vs Prop			0.00			

Note: robust standard errors in brackets. Time dummies included in all regressions. Rho is the share of the variance of the dependent variable explained by random effects. Corr ui is the correlation coefficient between the predicted random effects and each political institutions variable. ***p<0.01, **p<0.05, *p<0.1.

In the following, we go beyond the existing literature, and look if different institutional arrangements of democracies are associated with differences in EGV. As shown by columns (2)-(4), all constitutional arrangements variables (except federal states) are associated with a significant reduction in EGV compared to dictatorships. However, the size of this stabilizing effect is fairly different depending on the considered form of democracy: estimated coefficients range between -1.7 and -3.6, suggesting that the lower EGV enjoyed by democracies compared to dictatorships varies with respect to their specific constitutional arrangement. More specifically, the effect of constitutional arrangements variables in Table 1 is as follows:

- (i) regarding government forms, according to column (2), although the strongest reduction in EGV is related to parliamentary and semi-presidential governments, equality tests do not support significant differences between parliamentary, semi-presidential, and presidential government forms with respect to dictatorships (see the bottom of Table 1). Thus, once a country adopts a political regime ensuring a reasonable level of constraints on the Executive, the extent of separation between the Executive and the Legislative powers is not found to be a critical factor for further reducing EGV;
- (ii) on the contrary, regarding electoral rules, column (3) shows that the decrease in EGV in democracies with proportional electoral rules is significantly higher than the EGV decrease in democracies with majoritarian and mixed electoral rules (the effect of the latter two types of electoral rules being statistically equal, see the bottom of Table 1). Consequently, the precise type of electoral rule might be of importance to understand how democratic regimes induce less EGV compared to dictatorships: moving towards electoral rules that enable a strong inclusiveness of the political decision-making process, i.e. proportional electoral rules, is found to be associated with a more important reduction in EGV. By allowing a strong inclusiveness of the political decision-making process, proportional electoral rules may foster lower EGV through a better management of redistributive conflicts caused by external shocks, and the implementation of less distortive public policies reflecting the preferences of a broader spectrum of voters;
- (iii) finally, regarding state forms, as shown by column (4), only unitary states are associated with a significant reduction in EGV compared to dictatorships. This suggests that limited separation of power between the central government and the local authorities is related to lower EGV compared to dictatorships. This result

may indicate that, compared with federal states, in unitary states the higher concentration of the political power could be associated with a more flexible decision-making process that enables the implementation of good macroeconomic stabilization policies to deal with the consequences of external shocks.

Let us now look at the two remaining institutional features of democratic regimes we consider in our analysis. As shown by columns (5)-(6) neither (iv) the number of veto-players, nor (v) the age of democracies significantly reduce EGV in democracies compared to dictatorships. These results may indicate that the number of political actors involved in the political decision-making process and a long-lasting experience of democratic institutions may not be among the institutional features that help understanding the lower EGV in democracies with respect to dictatorships.

To summarize, our estimates show that institutional details are of crucial importance to understand the stabilizing of democratic regimes, since not all forms of democracy are associated with a significant decrease in EGV, and, when they do, the magnitude of their effect may display significant differences. Proportional electoral rules and unitary states seem to be particularly effective in reducing EGV with respect to dictatorships. Thus, more inclusiveness of the political decision-making process and a limited separation of power between the central government and the local authorities appear as two institutional features of particular importance for explaining the stabilizing effect of democratic regimes. In turn, all government forms display the same favorable effect on EGV, while the number of veto players and the age of democracies are not found to statistically reduce EGV compared to dictatorships.

V. Robustness

We explore the robustness of our results to (i) alternative measures of main variables, (ii) additional EGV determinants, and sources of unobserved heterogeneity, and (iii) potential heterogeneity related to the level of economic development.

5.1. Alternative measures of main variables

Regarding EGV, estimations performed using an alternative measure (the standard deviation of the output gap by three-year period, computed using the Hodrick-Prescott filter), and when abstracting from EGV outliers are consistent with our baseline results (to save space, these results are available upon request).

Regarding political institutions variables, our measure of democratic regimes is based on the Polity2 index from the PolityIV database. However, as indicated by Acemoglu et al. (2014), since this measure could be polluted by measurement errors, it could be worthy to draw upon several sources to better document genuine changes in democratic scores (see also Papaioannou and Siourounis, 2008). Using Acemoglu et al. (2014)'s coding of democratic regimes for all political institutions variables used in our analysis, Table F in the supplementary material shows that our results are robust to this alternative measure of democracies.

5.2. Additional controls

We introduce as additional controls the seven variables that were not retained in the baseline specification of the RE model following our selection procedure, namely the one-period lag of: the log of financial development, the log of trade openness, financial openness, political instability, economic crisis, the log of inflation, and the standard deviation of inflation (see Tables D-E in the supplementary material for definitions, sources, and descriptive statistics). As shown by Table G in the supplementary material, these variables do not significantly affect EGV, with the exception of the log of inflation.¹³ In addition, our main results still hold, namely: democracies still decrease EGV compared to dictatorships; proportional electoral rules and unitary states still appear to be particularly effective in reducing EGV; the three government forms are again associated with a comparable significant decrease in EGV; and the number of veto players and the age of democracies do not significantly affect EGV yet again. Similar conclusions arise when accounting for autocorrelation in EGV by introducing the one period lag of EGV as an explanatory variable, and also when we further account for unobserved heterogeneity using regional dummies, and interaction between region and period dummies¹⁴ (see Tables H and I in the supplementary material).

5.3. The level of economic development

As suggested by Lucas (1988) and Pritchett (2000), developing countries present less stable growth rates than developed countries. For instance, since e.g. the productive structure, the

¹³ To save space, all seven variables were introduced jointly. We report that introducing them sequentially does not alter their significance or the significance of political institutions variables (results are available upon request).

¹⁴ We use interaction between region and period dummies (suggested by Giavazzi and Tabellini, 2005) to account for regional patterns of democratic transitions associated with both the adoption of specific forms of democracy, and a large increase in EGV. The regions that experienced political transitions in our sample are: Sub-Saharan Africa, Latin America, East Asia and Pacific, South Asia, Middle East and North Africa, and Former European Socialist Republics.

quality of institutions, and the type of implemented public policies may depend on countries' level of economic development, developing and developed countries may be exposed to different sources of shocks that influence the stability of their economic growth. As a result, the specific institutional features of democracies that can support lower EGV compared to dictatorships might depend on the level of economic development. We analyze this issue by dividing our sample into two sub-samples, corresponding to developing (DC) and developed (DV) countries, using World Bank's classification (see Table J in the supplementary material).

Table 2 shows several differences between DC and DV. First, the stabilizing effect of democratic regimes is stronger in DV compared to DC. One possible explanation may be related to the institutional complexity of democracies compared to dictatorships, making their functioning more costly. Thus, the availability of financial resources for carrying out an efficient political decision-making process may enable a good coordination and implementation of public policies, with favorable effects on EGV.

Second, compared to the full sample, all forms of democracy in DV are associated with lower EGV compared to dictatorships, and their effect is stronger. Besides, the differences among electoral rules (government forms) are weaker (stronger), and the effect of federal states becomes significant and of similar magnitude with respect to unitary states. Finally, the number of veto players and the age of the democracy are found to be significantly associated with a decrease in EGV compared to dictatorships: having an additional veto-player (ten years of democracy) reduces EGV on average by 0.2 (0.1) percentage points.

Third, results for DC are close to the ones obtained for the full sample. In particular, the favorable effect of the three government forms is not statistically different among them, and proportional electoral rules, now together with majoritarian electoral rules, have the largest stabilizing effect. Besides, contrary to the results for DV, only unitary states are associated with a significant decrease in EGV, and the effect of the number of veto players and the age of democracies is not significant.

In sum, results in Table 2 suggest the presence of heterogeneities related to the level of economic development, in the relationship between forms of democracy and EGV. However, given the relatively limited size of the DV and DC subsamples, these results should be considered with caution.

Table 2. Forms of Democracy and Economic Growth Volatility: The Role of Economic Development

	Political Regimes		Government Forms		Electoral Rules		State Forms		Veto players		Age democracies	
	DC	DV	DC	DV	DC	DV	DC	DV	DC	DV	DC	DV
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)
Democracy	-0.948*** [0.263]	-3.642*** [1.268]										
Parliamentary			-3.285*** [1.081]	-4.425** [1.996]								
Semi-Pres			-3.129*** [1.086]	-3.734* [1.931]								
Presidential			-3.173*** [1.060]	-3.633* [2.114]								
Majoritarian					-3.533*** [1.085]	-4.742** [1.877]						
Mixed					-2.331* [1.253]	-4.582*** [1.687]						
Proportional					-3.475*** [1.167]	-4.612*** [1.742]						
Unitarism							-2.010* [1.026]	-4.541** [1.764]				
Federalism							-0.716 [1.211]	-4.288*** [1.601]				
Veto Players									0.110 [0.119]	-0.220** [0.0997]		
Age democracies											-0.000283 [0.00574]	-0.00965** [0.00382]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control gvt. forms	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control elec. rules	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Control state forms	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Control V-P	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Control Age Dem	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Obs./Countries	921/107	247/28	834/103	239/28	833/103	239/28	834/103	239/28	834/103	239/28	834/103	239/28
R-squared/Rho	0.15/0.03	0.48/0.00	0.16/0.06	0.50/0.00	0.16/0.06	0.49/0.00	0.16/0.06	0.49/0.00	0.15/0.06	0.47/0.04	0.15/0.06	0.47/0.04
Wald test p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Robust standard errors in brackets. Time dummies included in all regressions. Rho is the share of the variance of the dependent variable explained by random effects. Corr ui is the correlation coefficient between the predicted random effects and each political institutions variable. ***p<0.01, **p<0.05, *p<0.1.

VI. Conclusion

Several empirical studies emphasized that democracies are associated with significantly lower EGV compared to dictatorships. However, little is said about the specific institutional features of democratic regimes that may explain this stabilizing effect. The goal of this paper was to go beyond the simple dichotomy between democracies and dictatorships, in order to understand which forms of democracy may explain the lower EGV enjoyed by democracies compared to dictatorships.

To this end, we used a large panel of 140 countries over the 1975-2007 period, and disaggregated the overall effect of democracies on EGV along five institutional dimensions, namely government forms, electoral rules, state forms, the number of veto players, and the age of democracies. We showed that institutional details are of crucial importance to understand the stabilizing effect of democratic regimes. In particular, two specific forms of democracy, namely proportional electoral rules and unitary states, turned out to be particularly effective (relative to the alternative electoral rules, and state forms, respectively) in reducing EGV compared to dictatorships. Thus, more inclusion of the political decision-making process and a limited separation of power between the central government and the local authorities appeared to be two institutional dimensions that may explain why democracies perform better in reducing EGV with respect to dictatorships. Besides, we found that the various government forms present a comparable stabilizing effect, suggesting limited further gains in terms of EGV reduction related to the extent of separation between the Executive and the Legislative powers. Moreover, the number of veto-players, and the age of democracies were not found to significantly affect EGV, indicating that the number of political actors involved in the political decision-making process and a long-lasting experience of democratic institutions might not robustly explain EGV differences between democracies and dictatorships. Finally, we unveiled heterogeneities related to the level of economic development in the effect of the various forms of democracy on EGV. In particular, contrary to developing countries, in developed countries all forms of democracy significantly reduce EGV compared to dictatorships, and the magnitude of their effect is stronger.

Consequently, our analysis suggests that the specific institutional characteristics of democratic regimes are of importance: not all forms of democracy are associated with a significant decrease in EGV compared to dictatorships, and, when this is the case, the magnitude of their effect may display significant differences. Thus, policymakers should be aware that the simple promotion of democratic regimes might not be sufficient to reduce

EGV, as choosing between various forms of democracy may entail important differences in terms of EGV, and, possibly, for countries' development path.

Future research may be devoted to this topic. Close to our study, one could explore possible nonlinearities between EGV and the forms of democracy whose measures are appropriate for such an analysis, namely the number of veto players and the age of democracies. Another potential issue of interest is related to the effect of different forms of democracy on countries' degree of exposure and their resilience capacity to international shocks that could transit through trade (see Cooray et al., 2017a, for an analysis at the level of political regimes), or the financial sector. Finally, one could also study the effect of different forms of democracy on variables other than EGV, such as political rights (see Cooray et al., 2017b, for an analysis of the effect of media freedom on women's rights).

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