Forms of Democracies and Macroeconomic Volatility: An Exploration of the Political Institutions Black-Box

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Abstract: Although the empirical literature on the determinants of economic growth volatility highlights a robust stabilizing effect of democratic regimes compared to dictatorships, no study focused so far on identifying the precise political institutions explaining this stabilizing effect. We open the political institutions black-box associated to democratic regimes, and study the effects of disaggregated political institutions on macroeconomic volatility along five institutional dimensions, namely forms of government, electoral rules, state forms, the number of veto players, and the age of democracies. Using a large panel of 140 countries over 1975-2007, we show that institutional details are of crucial importance, since the stabilizing effect of democracies depends on the precise institutional dimensions at work. Thus, our study contributes to the institutional design debate, by showing that the simple promotion of democratic regimes might not be sufficient to foster a more stable development path.

Keywords: Political Institutions; Macroeconomic Volatility; Positive Constitutional Economics; Comparative Politics; Economic Development.

JEL classification codes: H11; O17; O43; P51; O11.

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I. Introduction

The empirical literature on the determinants of economic growth volatility highlights a robust stabilizing effect of democratic regimes. Authors such as, e.g. Rodrick (1999, 2000), Henisz (2000, 2004), Quinn and Woolley (2001), Mobarak (2005), Nooruddin (2003), Acemoglu et al. (2003), Yang (2007), or Klomp and de Haan (2009), show that democracies provide more macroeconomic stabilization compared to dictatorships.[1] They argue that democratic regimes better handle the consequences of external shocks and limit the occurrence of internal shocks, due to the implementation of less distortive public policies and a better ability to cope with sociopolitical conflicts.

However, to the best of our knowledge, no study focused so far on identifying the precise political institutions explaining the stabilizing effect of democracies. Indeed, Acemoglu (2005) and Acemoglu and Johnson (2005) show that the concept of democratic regime indiscriminately gathers a set of economic institutions (e.g., the limitation of government's expropriation power related to property rights protection) and political institutions (e.g., the various constitutional arrangements in place). Therefore, as Voigt (2011) suggests, it is necessary to go beyond the simple opposition between autocratic and democratic regimes.

We open the political institutions black-box associated to democratic regimes, and explore the effects of disaggregated political institutions on macroeconomic volatility. We take advantage of constitutional economics and comparative politics literature, which provided valuable theoretical explanations regarding the effects of alternatives constitutional arrangements within democratic regimes on the political decision-making process. Using a large panel of 140 countries over 1975-2007, we disaggregate the overall effect of democracies on economic growth volatility along five institutional dimensions, namely forms of government, electoral rules, state forms, the number of veto players and the age of democracies, with the goal of identifying which democratic institutional features matter for explaining differences in macroeconomic volatility between autocracies and democracies.

While we confirm that democratic regimes significantly decrease economic growth volatility, our results show that institutional details are of crucial importance. First, we find that proportional electoral rules play a central role in explaining the stabilizing effect of democracies, which confirms the relevance of the inclusion dimension of the political decision-making process when dealing with economic growth volatility (Rodrick, 1999,

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[1] On the contrary, the effect of democratic regimes on economic growth is subject to more debate (see the meta-analysis of Doucouliagos and Ulubasoglu, 2008).

2000). Second, albeit semi-presidential governments and unitary states exert the strongest effect among comparable constitutional arrangements, their effects are not statistically different from those related to other forms of government and state forms respectively. Thus, there seems to be limited gains in terms of macroeconomic stability from the precise constitutional arrangements associated to government and state forms. Third, an increase in the number of veto players and the age of democracies significantly reduces economic growth volatility, but only until a threshold estimated around 5 veto players and 80 years of democracy. These results are robust to a wide set of robustness tests, including different measures of main variables, controlling for outliers, and accounting for additional determinants of macroeconomic volatility.

In addition, we provide a systematic analysis of the role played by economic development in the relationship between political institutions and economic growth volatility. Compared to results for the full sample, all measures of forms of government, electoral rules and state forms are found to reduce macroeconomic volatility in high-income countries, while in low-income countries only presidential, proportional, and unitary institutions have a significant effect. The same holds regarding the number of veto players and the age of democracies, albeit several nonlinearities are at work. Indeed, the age of democracies reduces growth volatility up to a higher threshold (around 100 years) in high income countries, while the number of veto players is nonlinearly related to macroeconomic volatility irrespective of the level of economic development. However, compared to high-income countries, the threshold below which the number of veto players decreases growth volatility is lower for low and intermediate levels of economic development.

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

We first present the literature on the link between political regimes and macroeconomic volatility. Then, based on constitutional economics and comparative politics, we discuss the theoretical mechanisms linking political institutions to macroeconomic volatility.

2.1. Political regimes and macroeconomic volatility

A large body of literature highlights better stabilization features of democracies compared with autocracies. Such an effect is defended on the following two grounds.

On the one hand, stronger control over political leaders' decisions limits the implementation of distortive public policies, thus the occurrence of internal shocks (Acemoglu et al., 2003). According to Quinn and Woolley (2001) and Nooruddin (2003), 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.[2] Similarly, capitalizing on Lindblom (1958, 1959, 1979), Chandra and Rudra (2005) emphasize the role of constrains on the political decision-making process, and particularly on what Lindblom calls "*partisans*", whose agreement is required to define and implement public policies. As a result, in democracies, policies match the preferences of the majority of partisans, and are characterized by important inertia, thus resulting in more macroeconomic stability than autocracies.[3] Fatas and Mihov (2003, 2006) support this argument by showing that fewer constraints on the Executive power result increase the more volatility of fiscal policies used at political purposes.

On the other hand, democracies perform better in reducing the magnitude and resilience of external shocks. According to Rodrick (1999, 2000), democracies manage more appropriately redistributive conflicts caused by such 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) supports this theory, by showing that democracies induce more macroeconomic stability in countries with significant ethno-linguistic fractionalization.

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.[4] In this paper, we deal with five institutional features of democratic regimes. Three of them, i.e. forms of government, electoral rules and state forms, are related to their constitutional

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[2] Thus, it is the uncertainty related to the reelection process that fosters macroeconomic stability in democracies. This theory assumes that in autocracies political leaders are not subject to uncertainty regarding their capacity of staying in power, and are therefore not punished if they implement policies that increase agents' income fluctuations. However, Wintrobe (1998) recalls that, in a dictatorship, political leaders may suffer from more political uncertainty, due to potentially more violent sanctions than in democracies, including revolutions, coups, or assassinations.

[3] A recent development of these works is the veto-players theory of Tsebelis (1995, 1999, 2002). However, in this latter, only institutions taking part *directly* in the political decision-making process are considered; thus, democratic systems may display few veto players but many partisans (i.e. many indirect institutions).

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

arrangements. The remaining two, i.e. the number of veto-players and the age of democracies, aim at measuring the current and historical functioning of democracies.

The literature discussed in section 2.1 insists on two main institutional mechanisms to explain the ability of democracies to reduce volatility compared with dictatorships, namely the extent of constraints faced by political leaders when implementing public policies, and the inclusiveness of the political decision-making process. To explore this issue more in-depth, and link our political institutions variables to macroeconomic volatility, we draw upon comparative politics theories on political governance. Interestingly, the literature on the political regimes-growth volatility 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). As a result, linking these two concepts to the institutional determinants of growth volatility should enable us to identify the precise forms of democracies that could reduce macroeconomic volatility.

The (i) degree of authority reflects the extent of constrains 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 state level. Based on Gerring et al. (2005), constitutional arrangements characterizing this authority dimension in democracies are government and state forms.[5] We discuss their macroeconomic effects from the perspective of two conflicting objectives, namely the stability and the flexibility of the political decision-making process.

On the one hand, to provide a stable environment, political leaders' behavior should be the most predictable (Henisz, 2000, 2004; Stasavage and Keefer, 2003), with emphasis on separation, diffusion, and fragmentation of political power. As a result, political systems would be more able to avoid internal shocks if they have a stable (highly constrained) political decision-making process, limiting the risk of implementing highly 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 forms of government and federal states seem *a priori* the most relevant constitutional arrangements. However, such an institutional set-up

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

would reduce the ability 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 economic, social, and cultural environment, emphasis must be placed on the concentration of political power, with a flexible government having a strong leadership and being able to defeat significant conflicts of interests (Olson, 1982; Gerring et al., 2005, 2009). As Rodrick (1999, 2000) mentioned, political systems far more efficiently mitigate the consequences of external shocks, if they include a flexible decision-making process enabling the implementation of good macroeconomic stabilization policies. In light of Gerring and Thacker (2004) and Gerring et al. (2005, 2009), parliamentary forms of government and unitary states seem *a priori* the most relevant constitutional arrangements. Nevertheless, such an institutional configuration constrains less political leaders' discretion, which could increase the probability of internal shocks arising from implementing distortive public policies (Fatas and Mihov, 2003; Acemoglu et al., 2003).

Consequently, government and state forms appear to be subject to an institutional trade-off between flexibility (parliamentary governments and unitary states) and stability (presidential governments and federal states) at the political decision-making process level, when dealing with growth volatility stemming from either internal or external shocks. Nevertheless, regarding government forms, semi-presidential governments can be viewed as an intermediate institutional setup between presidential and parliamentary governments, leading to an appropriate compromise between flexibility and stability in the political decision-making process, and, thus, should induce more macroeconomic stability.

Turning to the (ii) degree of inclusion of the political decision making-process, it illustrates political leaders' ability to account for the largest possible points of view, interests, and ideas, when defining and implementing public policies. It reflects a downstream dimension of political governance, i.e. related to the extent of integrating citizens' preferences in the definition and implementation of public policies. As emphasized by Gerring et al. (2005), constitutional arrangements characterizing this degree of inclusion in democratic regimes are electoral rules and state forms.[6] In our context, inclusiveness would mitigate political and social instability induced by the intensification of redistributive conflicts arising from external shocks (Rodrick, 1999, 2000), and limit the effects of internal shocks through the implementation of public policies reflecting preferences of a broad spectrum of population

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

(Acemoglu et al., 2003). Following Gerring et al. (2005), we assume that constitutional arrangements allowing a strong inclusion of the political decision-making process are proportional electoral rules and federal state forms.

Furthermore, Tsebelis' (1995, 1999, 2002) veto-players theory provides a precious guideline to sum up our previous explanations on the link between political institutions and macroeconomic volatility. Indeed, more (less) flexible and weakly (highly) inclusive political systems are associated to a limited (large) number of veto players. However, we could expect a non-linear relationship between the number of veto players and macroeconomic volatility, since an increase in collective political actors above a certain threshold would increase the inertia of the political decision-making process (Tsebelis, 2002). This would decrease the ability to deal efficiently with external shocks, through, for instance, the implementation of timely and appropriate macroeconomic stabilization policies (Rodrick, 1999, 2000).

Finally, Brender and Drazen (2004, 2007) find that the age of democracies significantly matters for explaining differences in the implementation of public policies. In our context, a long-lasting experience of democratic institutions would enable democracies to adapt more efficiently their political decision-making process, in terms of flexibility, stability and inclusion, when dealing with internal or external shocks. Nevertheless, we could expect a non-linear relationship between the age of democracies and growth volatility, since the institutional complexity of more mature democracies tends to grow over time, leading to higher inertia in the political decision-making process and, thus, to less ability to deal efficiently with macroeconomic volatility stemming from external shocks.

In light of this literature, we aim at testing the following seven hypotheses regarding the relation between political institutions and macroeconomic volatility:

Hypothesis #1: Democracies enjoy less growth volatility compared to autocracies.

Hypothesis #2: Semi-presidential governments are associated with more macroeconomic stability compared to presidential and parliamentary governments, due to better compromise between flexibility and stability in the political decision-making process.

Hypothesis #3: Proportional electoral rules, by fostering more inclusion in the political decision-making process, are associated with more macroeconomic stabilization compared to mixed and majoritarian electoral rules.

Hypothesis #4: Federal states are associated with more macroeconomic stabilization compared to unitary states, due to better ability to account for both a stable and inclusive political decision-making process.

Hypothesis #5: Democracies with more veto players enjoy more macroeconomic stability.

Hypothesis #6: More mature (older) democracies enjoy more macroeconomic stability.

Hypothesis #7: The relationships depicted by hypotheses #5 and #6 may be reversed after a certain threshold, above which an increase in the number of veto players or in the age of democracies is associated with higher macroeconomic volatility, due to higher inertia in the political decision-making process.

III. Data and methodology

3.1. Data

We explore the relationship between political institutions and macroeconomic volatility in a panel of 140 countries over 1975-2007.[7] We use three-year averaged data as a compromise between two conflicting issues. On the one hand, compared to previous work that mostly relies on cross-section data, the use of panel data allows accounting for within-countries dynamics of growth volatility and its determinants.[8] On the other hand, the Random-Effects (RE) model we draw upon is typically suited for panels with relatively large cross-sections and small time dimensions.

Regarding macroeconomic volatility, we follow Acemoglu et al. (2003), Fatas and Mihov (2003, 2006) and Yang (2007), and measure it as the standard deviations of GDP growth by three-year sub-period. This variable is based on GDP per capita data from the Penn World Table 7.1 (2013) database.

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), or Giavazzi and Tabellini (2005), this variable equals 0 (1) for autocratic (democratic) regimes, namely when the Polity2 index is negative (positive).[9] Since our data are three-year averaged, a country is considered as democratic for the corresponding sub-period if it has a democratic regime during all three years, and as autocratic if not.

However, this political regimes variable only measures the aggregated dimension of democracies. Thus, to go beyond the existing literature, we follow Voigt (2012) and capture

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[7] Countries and time periods in our sample were selected exclusively based on data availability (Table A in appendix presents the list of countries in our sample).

[8] This is particularly important when measuring growth volatility, as comparable average of growth volatility among different countries may cover rather different dynamics of growth volatility over time (see Yang, 2007).

[9] 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.

five additional essential features of political institutions, namely government forms, electoral rules, state forms, the number of veto-players, and the age of democracies.

First of all, eight of our political institutions variables are related to constitutional arrangements of democratic regimes, and are built as follows. Observations corresponding to democracies (modality 1 of the political regimes variable) and characterized by a specific constitutional arrangement (e.g. parliamentary forms of government) are equal to 1. Otherwise, i.e. when the constitutional arrangement (e.g. semi-presidential and presidential governments) or the political regime (here, autocratic regimes) do not correspond to the institutional modality studied, observations 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);[10] and (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 overlapping two sources, namely the 2013 World Factbook database from the CIA, and political data from each country sheet from the website Perspective Monde of Sherbrooke University).

Furthermore, in addition to these constitutional arrangements variables, we use the same methodology and build the following two additional political institutions variables, related to the current and historical functioning of democracies: (i) a veto-players variable, equal to the average number of veto-players by sub-period if the political regime is democratic, and equal to 0 otherwise (data used to create this variable come from the Political Institutions database of Keefer, 2010); (ii) an age of democracies variable, equal to the average number of years by sub-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 democratic regimes, respectively).

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

To summarize, the use of these ten political institutions variables allows disaggregating the overall effect of democracies (i.e. opening the political institutions black box), with the goal of emphasizing what type of institutions matter for explaining differences in macroeconomic volatility between autocracies and democracies. In particular, including autocracies regimes in the reference modality (0) of each political institution variable means that estimated coefficients must be interpreted as the growth volatility differential between autocracies and democracies presenting this specific institutional feature.[11] Tables B to D in appendix present the distribution of political institutions variables for each country in our sample.

3.2. Descriptive statistics

Table 1 shows that macroeconomic volatility is roughly half in democracies compared to autocracies. Moreover, albeit of lower magnitude, such differences persist when considering disaggregated political institutions variables: growth volatility is between 2.29 for countries with mixed electoral rules and 3.14 in federal states. Finally, differences in volatility are quite sizable among veto players and age of democracies variables, as the average standard deviation of economic growth is roughly between 2 and 5.5. Such differences call for a more detailed analysis of the effect of disaggregated institutions on macroeconomic volatility.

Table 1. Political Regimes, Democratic Political Institutions and Growth Volatility

Political regimes		Government forms			Electoral rules		
Dem.	**Dict.**	**Pres.**	**Semi-Pres.**	**Parl.**	**Maj.**	**Mix.**	**Prop.**
2.95	5.54	2.95	2.65	2.48	3.04	2.29	2.54
State forms		Age of democracies			Number of veto players		
Fed.	**Uni.**	**Absent (0)**	5.54		**0**	5.66	**5**	2.14
3.14	2.42	**Nascent (> 0 to 3 years)**	4.93		**1**	3.81	**6**	2.66
		Young (4 to 29 years)	2.89		**2**	3.14	**7**	2.09
		Mature (30 to 206 years)	2.07		**3**	3.10	**8+**	3.83
					4	2.43		

Note: mean of the standard deviations of GDP growth by political institutions over 1975-2007. We merge in one category the 10 observations with 8 or more (8+) veto players (namely, 4 with 8 veto players, 3 with 9 veto-players, and 1 observation with 13, 14 and 17 veto-players). Based on a quartile partition, the age of democracies defines absence (0 year), nascent (0 to 3 years), young (4 to 29 years), and mature (30 to 206 years) democracies.

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[11] Moreover, including autocracies in the reference modality (0) of each political institution variable allows us exploiting not only the between-country variability of political institutions, but also their within-country variability, due to the presence in our sample of a moderate number of countries that experienced at least one political transition from autocratic to democratic regimes (and vice-versa).

3.3. Political institutions: non-random selection and high inertia in panel data

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

The non-random selection problem is related to the specification of our econometric model. Tables F and G in appendix show that both political institutions and growth volatility are correlated with geographic, historical and economic development factors, such as colonial and legal origins, income per capita, or large waves of democratization associated to specific forms of democracies. Compared to previous work mainly based on cross-section data, drawing upon panel data to account for both observed heterogeneity (through control variables) and unobservable country and temporal heterogeneity (through country effects and time dummies), allows better tackling the potential non-random selection of political institutions. Next, we observe for the time span of our analysis (1975-2007) several regional patterns of democratic transitions, associated not only with the adoption of specific democratic political institutions but also with a large increase in macroeconomic volatility (see Table G in appendix). To account for these historical shocks, potentially correlated to both political institutions and growth volatility, we follow Giavazzi and Tabellini (2005) and control for a set of interaction variables between regions experiencing political transitions, as well as for time dummies.[12] Finally, Table H1 in appendix shows that institutions differ substantially along several first-order determinants of growth volatility, such as GDP growth, the occurrence of recessions, inflation, terms of trade volatility, and population. Thus, to avoid a misleading evaluation of the relationship between political institutions and macroeconomic volatility, we account for these factors in our econometric specification.

The high inertia problem refers to the choice of the most appropriate estimator. Table A in appendix shows that, among the 140 countries in our sample, only 66 experienced at least one political transition from autocracy to democracy (or vice versa) over 1975-2007. The same institutional inertia prevails regarding constitutional reforms in democracies (see Tables B and C in appendix): only 12 constitutional reforms in permanent democracies (of which 9 are related to electoral rules) and only 15 constitutional reforms in countries with political transitions (of which 12 are related to electoral rules). Finally, as illustrated by Table E1 in appendix, political regimes and constitutional arrangements variables present small within variability with respect to their between variability.

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[12] These regions are: Sub-Saharan Africa, Latin America, East Asia and Pacific, South Asia, Middle East and North Africa, and Former European Socialist Republics.

Given (i) potential endogeneity and (ii) high inertia of political institutions, we are left with few appropriate panel data methods. Regarding (i) endogeneity, the use of Propensity Score Matching (see Persson and Tabellini, 2007) is inappropriate for our analysis focusing on the disaggregated effect of institutions; for example, in the case of constitutional arrangements variables, a matching estimator would be impossible to implement with no less than eight treatment variables. In addition, as emphasized by Acemoglu (2005), the instrumental variables used so far in the literature[13] represent relevant determinants of a global institutional concept such as political regimes (including economic and political institutions), but certainly not instruments of the precise constitutional arrangements in place in a given democratic system, as this is the case in our analysis. Furthermore, identifying different instruments for each of the ten political institutions variables would represent a very challenging exercise given the aim of our paper.

Regarding (ii) inertia, the traditional within-estimator would limit our analysis to the narrow subset of countries having experienced at least one political transition over 1975-2007, while a Least Square Dummy Variable (LSDV) estimator with country-dummies would absorb most of the effects of the highly-inertial institutional variables. Moreover, the Fixed Effect Vector Decomposition (FEVD) estimator of Plumper and Troeger (2007) is unlikely to provide relevant inference, since, given that 47% of countries in our sample experienced at least one political transition, the within dimension of political institutions variables is not low enough to proceed to a relevant vector decomposition of country fixed effects. Finally, inertia in institutions makes the use of the System-GMM estimator problematic, as applying the first-difference (to remove country unobserved heterogeneity in the difference equation and to instrument endogenous variables in the level equation) limits our sample to countries characterized by at least one political transition.[14]

Taking into account these limitations, a viable strategy is to resort to a Random-Effects (RE) model.[15] However, albeit the RE model is appropriate for estimating the effects of highly inertial variables, one challenging underlying assumption is the orthogonality

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[13] For example, Persson and Tabellini (2003, 2004) instrument democratic political institutions by the timing of adoption of the current constitution (between 1921-1950, between 1951-1980 and after 1980), cultural and geographic variables from Hall and Jones (1999), legal origin variables from La Porta et al. (1998), and colonial history variables from Acemoglu et al. (2001).

[14] Yang (2007) and Klomp and de Haan (2009) draw upon System-GMM to assess the link between political institutions and growth volatility. However, their measure of institutions (namely, the Polity2 index from the PolityIV database) displays significantly more within variability compared to our disaggregated measures of institutions.

[15] Alternatively, drawing upon Mundlak's (1978) correlated random effects model, involving the use of country-specific averages of covariates, is equally inappropriate for our analysis, because this new set of variables would absorb most of the effects of our political institutions variables.

between political institutions and random effects. Given the strong limitations of fixed-effects models in our context, the traditional Hausman test for evaluating the orthogonality hypothesis is not relevant.[16] Thus, we implement an alternative procedure to systematically conduct this test: after each estimate, we computed a bilateral correlation test between predicted random effects and political institutions variables, which provides a proxy for testing the relevance of our RE model.

3.4. The econometric model

To estimate the disaggregated effect of political institutions on macroeconomic volatility, we consider the following RE model

$$Y_{it} = \alpha + \sum_{k=1}^{K} \beta_k X_{kit-1} + \gamma W_{it-1} + \mu_i + \nu_t + \varepsilon_{it} \,. \tag{1}$$

α is a constant term, μ_i and ν_t are respectively country-random effects and time dummies, Y stands for macroeconomic volatility, X includes our political institutions variables (with K the number of modalities for each category of political institutions tested), and W is the vector of traditional determinants of macroeconomic volatility, namely, the logarithm of GDP per capita (*Log_GDP_pc*), GDP growth (*Growth*), a recession dummy (*Crisis*), the logarithm of the inflation rate (*Log_Inflation*), the logarithm of central government public spending (*Log_gvt_sp*), the terms of trade standard deviations (*sdterm_trade*), and the logarithm of population (*Log_pop*).[17] To account for a potential simultaneous bias, political institutions and control variables are one sub-period lagged.

IV. Results

Regression (1) in Table 2 confirms our Hypothesis #1, since democracies significantly decrease economic growth volatility compared to dictatorships. Consistent with previous evidence (e.g., Rodrick, 1999, 2000; Acemoglu et al., 2003; Mobarak, 2005; Yang, 2007; or Klomp and de Haan, 2009), this result is obtained when controlling for traditional determinants of macroeconomic volatility, which display the expected sign and are significant (except for the variable *Crisis*). Remarkably, the share of the variance explained by the random effects (Rho) strongly decreases on average, from 25% (without controls, results are

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[16] When comparing fixed and random-effects models, the presence of highly inertial institutional variables leads to evaluate the effect of political institutions on growth volatility on different samples, and, as a result, to the mechanical rejection of the absence of correlation between institutions and random effects.

[17] Appendix A presents the sources and the construction of these variables, and Tables H1-H2 display descriptive statistics.

available upon request) to roughly 5% (with controls, see Table 2). Thus, the correlation between political institutions and random effects turns into not significant (see the bottom of Table 2), which supports our RE model. In addition, the effect of democracies is stable when further accounting for the non-random selection of political regimes, by controlling in regression (1a) through a set of interaction variables between regions and time dummies. In the following, we go beyond the existing literature and explore the effect of disaggregated political institutions variables on macroeconomic volatility.

4.1. Constitutional arrangements variables

Regressions (2)-(4) in Table 2 show that, except for mixed electoral rules, all constitutional arrangement variables have a negative and significant effect on economic growth volatility. In addition, the same holds when we control for interaction terms between time dummies and regions, in regressions (2a)-(4a). As such, we unveil an overall sizeable stabilizing effect of democratic regimes. Indeed, compared to dictatorships, democracies 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 and resilience of external shocks, through the implementation of appropriate public policies (Acemoglu et al., 2003; Quinn and Woolley, 2001; Nooruddin, 2003) and less socio-politic instability (Rodrick, 1999, 2000), which enhances macroeconomic stability.

Let us now take a closer look at Table 2. Regarding (i) government forms, semi-presidential governments exert the most important stabilizing effect, by reducing growth volatility by roughly 1.6 percentage point (henceforth pp) compared to autocracies, which confirms our Hypothesis #2. However, the estimated coefficients associated to each government form are not statistically different from each other (see p-values of equality tests at the bottom of Table 2). Thus, once a country adopts a political regime ensuring a reasonable level of constrains on the Executive, more or less flexibility of the political decision making process at the horizontal level (i.e. the relationship between Executive and Legislative powers) is not found to be a critical factor for reducing macroeconomic instability.

Table 2. Political Regimes, Constitutional Arrangements and Macroeconomic Volatility

	Political Regimes		Government Forms		Electoral Rules		State Forms		All Pol. Inst.	
	(1)	(1a)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)	(5a)
Democracy	-1.385***	-1.419***								
	[0.293]	[0.298]								
Presidential			-1.430***	-1.411***					-1.514*	-1.959**
			[0.322]	[0.377]					[0.783]	[0.924]
Semi-Pres			-1.787***	-1.639***					-1.905***	-2.237***
			[0.386]	[0.476]					[0.730]	[0.809]
Parliamentary			-1.495***	-1.609***					-1.902**	-2.384***
			[0.421]	[0.458]					[0.806]	[0.866]
Majoritarian					-0.995***	-1.096***			-0.374	-0.486
					[0.374]	[0.362]			[0.447]	[0.496]
Mixed					-0.503	-0.486				
					[0.489]	[0.518]				
Proportional					-1.913***	-1.900***			-1.331***	-1.331***
					[0.335]	[0.376]			[0.364]	[0.377]
Federalism							-0.957**	-1.089***	1.376	1.686
							[0.382]	[0.411]	[0.926]	[1.049]
Unitarism							-1.468***	-1.481***	0.923	1.431
							[0.309]	[0.308]	[0.860]	[0.985]
Log_GDP_pc	0.564***	-0.403**	-0.501**	-0.36	-0.471**	-0.408*	0.581***	-0.438**	-0.436*	-0.370
	[0.174]	[0.196]	[0.204]	[0.244]	[0.205]	[0.239]	[0.179]	[0.212]	[0.224]	[0.277]
Growth	0.0699**	0.0771*	0.0764**	0.0564	0.0754*	0.0579	0.0700**	0.0757*	0.0741*	0.0494
	[0.0351]	[0.0435]	[0.0387]	[0.0486]	[0.0386]	[0.0487]	[0.0354]	[0.0436]	[0.0394]	[0.0495]
Crisis	0.365	0.435	0.311	0.2	0.311	0.223	0.357	0.417	0.280	0.126
	[0.342]	[0.371]	[0.393]	[0.430]	[0.397]	[0.437]	[0.349]	[0.376]	[0.403]	[0.440]
Log_inflation	0.334**	0.457***	0.343**	0.458**	0.385**	0.479***	0.346**	0.463***	0.417**	0.497***
	[0.154]	[0.172]	[0.167]	[0.184]	[0.169]	[0.185]	[0.156]	[0.173]	[0.169]	[0.185]
Log_gvt_sp	1.363***	1.273***	1.501***	1.511**	1.414***	1.402**	1.344***	1.264***	1.524***	1.494**
	[0.446]	[0.481]	[0.522]	[0.587]	[0.496]	[0.584]	[0.442]	[0.481]	[0.513]	[0.599]
Sdterm_trade	3.391**	3.424**	3.310**	3.191**	3.343**	3.215**	3.356**	3.397**	3.141**	3.029**
	[1.425]	[1.516]	[1.445]	[1.453]	[1.448]	[1.454]	[1.413]	[1.506]	[1.378]	[1.394]
Log_pop	0.560***	0.605***	0.528***	0.581***	0.579***	0.633***	0.599***	0.640***	-0.596***	-0.637***
	[0.118]	[0.123]	[0.134]	[0.149]	[0.131]	[0.147]	[0.127]	[0.134]	[0.143]	[0.166]
Obs./Countries	979/128	979/128	896/121	896/121	897/121	897/121	979/128	979/128	894/121	894/121
R-squared/Rho	0.19/0.04	0.22/0.04	0.18/0.05	0.22/0.09	0.19/0.05	0.22/0.09	0.19/0.04	0.22/0.04	0.19/0.05	0.22/0.11
Correlation tests between predicted random effects and political institutions variables										
Corr ui Dem	-0.022	-0.018								
Corr ui Pres			-0.032	0.005					-0.026	0.011
Corr ui Semi-P			0.015	-0.015					0.026	-0.007
Corr ui Parl			-0.027	-0.039					-0.024	-0.034
Corr ui Maj					-0.018	-0.023			-0.006	-0.003
Corr ui Mix					-0.024	-0.003				
Corr ui Prop					-0.012	-0.019			-0.013	-0.022
Corr ui Uni							0.043	0.043	-0.039	-0.046
Corr ui Fed							-0.053*	-0.05	0.020	0.034
Tests of significant differences in coefficients between political institutions variables (p-values)										
Pres vs Semi-P			0.297	0.666					0.256	0.577
Pres vs Parl			0.87	0.714					0.316	0.393
Parl vs Semi-P			0.383	0.943					0.993	0.731
Maj vs Prop					0.012	0.051				
Fed vs Uni							0.156	0.275		

Note for Tables 2-3: 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 institution variable. Each specification (a) includes interaction terms between time dummies and regions (Sub-Saharan Africa, Latin America, East Asia and Pacific, South Asia, Middle East and North Africa, Former European Socialist Republics). ***p<0.01, **p<0.05, *p<0.1.

Moreover, moving to (ii) electoral rules, regressions (3)-(3a) show that proportional electoral rules induce the most important decrease in macroeconomic volatility, with an estimated average effect of 1.9 pp, confirming our Hypothesis #3. This effect is around two times higher than the stabilizing effect of majoritarian rules, which in turn dominate mixed electoral rules, which are found not to be statistically different from dictatorships in terms of growth volatility. Remarkably, equality tests show that differences among the effects of different electoral rules are statistically significant. Consequently, we found that the precise type of electoral rule is of crucial importance, as moving towards electoral rules that enable strong inclusiveness of the political decision-making process, i.e. proportional electoral rules, reduces macroeconomic volatility.

Finally, Table 2 shows that (iii) unitary states reduce growth volatility by roughly 1.5 pp compared to dictatorships, and perform better than federal states in terms of growth volatility reduction, thus refuting our Hypothesis #4. Albeit the statistical difference among the estimated coefficients of the two state forms is not significant, more flexibility of the political decision making process at the vertical level (i.e. the relationship between central government and local powers) might be considered as a determinant of macroeconomic instability, since the stabilization effect of unitary states was found to be 50% higher compared to federal states.

We now go one step further by introducing all statistically significant constitutional arrangements variables in the same econometric specification.[18] Estimations in columns (5)-(5a) confirm our previous results. Indeed, although the size of the coefficient decreases, proportional electoral rules are the only electoral rules that significantly reduce growth volatility, thus confirming the relevance of the inclusion dimension in the political decision-making process for macroeconomic instability. Next, we confirm that all government forms significantly reduce growth volatility, with no statistical difference between their estimated effects. Finally, regarding state forms, once we account for their correlation with government forms and electoral rules, they no longer seem to affect growth volatility; however, this result should be considered with caution, given that our constitutional arrangements variables are strongly correlated (see Table E2 in appendix).

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[18] In addition to being statistically not significant, the mixed electoral rules variable was dropped from the estimates of Table 2 columns (5)-(5a) to avoid perfect collinearity of constitutional arrangements variables.

4.2. Veto players and age of democracies

We now disaggregate the overall stabilizing effect of democracies along two additional dimensions, namely (i) the number of veto players and (ii) the age of democracies. Regressions (1)-(1a) in Table 3 show that the higher the (i) number of veto players, the lower macroeconomic volatility. On average, an additional veto player induces an average decrease of growth volatility by 0.2 pp compared to dictatorships. Thus, consistent with our Hypothesis #5, more separation, diffusion, and fragmentation of political power enables more predictability in political leaders' behavior (Henisz, 2000, 2004; Stasavage and Keefer, 2003), resulting in less macroeconomic volatility (Acemoglu et al., 2003; Fatas and Mihov, 2003, 2006). Besides, as shown by regressions (2)-(2a) in Table 3, the (ii) age of democracies does not significantly affect macroeconomic volatility, thus refuting (for now) our Hypothesis #6.

Let us now go one step further. According to our Hypothesis #7, the relationship between these two institutional features and macroeconomic volatility might be nonlinear.[19] To account for such potential nonlinearities, we introduce the quadratic term for each of these two variables. As illustrated by regressions (3)-(4a) in Table 3, the coefficient of the square of veto players and age of democracies is significant, confirming our Hypothesis #7.

On the one hand, an increase in the number of veto players decreases macroeconomic volatility only up to a certain threshold. Based on regression (3), the threshold above which its effect changes sign is between 4 and 6. Besides, such an economically-meaningful threshold is equally found when accounting for interaction dummies in regression (3a). Thus, consistent with the previous works of Tsebelis (1995, 1999, 2002), an increase in collective political actors above a reasonable number, which enables the implementation of efficient constrains on political leaders' discretion, increases the inertia of the political decision-making process. This decreases the ability to deal efficiently with external shocks, through, for instance, the implementation of appropriate macroeconomic stabilization policies (Rodrick, 1999, 2000).

On the other hand, regressions (4)-(4a) show that accounting for nonlinear effects of the age of democracies turns its effect into significant compared to (2)-(2a), which confirms our Hypothesis #6. Thus, growth volatility decreases up to a threshold estimated around 80 years, suggesting possible stabilization gains from setting up a democratic regime. However, consistent with results for veto players, as a democracy becomes more mature, its institutional complexity tends to grow, leading to higher inertia in the political decision-making process and, thus, to less ability to deal efficiently with volatility stemming from external shocks.

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[19] For example, descriptive statistics in Table 1 show that growth volatility decreases up to 5 veto-players, but then becomes non-monotonic.

Table 3. Veto Players, Age of Democracies and Macroeconomic Volatility

	Veto Players		Age of Democracies		Veto Players^2		Age of Democracies^2	
	(1)	(1a)	(2)	(2a)	(3)	(3a)	(4)	(4a)
Veto Players	-0.197**	-0.219***			-0.571***	-0.543***		
	[0.0772]	[0.0773]			[0.130]	[0.130]		
Veto Players²					0.0607***	0.0518***		
					[0.0179]	[0.0182]		
Age Democracies			-0.00631	-0.00856			-0.0395***	-0.0484***
			[0.00512]	[0.00562]			[0.0106]	[0.0112]
Age Democracies²							0.000226***	0.000265***
							[5.36e-05]	[5.47e-05]
Log_GDP_pc	-0.661***	-0.511**	-0.688***	-0.471*	-0.588***	-0.431**	-0.572**	-0.25
	[0.194]	[0.223]	[0.228]	[0.255]	[0.185]	[0.213]	[0.229]	[0.252]
Growth	0.0659*	0.07	0.0659*	0.0774*	0.0652*	0.0698	0.0638*	0.0759*
	[0.0352]	[0.0438]	[0.0354]	[0.0434]	[0.0350]	[0.0438]	[0.0353]	[0.0435]
Crisis	0.412	0.45	0.441	0.531	0.385	0.43	0.368	0.476
	[0.337]	[0.372]	[0.329]	[0.364]	[0.337]	[0.374]	[0.328]	[0.364]
Log_inflation	0.276*	0.430**	0.236	0.407**	0.310**	0.447**	0.248	0.438**
	[0.160]	[0.178]	[0.169]	[0.182]	[0.156]	[0.174]	[0.166]	[0.177]
Log_gvt_sp	1.426***	1.273**	1.389***	1.175**	1.370***	1.262**	1.509***	1.365***
	[0.478]	[0.519]	[0.470]	[0.496]	[0.466]	[0.508]	[0.470]	[0.494]
Sdterm_trade	3.683**	3.683**	3.815**	3.764**	3.520**	3.537**	3.634**	3.531**
	[1.524]	[1.602]	[1.573]	[1.642]	[1.468]	[1.555]	[1.494]	[1.539]
Log_pop	-0.553***	-0.612***	-0.556***	-0.593***	-0.572***	-0.619***	-0.558***	-0.590***
	[0.124]	[0.133]	[0.126]	[0.134]	[0.121]	[0.129]	[0.127]	[0.130]
Obs./Countries	963/126	963/126	979/128	979/128	963/126	963/126	979/128	979/128
R-squared/Rho	0.18/0.05	0.21/0.05	0.17/0.05	0.21/0.05	0.18/0.04	0.22/0.05	0.18/0.05	0.22/0.04
Correlation tests between predicted random effects and political institutions variables								
Corr ui V-P	-0.028	-0.019			-0.014	-0.009		
Corr ui V-P²					0.015	0.021		
Corr ui Age Dem			-0.001	0.007			-0.002	0.009
Corr ui Age Dem²							0.004	0.014

Overall, results in Tables 2-3 show that constitutional arrangements and the current and historical functioning of democracies play a critical role in explaining macroeconomic volatility differences between democracies and dictatorships.

V. Robustness

We explore the robustness of our previous findings by taking into account (i) alternative measures of main variables, (ii) alternative specifications of our main regressions, and (iii) the level of economic development.

5.1. Alternative measures of main variables

Regarding our dependent variable, in our benchmark analysis we measured macroeconomic volatility as the standard deviation of GDP per capita growth by three-year sub-period. For robustness issues, we consider an alternative measure, namely the standard deviation of the output gap by three-year sub-period, computed using the Hodrick-Prescott filter with a smoothing parameter of 6.25, as suggested by Ravn and Uhlig (2002).

In addition, in our benchmark analysis we equally assumed the presence of a democratic regime in a given sub-period if all three years were democratic. We now alter this

three-year sub-period threshold, by considering the presence of a democratic regime for a three-year sub-period if two, and then one, of the three years were democratic.

Tables J and K in appendix show that our results are robust to these changes in our main variables. Indeed, democracies still significantly decrease macroeconomic volatility compared to autocracies when using the output-gap volatility variable as dependent variable (Tables J1) or alternative thresholds for differentiating between democracies and dictatorships (Tables K1.1 and K1.2). Moreover, using alternative measures for main variables leads to unchanged conclusions regarding the effect of constitutional arrangements variables in regressions (1)-(4a) of Tables J1, K1.1 and K1.2. First, the strongest effect arises for semi-presidential governments, but differences among the estimated effects of forms of governments are still not significant. Second, proportional electoral rules still outperform majoritarian electoral rules, which in turn dominate mixed rule, the latter not significantly impacting, yet again, macroeconomic volatility. Third, both state forms are effective in reducing growth volatility, and there is once again no statistical difference among their estimated coefficients. Fourth, when constitutional arrangements variables are considered jointly in regressions (5)-(5a) of Tables J1 using the output gap volatility as the dependent variable, our results are identical to those obtained in Table 3 columns (5)-(5a), while only the robust effect of proportional electoral rules on growth volatility is confirmed when using alternative thresholds in Tables K1.1 and K1.2.[20]

Finally, our main results for the effect of the number of veto players and the age of democracies are equally comforted,[21] as emphasized by Table J2 (the use of the output-gap volatility as dependent variable) and Table K2 (different thresholds to define democratic regimes). A higher number of veto players reduces output-gap volatility, but only up until a threshold estimated between 4 and 6 players, while the stabilizing effect of the age of democracy is reinforced, since the threshold below which it reduces growth volatility is around 85 years, roughly 5 years more compared to our benchmark results.

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[20] In Table K1.1 regressions (5)-(5a), the unitary states variable was dropped due to perfect colinearity issues.
[21] Given its construction, the age of democracies variable cannot be altered by changing the three-year sub-period threshold.

5.2. Alternative specifications of main regressions

We consider two alternative specifications of our main regressions. On the one hand, we abstract from growth volatility outliers.[22] On the other hand, we alternatively account for additional determinants of macroeconomic volatility, namely the one period-lagged of the following variables: the standard deviations of GDP per capita growth, the logarithm of financial development, the logarithm of trade openness, financial openness, climate shocks, and inflation volatility.[23]

As emphasized by Tables L1-2 and M1-2 in appendix, accounting for outliers and for additional determinants of growth volatility leaves our main results unchanged.[24] Democratic regimes and constitutional arrangements variables are found to decrease growth volatility, except for mixed electoral rules, while the strongest effect is found yet again for semi-presidential governments, unitary states, and proportional electoral rules. Next, when constitutional arrangements variables are considered jointly in Table M1.2, results are consistent with those obtained in Table 3 columns (5)-(5a). In addition, confirming our benchmark results, macroeconomic volatility decreases following an increase in the number of veto players or in the age of democracies, but only up until a threshold, estimated around 5 veto players and 85 years respectively.

5.3. The level of economic development

Classical contributions by Lucas (1988) and Pritchett (2000) conclude that developing countries present less stable growth rates than developed countries. Consequently, to explore the potential importance of the level of economic development in the relationship between political institutions and growth volatility, we divide our sample into three sub-samples, corresponding to low-, intermediate-, and high-GDP per capita levels, using World Bank's classification (see Table I in appendix).[25]

As emphasized by regressions (1)-(3) in Table 4, the effect of democracies on macroeconomic volatility significantly differs with the level of economic development.

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[22] The distribution of growth volatility is fairly homogenous, except for some extremely high values. To abstract from them, we drop all values in the last decile above a threshold equal to 30 standard deviations of GDP per capita growth by three-year sub-period. This leads to drop observations for Afghanistan, Equatorial Guinea, Iraq, Kuwait, Lebanon, Liberia, Nicaragua, and Rwanda.

[23] See Appendix A for details about the sources and construction of these variables and Tables H1-H2 for descriptive statistics.

[24] Results of estimations including interactions variables between regions and sub-periods confirm our main findings, and are available upon request.

[25] Because of the small size of each sub-sample and the strong correlations between constitutional arrangements variables, our estimates do not include interaction variables between regions and sub-periods, and we cannot present a joint estimate of constitutional arrangements variables.

Compared to their effect in the full sample (see regression (1) in Table 2), democracies do not significantly affect growth volatility in low-income countries, while in high-income countries the size of its effects is more than double. We explore in detail these heterogeneities by considering alternatively constitutional arrangements variables (Table 4), and the number of veto players and the age democracies variables (Table 5).

Regressions (4)-(12) in Table 4 show that the effect of political institutions on macroeconomic volatility varies across both constitutional arrangements variables and the level of economic development. Concerning high-income countries, all constitutional arrangements variables significantly decrease growth volatility, and the magnitude of this effect is, in most cases, at least twice higher compared to results for the full sample. Moreover, the estimated coefficients of parliamentary governments and unitary states are statistically different from their respective institutional counterparts. Thus, in high-income countries, once democratic regimes reach a reasonable level of constraints and inclusion in the political decision-making process, emphasis must be placed on more flexible constitutional arrangements in order to offset the growing complexity of their institutional structures.

Significantly opposite conclusions arise when considering low- and intermediate-income countries. Table 4 shows that presidential forms of government, proportional electoral rules, and unitary states are the constitutional arrangements that matter the most for reducing growth volatility in low-income countries. Because corruption and low inclusiveness of the political decision-making process are two prominent features that plague institutions in low-income countries (Acemoglu et al., 2003), democratic regimes allowing a strong separation of political power (i.e. presidential governments) and a strong inclusion of population preferences (i.e. proportional electoral rules) represent the most suited constitutional structures to tackle such institutional weaknesses, and, as a result, to reduce macroeconomic volatility. Besides, to offset the high fragmentation of political power in democracies with presidential form of governments, unitary states, by fostering a better coordination of public policies between the central government and local authorities, and also by limiting the appropriation of public resources by local authorities, act as an additional relevant constitutional feature for decreasing growth volatility. Comparable results arise for intermediate-income countries, except for one important difference: the effect of both state forms is significant, meaning that the precise structure of the relationship between central government and local powers is of lower interest for macroeconomic volatility reduction in these countries.

Table 4. Political Regimes, Constitutional Arrangements and Macroeconomic Volatility: The Role of Economic Development

	Political Regimes			Government Forms			Electoral Rules			State Forms		
	Low	Interm.	High	Low	Interm.	High	Low	Interm.	High	Low	Interm.	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Democracy	-0.702 [0.439]	-0.933** [0.420]	-3.575*** [1.346]									
Presidential				-1.659*** [0.431]	-1.051** [0.525]	-2.855*** [0.954]						
Semi-Presidential				-0.869 [0.691]	-1.191* [0.661]	-3.312*** [1.100]						
Parliamentary				0.591 [0.695]	-0.87 [0.575]	-3.951*** [1.119]						
Majoritarian							-0.471 [0.562]	-0.779 [0.811]	-2.662*** [1.012]			
Mixed							0.377 [1.593]	0.202 [0.786]	-2.688** [1.105]			
Proportional							-1.213*** [0.425]	-1.192*** [0.396]	-2.641*** [1.004]			
Federalism										0.140 [0.856]	-0.940* [0.555]	-3.260*** [1.175]
Unitarism										-0.893* [0.457]	-0.931* [0.496]	-3.755*** [1.364]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs./Countries	331/49	413/52	235/27	297/48	367/46	232/27	296/48	369/46	232/27	331/49	413/52	235/27
R-squared/Rho	0.16/0.01	0.22/0	0.48/0	0.16/0.02	0.22/0.01	0.50/0	0.15/0.03	0.23/0.01	0.47/0	0.16/0.02	0.22/0	0.49/0
Correlation tests between predicted random effects and political institutions variables												
Corr ui Dem	0.036											
Corr ui Pres				-0.02	-0.066							
Corr ui Semi-Pres				-0.012	0.034							
Corr ui Parl				0.0262	0.04							
Corr ui Maj							0.023	-0.032				
Corr ui Mix							0.016	0.003				
Corr ui Prop							-0.015	0.028				
Corr ui Uni										-0.051		
Corr ui Fed										0.143***		
Tests of significant differences in coefficients between political institutions variables (p-values)												
Pres vs Semi-Pres					0.841	0.138						
Pres vs Parl						0.0001						
Parl vs Semi-Pres						0.035						
Maj vs Mix									0.942			
Maj vs Prop									0.96			
Mix vs Prop									0.925			
Fed vs Uni											0.99	0.085

Notes for Tables 4-5: 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 institution variable. Unfeasible correlation tests when rho equals zero (absence of random effects). ***p<0.01, **p<0.05, *p<0.1.

The effect of the number of veto players and the age of democracies is depicted in Table 5, and equally depends on the level of economic development. First, we find, yet again, a nonlinear effect of the number of veto players and the age of democracies. However, the conditions under which these democratic features decrease macroeconomic volatility are more favorable in high-income countries, namely until 7 veto players and 103 years of democracy, suggesting that high-income countries benefit from a long-lasting experience of democratic institutions, which enables a more efficient resolution of coordination problems in the implementation of public policies, in spite of a relatively high number of collective political actors.

Second, more veto players and more mature democratic regimes significantly reduce growth volatility in intermediate-income countries. However, compared to high-income countries, the size of the effect is lower and the shape of nonlinearities is different: if growth volatility always decreases with the age of democracies, an increase in the number of veto players more rapidly *increases* macroeconomic volatility (i.e. starting at the 4th player).

Finally, in low-income countries, macroeconomic volatility seems to be affected only by the number of veto players. But even in this case, volatility decreases only up until the 3rd player. Thus, from a macroeconomic volatility perspective, in order to limit coordination problems in the implementation of public policies, the political decision-making process in developing countries must include a moderate number of collective political actors, due to their relatively recent experience of democratic institutions, and their associated complexity.

To summarize, Tables 4 and 5 illustrate the presence of important heterogeneities in the effect of political institutions on growth volatility, depending, in addition to the precise type of political institutions in place, on the level of economic development. Overall, macroeconomic volatility reduction arising from democratic political institutions increases with the level of economic development. One possible explanation is that, because of their institutional complexity compared to dictatorships, democracies are more costly in terms of functioning; 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, which in turn may allow better ability to deal with growth volatility.

Table 5. Veto Players, Age of Democracies and Macroeconomic Volatility: The Role of Economic Development

	Veto Players						Age of Democracies					
	Low		Interm.		High		Low		Interm.		High	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Veto Players	-0.063	-0.377**	-0.0847	-0.685***	-0.336**	-0.892***						
	[0.134]	[0.191]	[0.108]	[0.181]	[0.150]	[0.297]						
Veto Player²		0.0531***		0.109***		0.0599**						
		[0.0199]		[0.0255]		[0.0254]						
Age Democracies							0.0158	-0.0728	-0.0101**	-0.0271*	-0.0103**	-0.0551***
							[0.0222]	[0.0610]	[0.00447]	[0.0157]	[0.00473]	[0.0137]
Age Democracies²								0.0023*		0.000138		0.000267***
								[0.0014]		[0.000108]		[7.02e-05]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs./Countries	328/48	328/48	405/51	405/51	230/27	230/27	331/49	331/49	413/52	413/52	235/27	235/27
R-squared/Rho	0.16/0.02	0.16/0.03	0.21/0.02	0.22/0.01	0.45/0.03	0.47/0	0.16/0.01	0.16/0.01	0.21/0	0.21/0	0.44/0.03	0.49/0
Correlation tests between predicted random effects and political institutions variables												
Corr ui V-P	0.059	0.06	-0.042	-0.031	-0.038							
Corr ui V-P²		0.071		-0.031								
Corr ui Age Dem							0.036	0.031	-0.02		0.033	
Corr ui Age Dem²								0.038				

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VI. Conclusion

An important literature emphasizes a robust negative correlation between democratic regimes and growth volatility. We went beyond the simple opposition between democracies and dictatorships, and focused on identifying the precise democratic political institutions explaining the stabilizing effect of democratic regimes.

To this end, we disaggregated democratic regimes along five institutional dimensions namely, forms of government, electoral rules, state forms, the number of veto players, and the age of democracies. We find that proportional electoral rules decrease significantly more macroeconomic volatility compared to other electoral rules. On the contrary, the effect of alternative government and state forms is not statistically different, suggesting that the extent of authority in the political decision-making process is less prone to stabilization gains. Besides, the effect of the number of veto players and of the age of democracies is subject to threshold effects.

In addition to showing the robustness of these results, we unveil that the stabilizing effect of political institutions on macroeconomic volatility increases with the level of economic development. In particular, in low-income countries, only presidential governments, proportional electoral rules, and unitary state forms are found to significantly reduce growth volatility, while the thresholds for the number of veto-players and the age of democracies below which these institutions favor stability decrease.

Consequently, our results point to the crucial role played by political institutions in promoting macroeconomic stability. By opening the political institutions black-box, we showed that institutional details are of crucial importance, since the stabilizing effect of democracies clearly depends on the precise institutional dimension at work, and on the level of economic development. Thus, policymakers must be aware that the simple promotion of democratic regimes might not be sufficient to foster a more stable development path.

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