

Institutional Constraints and Fiscal Policy Stability

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Abstract

Veto player theory (Tsebelis, 2002) predicts that the number of veto players influencing policy stabilities. While studies in OECD countries have shown supportive evidence (Tsebelis and Chang, 2004), there is few work on policy stability in nondemocracies. This project uses a new dataset from GSRE (Global State Revenues and Expenditures dataset) and performs an empirical test on veto player / institutional constraint and budget stability in new democratic countries. Results show that there is at most moderate support that institutional constraints (veto players) lead to incremental budget changes, coefficients hardly achieve significant levels. Besides, our results show little evidence on Punctual Equilibrium Theory (PET): higher institutional constraints are not directly related to budget punctuations.

Key words: budget policy, institutional frictions, punctuations ¹

¹Replication files available on author's Github account: <https://github.com/haowang666>

1 Introduction

Budget policy is a key aspect of government activity, one that attracts lots of academic attentions in the past few years. What can explain the changes of budgetary settings? Why budgetary changes are stable in some countries but less so and more punctuated in other countries? What are the possible mechanisms that can explain the differences? These questions are not yet fully explored. This project tests the budget stability hypothesis with a newly-compiled dataset: GSRE (Global State Revenues and Expenditures dataset).

Government policy making involves negotiations of different branches and institutions. In democratic countries, to pass a policy modification requires the majority rule. This requirement makes the status quo at an advantageous position: any further move has to beat the status quo with a majority of votes. This institutional constraint is featured in the ‘veto-player’ theory ([Tsebelis, 2002](#)). Veto player theory defines ‘veto players’ as individuals or institutions whose agreement is required for a change of the status quo. Consequently, when the number of veto players increases, the winning set that can defeat status quo will shrink, which in turn leads to higher policy stability. Since veto player is ultimately related to the level of institutional constraints, a corollary is that institutional checks lead to more stable, incremental policy outcomes. With many checks and balances in the government, it will be harder to move policies from the status quo equilibrium.

[Tsebelis and Chang \(2004\)](#) apply veto player theory in the budget changes of the 19 OECD countries. In their analysis, parties with more polarized positions are modeled as potential veto players who could have blocked the policy proposals. Their results show that countries with more veto players have more stable budget policies.

On the other hand, veto player theory also implies that more veto players makes politicians harder to adjust current policies. This is particularly salient in countries with multiple veto players (e.g. the United States). During some time periods with exogenous shocks, the policy

stability can be harmful and politicians may react to the long-time stability with rapid changes of policies, which forms a policy punctuation.

This theoretical expectation leads to another potential outcome: the amount of veto power may lead to larger policy punctuation. While stability refers to the overall changes, punctuation describes the distribution of policy changes. They may seem incompatible at this moment, but actually they are not and we will address it in the later sections.

Punctuated Equilibrium Theory (PET) ([John and Bevan, 2012](#), [Jones and Baumgartner \(2014\)](#)) argues that government budget shifts over due to the over-attention and under-attention to certain policy areas. Consequently, it features with long periods of stability and short periods of radical changes. Considering the institutional constraints, we also want to test the effect of veto player on policy punctuation.

Our study contributes to the existing literature in two parts: First, with the newly released GSRE data, we extend the coverage to a much broader sample size. Till now most empirical studies on budget changes are drawn from OECD countries, although a few studies have started looking at nondemocratic cases, they are mostly cases studies ([Baumgartner et al., 2017](#), [Lam and Chan \(2015\)](#)). Second, we systematically evaluate the two theories. Our results show that institutional constraints lead to more stable policy changes. However, there is little evidence that institutional constraints lead to policy punctuation.

2 Nature of Policy Changes

2.1 Punctual Equilibrium Theory

Governments change budget policy regularly. The amount of budget allocated to each specific program vary from year to year, we can differentiate the budget changes into two categories: deliberate change and automatic changes ([Tsebelis and Chang, 2004](#)). The automatic changes

are often a reflection of the environmental factors such as socio-economic development. The deliberate change requires cooperation of different political actors to break the current policy equilibrium. In this project we study the dynamics of the budget changes. In particular, we want to explore the mechanisms of the budget percentage changes.

Scholars developed multiple models addressing the nature of budget shifts. Early models assume no internal frictions and budget can shift smoothly, in an incremental pattern. For instance [Wildavsky \(1964\)](#) proposes an incremental model of budgetary model based on the observations of the federal budget constructions of the U.S. government. His model ignores the internal institutional frictions, arguing that policy shifts features a pattern of randomness. Incremental model predicts that budget changes (the between-year differences) will approximate a Gaussian distribution due to the randomness of decision information. Later on this model is transformed by John Padgett in a theory of policy punctuations. Through the long-term observation of the U.S. federal budgetary expenditure, Padgett finds that budget policy remain minimal changes over a long term period and have huge fluctuations in some short-periods ([Padgett, 1980](#)). The entire pattern resembles some tall towns on a flat land: at most of the time there is no changes, but when there is a change, the magnitude is huge. [Jones, Baumgartner and True \(1998\)](#) test this hypothesis with congressional budget authority of the U.S. government, of which they find that government spending is characterized by much greater changes than is typically portrayed in the literature, even if there is great stability for most categories most of the time. This pattern of budget circles is named as ‘Punctuated Equilibrium Theory’.²

²Punctuated Equilibrium is a term borrowed from evolutionary biology, it describes a pattern which proposes that once species appear in the fossil record they will become stable, showing little evolutionary change for most of their geological history.

2.2 Explain Policy Changes

Punctuated equilibrium theory describes the general pattern of budget changes. However, it is still unclear what causes the budget shifts. According to [Jones and Baumgartner \(2014\)](#), to explain the changes of budget we would need to incorporate both internal institutional constraints and external information flows. Efficient budget policy requires both accurate reflection of the external information and low levels of internal constraints. We can model this as the following system:

Input (external information) \Rightarrow Processing (internal institutions) \Rightarrow Budget
changes

Both the first step and the second step can influence the final budget outcomes. The information collection can be inefficient and prone to erroneous messages. In a complex environment like politics, it is harder for politicians to decipher signals from the noise. Consequently, inefficient information gathering may lead to inefficient policy decisions. On the other hand, decisions are also bounded by institutional constraints. ‘The detection and interpretation of signals may be limited by the system’s structure - incentives, for example, that encourage focusing on internal dynamics, such as bureaucratic infighting rather than problem solving’ ([Fagan, Jones and Wlezien, 2017](#), p.3).

3 Budget Policy in Authoritarian Countries

Scholars study both the input and processing stages under democratic regimes, arguing that free and transparent information processing as well as less institutional constraints lead to incremental budget changes ([Jones and Baumgartner, 2014](#)). Studying budget changes in authoritarian countries can be different from electoral democracies. First, there is no free and fair elections in authoritarian regimes. Election and regular political participation face the “dictator’s dilemma” in nondemocracies ([Wintrobe, 1998](#)). Second, while serving as the

information provider and monitor of the government actions in democratic regimes, media and press are not independent in autocracies. Overall these create barriers for information input and leads to inefficient information collection in authoritarian countries.

On the other hand, institutional constraints are weaker in authoritarian countries. Unlike democracies, the autocrat has better control over the government and the legislative institutions. For instance in a democratic government with checks-and-balances institutional design, the executive branch will be constrained by the legislature, which implies a longer period of negotiation and cooperation. Nevertheless autocrats are not completely free of the veto-player framework ([Tsebelis, 2002](#)). Frictions and intra-elite competitions still exist and often dictators need to choose co-optation strategy ([Svolik, 2012](#)).

So far only a few studies look at budgetary patterns in authoritarian countries. In the Hong Kong case, [Lam and Chan \(2015\)](#) propose that non-democracies are characterized by less friction than democracies because the institutional design of these regimes centralizes power at the highest level of government, meanwhile there is little check and balances of the executive branch. Lacking the incentive of electoral competition, officials are less motivated to monitor and respond to the external environment. Consequently, there is high levels of inertia of environmental changes. Errors of information may accumulate over time and threaten the regime stability. [Baumgartner et al. \(2017\)](#) conduct the first cross-national studies of budgetary changes in authoritarian countries (Brazil, Turkey, Malta and Russia). Their analysis suggests that authoritarian countries have different patterns of policy shifts with the democratic regimes. However, the argument is only moderately supported by their empirical evidence due to the lack of data.

Overall, we hope to expand the current research agenda of policy shifts to authoritarian countries. We argue that the budget system theory still applies to authoritarian regimes. However, due to the difficulty of conceptualizing the information gathering, we focus mainly on the internal frictions in authoritarian countries.

4 Hypotheses

Previous studies on budget changes highlight the importance of input and processing. While both steps are important for decision making, we only focus on the institutional frictions in this manuscript. Viewing institutional friction as a constraint on any deviations from the status quo, we argue that countries with higher levels of institutional friction have smaller budget policy shifts. We use the similar framework appeared in [Tsebelis and Chang \(2004\)](#): countries with more veto players have smaller winning sets that can beat the status quo, consequently lead to stable policy outcomes (small incremental changes).

institutional frictions \Rightarrow stable policy shifts

On the other hand, the existing multiple veto players make it harder for reforms and policy adaptations. In the extreme condition, the current winning set $P \in \emptyset$: politicians are unable to come up with any changes of the current policy plans. A stable budget policy is not necessary a good policy: it needs to speak to the external socio-economic environment. For instance, the incumbent government should be able to spend more in social-welfare domain if there are serious welfare issues. Eventually this inability of adaptation leads to an accumulation of problems and even threaten the stability of the regime. Politicians may respond to the long-term stability with short-term rapid changes as a remedy of the chronological grid-lock, which is a policy punctuation ([Epp and Baumgartner, 2016](#), [Keefer and Stasavage \(2003\)](#)).

Institutional frictions \Rightarrow unable to change policy accordingly \Rightarrow long term incremental changes and short-term rapid changes \Rightarrow punctual equilibrium.

Therefore we have the following two hypothesis:

1. Institutional frictions lead to budget stability (minimal difference between fiscal years)
2. Institutional frictions lead to higher budget punctuations.

5 Data and Conceptualization

Data in this project comes from various sources. The dependent variable comes from the GSRE project (Global State Revenues and Expenditures data set). GSRE is a comprehensive budget data set based on the previous released historical documents from the International Monetary Fund (IMF). Comparing with the IMF COFOG data set, GSRE increases coverage and accuracy of budgeting data for most authoritarian regimes and some democratic regimes. Since GSRE is built on IMF historical documents, it covers all independent states that have been or are the members of the IMF and are being coded as an authoritarian regime in the [Geddes, Wright and Frantz \(2014\)](#) data set.

Data on deliberative democracies and other regime-related variables come from the Varieties of Democracy (Vdem) project ([Coppedge et al., 2016](#)). Unlike the widely used democracy index like Polity ([Marshall, Gurr and Jaggers, 2015](#)), Vdem provides multidimensional measurements of regimes, including both democracies and autocracies.

Data on institutional constraints come from the political constraints index (POLCON) ([Henisz, 2000](#)). Political constraint index measures the risk of policy changes. Henisz uses a quantitative model to capture the competitiveness portion of the definition of democracy (competitiveness and participation) with a proxy of number of independent veto points over policy outcomes and distribution of preferences of those actors. POLCON is based on strong assumptions about each actors veto power. In the newest version, measure is also modified to take into account the extent of alignment across branches of government using data on the party composition of the executive and legislative branches.

Data on division of power draws from the Political Institution Index ([Beck et al., 2001](#)).

5.1 Measuring Dependent Variables

To evaluate the budget-stability hypothesis and punctual equilibrium hypothesis, we create two different dependent variables. The volatility index measures the budget shifts of a certain country at a single time point. We use L-Kurtosis score to measure the degree of punctuation (peakness).

5.1.1 Volatility Index

I measure the budget stability as the simple euclidean distance of the between-year percentage differences. It can be written in the following equation: S_{jt} is the volatility index of the j th country at a certain year t . Since government budget has various categories: p_{jit} denotes the percentage of i th category out of total expenditure of the country j at year t . S_{jt} will increase as the difference between p_{it} and p_{it-1} increases.

$$S_{jt} = \sqrt{\sum_{i=1}^i (p_{jit} - p_{jit-1})^2} \quad (1)$$

For the percentage of each expenditure term p_{it} , $p_{it} \in [0, 1]$, S_{jt} has the same boundary as $[0, 1]$. Larger score means more volatile budget policies.

5.1.2 L-Kurtosis Score

To evaluate the distribution of budget shifts, we calculated the L-Kurtosis score of policy changes of each country across the available time spans. Specifically, we calculate the between-year difference of budget percentages, and then using L-Kurtosis statistics to find the L-Kurtosis (LK) score. L-Kurtosis (LK) is the 4th L-moment of the moment statistics. It is used to summarize the peakness of the variable distributions. An L-Kurtosis score of 0.123 approximates a Gaussian distribution (also see ([Baumgartner et al., 2017](#), [Breunig](#)

and Jones (2011))). Higher LK score means heavy tails and high peaks. Figure 1 shows an example of LK score and distributions. In this figure, the red line has a LK score of 0.84, makes it more ‘punctuated’ than the blue line: it features long-time incremental changes and short-term radical shifts (for detailed calculation, check (Hosking, 1990)).

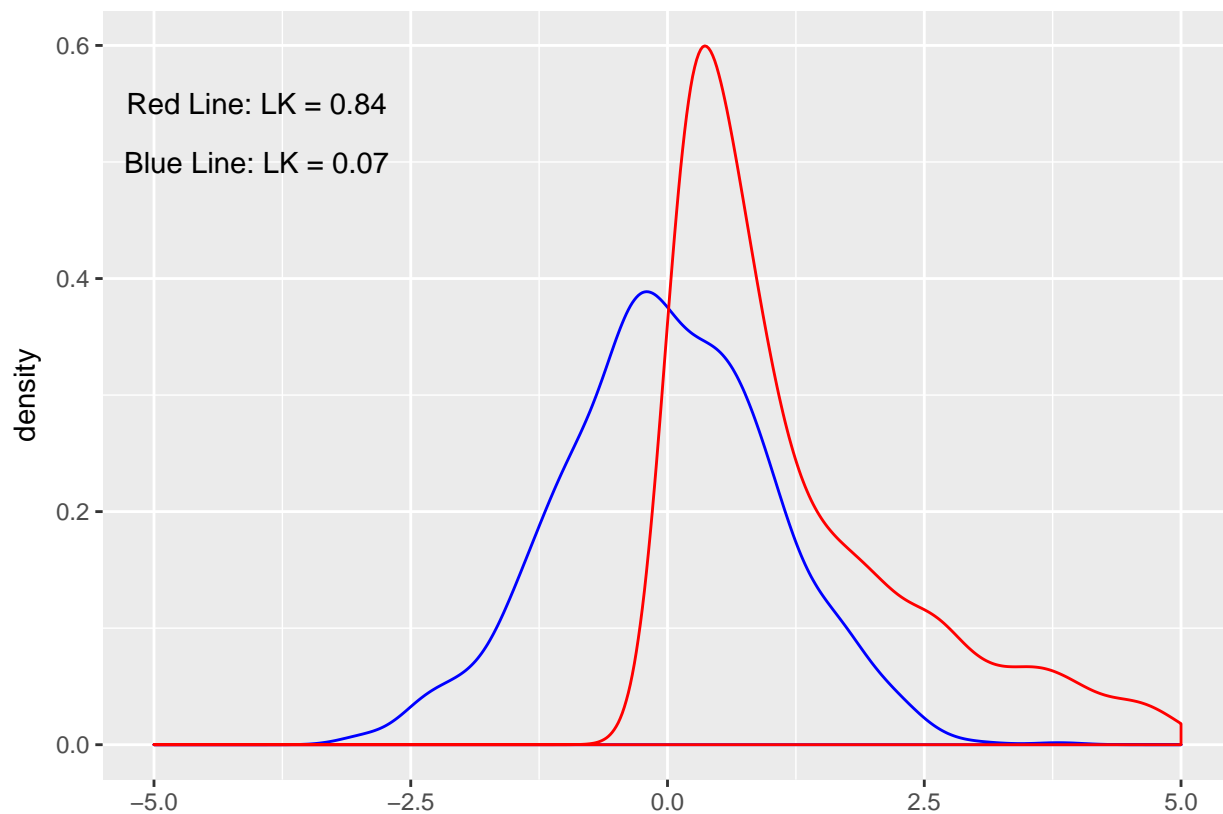


Figure 1: LK Score Example

5.2 Independent Variables

We have two major independent variables: In the horizontal level: veto players are different government divisions and political parties. In the vertical level, a strong local government with independent fiscal abilities can act as a strong veto players well.

5.2.1 Horizontal Level

We use two measurements of institutional constraints: POLCON index ([Henisz, 2000](#)) and Party Institutionalization Index ([Coppedge et al., 2016](#)).

5.2.2 Vertical Level

Regional authority index (RAI), modeled by the state government authority over taxation ([Beck et al., 2001](#)).

5.2.3 Corruption

From Vdem Project ([Coppedge et al., 2016](#))

5.2.4 Other Controls

Education, GDP, GDP grow rate, inequality, Democracy Indices, etc .

6 Method and Results

GSRE data set contain lots of missing data, we did 5 multiple imputations and report results of the original dependent variable as well as the 5 imputed ones.

Table 1 reports fixed effect result. Table 3 reports L-Kurtosis score result. Table 2 reports twoway fixed effect result, as a robustness check ([Beck and Katz, 2011](#)).

6.1 Fixed Effect Panel Data

$$S_{jt} = a_j + \beta_2 Cont_{jt} + \beta_3 Party_{jt} + \beta_4 RAI_{jt} + \beta_5 Corrupt_{jt} + \mathbf{Z}\beta + \epsilon_{jt} \quad (2)$$

Table 1: Fixed Effect Regression Results

	<i>Dependent variable:</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Constraints	−0.021 (0.022)	−0.040** (0.020)	−0.027 (0.019)	−0.017 (0.019)	−0.021 (0.019)	−0.052*** (0.019)
Party	−0.019 (0.030)	0.030 (0.024)	−0.001 (0.024)	0.017 (0.024)	0.011 (0.023)	0.012 (0.023)
Consult	0.0003 (0.006)	0.009 (0.005)	0.006 (0.005)	0.008 (0.005)	0.005 (0.005)	0.013** (0.005)
Federalism	0.004 (0.024)	0.004 (0.019)	−0.017 (0.019)	0.029 (0.019)	0.014 (0.019)	0.002 (0.019)
Corruption	−0.072** (0.030)	−0.105*** (0.028)	−0.085*** (0.027)	−0.098*** (0.027)	−0.088*** (0.027)	−0.063** (0.027)
Polity	0.001 (0.001)	0.002 (0.001)	−0.0002 (0.001)	−0.001 (0.001)	0.0003 (0.001)	0.0003 (0.001)
Censorship	0.010* (0.006)	−0.005 (0.005)	0.009** (0.005)	0.003 (0.005)	0.004 (0.005)	0.004 (0.005)
Education	−0.004 (0.004)	0.006* (0.003)	0.007** (0.003)	0.005* (0.003)	0.006* (0.003)	0.005 (0.003)
GDP pc	0.029** (0.012)	0.021* (0.011)	0.018* (0.011)	0.027** (0.011)	0.014 (0.011)	0.022** (0.011)
Observations	2,340	3,482	3,482	3,482	3,482	3,482
R ²	0.009	0.016	0.016	0.017	0.015	0.018

Note:

*p<0.1; **p<0.05; ***p<0.01

DV: Stability Index, higher value indicates more volatile policies

6.2 Fixed Effect with Two Way Effects

$$S_{jt} = a_j + \lambda_t + \beta_2 Cont_{jt} + \beta_3 Party_{jt} + \beta_4 RAI_{jt} + \beta_5 Corrupt_{jt} + \mathbf{Z}\beta + \epsilon_{jt} \quad (3)$$

Table 2: Two Way Fixed Effect Regression Results

	<i>Dependent variable:</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Constraints	−0.012 (0.028)	−0.042* (0.024)	−0.010 (0.023)	−0.003 (0.024)	−0.016 (0.023)	−0.040* (0.023)
Party	−0.004 (0.030)	0.025 (0.024)	−0.008 (0.024)	0.015 (0.024)	0.001 (0.023)	0.011 (0.023)
Consult	0.002 (0.007)	0.011* (0.005)	0.007 (0.005)	0.011** (0.005)	0.007 (0.005)	0.014*** (0.005)
Federalism	0.008 (0.025)	0.016 (0.020)	−0.005 (0.019)	0.049** (0.019)	0.027 (0.019)	0.015 (0.019)
Corruption	−0.054* (0.032)	−0.105*** (0.030)	−0.107*** (0.029)	−0.085*** (0.029)	−0.102*** (0.029)	−0.063** (0.028)
Polity	−0.001 (0.001)	0.001 (0.001)	−0.001 (0.001)	−0.002 (0.001)	−0.0002 (0.001)	−0.001 (0.001)
Censorship	0.011* (0.006)	−0.004 (0.005)	0.011** (0.005)	0.002 (0.005)	0.006 (0.005)	0.005 (0.005)
Education	−0.002 (0.006)	0.011** (0.005)	0.006 (0.005)	0.014*** (0.005)	0.010** (0.005)	0.010** (0.005)
GDP pc	0.025** (0.012)	0.019* (0.011)	0.006 (0.011)	0.018* (0.011)	0.003 (0.011)	0.013 (0.011)
Observations	2,494	3,656	3,656	3,656	3,656	3,656
R ²	0.009	0.015	0.014	0.018	0.016	0.014

Note:

*p<0.1; **p<0.05; ***p<0.01

DV: Stability Index, higher value indicates more volatile policies

6.3 OLS with L-Kurtosis

Table 3: OLS Regression with L-Kurtosis as Dependent Variable

	<i>Dependent variable:</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Constraints	0.0002 (0.011)	0.002 (0.006)	0.001 (0.007)	0.001 (0.006)	-0.002 (0.006)	0.003 (0.005)
Party	-0.004 (0.004)	0.002 (0.002)	-0.0004 (0.002)	0.0004 (0.002)	0.001 (0.002)	0.002 (0.002)
Consult	-0.0003 (0.001)	0.0003 (0.001)	0.00002 (0.001)	0.0005 (0.001)	0.0002 (0.001)	0.0004 (0.001)
Federalism	0.003 (0.003)	-0.00004 (0.002)	-0.001 (0.002)	0.002 (0.002)	-0.0001 (0.002)	0.002 (0.002)
Corruption	0.002 (0.004)	0.004* (0.002)	0.004* (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.004** (0.002)
Polity	0.0001 (0.0003)	-0.00002 (0.0002)	0.0001 (0.0002)	0.00002 (0.0002)	-0.00000 (0.0002)	-0.0001 (0.0002)
Censorship	0.001 (0.001)	0.0004 (0.001)	0.0003 (0.001)	-0.0004 (0.001)	0.001 (0.001)	0.001* (0.001)
Education	0.001* (0.0004)	-0.0004* (0.0002)	0.0002 (0.0003)	-0.0003 (0.0002)	-0.0001 (0.0002)	-0.0002 (0.0002)
GDP pc	0.001 (0.001)	0.001 (0.001)	0.0001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Constant	-0.007 (0.009)	0.004 (0.005)	0.010* (0.005)	0.002 (0.005)	0.004 (0.005)	0.003 (0.004)
Observations	117	117	117	117	117	117
R ²	0.182	0.096	0.074	0.143	0.108	0.182
Adjusted R ²	0.096	0.001	-0.023	0.053	0.014	0.096

Note:

*p<0.1; **p<0.05; ***p<0.01

7 Discussion

Constraint Index does not appear to be statistically significant in all models. Corruption needs more attention.

8 Appendix

8.1 Descriptive Statistics

Here I provide summary statistics of the variables I used in this study

8.1.1 summary statistics of deliberative democracy

Table 4: Deliberative Democracy Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Deliberative Democracy	6,373	0.201	0.225	0.001	0.881
Justification on Public Policy	6,382	-0.067	1.226	-3.125	3.415
Justification on Common Goods	6,382	0.083	1.153	-3.394	2.868
Respect for Counterarguments	6,382	-0.526	1.297	-3.257	2.726
Range of Consultation	6,382	-0.194	1.267	-3.211	3.713
Range of Engagement	6,382	-0.266	1.311	-3.244	3.159

8.1.2 summary statistics on institutional constraints

Table 5: Institutional Constraints

Statistic	N	Mean	St. Dev.	Min	Max
Judicial Constraints	6,382	0.450	0.269	0.006	0.979
Legislative Constraints	6,354	0.385	0.282	0.024	0.959
Institutionalization of Party	6,381	0.492	0.273	0.006	0.986
Institutionalized Democracy	5,904	2.874	3.609	0	10
Institutionalized Autocracy	5,904	4.403	3.517	0	10
Political Constraints Index-5	5,296	0.222	0.290	0.000	0.890
Political Constraints Index-3	6,079	0.147	0.196	0.000	0.688

Table 6: Division of Power (centrl-regional) Index

Statistic	N	Mean	St. Dev.	Min	Max
Division of Power	5,774	0.304	0.330	0.000	0.991
Regional Government Power	5,782	-0.325	1.286	-2.664	2.775
Local Government Power	5,852	0.013	1.249	-2.733	2.326

Table 7: Corruption and Election Irregularities

Statistic	N	Mean	St. Dev.	Min	Max
Corruption Index	6,382	0.552	0.232	0.028	0.946
Executive Corruption Index	6,382	0.564	0.264	0.018	0.979
Vote Buying	1,531	-0.090	1.328	-3.033	3.228
Election Irregularities	1,531	-0.175	1.348	-3.095	3.290

8.1.3 summary statistics on federalism

8.1.4 summary statistics on corruption and election irregularities

8.1.5 summary statistics on other control variables

Table 8: Other Control Variables

Statistic	N	Mean	St. Dev.	Min	Max
Media Censorship	6,382	-0.311	1.434	-3.036	3.316
Education	6,184	4.470	2.691	0.004	13.285
GDP pp(logged)	5,839	7.629	0.886	5.315	10.667
GDP growth	5,807	1.763	6.388	-61.493	86.946
Income Inequality	4,137	42.720	10.359	15.000	73.900
Civial War	6,200	0.090	0.286	0	1
Oil Production Per Capita	6,164	347.425	2,506.486	0.000	78,588.800

8.1.6 dependent variable components

In the following table I report the components of dependent variables. It is measured as the percentage expenditure of total expenditure. Two indicators are dropped out in the further

analysis due to technical concerns. The variable **subpentrans** contains too few points, and the variable **pensions** must be dropped due to the convergence issue in multiple imputation.

Table 9: Components of Budget Stability Measurements

Statistic	N	Mean	St. Dev.	Min	Max
expend_security_EXP	3,034	0.166	0.123	0.000	0.712
expenddefence_EXP	2,418	0.143	0.119	0.00001	0.712
exp_public_order_EXP	1,300	0.059	0.034	0.000	0.248
wagessalaries_EXP	3,981	0.293	0.128	0.00000	0.859
pensions_EXP	1,131	0.058	0.065	0.000	0.392
total_welfare_EXP	2,927	0.238	0.127	0.00003	0.920
education_EXP	2,624	0.133	0.061	0.00002	0.388
health_EXP	2,337	0.058	0.032	0.00001	0.212
social_protection_EXP	1,451	0.055	0.073	0.000	0.599
housing_EXP	1,084	0.035	0.036	0.000	0.420
owelfarespend_EXP	1,334	0.067	0.077	0.00000	0.510

8.1.7 dependent variable statistics

Table 10: Volatility Index Table

Statistic	N	Mean	St. Dev.	Min	Max
Original	5,299	0.103	0.144	0.00000	1.110
Imputation 1	5,299	0.249	0.176	0.00001	1.318
Imputation 2	5,299	0.256	0.172	0.00001	1.085
Imputation 3	5,299	0.245	0.171	0.00001	1.810
Imputation 4	5,299	0.253	0.173	0.00001	1.121
Imputation 5	5,299	0.249	0.169	0.00001	1.064

8.2 Missing Cases

GSRE contains lots of missing cases. To avoid losing statistical powers and potential bias due to list-wise deletion, this article employs multiple imputation of the GSRE part data. Results reported in the paper are from the first imputation. Appendix includes the rest 4 imputations.

Table 11: LK Score Table

Statistic	N	Mean	St. Dev.	Min	Max
Original	158	0.003	0.007	−0.015	0.053
Imputation 1	158	0.013	0.004	0.001	0.026
Imputation 2	158	0.013	0.004	−0.008	0.034
Imputation 3	158	0.013	0.004	0.001	0.030
Imputation 4	158	0.013	0.004	0.001	0.025
Imputation 5	158	0.013	0.004	0.001	0.022

The total missing map is showing in the corresponding figure. In this table, the components represent the percentage expenditure of each sector in terms of total expenditure.

I also calculated results without multiple imputation: points that are missing in the GSRE data set is set to be 0. Theoretically in this situation missing cases will contribute zero effects to the policy stability indicator. I calculate dependent variable while filling missing cases as 0. After the DV is imputed, I re-coded observations with 0 values as missing (This is because a completely missing case will yield 0 as the outcome).

The density plot of stability index without imputation is shown in the following figure

The relationship between the raw DV and the imputed DV is shown in the following graph. Due to the page limits only the relationships between the original dependent variable and the first two imputed dependent variables are displayed here.

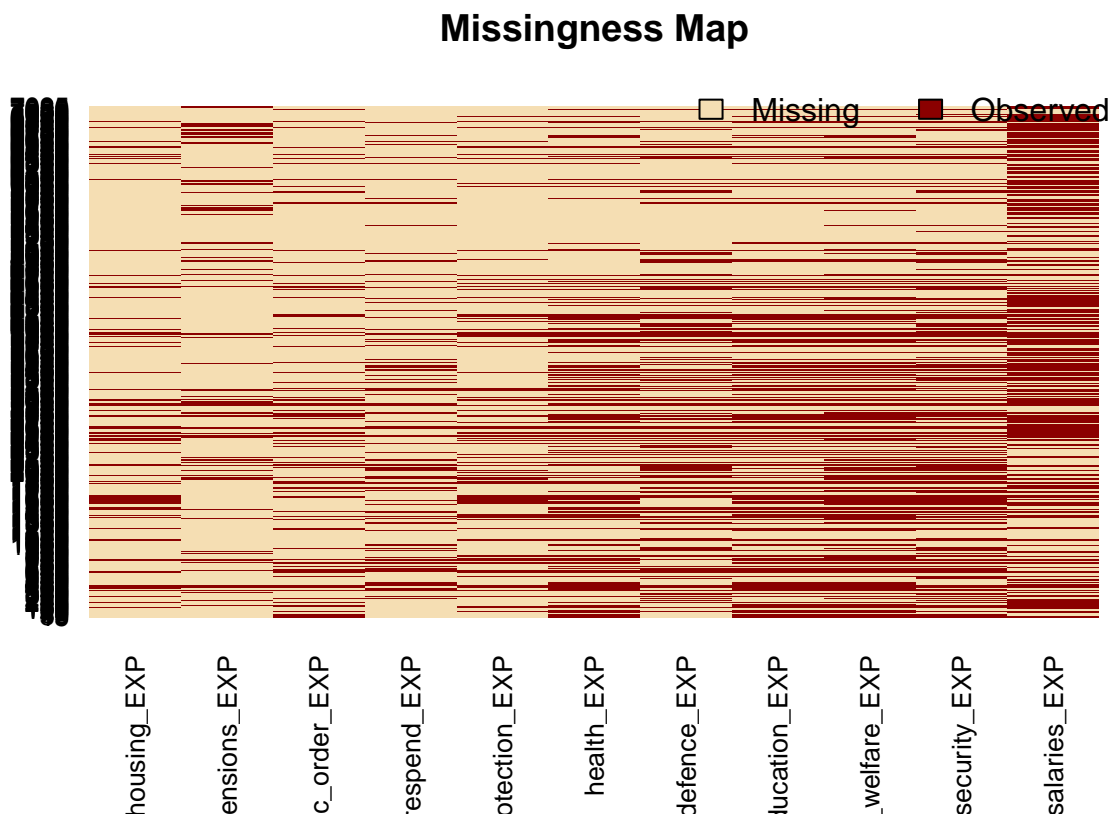


Figure 2: Missing Map

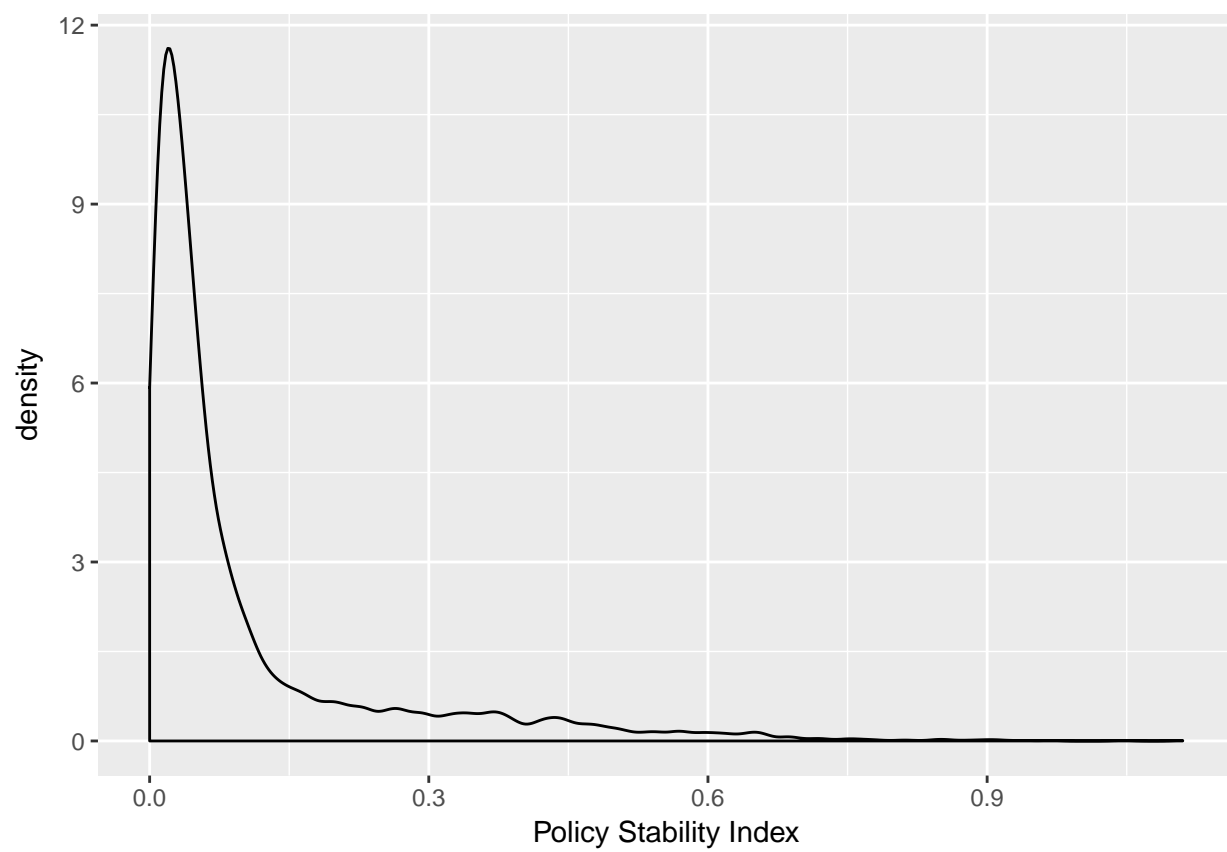


Figure 3: Policy Stability Index Density

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