Analyzing Factors in Political Systems that Affect Fiscal Prudence: An Empirical Study [1]

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Abstract

This paper primarily investigates the relationship between a country's political institutions and its fiscal performance, especially in the dimensions of economic growth, debt accumulation, and fiscal deficits. We ask two questions: How do democratic and autocratic governments perform differently in terms of fiscal prudence, and how do political institutions affect a country's fiscal prudence? This paper contributes the current literature by examining panel data from over 140 countries between 1975 and 2017. Specifically, this paper finds evidence that A) democracies have a weak, positive impact on economic growth, B) parliamentary systems are associated with a higher yearly increase in debt-GDP ratio than presidential systems, and C) some political institutions exert different magnitudes of influence on economic outcomes in democracies and autocracies.

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[1] The codes and dataset used in this research are stored in github.com/gtlron

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The field of comparative political economy analyzes variations in political systems that translate to divergent economic choices and performances. Since the 1980s, economists and political scientists have produced numerous researches and theories that seek to explain patterns in economic development across countries. In 2008, a financial crisis originated in the United States lead to a worldwide recession. Fiscal responses and economic recoveries from the Great Recession have since then varied across the globe. A 2015 Federal Reserve Bank of St. Louis study confirms that since 2009, Asia and Africa have grown more than 50 percent, but Europe on average experienced sluggish GDP growth at just below 10 percent. In addition, many countries adopted fiscal stimulus packages that increased their national debt to unprecedented, perhaps unsustainable, levels. In analyzing the global recovery patterns, one natural question to raise is: did political institutions play a role in shaping these fiscal outcomes?

Many important works of modern political economy research point to institutions as the fundamental cause of sustainable economic growth. Acemoglu et al. (2005, p. 389), for example, asserted that "differences in economic institutions are the major sources of cross-county differences in economic growth and prosperity." While economic institutions determine the growth potential and future distribution of resources, the authors also acknowledge that economic institutions "are themselves endogenous and determined by political institutions and distribution of resources in society" (p. 392). Similarly prevalent was the idea that democratic institutions create economic growth by securing property rights and restraining distortionary policies (Acemoglu et al., 2001). But evidence since 2008 suggested that Europe, although on average more democratic than Asia and Africa, faced more difficulties creating economic growth.

It is natural to think that autocratic regimes, without the intervention of a powerful legislative or judicial body, could pass legislation with more ease than their democratic counterparts. On the other hand, various political elements in democracies, such as government structure and legislature representation, could also dramatically shape the creation of fiscal policies. Part of this paper seeks to address these questions by collecting data and testing models about economic growth for over 140 countries between 1975 and 2017.

Moreover, fiscal prudence is also a measure of fiscal responsibility. "The fundamentals are not complicated," wrote Oxford economics professor Paul Collier in 2010, "a prudent government increases assets by more than debts." In the aftermath of the 2008 recession, governments all over the world accumulated national debt from distributing stimulus packages. However, in regular times, a regime in power would also be reluctant to ameliorate national debt by cutting spending on programs for which its popularity and longevity depend on, even though doing so may improve the health of the economy. Using data on budget deficit and gross national debt, this paper also seeks to identify a causal relationship between various political institutions and fiscal responsibility.

This study provides empirical analyses with a comprehensive dataset comprised of several databases in comparative political analysis. We construct two separate samples, one large sample covering over 140 countries between 1975 and 2017, and another smaller dataset

containing 36 democratic countries. The large sample is useful for comparing democracies and autocracies and studying the impacts of political institutions. The smaller sample allows for a more robust investigation on political institutions within democracies.

We employ cross-sectional OLS regression, fixed effects regression, and instrumental variable regression in this study. There is some evidence for a weak, positive causal relationship between democracy and economic growth. Approximating impacts of various political institutions on economic outcomes, we find evidence that countries with parliamentary systems typically accumulate more debt than those with presidential systems in a year. Also, results show that EU membership leads to a small increase in government budget deficit each year. Lastly, the impacts of some political institutions on economic outcomes are different in democracies and autocracies.

The results above are robust to country-level and year fixed effects, plus the inclusion of control variables. In addition, they are robust to different measurements of democracy and different data samples. This study presents new empirical results to the literature with outcomes variables measuring fiscal prudence and involves the latest data up to 2017.

The structure of this paper proceeds as follows: The next section reviews current literature and competing hypotheses on how political institutions impact economic growth and fiscal responsibility. Section II explains the measurement issues in this study. Section III describes the data used in this study. Section IV identifies the empirical strategy, and section V presents the main results. Section VI investigates the robustness of our results, and Section VII concludes.

I. Literature Review

A. Democracy vs. Autocracy

One prevalent observation among political scientists and economists is that democracies today are on average much more wealthier than non-democracies (Acemoglu et al., 2008). This strong correlation is at the heart of the modernization theory as proposed by Lipset (1959), who asserted that individual countries should become more democratic as they become richer. Acemoglu et al. (2008) examined this critical assumption and found no casual relationship of income on democracy; instead, their hypothesis is that "the positive cross-sectional relationship and the 500-year correlation between changes in income and democracy are caused by the fact that countries have embarked on divergent development paths at some *critical junctures* during the past 500 years" (p. 812). These critical junctures mostly involve historical variables such as the date of independence, early constraints on executive power, and religion.

North (1990, p. 3) defines institutions as "humanly devised constraints that shape human interaction." Economic institutions, of particular importance to economic outcomes, include the structure of property rights and the regulation of markets. Acemoglu et al. (2005) established a fundamental framework in which different economic institutions, through determining incentives and constraints for economic actors, shape divergent economic

outcomes. Central to much of political economy research is the assumption that institutions are endogenous—i.e., institutions are determined by society. Acemoglu et al. (2005) proposed that economic institutions are shaped by political institutions as well as the distribution of wealth, physical and human capital in a society. Political institutions, such as the type of government and constraints on key political actors, present conflicting interests which shape preferences over the economic institutions in a society. The division of Korea in 1948 into two separate political entities was such a natural experiment; governed by vastly more democratic political institutions, South Korea later emerged as the economically dominant half. The rise of democracy in nineteenth-century Europe, too, contributes to the Acemoglu et al. (2005) theory in which political institutions determined economic institutions and policies.

Satyanath and Subramanian (2004) found empirical evidence that democratic institutions and financial openness have a strong, positive effect on macroeconomic stability. The two channels for which democratic institutions contribute to economic stability are through checks on the power of politicians, and greater accountability of politicians. Rodrik (1999) summarized that democracy, through participation, consultation, and bargaining, requires politicians to forge consensus before making macroeconomic policy adjustments.

Barro (1996) offered an empirical study on the impact of democracy on economic growth. Examining panel data for around a hundred countries from 1960 to 1990, Barro found that democratic countries in general have not experienced faster growth than nondemocratic countries in the postwar era. Friedman (1962) argued that political freedom increases economic freedom and thus encourage economic growth, but democracies also have the tendency to exaggerate wealth inequality via the enhanced roles of interest groups in legislatures. In addition, pluralism gives rise to competitive populism and demand for public goods, spirits that are detrimental to economic stability (Satyanath and Subramanian, 2004). Autocratic regimes, on the other hand, avoid the pressure from such special interest groups. Plus, in theory, nothing stops nondemocratic governments from maintaining economic freedom. Schwarz (1992), for example, observes that most OECD countries began rapid economic development in periods of limited political rights. Schweinitz (1959) also pointed out that democracies in poor countries would pursue immediate consumption at the cost of meaningful investments, thus limiting economic growth.

The adverse effects of autocracy on economic growth is intuitive. Without effective constraints from democratic institutions, officials from an authoritarian government may privatize the nation's wealth or carry out unpopular policies. Weingast (1995) also notes that powerful political actors cannot credibly or adequately compensate for potential losses that occur from unsuccessful economic policies. "History suggests that dictators come in two type," Barro (1996, p. 33) observes, "one whose personal objectives often conflict with growth promotion and another whose interests dictate a preoccupation with economic development." In accordance with this view, Sah (1991) famously stated that dictatorship is a form of risky investment.

Przeworski and Limongi (1993) further demonstrated the theoretically ambiguous impact of political regime type on economic growth. In the authors' view, the notion that democracies protect property rights is far-fetched. The market and the state are two separate

mechanisms in which resources can be allocated, but the property rights literature historically overlooked the role of democracy in protecting property rights. Under capitalism, "individuals are simultaneously market agents and citizens" (p. 53). Private actors, too, have preferences over allocation of rights that do not in general coincide with the market outcome. Democracy hence "exacerbates this divergence by equalizing the right to influence the allocation of resources" (p. 53).

Another argument made against democracy is that "dictatorship insulates the state from particularistic pressures" (Przeworski and Limongi, 1993, p. 55). In the latter half of the twentieth-century, the Asian tigers achieved economic miracles because the states were able to pursue development policies without pressure from large interest groups, which was only possible under authoritarianism. Acemoglu (2009) coined the term "dysfunctional democracy" to describe a democracy captured by elites or a populist leader who pursue populist policies that are detrimental to economic growth. Huntington and Dominguez (1975) articulated that dictatorships are better positioned to set aside urges to expand personal consumption, thus force savings and launch policies that encourage growth.

Barro (1996) and Pereira and Teles (2008) both found evidence that political institutions exert strong influence on economic growth in incipient democracies but not consolidated democracies. Democratic institutions encourage economic growth in cases of extreme dictatorship as well. This theory argues that established democracies have already internalized the effect of political institutions, while autocracies and early democracies react strongly to regulations or constraints on executive power.

One common flaw is that researchers often use direct measures of democracy, instead of changes in measures of democracy, as endogenous variables in regression models. As Acemoglu et al. (2008) pointed out, the latter option would reflect more accurately how changes in democracy are translated into changes in economic performance. Nevertheless, numerous articles reinforce the theoretically ambiguous relationship between political freedom and economic growth. Rachidi and Saidi (2014), for example, found the effect of democracy on economic growth to be negative for countries in the Middle East and North Africa region between 1983 and 2012. Similarly, Radu (2015) discovered a weak, negative relationship between political freedom and the direction of growth in Central and Eastern European countries between 1990 and 2010, although economic freedom is often positively correlated with the levels of GDP.

There is simply not a fixed formula for economic success. Facing competing hypotheses and statistical evidence for the impact of democracy on growth, Przeworski and Limongi (1993, p. 65) conclude that "our own hunch is that politics does matter, but 'regimes' do not capture the relevant differences." This realization is one of the many motivations to analyze political institutions beyond the level of democracy versus non-democracy; a number of political institution variables are introduced in Section IV of this paper.

B. Fiscal Prudence

Fiscal policies are dynamic and complicated. The ability to run deficits in recessions is a valuable tool for stabilization of the business cycle. Indeed, in the aftermath of the Great Recession, many governments took on excessive debt to reboot their economy. Keynesian theory states that increased government spending and reductions in taxes should increase demand for goods and services which could help offset the recession. Auerbach and Gorodnichenko (2012) found encouraging evidence that deficit increases can increase GDP in the short run, especially during recessions. However, large budget deficits and national debt endangers a country's financial future. Large deficits crowds out private investment at the expense of economic growth by way of higher interest rates. In addition, implicit liabilities, which are financial obligations the government has in the future, are often not recognized in the annual budget process. To avoid the possibility of government default, a sustainable government budget must satisfy the following intertermporal budget constraint:

$$D_t = (1 + r_t)D_{t-1} + S_t - T_t$$

where D_t denotes government debt at year t, r_t interest rate at year t, D_{t-1} government debt at year $t-1$, S_t is primary spending, and T_t the revenue from taxes. Rewriting D_{t-1} in terms of D_t:

$$D_{t-1} = \frac{1}{1+r}T_t - \frac{1}{1+r}S_t + \frac{1}{1+r}D_t$$

and continue to solve for D_t, D_{t+1}, D_{t+2}, … in this manner:

$$D_{t-1} = \sum_{s=0}^{\infty}(\frac{1}{1+r})^{s+1}T_{t+s} - \sum_{s=0}^{\infty}(\frac{1}{1+r})^{s+1}S_{t+s} + lim_{s\to\infty}(\frac{1}{1+r})^{s+1}D_{t+s}$$

Assume that national debt cannot grow faster than interest rate forever, the last term goes to zero, and therefore

$$D_{t-1} = \sum_{s=0}^{\infty}(\frac{1}{1+r})^{s+1}T_{t+s} - \sum_{s=0}^{\infty}(\frac{1}{1+r})^{s+1}S_{t+s}$$

Altogether, this equation states that the national debt equals the present discounted value for future tax payments subtract the present discounted value of future primary spending (i.e., excluding interest). The fiscal gap measures the size of imbalance in this model (Auerbach, 1994). After the Great Recession, many of the world's advanced economies reached historically unprecedented levels of debt (Auerbach, 2011). In the United States in 2017, the long-run fiscal gap represented roughly five percent of annual GDP or one quarters of the federal budget (Auerbach and Gale, 2017), offering an unsustainable long-term budget outlook.

Mauro et. al (2015) found that most advanced countries adopted fiscal budgets that were consistent with meeting the intertemporal budget; however, after the Great Recession, some countries failed to meet the standard. The U.S. National Research Council in 2010

recommended that countries adopt measures to slow the rate of debt accumulation to a lower level than the growth rate of the economy, and then lower debt to a generally prudent proportion of GDP within a reasonable period of time. Although the task of lowering national debt is challenging, both the National Research Council and the IMF (2009b, 23) select 60 percent debt-GDP ratio as a reasonable target for advanced economies, respectively within a decade of initiating policy action and by 2030.

Taking the example of the United States. If the federal government achieves balanced budget every year, then the dollar amount of gross debt would be constant. The debt-GDP ratio would thus decrease as the economy grows. Although a balanced budget was not consistently achieved in recent years, it was the norm over most of U.S. history (Schick, 2007). Nevertheless, the requirement of balanced budget is an unnecessarily restrictive condition for prudent fiscal policy; running modest deficits to finance investment projects for future generations is also appropriate (National Research Council, 2010). In normal circumstances, a country's nominal GDP should increase by about 5% each year. A 3 percent deficit is thus sustainable for a country with 60 percent debt-GDP ratio (Collier, 2010).

High levels of national debt impose serious threats to a country's economic health in case of adverse events such as an economic downturn. The IMF (2009b, 21) found that the size of fiscal stimulus packages during the Great Recession were inversely related to the initial level of debt, suggesting that governments with higher debt obligations were more politically or economically constrained than others. In addition, Engen and Hubbard (2004) pointed out that higher debt tends to increase long-term interest rate in theory and in practice, which would further increase the debt burden. As the level of debt increases, politicians sometimes find necessary tax increases or spending cuts too politically difficult, thus opting to fill the debt by printing money (Reinhart and Rogoff, 2009). The resulting hyperinflation may destroy personal wealth and government programs (National Research Council, 2010).

How do political institutions determine a country's fiscal strategy? In general, policy outcomes encompass conflicting interests among different groups of voters, between voters and politicians, and between different politicians. The way these conflicts are resolved depend on the political institutions in place. Analyzing data for 55 countries over 200 years, Mauro et. al (2015) found that a legislative majority, whether left-leaning or right-leaning, is systematically related to fiscal policy response to increases in national debt. Persson and Tabellini (2000) also filled the gap in deficit literature by empirically analyzing the impact of electoral rules and political regimes on fiscal outcomes for about 60 democracies. The econometric results show that presidential regimes are associated with a smaller response of spending to income shocks and smaller budget deficits than parliamentary regimes, which are likely explained by the different mechanisms through which fiscal policies are made.

Presidential systems typically involve a separation of powers between the executive branch and legislature, and they do not entail the confidence requirement the way parliamentary systems do. Administrations in the parliamentary system require the support of the majority of parliament to maintain power throughout an election period. However, when a presidential system is mixed with multipartism, then chances of legislative deadlock and ideological polarization increase dramatically (Mainwaring, 1993). A president seeking coalition for

legislative support is inherently more politically unstable and difficult than the case in a parliamentary system. On the other hand, legislative majorities in parliamentary systems, fearing no-confidence motions, are more likely to develop stable and cohesive relations (Persson et. al, 2000). Such cohesion is found to be associated with economic policies that promote growth (Persson, 2005).

Speaking of political institutions, Poterba (1994) articulated that coalition governments are more likely than single-party governments to exhibit fiscal profligacy because of power dispersion. Roubini and Sachs (1989) similarly found that the spread of political power, such as power sharing across branches of government or rotation of political parties in charge, increases the likelihood of inefficient budgetary policy. Among industrial countries in the 1980s, the worst cases of budget deficits occurred under a divided (coalition) government. Federalism, on the other hand, creates competition among subnational governments that are better suited to create policies adjusting for local conditions, in turn encouraging economic growth (Weingast, 2006).

Political institutions that hold politicians accountable would in theory reduce corruption and encourage growth (Benhabib and Przeworski, 2006). In unitary systems, it is clear to citizens who is responsible for the current economic performance, but the case is confusing for citizens in a coalition government. Alesina and Rosenthal (1995) also point out that coalition governments face more difficulties making fiscal adjustments than a unitary government.

II. Measurement Issues

Intuitively, we can assess the impact of political institutions on economic growth by comparing changes in political variables and annual GDP growth rate. But how should fiscal prudence be measured?

Since this paper is concerned about debt sustainability in fiscal planning, we select annual budget balance and debt-GDP ratio as direct proxies for fiscal prudence. As suggested by the intertemporal budget constraint model above, annual budget balance equals total revenues minus total government spending and interest on debt. A negative budget balance denotes a fiscal deficit, whereas a positive balance indicates a fiscal surplus. In this study, budget deficits are always presented as a fraction of GDP.

Secondly, the change in debt-GDP ratio also measures whether a government is successful in reducing national debt. It is important to note that the gross debt-GDP ratio may decline even if there is a budget deficit. Consider the following equation:

$$\frac{d}{dt}\left(\frac{Debt}{GDP}\right) = \frac{1}{GDP}\left(\frac{dDebt}{dt}\right) - \left(\frac{Debt}{GDP^2}\right)\frac{dGDP}{dt} = \frac{Deficit}{GDP} - \left(\frac{Debt}{GDP}\right)\frac{dGDP/dt}{GDP}$$

If $\frac{Deficit}{GDP}$ is smaller than $\left(\frac{Debt}{GDP}\right)\frac{dGDP/dt}{GDP}$, the overall debt-GDP ratio will decrease. This happens when GDP grows faster than debt.

The use of budget deficit or debt-GDP ratio as measures of fiscal prudence is not without concerns. Auerbach (2014) criticized the use of budget deficit as a measurement tool for fiscal policy because it does not take into account generational consequences of fiscal policy, for example implicit liabilities. In addition, these measures are of limited use in understanding fiscal policy. Auerbach et. al (1994, p. 74) argues: "First, fiscal policy is dynamic and cannot be described by a short-term measure that entirely ignores the likely course of future policy. Second, a single deficit measure cannot identify the intergenerational distribution of the burden of government finance at any given time." Nevertheless, regressing these fiscal outcomes on political variables should offer a general picture of how political institutions affect fiscal policy prudence.

In addition, Bohn (1998) popularized a "fiscal" reaction regression by examining the government primary (non-interest) budget balance as a response to changes in debt-GDP ratio. A positive response indicates that the government is taking actions, either through reducing government spending or raising taxes, to counter a rise in national debt. The empirical model is built based on Barro's (1979) tax-smoothing model, which suggests that tax rates should only be a function of permanent government spending and the level of debt. Bohn (1998) introduced the following regression model:

$$s_t = \rho * d_t + \alpha * Z_t + \epsilon_t$$

where s_t is the ratio of government primary surplus to income (GDP), d_t is the ratio of gross debt to GDP at the start of the measurement period t, Z_t is a set of other determinants of primary surplus, and ϵ_t is the error term.

The coefficient ρ thus measures the responsiveness of government fiscal planning to changing debt-GDP ratios. A positive coefficients denotes a positive response and provides reliable information for fiscal sustainability. Bohn (1998) found evidence for positive correction actions for the U.S. government in periods between 1916 and 1995, plus that debt-GDP ratio exhibits mean-reverting characteristics. Although based on data limitations, the regression models used in this study do not incorporate this popular approach, it is nevertheless worthy to mention.

III. Data & Summary Statistics

The World Bank offers comprehensive datasets on several economic outcomes on a yearly basis, including the GDP per capita in current US dollars, annual GDP growth rate, gross government debt-GDP ratio, and annual government budget deficits. Compared to the International Monetary Fund, which also offers data on government deficit and debt for about 100 countries between 2006 and 2017, the World Bank makes available more observations in historical periods (15,370 data entries vs. 1730 from the IMF). In addition, the Organization for Economic Co-operation and Development (OECD) records information on economic growth, government deficit and gross debt for a group of 35 high-income countries. A complete list of variables, descriptions, and data sources are included in Appendix Table 1.

Based on data availability, this study focuses on the period from 1975 to 2017. In order to construct one comprehensive dataset for every economic indicator variable, we merged data from multiples sources mentioned above based on the following rules:

1. For each economic indicator, the paper prioritize datasets that offer more comprehensive coverage. Missing data from the dataset were complemented by available data from another source.
2. Because OECD data provides nearly comprehensive coverage of its 35 member states, we replace data series from World Bank or IMF, which provides fewer observations for these countries, wherever applicable. This approach, combined with the Comparative Political Data Set (CPDS), allows us to further investigate the impact of different political institutions within democracies.

As for the endogenous political variables, Freedom House and Polity have traditionally been the most renowned data sources for measuring democracy around the world. Freedom House measures civil liberties and political freedom on a scale from one to seven, with one being the highest degree of freedom and seven the lowest. The combined average score designates the freedom status of a country or territory: average ratings between 1 and 2.5 designates free status, between 3 and 5 partly free, and between 5.5 and 7 not free. In this study, the civil liberties and political freedom scores, as well as the combined ratings, are reversed and normalized on a zero-to-one scale, with zero representing the lowest degree of freedom and one the highest. The composite score is also converted to an indicator for democracy, with those of composite score higher than 0.5 being considered democracies.

The Polity IV dataset, perhaps the most widely used resource in comparative politics research, measures the authority characteristics of states. The term "polity" is defined by Webster's New World College Dictionary as a "political or governmental organization; a society or institution with an organized government; state; body politic." The Polity IV dataset includes measures for institutional democracy, autocracy, and a combined Polity score. Institutional democracy is assessed on three aspects: citizen participation, institutional constraints on executive power, and guarantee of civil liberties in everyday life. Similarly, autocracy score is derived from assessments of political participation, executive recruitment, and executive constraints. Both democracy and autocracy were recorded on a zero-to-ten scale but normalized to zero-to-one in this study. A value closer to one denotes higher levels of democracy or autocracy. The combined Polity score is calculated subtracting autocracy score from democracy score and provides a more straightforward tool for assessing the regime. It also takes into account periods of foreign intervention, collapse of central government authority, and political transitions. Although democracy and autocracy exhibits drastically different forms of government, this approaches does not suggest that democracy is the exact opposite of autocracy in a unified political spectrum. In fact, different measurements of democracy and autocracy scores could produce the same Polity score.

In addition, the Polity IV dataset includes a set of political measurements useful for control variables, including state failure which is an indicator variable noting each case of complete collapse of central authority.

Another quantitative measurement of democracy comes from the Unified Democracy Scores project by Pemstein et. al (2010), which offers a straightforward composite democracy score for virtually every country from 1946 to 2012. We utilize this data in place of Freedom House or Polity data in the robustness checks in Section VI.

The Cross-National Time-Series Data Archive (CNTSDATA) is a comprehensive dataset comprised of annual data for political institutions for over 200 countries. Notably, the set of political variables covers an index for legislature fractionalization, type of political regime, type of effective executive, executive responsibility to the parliament, and legislature effectiveness and selection.

Additional political variables are found in the Database of Political Institutions (DPI). Among a number of political institutions, those that are of particular interest to this study include an indicator for presidential or parliamentary systems, the ideological leaning of the party in power, status of political opposition in the legislature, electoral competitiveness for executive and legislative elections, and systems of proportional representation or plurality in legislature. These political variables have been shown to correlate with economic growth and fiscal outcomes in previous studies, such as Pereira and Teles (2008), and Persson and Tabellini (2000).

As mentioned by Pereira and Teles (2008), it is important to note that these political variables involve two dimensions. The first dimension is formal rules that govern a political system, such as the type of regime, constraint on executive power, type of representation, and personnel selection. The second category are outcomes of the political process, such as the number of years an executive or party has been in power, legislature fractionalization, and political opposition. These drastically distinct political variables act as endogenous and control variables in econometric models laid out in the next section.

Finally, the Comparative Political Data Set (CPDS) presents a collection of political and institutional country-level data for 36 democratic countries, along with some additional demographic and economic variables. This dataset is particularly valuable because it contains demographic and economic variables, such as age composition and financial openness in a society, that have been previously shown to correlate with fiscal policy outcomes (e.g. Persson and Tabellini, 1999). Political indicators in the dataset include institutional constraints on the central government, presidential or parliamentary system, plurality or proportional representation, federalism, bicameralism, and ideological leaning of the cabinet and legislature. Coincidentally, the OECD and CDPS cover nearly the same group of democratic countries. This allows us to investigate the impact of a number of political institutions on fiscal prudence within democratic countries.

The study hence adopts two separate samples. A larger sample contains roughly six thousand observations for over 140 countries, but in many cases certain economic or political variables are missing from related datasets. We operate on the larger sample to analyze the impact of democracy and autocracy on economic growth and fiscal prudence, as well as the impact of political institutions from the CNTSDATA and DPI datasets. The smaller sample features 36 democratic countries from the CPDS dataset; with over a thousand observations,

OECD provides nearly complete coverage for economic outcomes. We focus on the impact of within-democracy political institutions on the outcome variables in this smaller sample.

Table 1 and 2 below shows the summary statistics for variables in the large and small samples. More descriptions and sources of these variables are included in Appendix Table 1.

Table 1: Summary Statistics, Large Sample

Statistic	N	Mean	St. Dev.	Min	Max
Year	6,782	1,996.677	12.254	1,975	2,017
log GDP per capita	6,159	7.756	1.624	4.175	11.689
GDP Growth Rate	6,102	3.638	6.511	−64.047	149.973
Debt to GDP Ratio	2,755	51.595	33.692	1.600	289.845
Change in Debt to GDP Ratio	2,572	0.656	10.619	−169.543	94.091
Budget Deficit	2,172	−2.404	6.731	−131.000	43.700
Polity	6,163	0.580	0.363	0.000	1.000
Freedom House	6,549	0.524	0.337	0.000	1.000
Unified Democracy Score	5,861	0.063	0.977	−2.039	2.263
State Failure	6,244	0.022	0.145	0	1
Parliamentary Representation	6,635	0.312	0.463	0	1
Control All Houses	5,552	0.572	0.495	0	1
Legislative Index of Election Competitiveness	6,631	0.758	0.346	0.000	1.000
Plurality Representation	5,085	0.545	0.496	0.000	1.000

Table 2: Summary Statistics, Small Sample

Statistic	N	Mean	St. Dev.	Min	Max
Year	1,219	1,996.695	11.534	1,975	2,015
log GDP per capita	1,201	9.692	0.906	7.005	11.689
GDP Growth Rate	1,214	2.589	3.485	−21.258	26.264
Debt to GDP Ratio	1,086	60.589	34.552	4.638	219.274
Change in Debt to GDP Ratio	1,053	1.431	6.242	−43.868	56.314
Deficit	1,104	−2.856	4.353	−32.129	18.696
Polity	1,137	0.984	0.040	0.650	1.000
Freedom House	1,195	0.957	0.081	0.250	1.000
Unified Democracy Score	1,117	1.481	0.434	−0.087	2.263
State Failure	1,137	0.000	0.000	0	0
Parliamentary System	1,218	0.844	0.363	0	1
Control All Houses	1,205	0.243	0.429	0	1
Legislative Index of Electoral Competitiveness	1,213	6.981	0.276	1.000	7.000
Plurality Representation	1,210	0.275	0.447	0	1
EU Member	1,219	0.505	0.500	0	1
Capital Account Openness	1,101	0.745	0.316	0.000	1.000
Openness Trade	1,185	87.266	55.607	15.478	374.148
Population 15 to 64	1,158	0.665	0.020	0.582	0.721
Populatio > 65	1,158	0.142	0.026	0.079	0.251

IV. Empirical Strategy

The following econometric model is the basis for regressions analyzing the impact of democracy on economic growth:

$$g_{it} = \alpha g_{it-1} + \gamma d_{it} + X'_{it}\beta + \mu_t + \delta_i + \epsilon_{it} \tag{1}$$

where g_{it} is the rate of economic growth for country i in year t. The lagged value of economic growth is included on the right-hand side to capture the persistence in economic growth and also potentially mean-reverting dynamics (i.e., the tendency for economic growth to return to some equilibrium value for the country). The main variable of interest is the score representing democracy, here noted by the value d_{it}. The coefficient γ thus captures the impact of democracy on economic growth. X'_{it} captures all other potential covariates such as demographic information and the level of development, which previous studies have shown to correlate with fiscal policy (e.g. Persson and Tabellini, 1999). In addition, μ_t denotes a set of time effects that capture common shocks to the rate of GDP growth across all countries (such as the 2008 Great Recession), and δ_i denotes a full set of country dummies. Finally, ϵ_{it} is an error term capturing all other omitted factors with $E[\epsilon_{it}] = 0$ for all i and t.

More generally, equation (1) can be modified to assess the impact of democracy on accumulation of debt or annual fiscal deficits. Since the debt-GDP ratio displays some mean-reverting behavior (Bohn, 1998), we use the yearly change in debt-GDP ratio as an outcome variable, writing

$$\triangle debt_{it} = \gamma d_{it} + X'_{it}\beta + \mu_t + \delta_i + \epsilon_{it} \tag{2}$$

where $\triangle debt_{it}$ is calculated subtracting last period's debt-GDP ratio from this period's debt-GDP ratio, and the lagged term on the right-hand side is removed. All other variables on the right-hand side preserve the same meaning as in equation (1). Similarly,

$$deficit_{it} = \gamma d_{it} + X'_{it}\beta + \mu_t + \delta_i + \epsilon_{it} \tag{3}$$

measures the impact of democracy on annual end-of-period fiscal deficits.

It is important to note that simple correlation between outcome variables and democracy or other political institutions does not establish causation. First, there is the issue of reverse causality, where economic or fiscal outcomes could shape democracy or political institutions. Secondly, there exists potential for omitted variable bias where some third factor is simultaneously influencing both economic outcomes and political institutions. To investigate the causal impacts, this study utilizes country fixed effects to control for time-invariant and country-specific effects. If the sources of bias in these regression analyses are country-specific factors affecting both economic outcomes and democracy measurement today, then including country fixed effects would remove such concern for omitted variable bias.

An instrument variable is also used to assess the impact of democracy on these outcomes, namely legislative election competitiveness. A proper instrument variable must satisfy three conditions: relevance, exogeneity, and exclusion restriction. Electoral competitiveness is correlated with the level of democracy because democracies hold more competitive elections than autocracies, which is supported by the statistically significant coefficient in first-stage regression in the next section. A set of rules determining election competitiveness is usually laid out in the Constitutions and hence exogenous to covariates such as the level of development and demography. Finally, it is plausible to think that election competitiveness have no direct effects on fiscal outcomes except through measurements of democracy.

We are also interested in the impact of political institutions on these fiscal outcomes. Take annual budget deficit, for example, the regression model is:

$$deficit_{it} = \gamma P_{it} + X'_{it}\beta + \mu_t + \delta_i + \epsilon_{it} \tag{4}$$

where the only difference to model (3) is that the original democracy measurement is replaced by P_{it}, which denotes a set of political institutions such as types of government system and citizen representation in legislature. Similarly, replacing the original d_{it} with P_{it} in equations (1) and (2) provide approximations for the impact of political institutions on economic growth g_{it} and changes in debt-GDP ratio $\triangle\, debt_{it}$.

Finally, we can add to the above equations an interaction term, democracy indicator times political institutions, to assess whether the impact of political institutions on fiscal outcomes are the same in democracies and autocracies. Again, take annual budget deficit as an example, the model

$$deficit_{it} = \gamma P_{it} + \rho D_{it} * P_{it} + X'_{it}\beta + \mu_t + \delta_i + \epsilon_{it} \tag{5}$$

introduces the new interaction term $D_{it} * P_{it}$, where D_{it} is an indicator variable that, based on the Polity composite score, takes the value 1 if country i in time t is a democracy and 0 if it is an autocracy. The coefficient ρ thus measures the varying effects of political institutions on fiscal outcomes in democratic and autocratic countries.

V. Regressions & Interpretation of Results

A. Impact of Democracy on Growth, Debt Accumulation, and Budget Deficits

We begin by evaluating equation (1). Table 3 and 4 below shows the results of regressing economic growth on democracy score using Polity score of democracy and Freedom House measure of democracy, both covering the entire sample for the period 1975-2017. All standard errors in this paper are clustered by country and hence robust against arbitrary heteroskedasticity and serial correlation at the county level (Acemoglu et al., 2008).

Regression 1 in both tables estimate the impact of democracy on GDP growth using an OLS regression. The resulting coefficient for the lagged GDP growth is statistically significant at 1 percent significance level. This shows that there exists a considerable

Table 3: Fixed Effects Results Regressing Economic Growth on Polity Measure of Democracy

	Large Sample, 1975-2017					
	Annual GDP Growth					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Previous GDP Growth	0.380***	0.317***	0.302***	0.345***	0.326***	0.319***
	(0.048)	(0.051)	(0.053)	(0.034)	(0.034)	(0.033)
Polity Score	−0.617**	1.123***	0.839*	0.751*	0.880**	0.602
	(0.277)	(0.393)	(0.438)	(0.426)	(0.430)	(1.648)
log GDP per capita				−0.101	−0.325	−0.305
				(0.297)	(0.312)	(0.357)
State Failure					−7.581***	−7.629***
					(1.843)	(1.830)
Constant	2.642***					
	(0.299)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	5,574	5,574	5,574	5,495	5,495	5,486
R^2	0.150	0.104	0.093	0.118	0.137	0.134
Adjusted R^2	0.150	0.078	0.060	0.085	0.104	0.101

Note: *p<0.1; **p<0.05; ***p<0.01
Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is annual GDP growth rate. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

Table 4: Fixed Effects Results Regressing Economic Growth on Freedom House Measure of Democracy

	Large Sample, 1975-2017					
	Annual GDP Growth					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Previous GDP Growth	0.368***	0.303***	0.290***	0.327***	0.311***	0.297***
	(0.055)	(0.057)	(0.059)	(0.038)	(0.038)	(0.040)
Freedom House Score	−0.609*	1.815***	1.533**	1.441**	1.038*	0.294
	(0.362)	(0.663)	(0.672)	(0.654)	(0.587)	(2.233)
log GDP per capita				−0.388	−0.599*	−0.452
				(0.300)	(0.317)	(0.316)
State Failure					−6.825***	−6.948***
					(1.905)	(2.010)
Constant	2.675***					
	(0.366)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	5,750	5,750	5,750	5,673	5,444	5,428
R^2	0.141	0.097	0.087	0.109	0.124	0.117
Adjusted R^2	0.140	0.070	0.054	0.076	0.091	0.084

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is annual GDP growth rate. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

persistence in GDP growth. Consider column 1 in the Table 3, for example, one percent increase in GDP growth rate last year is correlated with 0.38 percent of GDP increase this year. The coefficient for democracy is also statistically significant at 5 percent significance level; however, the impact is negative and small. Since Polity score is normalized on a 0-1 scale, this shows a total transition from the autocratic end to the democratic end of the democracy spectrum results in a decrease in GDP growth rate by 0.62 percent.

Column 2 to 5 in both tables present our basic results with fixed effect estimates. As mentioned above, country fixed effects remove time-invariant factors such as historical or geographical elements that shape democracy and economic outcomes today. Time fixed effects remove common shocks to economic growth, such as the Great Recession. Once we control for country fixed effects in column 2, the impact of democracy becomes strongly positive and statistically significant at 1 percent significance level. The addition of time fixed effects in regression 3 decreases the magnitude of the coefficient and lowers the significance level of the results to 10 percent and 5 percent in Table 3 and 4, respectively. This trend continues as we include control variables, first log GDP per capita and then cases of state failure, in regression 4 and 5. The coefficients for log GDP per capita, an indicator for the level of development in each country, are usually negative and not statistically significant. On the other hand, cases of state failure have a large, negative casual impact on GDP growth. Regression 5 in Table 3 suggests that state failure (i.e., the complete collapse of central authority) leads to GDP decline of 7.6 percent.

Column 6 presents the coefficients using instrumental variable regression. Legislative election competitiveness, a value recorded in the Polity IV dataset, is used as an instrument for democracy. The first stage regression suggests a strong, positive causal relationship between election competitiveness and democracy, a value statistically significant at 1 percent significance level that verifies the instrumental relevance assumption. However, the resulting coefficients for democracy turn out to be statistically insignificant. One possible explanation is that the standard error involved with the democracy variable is too large, but also the magnitude of the coefficient is considerably smaller compared to other fixed effects models. The more likely explanation is that democracy is not the only channel through which election competitiveness can affect economic growth, a scenario we discuss more in Section IV.

Overall, these regressions suggest evidence for a positive causal relationship between democracy and economic growth, although the effect is minimal. Column 5 in Table 3, for example, suggest that a total transition from autocracy to democracy improves GDP growth by roughly 0.9 percent, a coefficient significant at 5 percent significance level. These estimates are in general robust to the inclusion of country and year fixed effects and control variables. In addition, there is consistent evidence that the lagged value of GDP growth exerts a substantial impact on the GDP growth rate next year. Log GDP per capita is not indicative for economic growth, but state failure leads to a decline in GDP growth by roughly 7 percent.

Table 5 and 6 below estimate the relationship between yearly change in debt-GDP ratio and democracy score, again using Polity IV and Freedom House measurements of democracy. The results covers the entire sample for the period 1975-2017 and includes clustered standard errors by country.

Table 5: Fixed Effects Results Regressing Debt Accumulation on Polity Measure of Democracy

	Large Sample, 1975-2017					
	Change in Debt-GDP Ratio from Last Year					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Polity Score	1.141	9.534*	6.910	7.373	7.590	−6.242
	(0.905)	(5.034)	(4.838)	(5.156)	(4.723)	(19.326)
log GDP per capita				0.156	0.332	0.885
				(2.020)	(1.853)	(1.714)
State Failure					26.442*	26.275*
					(14.153)	(14.838)
Constant	−0.337					
	(0.814)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,264	2,264	2,264	2,262	2,262	2,259
R^2	0.001	0.006	0.003	0.003	0.034	0.023
Adjusted R^2	0.0004	-0.054	-0.078	-0.078	-0.046	-0.057

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is the change in debt-GDP ratio from last year. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

Table 6: Fixed Effects Results Regressing Debt Accumulation on Freedom House Measure of Democracy

	Large Sample, 1975-2017					
	Change in Debt-GDP Ratio from Last Year					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Freedom House Score	1.033	4.735	4.223	3.124	4.837	−8.766
	(0.634)	(4.471)	(4.289)	(4.374)	(4.303)	(27.047)
log GDP per capita				0.534	0.518	0.911
				(1.843)	(1.821)	(1.697)
State Failure					26.485*	25.385*
					(14.369)	(13.731)
Constant	−0.111					
	(0.542)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,491	2,491	2,491	2,379	2,249	2,246
R^2	0.001	0.001	0.001	0.001	0.031	0.024
Adjusted R^2	0.0005	-0.057	-0.076	-0.080	-0.050	-0.057

Note: *p<0.1; **p<0.05; ***p<0.01
Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is the change in debt-GDP ratio from last year. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

These columns utilize the same regression methods as those in Table 3 and 4. Column 1 present results with OLS regression model. Country fixed effects are introduced beginning with regression 2 and time fixed effects are introduced starting with regression 3. Column 4 and 5 adds new control variables, and column 6 utilizes an instrumental variable regression.

In all of these models, the coefficients for the democracy variable are statistically insignificant at less than 10 percent significance level. OLS results in column 1 show that the magnitude of the democracy coefficient is about 1, meaning a total transformation from autocracy to democracy would add 1 percent to the debt-GDP ratio for a country in a year. Once we control for country and year fixed effects, the magnitude of the coefficients rise substantially, albeit still statistically insignificant. The inclusion of log GDP per capita as a control variable does not append to the explanatory power of the variables, contrary to the convention in previous research that used the level of development as a determinant of fiscal policy outcomes (Persson and Tabellini, 1999). In all regressions involving log GDP per capita, the coefficients turn out to be weak and statistically insignificant. State failures, however, have coefficients that are significant at 10 percent significance level. The magnitudes of their coefficients are large as well: column 5 in Table 5 show that a case of state failure leads to a 26 percent increase in the country's debt-GDP ratio, which is probably reasonable in the case of utter collapse of central government authority.

Regression 6 uses legislative election competitiveness as an instrument for democracy. The resulting coefficients are negative and statistically insignificant. One particularly notable aspect of these regressions is the large standard errors involved with variable coefficients. The IV estimate for democracy in Table 5, for example, has an standard error of 19.3, which is unusually large for increase in debt-GDP ratio in a year. Overall, the results indicate that there does not exist a causal relationship between democracy and debt accumulation. Section VI further discusses the robustness of these coefficient estimates.

Table 7 and 8 take on an alternative measure of fiscal prudence: annual budget deficit, using measurements from Polity IV and Freedom House for democracy. The results covers the entire sample for the period 1975-2017 and includes clustered standard errors by country. It is important to note that budget deficits data are reported as fiscal balance, where a positive value denotes fiscal surplus and a negative value denotes fiscal deficit. Hence relevant regression coefficients should be interpreted as having a reverse impact on budget deficit (i.e., positive coefficient denote improved fiscal balance and better fiscal prudence).

Column 1 present OLS results of regressing annual budget deficit on democracy. The resulting coefficient for the Polity IV data is statistically significant, but this is not the case for the Freedom House Data. The coefficient for democracy in column 1, Table 7, suggests that a complete transformation from autocracy to democracy will decrease annual budget balance (i.e. increase budget deficit) by about 3.6 percent; that is, democratic governments are less fiscally prudent than autocratic governments. Column 2 introduces country fixed effects to the regression, but Table 7 and Table 8 present conflicting results. Using Polity measure of democracy, democracy has a statistically insignificant, negative impact on government balance, whereas Freedom House democracy measurements suggest a positive and statistically significant impact on annual budget balance. Hence column 2 in Table 8

Table 7: Fixed Effects Results Regressing Budget Deficit on Polity Measure of Democracy

	Large Sample, 1975-2017					
	Annual Budget Deficit					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Polity Score	−3.607**	−4.783	−5.798	−5.034**	−5.447**	0.942
	(1.707)	(5.520)	(4.926)	(2.494)	(2.649)	(5.000)
log GDP per capita				2.559***	2.553***	1.995**
				(0.751)	(0.742)	(0.860)
State Failure					−3.146*	−2.395
					(1.605)	(1.921)
Constant	0.629					
	(1.530)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	1,934	1,934	1,934	1,927	1,927	1,925
R^2	0.020	0.003	0.005	0.019	0.022	0.011
Adjusted R^2	0.019	-0.057	-0.080	-0.066	-0.063	-0.075

Note: *p<0.1; **p<0.05; ***p<0.01
Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is governemnt annual budget deficit. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

Table 8: Fixed Effects Results Regressing Budget Deficit on Freedom House Measure of Democracy

	Large Sample, 1975-2017					
	Annual Budget Deficit					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Freedom House Score	−0.333	7.257**	4.135	−0.999	−1.496	0.672
	(1.504)	(3.169)	(3.248)	(2.789)	(2.818)	(6.976)
log GDP per capita				2.285***	2.164***	1.997**
				(0.741)	(0.734)	(0.886)
State Failure					−2.480	−2.165
					(1.932)	(2.108)
Constant	−2.119*					
	(1.261)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,090	2,090	2,090	1,972	1,909	1,907
R^2	0.0002	0.007	0.002	0.013	0.014	0.013
Adjusted R^2	-0.0003	-0.050	-0.077	-0.070	-0.072	-0.073

Note: *p<0.1; **p<0.05; ***p<0.01
Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is governemnt annual budget deficit. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

contradicts the previous OLS result, suggesting that a complete transformation from autocracy to democracy would reduce the government annual budget deficit by about 7.2 percent.

The conflicting results are persistent to the inclusion of time fixed effects in column 3, although the coefficient for Freedom House measurement of democracy ceases to be statistically significant. Column 4 introduced log GDP per capita as a control variable, which retains positive and statistically significant coefficients in columns 4-6. Column 4 in Table 7, for example, suggests that a 10 percent increase in GDP per capita reduces annual fiscal deficit by 0.26 percent. Although the value is small, its statistical significance is in accordance with previous literature such as Persson and Tabellini (1999). The inclusion of this covariate significantly alters the democracy coefficient in column 4 of Table 8, however it is still statistically insignificant.

The inclusion of state failure as a covariate in column 5 does not substantially change the magnitude and statistical significance of democracy coefficients. Instrumental variable estimation in column 6 reduce the democracy coefficients to insignificant levels. In columns 5 and 6, the coefficients for state failure are not statistically significant at 5% significance level.

Overall, Table 7 and 8 present conflicting results for the impact of democracy on fiscal deficit. Table 7, using the Polity measurement of democracy, suggests that democracy increases annual budget deficit, but the Freedom House data indicate the impact is not statistically significant. Hence we cannot establish a casual relationship between democracy and budget deficits from these conflicting results.

B. Impact of Political Institutions on Growth, Debt Accumulation, and Budget Deficits

The other half of regression analyses in this study involves the impact of political institutions on economic growth, debt accumulation, and fiscal deficits. We first examine the impact of political institutions using the large sample. We then investigates the econometric model with the smaller sample with 36 democratic countries, including data for more control variables. Lastly, we compare the impact of political institutions in democratic and autocratic countries by including interaction terms in regressions.

The political institutions examined in the study include presidential system vs. parliamentary system, proportional representation vs. plurality representation, and whether the party of executive control all relevant houses. The “parliamentary system” variable is an indicator that takes value 1 if a country has parliamentary system and 0 if a country has a presidential system. “Plurality representation” takes value 1 if the majority of seats in the lower house of legislature are plurality (i.e., legislators are elected using a winner-take-all rule), as contrast to 0 if the majority of the seats are proportional representation. “Control all houses” is also an indicator that takes the value 1 if the executive’s party controls a majority number of seats in all law-making houses in the legislature, and 0 otherwise.

Table 9 presents the results of regressing our three outcome variables on various political institutions. Column 1-3 use annual GDP growth rate as outcome, column 4-6 use change in debt-GDP ratio as outcome, and column 7-9 use budget deficit as outcome. The three regressions for each outcome variable are cross-sectional OLS, time fixed effects, and time and country fixed effects models. We include log GDP per capita and cases of state failure as control variables for all regressions. In addition, previous level of GDP growth is used as an endogenous variable for regressions 1-3; the coefficients are all positive, statistically significant, and omitted for the purpose of analysis.

Column 1 shows the OLS estimates of regressing annual GDP growth on political institutions. The coefficients for all three political institution variables are small and statically insignificant. Log GDP per capita has a negative and statistically significant coefficient; specifically, a 10 percent increase in GDP per capita results in a decrease in annual GDP growth by about 0.03 percent. Hence the impact is minimal. Consistent with the regressions before, state failure has a strong, negative impact on annual GDP growth. In this case, state failure leads to a 5.3 percent decline in GDP growth rate.

Column 2 introduces the time fixed effects to control for common shocks to all countries. The coefficients for the political institution variables did not change visibly, so are the coefficients for control variables. When country fixed effects are introduced in column 3, however, the magnitude of political institutions' coefficients increased dramatically, although still small in terms of aggregate effect on GDP growth. Taken together, the results suggest that the impact of presidential system or parliamentary system on economic growth are roughly the same, and plurality representation has the same influence on GDP growth as a system of proportional representation in the lower house of legislature. There is some evidence for a negative, causal relationship between controlling all houses and GDP growth; namely, if the executive's party controls all relevant houses, GDP growth is projected to decrease by 0.45%. The impact of political institutions on economic growth are thus minimal as well.

Column 4 records the OLS estimates for the impacts of political institutions on change in debt-GDP ratio. The coefficients for political institutions are similar to those column 1 as they are all statistically insignificant. Accounting for time fixed effects in column 5, the positive coefficient for parliamentary system became statistically significant at 5 percent significance level. The coefficients for other political institutions did not change very much. In both of these regressions, log GDP per capita have positive and statistically significant coefficients. The coefficient for state failure is also very sizable, but the values are not statistically significant because of the large standard errors.

Column 6 incorporates country fixed effects into the regression model. The magnitudes of coefficients improved quite visibly, although standard errors increased, too. The coefficient for parliamentary system is now 3.9, which means a parliamentary system on average adds 3.9 percent more debt relative to GDP than a presidential system does. The other coefficients suggest plurality representation in the lower house increases debt-GDP ratio by 1.5 percent more than proportional representation, and control over all houses reduces debt-GDP ratio by about 1.1 percent. However these effects cannot be interpreted as causal relationships.

Table 9: Fixed Effects Results on Politcal Institutions, Large Sample

	Large Sample, 1975-2017								
	Annual GDP Growth			Change in Debt-GDP Ratio			Annual Budget Deficit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Parliamentary System	−0.057	0.010	0.100	0.429	0.904**	3.903***	−1.221*	−0.973	−2.254
	(0.190)	(0.195)	(0.435)	(0.338)	(0.374)	(1.254)	(0.716)	(0.766)	(1.535)
Plurality Representation	0.001	−0.014	−0.493	0.328	0.421	1.538	0.612	0.678	0.922
	(0.232)	(0.225)	(0.425)	(0.463)	(0.462)	(1.945)	(0.679)	(0.661)	(1.103)
Control All Houses	0.042	0.034	−0.452**	−0.343	−0.280	−1.094	−0.169	−0.303	−0.174
	(0.206)	(0.200)	(0.225)	(0.486)	(0.477)	(0.908)	(0.592)	(0.586)	(0.430)
log GDP per capita	−0.250***	−0.281***	−0.854	0.417**	0.411**	0.290	0.432	0.382	1.386*
	(0.060)	(0.061)	(0.780)	(0.186)	(0.163)	(1.307)	(0.339)	(0.350)	(0.776)
State Failure	−5.343***	−5.531***	−5.940***	11.886	12.064	23.687*	−0.164	−0.398	−0.319
	(1.243)	(1.123)	(1.326)	(7.807)	(7.919)	(12.455)	(0.887)	(0.882)	(0.528)
Constant	4.318***			−3.396**			−5.836**		
	(0.524)			(1.689)			(2.788)		
Previous GDP Growth?	Yes	Yes	Yes	No	No	No	No	No	No
Year dummy?	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Country dummy?	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Observations	4,172	4,172	4,172	2,054	2,054	2,054	1,745	1,745	1,745
R^2	0.192	0.195	0.109	0.014	0.017	0.025	0.016	0.014	0.012
Adjusted R^2	0.191	0.186	0.067	0.011	-0.006	-0.058	0.014	-0.013	-0.076

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1, 4, and 7. Fixed effects OLS regressions in the other columns. Robust standard errors clustered by country are reported in parentheses. Year dummies are included in regressions 2-3, 5-6, and 8-9, and country dummies are included in regressions 3, 6, and 9. Dependent variables are annual GDP growth rate, change in debt-GDP ratio, and annual budget deficit. Regression 1-3 include lagged GDP growth rate as endogenous variable. Covariates are added in all regressions. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

Overall, regression results suggest that, accounting for time and country fixed effects, parliamentary system adds 4 percent more to debt-GDP ratio than a presidential system does.

Column 7 shows that the political institutions do not yield any explanatory powers for annual budget deficits. The three coefficients are all insignificant at 5% significance level. The inclusion of fixed effects in column 8 and 9 did not change the statistical significance of these coefficients. Assessing the magnitudes of coefficients, the only sizable coefficients come from the parliamentary system indicator. Column 9, for example, suggests a parliamentary system reduces annual budget balance by 2 percent (i.e., increases budget deficit by 2 percent) compared to a presidential system. The finding are in accordance with the conclusion reached in Persson and Tabellini (2000) that presidential systems have smaller budget deficits. Surprisingly, the coefficient for state failure and log GDP per capita are not statistically significant either.

Overall, the results from Table 9 suggest that there does not exist a casual relationship between political institutions and economic growth, debt accumulation, or budget deficits, with the possible exception that parliamentary system has the tendency to increase national debt-GDP ratio by roughly 4 percent more than a presidential system.

Next, Table 10 shows the results of assessing the impact of political institutions on economic outcomes in the small sample, which has considerably more covariates. The small sample differs from the large sample also because it contains only 36 democracies that are members of the OECD or the European Union. In addition to the political institutions listed in Table 9, we also include an indicator variable for EU membership. The structure of Table 10 is almost identical to that of Table 9, with the difference being addition of EU membership indicator and more control variables.

The new control variables involve financial and trade openness, and some demographic information. Capital account openness is an index for financial openness designed by Chinn and Ito (2006), calculated from regulation rules on cross-border financial transactions. Trade openness is calculated as a percentage of total imports and exports over GDP. The last two covariates measures the percentage of population between 15 and 64 years old, and those over 65 years old. These variables have been shown to correlate with fiscal policies in previous literature including Persson and Tabellini (1999).

Coefficients in column 1-3 suggest political institutions in democracy have very minimal effects on overall economic growth. Notably, the coefficients for “control all houses” are negative and statistically significant at 1 percent significance level. Take column 3, for example, the coefficient suggests an executive’s party that has control over all relevant houses results in a 0.3 percent decreases in GDP growth rate compared to a case without total control over relevant houses. On the other hand, the coefficient for plurality is inconsistent since the inclusion of control fixed effects reversed the direction of the casual effect. The coefficients for parliamentary system and EU membership are all statistically insignificant. Hence these results show the impacts of political institutions in a democracy on economic growth are negligible. Among the covariates, capital account openness maintains a consistent, small positive impact on the GDP growth rate.

Table 10: Fixed Effects Results on Politcal Institutions, Small Sample

	Small Sample, 1975-2015								
	Annual GDP Growth			Change in Debt-GDP Ratio			Annual Budget Deficit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Parliamentary System	−0.009	−0.127	0.507	0.128	0.498	1.314**	0.246	0.207	−2.984**
	(0.205)	(0.213)	(0.713)	(0.364)	(0.439)	(0.609)	(1.139)	(1.170)	(1.331)
Plurality Representation	0.342***	0.411***	−0.399**	0.426	0.099	2.129**	−1.381	−1.264	2.057***
	(0.125)	(0.112)	(0.185)	(0.667)	(0.699)	(1.066)	(1.388)	(1.415)	(0.669)
Control All Houses	−0.335**	−0.395***	−0.316**	−0.706	−0.284	−0.848	−0.689	−0.998*	−0.282
	(0.135)	(0.119)	(0.161)	(0.717)	(0.600)	(0.655)	(0.635)	(0.565)	(0.570)
EU Member	−0.207	−0.132	−0.197	0.872	0.600	−0.225	−3.201***	−3.009**	−1.493**
	(0.161)	(0.120)	(0.236)	(0.638)	(0.519)	(0.781)	(1.232)	(1.174)	(0.611)
log GDP per capita	−0.627***	−0.357**	−0.853*	0.351	−0.135	−1.611	1.169	1.563*	2.933**
	(0.121)	(0.148)	(0.484)	(0.425)	(0.581)	(1.338)	(0.813)	(0.917)	(1.322)
State Failure	0.773**	0.237	−0.085	−1.008	0.199	−0.132	2.589*	1.984	1.905
	(0.318)	(0.345)	(0.364)	(1.055)	(1.269)	(2.142)	(1.372)	(1.571)	(1.417)
Capital Account Openness	0.008***	0.008***	0.027***	−0.017**	−0.020***	−0.046**	0.010	0.008	0.018
	(0.002)	(0.003)	(0.005)	(0.007)	(0.007)	(0.020)	(0.013)	(0.014)	(0.023)
Openness Trade	−2.001	−2.478	7.131	9.741	17.509	46.058	−19.131	−18.688	−5.495
	(3.945)	(3.467)	(6.951)	(13.652)	(14.130)	(32.572)	(22.625)	(23.852)	(22.479)
Population 15-64	−10.435***	−6.522**	−3.184	12.745	−0.592	10.664	2.098	7.417	−35.983
	(2.875)	(2.996)	(4.516)	(14.883)	(19.415)	(28.947)	(20.456)	(25.206)	(27.211)
Population >65	9.340***			−8.831			−2.654		
	(2.739)			(8.547)			(12.104)		
Previous GDP Growth?	Yes	Yes	Yes	No	No	No	No	No	No
Year dummy?	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Country dummy?	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Observations	934	934	934	888	888	888	929	929	929
R^2	0.254	0.270	0.193	0.021	0.022	0.024	0.188	0.216	0.110
Adjusted R^2	0.246	0.230	0.121	0.011	-0.033	-0.068	0.180	0.174	0.030

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1, 4, and 7. Fixed effects OLS regressions in the other columns. Robust standard errors clustered by country are reported in parentheses. Year dummies are included in regressions 2-3, 5-6, and 8-9, and country dummies are included in regressions 3, 6, and 9. Dependent variables are annual GDP growth rate, change in debt-GDP ratio, and annual budget deficit. Regression 1-3 include lagged GDP growth rate as endogenous variable. Covariates are added in all regressions. Base sample is an unbalanced panel, 1975 to 2015. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

Column 4-6 represent the impact of political institutions on debt accumulation in democracies. All the coefficients for political institutions are not statistically significant except for parliamentary system and plurality representation in column 6. The coefficient for parliamentary system in column 6 is 1.314, suggesting that a parliamentary system increases debt-GDP ratio by 1.3 percent in a year more than its presidential counterparts. The coefficient for plurality representation in column 6 is 2.219, suggesting that plurality representation increases debt-GDP ratio by 2.2 percent more than proportional representation does in a year. These coefficients are quite sizable. In addition, the finding that parliamentary system contributes more to debt accumulation than a presidential system is in accordance with the results in column 5 and 6 in Table 9. As for the covariates, capital account openness still maintains a small and negative impact on debt accumulation.

In column 7-9, a negative coefficient denotes decrease in budget balance (deficit). First of all, EU membership has strong, negative coefficients that suggest EU members experience more budget deficit than non-EU countries. Column 9, for example, suggests that EU membership leads to a 3 percent rise in budget deficit. The control of all relevant houses does not have any explanatory power over the outcome of fiscal deficit. Finally, with the inclusion of time and country fixed effects, the coefficients for parliamentary system and plurality representation became negative and positive, respectively. The results indicate that a parliamentary system produces about 3 percent more budget deficit than a presidential system does, and that plurality representation improves budget balance by 2 percent more than proportional representation. However, since these results are not consistent through column 7-9, they do not establish a convincing causal relationship. The only convincing result from these columns is that EU membership leads to more budget deficits.

Finally, following the example of Pereira and Teles (2008), we construct interactions terms of democracy and political institutions to investigate whether political institutions have different effects on outcome variables in democracies and autocracies. The democracy dummy variable is constructed from the adjusted Polity composite score. Table 11 shows the results.

Row 4-6 represent the interaction terms in the regression models. First consider column 1-3 on the outcome variable, economic growth. The interaction term of democracy times parliamentary system has negative coefficients in column 1 and 2 that are statistically significant at 5% significance levels. Column 1, for example, indicates that the impact of parliamentary system on economic growth in comparison to a presidential system in a democracy is 1.3 percent lower than the impact of parliamentary system in comparison to a presidential system in an autocracy. In other words, the statistical significance of the term suggests the impact of parliamentary system relative to a presidential system on economic growth is indeed different for democracies and autocracies. This difference, however, disappears when country fixed effects are added in column 3. The other interaction terms do not have coefficients that are significant at 5 percent significance level.

In column 4-6, the first and third interaction term exhibit negative coefficient, and the second interaction term exhibit positive coefficients. Take column 6, for example, the results shown that the difference between the impacts of parliamentary system on debt accumulation

Table 11: Fixed Effects Results on Politcal Institutions, including Interaction Terms

	Large Sample, 1975-2017								
	Annual GDP Growth			Change in Debt-GDP Ratio			Annual Budget Deficit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Parliamentary System	1.118*	1.244**	0.486	3.052*	3.226**	12.259***	−2.002	−2.218	−5.601*
	(0.626)	(0.589)	(1.039)	(1.732)	(1.586)	(3.189)	(3.818)	(3.830)	(3.219)
Plurality Representation	−0.513	−0.563	−0.922	−2.437*	−2.018	−6.045*	2.893	2.988	4.151
	(0.650)	(0.635)	(0.618)	(1.475)	(1.484)	(3.195)	(2.225)	(2.198)	(3.231)
Control All Houses	0.340	0.418	−1.058**	0.731	0.680	0.637	1.269	1.252	2.433
	(0.626)	(0.610)	(0.458)	(1.285)	(1.310)	(2.061)	(1.556)	(1.493)	(2.947)
DEM*Parliamentary System	−1.345**	−1.400**	−0.740	−2.956	−2.622	−8.618***	0.938	1.360	3.079
	(0.634)	(0.605)	(0.989)	(1.851)	(1.673)	(2.834)	(3.901)	(3.936)	(2.596)
DEM*Plurality Representation	0.680	0.715	0.753	3.204**	2.823*	9.144***	−2.738	−2.752	−3.411
	(0.625)	(0.615)	(0.615)	(1.459)	(1.462)	(3.230)	(2.290)	(2.246)	(3.083)
DEM*Control All Houses	−0.415	−0.553	0.814*	−1.328	−1.190	−2.054	−1.971	−2.086	−2.832
	(0.665)	(0.655)	(0.463)	(1.395)	(1.427)	(2.315)	(1.609)	(1.540)	(3.098)
log GDP per capita	−0.245***	−0.269***	−0.684	0.407**	0.402***	0.316	0.632**	0.575*	2.062**
	(0.059)	(0.059)	(0.825)	(0.177)	(0.154)	(1.268)	(0.305)	(0.317)	(1.019)
State Failure	−5.423***	−5.614***	−5.923***	13.409*	13.415*	27.202**	−1.488	−1.683	−2.301
	(1.420)	(1.312)	(1.396)	(7.445)	(7.575)	(11.855)	(1.962)	(1.916)	(1.905)
Constant	4.349***			−3.116*			−7.749***		
	(0.509)			(1.612)			(2.424)		
Previous GDP Growth?	Yes	Yes	Yes	No	No	No	No	No	No
Year dummy?	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Country dummy?	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Observations	4,172	4,172	4,172	2,054	2,054	2,054	1,745	1,745	1,745
R^2	0.194	0.197	0.112	0.018	0.020	0.035	0.055	0.056	0.033
Adjusted R^2	0.192	0.188	0.070	0.014	-0.004	-0.049	0.050	0.028	-0.055

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1, 4, and 7. Fixed effects OLS regressions in the other columns. Robust standard errors clustered by country are reported in parentheses. Year dummies are included in regressions 2-3, 5-6, and 8-9, and country dummies are included in regressions 3, 6, and 9. Dependent variables are annual GDP growth rate, change in debt-GDP ratio, and annual budget deficit. Regression 1-3 include lagged GDP growth rate as endogenous variable. Covariates are added in all regressions. Base sample is an unbalanced panel, 1975 to 2015. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

relative to a presidential system is vastly different (8 percent lower) in democracy than in autocracy. Similarly, plurality representation has a much bigger, positive effect on debt accumulation relative to proportional representation in democracy than in autocracy. The coefficients for the control all houses interaction terms are not statistically significant at 5 percent significance level.

Column 7-9 show the coefficients for the annual budget deficit outcome variable. The magnitudes of these coefficients suggest quite moderate differences between the impacts of these political institutions in democracies and autocracies. However, none of these results are statistically significant at 5 percent significance level. Hence we cannot confirm that the impacts of political institutions on budget deficit are very different in democracies and autocracies.

Overall, the regression results show some evidence to support the Pereira and Teles (2008) claim that the impact of political institutions are different for democracies and autocracies. Namely, parliamentary system may have a smaller impact on economic growth compared to presidential system in a democracy. Plurality representation have a bigger impact on debt accumulation compared to proportional representation in democracies. The impact of parliamentary system on change in debt-GDP ratio is also much smaller in democracies than in autocracies.

VI. Robustness Check

The four major results from the previous section are:

1. There exist some evidence for a positive causal relationship between democracy and economic growth, although the value is small.
2. Parliamentary system leads to a bigger increase in debt-GDP ratio than a presidential system does.
3. EU membership leads to a moderate increase in annual budget deficit among democratic countries.
4. The impacts of various political institutions on economic growth and fiscal outcomes are different in democracies and autocracies.

Table 12 recreates the model (1) using Unified Democracy Score (UDS). Column 2-5 shows that once we control for country fixed effects, the coefficients for democracy are positive and statistically significant at 5 percent significance level. In addition, the magnitude of these estimates are quite small. For example, column 5 suggests that a improvement of 1.0 in UDS increases GDP growth rate by roughly 0.5 percent. These are similar to the results obtained in Table 3 and 4. Hence the first finding is robust to varying measurements of democracy including the Polity composite score, Freedom House score, and Unified Democracy Score.

One drawback from these regressions is that column 6, IV regression, gives insignificant results. There are several reasons for this behavior. We verified instrumental relevance with first-stage regression estimates that are positive and statistically significant. Hence the concern is that there may be other channels through which legislative election

Table 12: Fixed Effects Results Regressing Economic Growth on Unified Democracy Scores

	Large Sample, 1975-2017					
	Annual GDP Growth					
	OLS	Fixed Effects				IV
	(1)	(2)	(3)	(4)	(5)	(6)
Previous GDP Growth	0.362***	0.291***	0.277***	0.314***	0.296***	0.282***
	(0.056)	(0.058)	(0.060)	(0.039)	(0.039)	(0.040)
Unified Democracy Scores	−0.270**	0.739***	0.548**	0.514**	0.513**	0.409
	(0.110)	(0.227)	(0.235)	(0.230)	(0.227)	(0.856)
log GDP per capita				−0.262	−0.486	−0.311
				(0.296)	(0.337)	(0.342)
State Failure					−7.568***	−7.619***
					(2.141)	(2.149)
Constant	2.436***					
	(0.239)					
Country dummy?	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy?	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	5,223	5,223	5,223	5,143	4,951	4,938
R^2	0.138	0.090	0.080	0.100	0.117	0.111
Adjusted R^2	0.138	0.060	0.043	0.063	0.080	0.075

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1. Fixed effects OLS regressions in columns 2 to 5, and IV regression with legislative election competitiveness as instrument in column 6. Robust standard errors clustered by country are reported in parentheses. Country dummies are included in regressions 2 to 6, and year dummies are included in regressions 3 to 6. Dependent variable is annual GDP growth rate. Covariates are added in regressions 4 through 6. Base sample is an unbalanced panel, 1975 to 2017. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

competitiveness may influence economic growth other than democracy. In addition, we cannot rule out the possibility that some third factor is affecting both election competitiveness and economic growth, for instance political oppositions, although the extent of how political opposition would affect economic growth is unknown. A valid instrument that satisfy such exogeneity and exclusion restriction conditions would be better suited to assess the impact of democracy on economic growth.

Secondly, column 6 in Table 9 shows that, controlling for country and year fixed effects, parliamentary system in general leads to a 3.9 percent increase in debt-GDP ratio than presidential system. Column 6 in Table 10 reproduced the same results with more control variables. Hence this finding is robust to the inclusion of fixed effects and more control variables. Column 4-6 in Table 11 also measure the impacts of parliamentary system on change in debt-GDP ratio. Specifically, column 6 shows that a parliamentary system significantly increases the debt-GDP ratio by 12 percent more than a presidential system in an autocracy. The coefficient is 8.6 percent smaller in a democracy, but the value is still positive and statistically significant. Thus it is quite convincing that parliamentary system indeed increases debt more than a presidential system does.

The robustness check for result 3 is limited by data availability. Column 7-9 in Table 10 show that the coefficients for EU membership are statistically significant and robust to the inclusion of fixed effects. The values are also quite comfortably outside the confidence interval with two standard errors on each end.

Lastly, the robustness test for result 4 involves new interaction terms with democracy dummies from Freedom House data. Table 13 below repeats the regression analyses in Table 11 with the new interaction terms. Column 1-3 and 8 all present coefficient on interaction terms that are statistically significant at 5 percent significance level. The original results show that political institutions exert different impacts on economic growth and debt accumulation in democracies and autocracies. Although column 8 measures the impact on budget deficit, this does not interfere with our conclusion that the impacts of these political institutions are different in democracies and autocracies.

VII. Concluding Remarks

This study began asking two questions: how do democracies and autocracies perform differently in terms of fiscal prudence, and how do political institutions affect a country's fiscal prudence? After reviewing relevant literature, we decided to use economic growth, national debt-GDP ratio, and budget deficits as outcome variables in our regression models. The idea is that higher GDP growth, reduced debt-GDP ratio, and negative budget deficits (positive budget balance) are all signs for a prudent fiscal policy.

The theories and evidence are divided about the impact of democracy and political institutions on these outcomes. Researchers argue that autocracy insulates the particularistic pressures in a society (Przeworski and Limongi, 1993), plus autocratic regimes are capable of dictating national economic policy without much consideration for expanding popular consumption (Huntington and Dominguez, 1975). The Asian tigers were the poster child of

Table 13: Fixed Effects Results on Politcal Institutions, with Interaction Term from Freedom House

	Large Sample, 1975-2017								
	Annual GDP Growth			Change in Debt-GDP Ratio			Annual Budget Deficit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Parliamentary System	0.458	0.438	−0.241	0.884	1.000	4.502	−1.334	−1.286	−2.029
	(0.294)	(0.296)	(0.577)	(0.738)	(0.713)	(2.807)	(1.296)	(1.300)	(2.479)
Plurality Representation	−0.266	−0.285	−0.457	−0.022	0.014	0.924	1.918*	2.103**	2.963**
	(0.332)	(0.321)	(0.431)	(0.798)	(0.782)	(2.731)	(0.985)	(0.970)	(1.431)
Control All Houses	0.082	0.094	−0.920***	−0.469	−0.396	−0.118	1.043	1.153	−1.107
	(0.296)	(0.288)	(0.290)	(0.737)	(0.669)	(1.644)	(0.953)	(0.913)	(1.051)
DEM*Parliamentary System	−0.979***	−0.876**	0.454	−0.753	−0.195	−0.448	0.309	0.198	−0.338
	(0.352)	(0.369)	(0.547)	(0.922)	(0.848)	(2.745)	(1.552)	(1.609)	(1.929)
DEM*Plurality Representation	0.501	0.527	−0.543	0.598	0.726	1.161	−1.944	−2.102*	−2.202*
	(0.340)	(0.332)	(0.468)	(0.949)	(0.898)	(3.145)	(1.236)	(1.214)	(1.259)
DEM*Control All Houses	−0.255	−0.323	0.957**	0.172	0.197	−1.521	−2.088*	−2.445**	1.022
	(0.368)	(0.371)	(0.374)	(0.986)	(0.932)	(1.780)	(1.148)	(1.085)	(1.138)
log GDP per capita	−0.194***	−0.220***	−0.886	0.420**	0.352**	0.258	0.789**	0.801**	1.534*
	(0.073)	(0.078)	(0.801)	(0.205)	(0.179)	(1.308)	(0.332)	(0.367)	(0.823)
State Failure	−5.364***	−5.499***	−6.034***	12.049	12.153	23.819*	−0.373	−0.369	−0.312
	(1.291)	(1.169)	(1.294)	(7.768)	(7.864)	(12.537)	(0.979)	(0.977)	(0.534)
Constant	4.043***			−3.295*			−9.283***		
	(0.601)			(1.837)			(2.693)		
Previous GDP Growth?	Yes	Yes	Yes	No	No	No	No	No	No
Year dummy?	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Country dummy?	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Observations	4,107	4,107	4,107	2,037	2,037	2,037	1,727	1,727	1,727
R^2	0.196	0.199	0.113	0.014	0.017	0.026	0.047	0.053	0.013
Adjusted R^2	0.194	0.190	0.070	0.010	-0.007	-0.060	0.042	0.025	-0.076

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-sectional OLS regression in column 1, 4, and 7. Fixed effects OLS regressions in the other columns. Robust standard errors clustered by country are reported in parentheses. Year dummies are included in regressions 2-3, 5-6, and 8-9, and country dummies are included in regressions 3, 6, and 9. Dependent variables are annual GDP growth rate, change in debt-GDP ratio, and annual budget deficit. Regression 1-3 include lagged GDP growth rate as endogenous variable. Covariates are added in all regressions. Base sample is an unbalanced panel, 1975 to 2015. For detailed data definitions and sources, see table for descriptive statistics and Appendix Table 1.

economic success stories in authoritarian governments. On the other hand, there has been numerous theories suggesting democratic institutions are the foundation for long-run economic growth (Acemoglu et al., 2005).

Using cross-sectional data containing over 140 countries for the period 1975 to 2017, this paper utilizes OLS, fixed effects, and instrumental variable regressions to test the hypothesis. The results indicate a weak but positive causal relationship between democracy and economic growth. The finding is robust to different measurements of democracy and to the inclusion of fixed effects and extra control variables.

The Comparative Political Dataset contains more potential control variables for its 36 component countries, so a smaller sample is constructed to examine the impact of political institutions on economic outcomes within democracies. We find that countries with parliamentary systems are prone to increase national debt more than countries with presidential systems, and that EU membership tends to increase national budget deficit among democratic countries. Lastly, the impacts of some political institutions on economic outcomes are different in democracies and in autocracies, a result coherent with previous studies such as Pereira and Teles (2008).

The contribution of this study to current literature includes an empirical study with the latest available data, and some evidence for theories that predict similar results. We conclude this study with answers to the two questions. Democratic regimes lead to a weak but positive increase in economic growth compared to autocratic governments. Parliamentary systems are less fiscally prudent than presidential systems in terms of reducing national debt. EU memberships may negatively impact a country's budget balance, and different political institutions have different magnitudes of impacts on economic outcomes in democracies and autocracies.

There are several areas where this research could be enhanced. First of all, there are a lot of missing observations in our dataset even though data were merged from multiple sources. The inadequacy of data created an unbalanced panel that introduced bias in the regression results. Secondly, the IV regression coefficients were not statistically significant in the first few regressions. Given significant results from other regression methods, there is reason to suspect that the instrument variable of legislative election competitiveness fails the exclusion restriction. It probably also indirectly affects economic growth through some channel other than democracy. Lastly, we were unable to collect demographic data for each country as control variables, even though previous literature suggest demographic data may be suggestive to fiscal policy outcomes. Adding more covariates, such as Table 10 with the small sample, could strengthen the robustness of the results.

Future research could be carried out in several directions. So far our discussion of fiscal prudence has been limited to aspects of economic growth and budget deficit analyses, but also it should be a measure of "fiscal responsiveness" to changing fiscal circumstances. This could mean, for instance, the amount of time it takes for a government to identify and react to a recession. In addition, more research could be devoted to studying the mechanism through which a country makes its fiscal policies. And lastly, if better data were available, we could

focus on the period immediate before and after 2008 to investigate the political factors that contributed to countries' fiscal reactions after the Great Recession. The results from such studies would be revealing for countries in terms of fiscal crises in the future.

Appendix Table 1—Data and Sources

Variable	Description	Source
log GDP per capita	Log value of GDP per capita. Used as control variable: indicator for development.	World Bank data: https://data.worldbank.org/
GDP Growth Rate	Annual real GDP Growth Rate	OECD General Government Deficit: https://data.oecd.org/gga/general-government-deficit.htm
Debt to GDP Ratio	Ratio of gross national debt to GDP	
Deficit	Annual fiscal balance	IMF Fiscal Monitor: http://www.imf.org/external/datamapper/datasets/FM
Polity	Polity IV composite score of democracy, normalized to 0-1 scale	Polity IV: http://www.systemicpeace.org/polity/polity4.htm
State Failure	Indicator variable that takes value 1 if a state or region is in "complete collapse of central authority" or "state failure", 0 otherwise	
Freedom House	Freedom House measurement of democracy, normalized to 0-1 scale	Freedom House: https://freedomhouse.org/report-types/freedom-world
Unified Democracy Score	Unified Democracy Score measurement of democracy	Unified Democracy Score: http://www.unified-democracy-scores.org/uds.html
Parliamentary System	Indicator variable that takes value 1 if the state has a parliamentary system, or 0 if it is an assembly-elected presidential system or presidential system	The Database of Political Institutions: https://publications.iadb.org/handle/11319/8806
Control All Houses	Indicator variable that takes value 1 if the party of the executive has an absolute majority in the houses that have lawmaking powers, 0 otherwise	
Legislative Index of Electoral Competitveness	Normalized to 0-1 from original scale: No legislature: 1; Unelected legislature: 2 Elected, 1 candidate: 3 1 party, multiple candidates: 4 Multiple parties are legal but only one party won seats: 5 Multiple parties DID win seats but the largest party received more than 75% of the seats: 6 Largest party got less than 75%: 7	
Plurality Representation	Indicator variable that takes value 1 if plurality system governs the majority of House seats, 0 if most seats are proportional.	
EU Member	Indicator variable for EU members	Comparative Political Dataset: http://www.cpds-data.org/index.php/data
Capital Account Openness	Index for the degree of openness in capital account transactions, normalized from the Chinn-Ito index	
Trade Openness	Openness of the economy, measured by ratio of total export and import over GDP	
Population 15-64	Percentage of population between 15 and 64 years old	
Population > 65	Percentage of population over 65 years old	

Appendix Table 2—Countries Included in the Study

Country	Code	Country	Code	Country	Code
Afghanistan	AFG	France	FRA	Nicaragua	NIC
Albania	ALB	Gabon	GAB	Niger	NER
Algeria	DZA	Gambia	GMB	Nigeria	NGA
Angola	AGO	Georgia	GEO	North Korea	PRK
Argentina	ARG	Germany	DEU	Norway	NOR
Armenia	ARM	Ghana	GHA	Oman	OMN
Australia	AUS	Greece	GRC	Pakistan	PAK
Austria	AUT	Guatemala	GTM	Panama	PAN
Azerbaijan	AZE	Guinea	GIN	Papua New Guinea	PNG
Bahamas	BHS	Guinea-Bissau	GNB	Paraguay	PRY
Bahrain	BHR	Guyana	GUY	Peru	PER
Bangladesh	BGD	Haiti	HTI	Philippines	PHL
Barbados	BRB	Honduras	HND	Poland	POL
Belarus	BLR	Hungary	HUN	Portugal	PRT
Belgium	BEL	Iceland	ISL	Qatar	QAT
Belize	BLZ	India	IND	Romania	ROU
Benin	BEN	Indonesia	IDN	Russia	RUS
Bhutan	BTN	Iran	IRN	Rwanda	RWA
Bolivia	BOL	Iraq	IRQ	Saudi Arabia	SAU
Bosnia & Herzegovina	BIH	Ireland	IRL	Senegal	SEN
Botswana	BWA	Israel	ISR	Sierra Leone	SLE
Brazil	BRA	Italy	ITA	Singapore	SGP
Brunei	BRN	Jamaica	JAM	Slovakia	SVK
Bulgaria	BGR	Japan	JPN	Slovenia	SVN
Burkina Faso	BFA	Jordan	JOR	Solomon Islands	SLB
Burundi	BDI	Kazakhstan	KAZ	Somalia	SOM
Côte d'Ivoire	CIV	Kenya	KEN	South Africa	ZAF
Cambodia	KHM	Kuwait	KWT	South Korea	KOR
Cameroon	CMR	Kyrgyzstan	KGZ	South Korea	KOR
Canada	CAN	Laos	LAO	Spain	ESP
Cape Verde	CPV	Latvia	LVA	Sri Lanka	LKA
Central African Republic	CAF	Lebanon	LBN	Sudan	SDN
Chad	TCD	Lesotho	LSO	Suriname	SUR
Chile	CHL	Liberia	LBR	Swaziland	SWZ
China	CHN	Libya	LBY	Sweden	SWE
Colombia	COL	Lithuania	LTU	Switzerland	CHE
Comoros	COM	Luxembourg	LUX	Syria	SYR
Congo - Brazzaville	COG	Macedonia	MKD	Tajikistan	TJK
Congo - Kinshasa	COD	Madagascar	MDG	Tanzania	TZA
Costa Rica	CRI	Malawi	MWI	Thailand	THA
Croatia	HRV	Malaysia	MYS	Timor-Leste	TLS
Cuba	CUB	Maldives	MDV	Togo	TGO
Cyprus	CYP	Mali	MLI	Trinidad & Tobago	TTO
Czechia	CZE	Malta	MLT	Tunisia	TUN
Denmark	DNK	Mauritania	MRT	Turkey	TUR
Djibouti	DJI	Mauritius	MUS	Turkmenistan	TKM
Dominican Republic	DOM	Mexico	MEX	Uganda	UGA
Ecuador	ECU	Moldova	MDA	Ukraine	UKR
Egypt	EGY	Mongolia	MNG	United Arab Emirates	ARE
El Salvador	SLV	Morocco	MAR	United Kingdom	GBR
Equatorial Guinea	GNQ	Mozambique	MOZ	United States	USA
Eritrea	ERI	Myanmar (Burma)	MMR	Uruguay	URY
Estonia	EST	Namibia	NAM	Uzbekistan	UZB
Ethiopia	ETH	Nepal	NPL	Venezuela	VEN
Fiji	FJI	Netherlands	NLD	Zambia	ZMB
Finland	FIN	New Zealand	NZL	Zimbabwe	ZWE

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