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Exploring the Relationships Between Democracy and Central Bank Independence: Empirical Evidence from 1989-2014 Panel Data

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Abstract

This paper applies fixed-effect panel regression on observational data from both developed and developing countries to test the established models of the impact of democracy, political rights, civil liberties, and political institutions on central bank independence (CBI). Evidence shows that lower civil liberties and political risk statistically influence CBI in both developed and developing countries. The findings also show that well-exercised democracy and political rights significantly influence CBI in developing countries only. By contrast, most political variables do not significantly influence CBI in highly developed countries. Instead, CBI depends on macroeconomic variables such as higher taxes and international debt. These findings provide new insights that differ from previously established results, which predict that CBI is not sensitive to political variables. Overall, this paper reaffirms the interplay between politics (proxied by democratic practices) and economy (proxied by CBI) in the early stages of development which varies across different levels of development.

Keywords: *Central bank independence; Democracy; Civil liberties; Panel data; Comparative politics*

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Introduction

A country's development and economic goals determine whether it needs to maintain an independent central bank. This independence may bring some advantages, such as lower inflation, increased attractiveness for investment, and higher confidence from international organisations. However, forgoing a central bank's independence also has benefits, such as the possibility of a government using the fiscal deficit to induce economic growth, commonly known as the fiscal multiplier effect (Hagedorn et al., 2019).

Central bank independence (CBI) and its relationship with the political system has been a contentious topic in developed countries, especially in Europe, but has been understudied in the context of developing countries. This article aims to fill the gap by studying the relationships using a recent and complete dataset. Improving on Bagheri and Habibi's (1998) model with a newer dataset, this study aims to infer a general relationship and as an exploratory analysis of the relationship between CBI, democracy, political rights, and civil liberties. The model uses a weighted least squares regression analysis examining the relationship between CBI and various variables, i.e., political liberty and stability, and macroeconomic indicators (Bagheri & Habibi, 1998).

This paper retains some of the variables used in Bagheri and Habibi (1998) while using a more complete and recent dataset to determine how the variables influence CBI across nations. Furthermore, the model analysis aims to corroborate the findings on the interaction between political and economic institutions. By detailing how economic and

political democracy intertwine, the findings can inform policy-making by central banks and promote democracy in developing countries.

Furthermore, much of the literature on CBI focuses on its effect on macroeconomic indicators, such as inflation (Berger et al., 2001; Eijffinger & Schaling, 1993; Waller, 1989), economic growth (Alesina & Summers, 1993), and price stability (Klomp & de Haan, 2009; Posen, 1998). More contemporary works, such as Acemoglu et al. (2008), examine economic policy as a whole and take account of constraints, as well as long-run and short-run changes. However, the study highlights only the macroeconomic indicators. Meanwhile, Epstein (2019) modelled monetary policy with four variables: capital-labour relation, industrial-financial relation, central bank independence, and national position in the global economy. In this context, CBI is a contestation for industrialists, labourers, and financiers who seek a looser or tighter monetary policy to suit their interests. However, Epstein's (2019) model has only been tested in OECD countries due to the unavailability of similar indicators in developing countries.

Existing literature in political science or governmental studies has examined case studies in different countries. For example, a past study has shown the politicisation of the Swiss Central Bank as an arena for domestic and foreign capitalist interests due to foreign capital investment (van't Klooster & Fontan, 2019). A previous study has also compared central bank governance practices using comparative case studies between the European Central Bank (ECB) and the United

States Federal Reserve (Pollard, 2003). Meanwhile, Hayo and Hefeker (2002) suggest that an endogenous 'inflation culture' determines inflation and monetary policies more than economic variables. Finally, Goodhart and Lastra (2018) examine the effect of nascent populism on CBI, showing how populism and populist leaders challenged policies aiming for price stability and the distributive consequences.

However, most studies on CBI focus on theoretical or normative grounds. For example, Issing (2006) suggests that the role of CBI is to promote a stability-oriented culture through price stability, thus reflecting national or societal commitment to monetary stability. Another point of contention is the redistributive consequences of CBI. Dietsch (2020) proposed institutional arrangements other than CBI and placed accountability towards monetary policies. Meanwhile, Fernández-Albertos (2015) argues that international cooperation is required because a monetary policy, especially CBI, has a spillover impact. Finally, Watson (2002) questioned the foundation of CBI, which creates an institutional guarantor for the continued reproduction of the current balance of social forces.

Past studies have also examined the relation between CBI and other political variables. For example, Way (2000) tested the relationships between CBI, inflation, unemployment, partisanship, and ideology among 16 OECD countries. Bernhard (1998) asserted that CBI is related to parliamentary variables, such as bicameralism, voter economic class, and the relationship between ruling party legislators and governing ministers.

This study draws on a model based on Bagheri and Habibi (1998), which analyses the effects of political liberty, political regime instability, political risk, and tax revenue on CBI. This paper's novelty lies in two aspects. First, it uses newer datasets, including more countries and longitudinal data from developing countries. Second, it uses fixed-effect panel regression to account for differences between countries. This study establishes that while higher democracy contributes to CBI in developing countries and in general, this is hardly the case in advanced countries, where political variables do not significantly influence CBI or promote a more independent central bank. This implies that the government's choice of central bank policy in developing countries is rooted in political institutions.

Different Measures of Democracy

The debate on what democracy is and how to measure it is ceaseless. Originally, democracy was defined simply as the government of the people for the people articulated through a supposedly free and fair election. However, this simplistic, dichotomous, or binary definition of democracy does not distinguish the quality of democracy. A semi-dictatorship with an election is equivalent to an established democracy since it does not distinguish anything else. Since then, continuous measures of democracy have gained traction as they enable a more substantial analysis of regimes (Wahman et al., 2013).

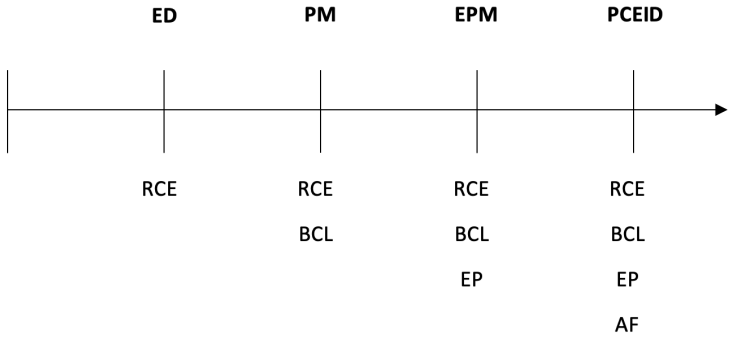
Coppedge et al. (2011) offered one of the most extensive conceptions of democracy, which proposes a multidimensional definition. It groups democracy into six types: electoral, liberal,

majoritarian, participatory, deliberative, and egalitarian. These six conceptions of democracy are distinguished by their primary principle. For example, electoral democracy focuses on competition and contestation, while egalitarian democracy focuses on political equity. In essence, these different conceptions may contradict each other. For example, affirmative action may be suited for egalitarian democracy as it would increase political equity through increased representation of gender or minority. However, from the lens of electoral democracy, affirmative action could be an unnecessary intervention and reduce competition. While these conceptions better capture the complexity of democracy in society, they make it more challenging to analyse with other variables.

Storm (2008) offered an alternative interpretation of the mechanism of democracy, presenting it as a continuum based on Collier and Levitsky (1997): non-democratic electoralist (ED), procedural minimum (PM), expanded procedural minimum (EPM), and prototypical conceptions of established industrial democracy (PCEID). These typologies also have certain elements: reasonably competitive elections, devoid of massive fraud, with broad suffrage (RCE); basic civil liberties, including freedom of speech, assembly, and association (BCL). Elected governments have effective power to govern (EG) and additional political, economic, and social features associated with industrial democracy (AF).

Storm's continuum model adopts Collier and Levitsky's (1997) model of democracy by removing its sequential nature

Figure 1. The Democracy Continuum



Source: Storm (2008)

to create a functional definition of democracy that accounts for regime changes' non-linearity. This model also resolves the question of what a 'maximalist' democracy is. However, this elementary definition is operationally discrete as a variable and unsuitable for numeric analysis.

Considering the shortcomings outlined above, this paper uses an index of democracy used by Teorell and Wahman (2018), which combines Freedom House and the Polity Index. Both indexes are continuous measures that enable the analysis of gradual rather than sudden regime changes, as with typologies such as those presented by Coppedge et al. (2011) and Storm (2008). While a dichotomous model has its methodological merit, this study adopts the continuous measure.

Determining Central Bank Independence and Central Bank Policies

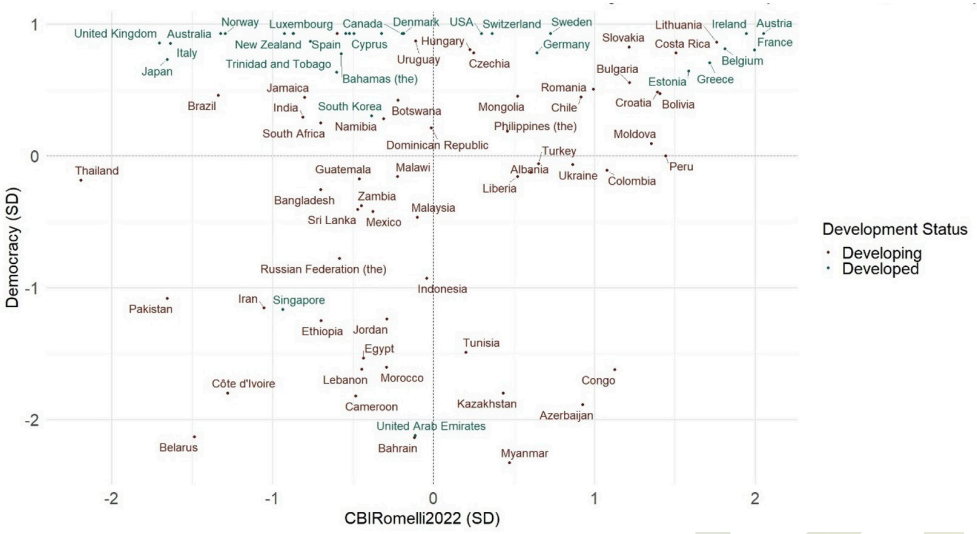
Various studies have attempted to quantify, measure, and index CBI. Grilli et al. (1991) sought to differentiate

between economic and political independence with five indicators: appointments, relationship with government, constitution, monetary financing of budget deficit, and monetary instrument. On the other hand, Cukier et al. (1992) utilise four main indicators: chief executive officer (CEO), policy formulation, objectives, and limitation on lending to the government. More recently, Jácome and Vázquez (2008) have expanded these indices as a longer time series, allowing for comparative cross-sectional and historical data analyses from 1990 to 2002. However, the problem of bias in the dataset remains as it is limited to developed and OECD countries, incorporating only 24 countries. Garriga (2016) incorporated a more complete dataset, including 185 countries from 1970 to 2012. Nevertheless, the most comprehensive dataset by time range is the Central Bank Index Extended by Romelli (2022), which contains data on CBI from 1972 to 2017.

Both the Garriga and Romelli Index assess the central bank's position within the national constitution, legislation, and other legal documents regarding the central bank. The Garriga Index employs 16 indicators in four categories: CEO's characteristics, policy formulation attributions, central bank's objectives, and central bank's limitations on lending to the public sector (Garriga, 2016). Meanwhile, the Romelli Index employs 42 indicators in six categories: governor and central bank board, monetary policy and conflict resolution, objectives, limitations on lending to the government, financial independence, and reporting and disclosure.

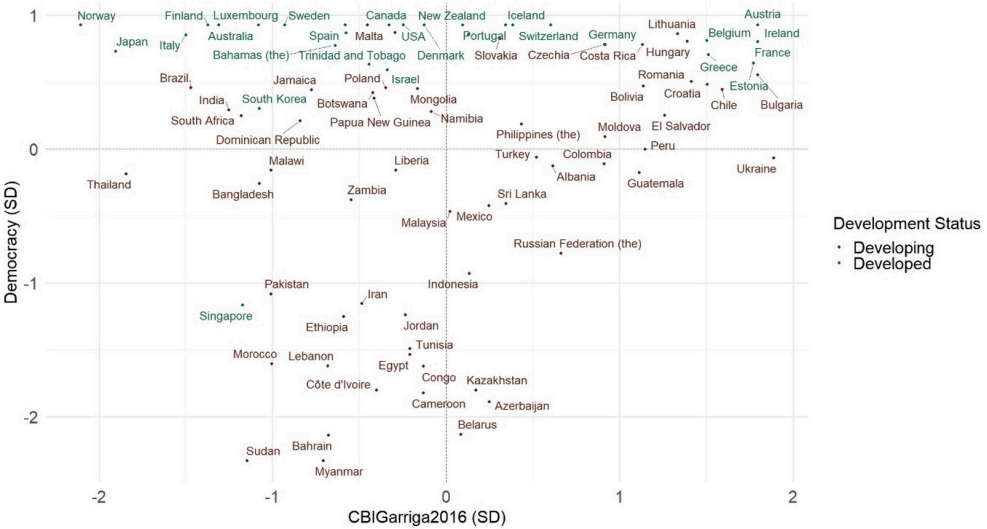
The analysis of descriptive statistics shows that these indexes are almost similar. However, the Garriga Index is more lenient in classifying developing countries with higher CBI. To demonstrate the interaction of CBI and democracy, a scatter plot of each index of CBI and democracy is created. Values for democracy scores and CBI are standardised to obtain the distance for each state to the average. The following cases outline policies and historical aspects influencing central banks and CBI at different levels of democracy and CBI. A nation's development status is also obtained from World Bank income classifications.

Figure 2. The distribution between Democracy and CBI



Source: Romelli (2022); Teorell and Wahman (2018)

Figure 3. The distribution between Democracy and CBI



Source: Garriga (2016); Teorell & Wahman (2018)

Particular countries have attractive central bank policies that demonstrate how the CBI functions. For example, with the adoption of the Euro in 1999, the Austrian National Bank (OeNB) is no longer the sole national monetary authority. Like most countries adopting the Euro, OeNB, as the national central bank, must cooperate with the European Central Bank (ECB) to stabilise the currency and achieve other monetary objectives provided that they do not interfere with domestic prices as stipulated in BGBl (Federal Law Gazette) No. 50/1984 as Amended by BGBl (Federal Law Gazette) Part I No. 37/2018). The Governor of the OeNB is also not bound to the OeNB's institution.

Instead, they are bound to the ECB and have a seat and vote on the Governing Council and the General Council of the ECB.

The Reserve Bank of Australia (RBA) starkly contrasts many central banks because it does not fully operate under a professional board of economists. Instead, the board incorporate industrial stakeholders, such as those representing farmers, trade unions, and manufacturing industries (Eichbaum, 1993). As a result, the appointment of board members is often political. Compared to a classical central bank, which focuses on controlling the twin goals of inflation and unemployment, the RBA also aims to control other macroeconomic indicators such as current accounts, interest rates, and other unspecified risks (Bell, 2004).

Likewise, since establishing a currency board in 1997, the Bulgarian Lev is not managed directly by the Bulgarian National Bank (BNB). Instead, the currency is pegged to another foreign currency: the Deutsche Mark and the Euro subsequently. The BNB cannot print money independently but can still set reserve requirements for domestic banks and manage foreign currency reserves with recommendations from the International Monetary Fund (IMF) (Avramov, 1999; Gulde, 1999). The Bulgarian National Bank may also extend credit to the government to purchase special drawing rights from the IMF, working as an intermediary.

In Asia, as the de facto central bank, the Monetary Authority of Singapore (MAS) can issue currency since its merger with the Board of Commissioners of Currency in 2002 (Woo, 2023; Wood, 1992). After its independence, Goh Keng Swee, the Ministry of Finance of Singapore, made this

decision, noting that countries could not "spend their way to prosperity" (Singapore Board of Commissioners of Currency, 1992). Singapore presents a surprising conundrum: while the MAS has relatively low independence to the political process and low democracy, due to the political consensus, the government has never pressured the MAS to implement any policy against the central bank's decisions or objectives (Redawan, 2023).

While these are not exhaustive examples of how CBI operate, they illustrate how central banks may have varying degrees of independence and distinct functions in different political and economic contexts. Therefore, this study aims to test the established models of the impact of democracy, political rights, civil liberties, and political institutions on CBI.

Methodology

The dataset of cases in this study is accessed from the January 2022 dataset compiled by the Quality of Government Institute. The compiled dataset offers structured panel data, removing the need to merge and clean various data. Furthermore, the dataset is open and available, allowing reproducibility (Teorell et al., 2022). The data is cleaned from observation with no complete value of all covariates, as it is impossible to perform regression on incomplete data. This study includes 1013 observations of 88 states, 60 classified as developing states and 36 as highly developed states for the Garriga Index of CBI. This study also uses another 966 observations of 84 countries, containing 56 countries classified as developing and 37 as advanced, for the Romelli Index of CBI. It must be noted that in one year, a country may be

classified as advanced while it is developing, and vice versa, as the World Bank gradually adjusts its classification.

This study utilises large-N cases from recent data on CBI made available by Romelli (2022) and Garriga (2016). A large-N case is critical to this study as it has advantages over small-N cases. Large-N cases are less prone to selection biases, allowing researchers to incorporate multiple variables into account, and are more suitable for numerical analyses. However, over-generalisation must be avoided, and other avenues to check for validity and robustness in large-N cases must be sought. Considering the number of variables in this data and the goal of this study as an exploratory study, large-N cases are more suitable than small-N cases.

The method in this paper utilises fixed-effect panel regression. Fixed-effect models account for individual subjects as a significant variable variation source. Thus, we assume a different unobserved error component for each country in the constant ai. Generally, fixed-effect models are more suitable when substantial time-invariant heterogeneity exists among entities. However, fixed-effect models do not account for time-variant unobserved factors (Bell & Jones, 2015; Brüderl & Ludwig, 2014). As the sample examined in this paper includes various countries with varying differences in their political and economic systems, the fixed-effect model is more appropriate.

The key advantage of using fixed-effect models is controlling all time-invariant unobserved heterogeneity. Fixed-effect models are more interested in observing variables with

within-entity variations rather than time-invariant variables. As such, fixed-effect models account for characteristics of individual units that do not change over time, such as culture, history, and other relatively static or difficult-to-measure constructs. As it reduces the heterogeneity bias, the model will be more accurate (Bell & Jones, 2015; Collischon & Eberl, 2020).

However, the disadvantage of fixed-effect models also lies here. Excluding the analysis of time-invariant variables means the inability to capture the effect of cultures and geographic location of each country on CBI. Furthermore, due to the nature of fixed-effect models, each coefficient should be treated as a partial correlation rather than a true causality. Assessing an actual causal effect requires an exogenous shock. It is possible to capture reverse causality when analysing the result of a fixed-effect model (Bell & Jones, 2015; Collischon & Eberl, 2020).

This study considers and makes assumptions when using fixed-effect models. The focus is on each nation's CBI and several fluctuating political variables rather than time-invariant ones. While we do not dismiss the intricacies of culture and international geopolitics, the nature of the fixed-effect model allows us to control them. Additionally, due to the sample size, errors caused by individual crises or events within a country and similar time-variant heterogeneity will be assumed to spread out close to zero.

Modelling the Relationships between CBI, Democracy, Political Rights and Civil Liberties

Although studies have attributed the success of CBI or central bank reform to democracy and democratic institutions (Acemoglu et al., 2008; Way, 2000), few have specifically examined political rights and civil liberty. Among the few is a study by Strong (2021), which asserted civil liberty as a reliable predictor for inflation or lower effect of CBI. Another study by Agoba et al. (2017) uses political rights as a proxy for the institution's quality. Nonetheless, these studies are regionally exclusive to Africa.

To model how CBI interacts with democracy, political freedom, and civil liberties, we create a fixed-effect panel regression model based on replicating variables utilised by Bagheri and Habibi (1998). While we mainly focus on political rights and civil liberties, we also include other variables as control, as with previous models. The model is estimated as follows:

$$\mathrm{CBI}_{it} = a_i + \beta_1 \mathrm{DEM}_{it} + \beta_2 \mathrm{PR}_{it} + \beta_3 \mathrm{CL}_{it} + \beta_4 \mathrm{ECOMP}_{it} + \beta_5 \mathrm{RISK}_{it} + \beta_6 \mathrm{TAXREV}_{it} + \beta_7 \mathrm{DEBT}_{it} + u_{it} \quad (1)$$

Table 1. Variables used in the study

	Variable	Description	Source
Criterion			
	CBI	Central bank independence	Garriga (2016) Romelli (2022)
Predictor			
	DEM	Democracy	Teorell and Wahman (2018)
	PR	Index of political rights	Freedom House (2022)
	CL	Index of civil liberties	
	ECOMP	Index of electoral competition	Vanhanen (2019)
	RISK	Index of political risk	The PRS Group (2022)
Control			
	TAXREV	Percentage of national income as tax revenue	World Bank (2022)
	DEBT	Gross domestic product (GDP) to debt ratio	World Bank (2022)

The Hausman test on various samples is used to select between fixed-effect and random-effect models, as shown in the appendix (Hausman, 1978). Most results indicate that a fixed-effect model is most appropriate for testing. The only exception is the Garriga dataset covering advanced country samples, which indicates that a random-effect model is preferable for testing.

Central Bank Independence

Central Bank Independence (CBI) generally refers to the central bank's independence concerning other political

offices. An independent central bank with a high CBI may set its inflation target and pursue that target using legal instruments with minimal interference from the political system. In contrast, a central bank with a lower CBI is subject to interference from political offices.

While Bagheri and Habibi (1998) used the averaged value of variables of each country of CBI, this study uses longitudinal values for each country and two indexes, the Garriga Index and the Romelli Index, for robustness and triangulation. Both indexes of CBI check for de jure CBI mandated in law and official documents. We changed the indexes from a 0 to 1 numeric scale to a 0 to 100 for legibility. A higher number on the scale corresponds to a more independent central bank.

Democracy

This study utilises Freedom House's rescaled to 0-10 Nations in Transit Index (Teorell & Wahman, 2018). The Nations in Transit Index is one of the most prominent indices of democracy, referred to for both academic and policy comparative analysis alongside The Economist Intelligence Unit Index and Polity Project's Polity V. This index rates a country's democracy from 0, the lowest score, to 10, the highest score of democracy.

These indicators have been scrutinised more recently as they hold stark ideological assumptions about democracy. They are heavily biased towards negative rights, such as freedom from government and institutional intervention, while ignoring socio-economic rights. This bias reflects a neoliberal, market-led understanding of democracy (Giannone, 2010). Another critique is that all

quantitative measures of democracy are inconsistent, especially in transitory or semi-democratic regimes (Högström, 2013).

Nevertheless, this study adopts this index as it provides a cross-sectional base for comparing different nation-states. These indices remain powerful tools for inferring a general pattern in democratic institutions, provided we also consider these biases. The Freedom House index's measurement is imperfect, but it will nonetheless give us a measurement of democracy, provided that it considers the bias in using the Freedom House Index.

Political Rights and Civil Liberties

This study also utilises the "Freedom in The World" dataset, constituting two main categories: political rights and civil liberties. Bagheri and Habibi's (1998) results support the idea that political rights are positively related to CBI. The Freedom House Methodology employs several indicators to measure the categories. Political rights are measured by three indicators: electoral process, political pluralism and participation, and the functioning of government. Meanwhile, civil liberties are measured in four indicators: associational and organisational rights, the rule of law, and personal autonomy and individual rights (Freedom House, 2022). Each variable is scored from 1 to 7, with 1 being the highest respect for political rights and civil liberty while 7 being the least respect for either.

Bagheri and Habibi used Gastil's (1990) index of freedom, a precursor to the Freedom in the World dataset. Freedom House adopted Gastil's methodology to create the Freedom in the World

index used in this article. In other words, the Freedom in the World index may be considered a successor or continuation of Gastil's dataset.

Electoral Competition

Initially, Bagheri and Habibi (1998) used the number of coups and assassinations for political instability to discern between party and regime instability. While party instability refers to a regular change that is not uncommon in a democracy, such as the number of electoral support and party changes, regime instability refers to much more radical and destabilising changes, such as coups and assassinations. Therefore, this article instead chooses electoral competition as a better proxy for party instability, especially in stable and developed countries.

This article uses electoral competition from Vanhanen (2019), originally published in Vanhanen (2000). Here, electoral competition is measured as the percentage of vote share obtained by non-coalition parties in presidential states or opposition in parliamentary states. Baghieri and Habibi's (1998) previous results support the hypothesis presented by Cukierman et al. (1992) that party political instability positively correlates with CBI.

Political Risk

Like the previous study, this article uses the International Country Risk Guide (ICRG) as another proxy for political instability. The ICRG measures political instability using indicators such as the frequency of coups and revolutions, the potential for civil war, the frequency of political assassination, and the military's political power. Higher scores denote a stable democracy with low risk, while lower scores

denote political instability in the regime (The PRS Group, 2022). However, unlike the previous study, this article uses a panel dataset instead of averaging the ICRG to represent a country.

According to Cukierman and Webb (1995), developing and unstable countries with high political risk have low CBI. This is because countries with authoritarian regimes tend to focus less on monetary austerity and controlling inflation, while unstable regimes focus more on development and survivability.

Tax Percentage of National Revenue and Debt to GDP Ratio

Both variables are treated as control variables, as in Bagheri and Habibi (1998), presuming these variables are accounted for as proxies for the tax system's efficiency. Like in the previous study, both variables were acquired from World Bank data.

Additionally, the tax percentage of national revenue is thought to be positively correlated with CBI. Thus, countries with lower tax composition in their budget tend to compensate with inflation tax and print more money, causing lower CBI. However, ultimately, their study found no significant influence of the tax percentage of national revenue on CBI. Recent evidence has also suggested that national tax revenue indicates lower political stability (Prichard et al., 2018).

Table 2. Comparison of variables and method used in this study with Bagheri & Habibi (1998)

	Data Source Used	
	Bagheri and Habibi (1998)	**This Article**
CBI	Cukierman et al. (1992)	Romelli (2022) Garriga (2016)
Democracy	Barro (1991)	Teorell and Wahman (2018)
Political Rights	Gastil (1990)	Freedom House (2022)
Civil Liberties	-	Freedom House (2022)
Electoral Competition	-	Vanhanen (2019)
Political Risk	The PRS Group (various years)	The PRS Group (2022)
Tax Revenue %	World Bank (various years)	World Bank (2022)
GDP Debt Ratio	World Bank (various years)	World Bank (2022)
	Methods Used	
Data Type	Cross-sectional averages	Longitudinal data
Number of Countries	20 Industrial 52 Developing	37 High Income 62 Developing
Method used	Weighted least square (WLS) regression	Fixed (FE) panel regression

Main Findings

Table 3. Descriptive statistics table of variables used in this article

Variables	Total	Developing	Highly-Developed
CBI (Romelli, 2022)	58.76	57.05***	61.35
	(19.55)	(17.56)	(22)
CBI (Garriga, 2016)	54.9	54.56	55.5
	(21.63)	(20.27)	(23.79)
Democracy	7.761	6.893***	9.162
	(2.571)	(2.48)	(2.046)
Political Rights	2.513	3.159***	1.469
	(1.788)	(1.752)	(1.281)
Civil Liberties	2.722	3.435***	1.572
	(1.539)	(1.284)	(1.178)
Electoral Competition	49.28	44.58***	56.87
	(18.14)	(18.9)	(13.82)
Political Risk	0.644	0.529***	0.829
	(0.206)	(0.147)	(0.142)
Tax Revenue %	17.52	16.24***	19.58
	(6.191)	(5.261)	(6.982)
Debt to GDP Ratio	53.62	50.45***	58.74
	(35.84)	(35.58)	(35.72)

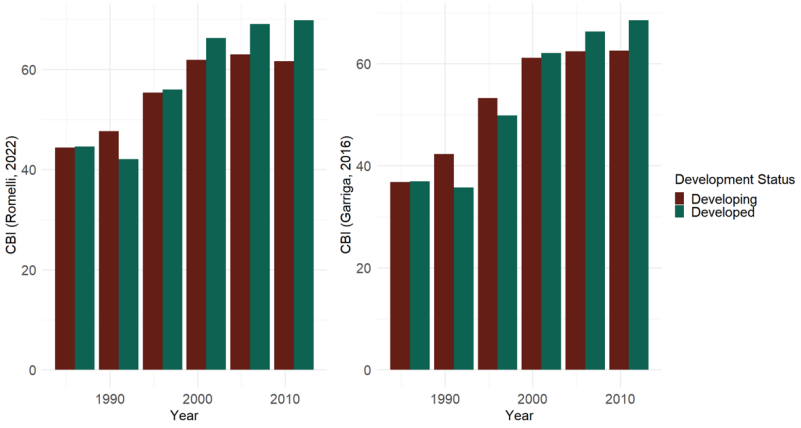
Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the descriptive statistics for key variables used in this analysis. Furthermore, disaggregated data from highly developed and developing countries are also presented with the relevant test of differences in means. This article categorises highly developed and developing countries using World Bank

income classifications. In this paper, countries classified as "high-income" are categorised into highly developed countries, while the remainder are categorised into developing countries.

The Romelli and Garriga indexes differ when disaggregating between highly developed and developing countries. A test on the difference of means on the Romelli index indicates a positive bias towards CBI in highly developed countries (scoring on average 55.5 compared to the developing countries 54.56). At the same time, no such thing exists in the Garriga index of CBI. While this implies an inconsistency between the two indexes when measuring CBI, further analyses will assess CBI through both indexes for robustness.

Figure 4. Annual CBI Trend between Highly Developed and Developing Countries



Source: Romelli (2022); Garriga (2016)

A test on the difference of means on every other variable also denotes a significant difference between Developing and highly developed countries. Namely, developing countries are less democratic (scoring an average of 6.893 in comparison to the highly developed countries 9.162), have less respect for political rights (scoring an average of 3.159 in comparison to the highly developed countries 1.469), have less respect for civil liberties (scoring on average 3.435 in comparison to the highly developed countries 1.572), less electorally competitive (having a voting minority of 44.58 per cent in comparison to the highly developed countries 56.87), have higher political risk (scoring on average 6.893 in comparison to the highly developed countries 9.162), rely less on tax budget (composing 16.24 per cent of government budget in comparison to the highly developed countries 19.58 per cent), and have lower debt (composing 50.45 per cent of GDP in comparison to the highly developed countries 58.74 per cent).

Table 4. Regression of CBI (Romelli, 2022) for all samples

	Dependent Variable Central Bank Independence (Romelli, 2022)					
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Democracy		3.810***	8.042***	6.294***	6.218***	6.465***
		(0.352)	(0.716)	(0.858)	(0.943)	(0.923)
Political Rights			5.550***	4.870***	4.835***	4.533***
			(0.824)	(0.839)	(0.859)	(0.841)
Civil Liberties				-2.996***	-3.028***	-2.500***
				(0.823)	(0.839)	(0.825)
Electoral Competition					0.007	0.009
					(0.037)	(0.036)
Political Risk						-0.260***
						(3.947)
Tax Revenue %	0.415***	0.466***	0.456***	0.450***	0.448***	0.441***
	(0.152)	(0.144)	(0.140)	(0.139)	(0.140)	(0.137)
GDP Debt Ratio	0.044***	0.048***	0.056***	0.049***	0.049***	0.039***
	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Constant	49.162***	18.499***	-28.562***	-4.761	-4.325	10.632
	(2.757)	(3.841)	(7.929)	(10.239)	(10.481)	(10.496)
Observations	1,013	1,013	1,013	1,013	1,013	1,013
R-squared	0.019	0.129	0.170	0.182	0.182	0.219
Number of Countries	84	84	84	84	84	84

Table 5. Regression of CBI (Garriga, 2016) for all samples

	Dependent Variable Central Bank Independence (Garriga, 2016)					
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Democracy		4.515***	10.570***	7.368***	7.099***	7.178***
		(0.485)	(0.973)	(1.175)	(1.287)	(1.286)
Political Rights			7.944***	6.599***	6.487***	6.320***
			(1.117)	(1.140)	(1.161)	(1.162)
Civil Liberties				-5.192***	-5.314***	-5.043***
				(1.094)	(1.120)	(1.126)
Electoral Competition					0.026	0.028
					(0.051)	(0.051)
Political Risk						-0.105**
						(5.225)
Tax Revenue %	-0.267	-0.186	-0.187	-0.178	-0.183	-0.195
	(0.204)	(0.195)	(0.190)	(0.188)	(0.188)	(0.188)
GDP Debt Ratio	0.062***	0.065***	0.079***	0.068***	0.069***	0.065***
	(0.020)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)
Constant	56.279***	19.770***	-47.777***	-5.007	-3.517	2.679
	(3.717)	(5.287)	(10.803)	(13.970)	(14.276)	(14.578)
Observations	966	966	966	966	966	966
R-squared	0.013	0.102	0.151	0.172	0.172	0.176
Number of Countries	88	88	88	88	88	88

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 6. Regression of CBI (Romelli, 2022) for developing samples

	Dependent Variable (Developing Countries Only) Central Bank Independence (Romelli, 2022)					
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Democracy		3.590***	7.828***	6.358***	6.487***	6.602***
		(0.354)	(0.756)	(0.866)	(0.965)	(0.954)
Political Rights			5.446***	5.063***	5.125***	4.864***
			(0.866)	(0.865)	(0.890)	(0.882)
Civil Liberties				-3.075***	-3.024***	-2.654***
				(0.910)	(0.926)	(0.921)
Electoral Competition					-0.012	-0.010
					(0.039)	(0.038)
Political Risk						-0.161***
						(4.350)
Tax Revenue %	0.013	0.026	-0.007	-0.058	-0.055	-0.035
	(0.190)	(0.174)	(0.168)	(0.167)	(0.168)	(0.166)
GDP Debt Ratio	-0.007	0.006	0.025	0.020	0.019	0.011
	(0.018)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Constant	57.536***	32.705***	-14.004*	8.934	8.176	15.387
	(3.121)	(3.769)	(8.271)	(10.641)	(10.938)	(10.987)
Observations	606	606	606	606	606	606
R-squared	0.000	0.159	0.215	0.232	0.232	0.251
Number of Countries	56	56	56	56	56	56

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 7. Regression of CBI (Romelli, 2022) for highly-developed samples

	Dependent Variable (Highly-Developed Countries Only) Central Bank Independence (Romelli, 2022)					
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Democracy		4.657**	4.992**	-4.050	-3.833	-0.357
		(1.879)	(2.367)	(3.958)	(3.960)	(3.791)
Political Rights			0.615	-3.924	-3.634	-2.473
			(2.632)	(3.059)	(3.067)	(2.912)
Civil Liberties				-6.424***	-6.231***	-4.771**
				(2.266)	(2.270)	(2.163)
Electoral Competition					0.121	0.089
					(0.100)	(0.095)
Political Risk						-0.579***
						(8.912)
Tax Revenue %	1.401***	1.480***	1.480***	1.554***	1.516***	1.331***
	(0.235)	(0.236)	(0.236)	(0.235)	(0.237)	(0.227)
GDP Debt Ratio	0.120***	0.113***	0.112***	0.109***	0.104***	0.089***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.020)
Constant	26.058***	-18.699	-22.613	76.403*	67.709	86.707**
	(4.822)	(18.682)	(25.116)	(42.880)	(43.459)	(41.292)
Observations	407	407	407	407	407	407
R-squared	0.158	0.172	0.172	0.190	0.193	0.277
Number of Countries	37	37	37	37	37	37

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 8. Regression of CBI (Garriga, 2016) for developing samples

	Dependent Variable (Developing Countries Only) Central Bank Independence (Garriga, 2016)					
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Democracy		4.352***	9.528***	7.173***	7.040***	7.055***
		(0.476)	(0.998)	(1.159)	(1.290)	(1.290)
Political Rights			6.671***	5.930***	5.871***	5.770***
			(1.140)	(1.142)	(1.170)	(1.177)
Civil Liberties				-4.547***	-4.605***	-4.484***
				(1.178)	(1.205)	(1.214)
Electoral Competition					0.012	0.014
					(0.053)	(0.053)
Political Risk						-0.045
						(5.546)
Tax Revenue %	-0.071	-0.019	-0.059	-0.106	-0.109	-0.107
	(0.245)	(0.229)	(0.222)	(0.220)	(0.220)	(0.220)
GDP Debt Ratio	-0.041*	-0.031	-0.010	-0.017	-0.016	-0.019
	(0.024)	(0.022)	(0.022)	(0.021)	(0.022)	(0.022)
Constant	57.843***	27.056***	-29.891***	5.365	6.142	8.342
	(4.082)	(5.079)	(10.908)	(14.123)	(14.514)	(14.765)
Observations	604	604	604	604	604	604
R-squared	0.006	0.139	0.190	0.212	0.212	0.213
Number of Countries	60	60	60	60	60	60

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 9. Regression of CBI (Garriga, 2016) for highly-developed samples

	Dependent Variable (Highly-Developed Countries Only) Central Bank Independence (Garriga, 2016)					
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Democracy		3.205	8.586**	-8.394	-8.591	-4.548
		(2.688)	(3.331)	(5.840)	(5.857)	(5.863)
Political Rights			10.730***	1.366	0.992	2.818
			(3.993)	(4.745)	(4.797)	(4.739)
Civil Liberties				-11.697***	-11.851***	-9.800***
				(3.331)	(3.346)	(3.336)
Electoral Competition					-0.084	-0.120
					(0.150)	(0.147)
Political Risk						-0.479***
						(13.460)
Tax Revenue %	-0.223	-0.175	-0.122	0.015	0.038	-0.166
	(0.336)	(0.338)	(0.335)	(0.332)	(0.334)	(0.333)
GDP Debt Ratio	0.267***	0.263***	0.254***	0.249***	0.252***	0.240***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.031)
Constant	43.990***	13.354	-51.823	134.689**	141.562**	146.004**
	(6.976)	(26.619)	(35.828)	(63.730)	(64.968)	(63.822)
Observations	362	362	362	362	362	362
R-squared	0.180	0.184	0.202	0.231	0.232	0.261
Number of Countries	36	36	36	36	36	36

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The Effect of Democracy on CBI

All models suggest a consistent positive link between democracy and CBI, regardless of which index is used. In hindsight, this may refute theoretical views that CBI is unnecessary for or inconsistent with democracy (Fernández-Albertos, 2015; Hayo & Hefeker, 2002; van't Klooster, 2019). The link between the Imputed Polity Index and CBI proven here is specific to a liberal, electoral democracy with independent media and civil society as indexed by Freedom House. The regression results predict a 6.465-point increase in the Romelli Index of CBI and a 7.178-point increase in the Garriga Index of CBI for each point of democracy.

This is consistent with Arena and Salvadori's (2003) argument that CBI as monetary policy is a product of the political process. In a democratic country with strong democratic institutions, CBI can be considered a political consensus on how unemployment and inflation, two agonistic forces, should be managed. Likewise, Bodea and Hicks (2015) argue that CBI in authoritarian countries will be less effective because central banks are not able to provide accountable oversight in authoritarian nations.

Effect of Political Rights and Civil Liberties on CBI

While political rights have a strong positive effect on CBI, civil liberty has a similarly strong but negative effect. The regression results predict a 4.533-point increase in the Romelli Index of CBI and a 6.320-point increase in the Garriga Index of CBI for each point of political rights. The regression results also predict a 2.500-point decrease

in the Romelli Index of CBI and a 5.043-point decrease in the Garriga Index of CBI for each point of civil liberties.

Political rights consist of the rule of law and the guaranteed right of political opposition to exist. Increased political participation and plurality are also factors in political rights. Governments and societies with higher political participation tend to have better oversight and accountability (Blair, 2000). Agoba et al. (2020) also posits that higher political rights enable investors to comment on policies that may threaten their investments. Thus, it may be proposed that the increase in CBI political rights is due to many factors.

Examining the methodology of civil liberty, we find that one factor in deciding civil liberty involves access to the market and freedom from monopoly. This may be a possible reason civil liberty negatively correlates with CBI. However, the indicator also uses the freedom to organise and participate in a union, as many studies have also pointed out the interaction of centralised wage bargaining through a union with CBI (Franzese, 2001).

Another possible reason is that CBI undermines democratic accountability. When central banks are highly independent, their decisions may not be directly accountable to elected officials, which can lead to a perceived lack of responsiveness to the preferences and needs of the public (Elgie, 1998; Jones & Matthijs, 2019; Palley, 2019). While the result of this study finds a significant negative effect between CBI and civil liberty, the category is composed of too many factors to discern a concrete component. Thus, it may be concluded that civil liberty's relationship with CBI is nuanced and complex.

The Effect of Electoral Competition and Political Risk on CBI

As predicted by previous papers, political risk remains a significant negatively correlated variable with CBI. Meanwhile, the electoral competition does not significantly affect CBI with the Garriga and Romelli indexes. This corresponds to Bagheri and Habibi's (1998) thesis that while external political instability is unconducive to CBI, internal political regimes, referring to business-as-usual changes in political parties, largely do not impact CBI or monetary policy.

Other studies also argue that electoral and political systems structure state behaviour on monetary policy, including CBI and effectivity. Presidential governments are more likely to preserve CBI than parliamentary governments. In parliamentary governments, single-party governments are argued to be less likely to preserve CBI than coalition governments amongst parliamentary countries. Likewise, the efficiency of the CBI and the state's commitment to the inflation target corresponds similarly to the form of government (Bernhard, 1998; Broz, 2002).

This study found a -2.602-point decrease in the Romelli Index of CBI and a -0.105-point decrease in the Garriga Index of CBI for each point of political risk. As expected, regimes with unstable or non-functioning governments tend to have lower CBI because of their lower capacity to enforce regulations. However, neither regression on the Romelli nor Garriga index suggests any effect between electoral competition and CBI. This study found that stable governments and the rule of law are paramount for a state to enforce high CBI. Conversely, while no direct effect between

party composition can be inferred from the regression, it may influence CBI by interacting with other variables.

Macroeconomic Variables and Central Bank Independence

This paper also examines several macroeconomic influences on CBI, namely the percentage of tax revenue in the budget and the debt-to-GDP ratio, as control variables. Previously, Baghieri and Habibi established that while the debt-to-GDP ratio has an apparent effect on CBI, the effect of the percentage of tax revenue in the budget is subtler and is mediated by democracy, especially in developing countries. This paper presents similar evidence about the effect of both variables on CBI.

A possible reason countries with higher international debt may have more CBI is pressure from international institutions. Binder (2021) argued that countries with debt from international institutions such as the IMF are subjected to political pressure through IMF recommendations. If governments are partially funded by debt, global capital institutions will likely interfere with monetary policy.

The regression results predict a 0.039-point increase on the Romelli Index of CBI with each point of increase in the percentage of tax revenue in the budget. However, the effect on the Garriga index does not present a significant result for the percentage of tax revenue in the budget. On the other hand, the regression result also predicts a 0.441-point increase in the Romelli Index of CBI and a 0.065-point increase in the Garriga Index of CBI for each point of debt-to-GDP ratio.

Highly Developed Countries

and Political Institutions

Different patterns emerged from this group after the sample was discriminated between highly developed and developing countries. The significant predictors of CBI converge to two distinct patterns. In developing countries, macroeconomic variables, budget composition and the debt-to-GDP ratio are unreliable predictors for CBI. Instead, three political rights variables, i.e., democracy, political rights, and civil liberties, are more consistent predictors for both the Romelli and Garriga indexes of CBI. However, political risk remains a significant predictor for CBI in regression using the Garriga index.

In contrast, developed countries have less consistent predictors for CBI. Civil liberties remain among the few political variables influencing CBI for the Romelli and Garriga indexes. Additionally, in the Romelli Index of CBI, political risk is also a significant predictor of CBI. However, macroeconomic variables, such as the composition of the budget and the debt-to-GDP ratio, also play a significant role in determining CBI, especially in the Garriga index. Moreover, regardless of income classification or index used, civil liberties and political risks are significant predictors of CBI.

A possible interpretation of this observation is that political institutions correlate with CBI, as political institutions are prerequisites to formulating and enforcing complex policies such as CBI. Although governments are not forced or required to adopt certain monetary policies, political conditions such as higher levels of democracy and political rights may encourage

them to do so. This observation may suggest that reforming political institutions can also affect economic institutions.

This effect is, however, more substantial in developing countries with lower incomes. In developing countries with lower democratic accountability, respect for political rights, and higher political risk, political institutions are correlated significantly with the development of these institutions. By contrast, in developed countries, the effect of most political variables explored here is irrelevant to CBI apart from civil liberties and political risk. Macroeconomic variables such as budget composition and national debt are more reliable predictors of CBI. When democracy and political institutions have developed to a certain threshold, the effect may slowly rescind. Thus, macroeconomic indicators become the most significant predictor of CBI.

Subsequently, this study has significant implications regarding central banking policy and strengthening democracy in the developing world. As countries strive to enhance democratic institutions, they may also benefit from reinforcing CBI. This independence is paramount to maintaining monetary stability, attracting investment, and achieving sustainable economic growth. Policymakers and stakeholders may benefit from simultaneously promoting CBI and fostering democratic governance.

Furthermore, this study has also revealed that political variables have a less significant influence on CBI in highly developed nations. This divergence highlights the necessity for an institutional

arrangement and central bank policies tailored to a nation's socioeconomic conditions and societal values. In emerging democracies where institutions are yet to establish themselves, fostering democracy could directly contribute to more independent and effective central banks.

These observations offer a strategic map for central banks and governments in developing nations, emphasising complementary political and economic reforms. By simultaneously promoting democratic values and CBI, countries may create a more stable and resilient economic foundation, which is essential for long-term development and prosperity.

Conclusion

The results of this study have several theoretical implications. First, CBI in developing nations is more likely influenced by political factors such as democracy, political rights, and civil liberties rather than purely economic factors. Conversely, political factors do not significantly affect CBI in highly developed nations. Overall, this study improves on and elaborates on previous studies that discuss the influence of the political environment on CBI.

This research also has practical implications regarding CBI. International institutions interested in democratising developing nations may look to improve political democracy by implementing economic democracy as well. Central bankers may also consider how their monetary policies can support broader economic and political democratisation efforts, ensuring that their policies promote economic stability and growth, which are foundational for political stability.

This study demonstrates the interplay between democracy, political institutions and CBI. While the literature concerning CBI and political institutions is extensive, this work reaffirms the influence of political institutions towards economic policy, especially CBI. Based on findings and discussion, this study concludes that the development of CBI is embedded in political institutions during early development. When a country is 'mature' in most political variables, except for civil liberties and political risk, politics will no longer be a significant predictor of CBI. Macroeconomic indicators become more significant predictors of CBI.

This study also proposes several avenues for further research. First, the regression result highlights the significant influence of low civil liberties on CBI, but the underlying causes have yet to be explained. One possible hypothesis is that civil liberties are related to the rights of association required for strong labour unions and worker rights. Explanatory studies examining more specific civil liberties and CBI components may benefit employment, wealth distribution, and welfare. Second, with a more comprehensive and de facto dataset on CBI rather than de jure CBI, further inspection can offer insight into the short-term effect on political actors of CBI rather than the long-term institutional effect of CBI, which are constraints to written formal documents.

Appendix 1: Haussman Test for Model Selection

Coefficients (Romelli, 2022)

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	**Random**	**Difference**	**Standard Error**
Democracy	6.465406	5.321166	1.14424	0.2283117
Political Rights	4.532702	3.79416	0.7385414	0.098558
Civil Liberty	-2.499738	-2.295719	-0.2040195	0.2056891
Electoral Competition	0.0094109	0.0202223	-0.0108114	0.0050483
Political Risk	-26.02068	-29.49915	3.478475	1.42471
Tax Revenue %	0.4408506	0.2046747	0.236176	0.0586979
GDP Debt Ratio	0.0386373	0.0343354	0.0043019	0.0021419
$\chi 2$	24.44			
Prob > $\chi 2$	0.0010			

Coefficients (Romelli, 2022) High-Developed Only

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	**Random**	**Difference**	**Standard Error**
Democracy	-0.3571629	-5.05564	4.698477	2.419731
Political Rights	-2.472835	-4.394245	1.921411	1.053643
Civil Liberty	-4.771007	-6.365709	1.594702	0.9446648
Electoral Competition	0.0888012	0.0765427	0.0122586	0.0248011
Political Risk	-57.91981	-59.55328	1.633466	3.853395
Tax Revenue %	1.331268	1.005946	0.3253218	0.0983695
GDP Debt Ratio	0.0885685	0.0910656	-0.0024971	0.0037351
$\chi 2$	17.88			
Prob > $\chi 2$	0.0125			

Coefficients (Romelli, 2022) Developing Only				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	Standard Error
Democracy	6.601519	5.353309	1.24821	0.2699313
Political Rights	4.863586	4.012334	0.8512518	0.1443802
Civil Liberty	-2.654031	-2.854368	0.2003374	0.1912275
Electoral Competition	-0.0099783	0.0035995	-0.0135778	0.0070882
Political Risk	-16.08955	-16.79096	0.7014112	0.8979859
Tax Revenue %	-0.0352703	-0.1665082	0.131238	0.0686644
GDP Debt Ratio	0.0110446	0.0015991	0.0094456	0.0035323
$\chi 2$	43.07			
Prob > $\chi 2$	0.0000			

Coefficients (Garriga, 2016)				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	Standard Error
Democracy	7.177652	6.02026	1.157392	0.4252192
Political Rights	6.320441	5.625728	0.6947137	0.2381262
Civil Liberty	-5.043334	-4.293676	-0.7496583	0.3730786
Electoral Competition	0.0284416	0.0367131	-0.0082715	0.012284
Political Risk	-10.53194	-18.64149	8.109551	2.297418
Tax Revenue %	-0.1945208	-0.3460705	0.1515497	0.0963404
GDP Debt Ratio	0.0645184	0.0596245	0.0048939	0.0049015
$\chi 2$	59.27			
Prob > $\chi 2$	0.0000			

Coefficients (Garriga, 2016) High-Developed Only				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	Standard Error
Democracy	-4.548369	0.8565139	-5.404883	4.040002
Political Rights	2.81751	3.699085	-0.8815745	2.376391
Civil Liberty	-9.799985	-7.907913	-1.892072	1.802567
Electoral Competition	-0.1202707	-0.0782885	-0.0419821	0.053891
Political Risk	-47.99907	-56.29707	8.298001	7.755924
Tax Revenue %	-0.1662743	-0.1185864	-0.0476879	0.178589
GDP Debt Ratio	0.2403565	0.2385628	0.0017937	0.010244
$\chi 2$	5.03			
Prob > $\chi 2$	0.6561			

Coefficients (Garriga, 2016) Developing Only				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	Standard Error
Democracy	7.054517	5.732542	1.321974	0.451007
Political Rights	5.770322	5.022358	0.7479645	0.275806
Civil Liberty	-4.483622	-4.349677	-0.1339447	0.33929
Electoral Competition	0.0137058	0.0299418	-0.0162361	0.013822
Political Risk	-4.539183	-6.282051	1.742868	1.54656
Tax Revenue %	-0.1068538	-0.2497597	0.1429059	0.109954
GDP Debt Ratio	-0.0185069	-0.0250449	0.006538	0.006312
$\chi 2$	14.19			
Prob > $\chi 2$	0.0480			

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