

10-8-2025

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Recommended Citation

Olaniran, Abeeb O. and Ndako, Umar B. (2025) "Independence of Central Banks in Nondemocratic Regimes: Implications for Price Stability," *Bulletin of Monetary Economics and Banking*: Vol. 28: No. 3, Article 1.

DOI: <https://doi.org/10.59091/2460-9196.2571>

Available at: <https://bulletin.bmeb-bi.org/bmeb/vol28/iss3/1>

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INDEPENDENCE OF CENTRAL BANKS IN NON- DEMOCRATIC REGIMES: IMPLICATIONS FOR PRICE STABILITY

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ABSTRACT

This study examines the impact of central bank independence on inflation in non-democratic regimes, with a specific focus on the differences between Islamic and non-Islamic groups. It utilizes nonstationary heterogeneous panels to estimate both the long-run and short-run responses of inflation to central bank independence. Additionally, it employs a panel smooth transition regression model to identify any potential threshold effects in this relationship. Our findings reveal an inverse relationship between central bank independence and inflation rates for both groups in the long run. Our result suggests that non-Islamic authoritarian countries may struggle more than Islamic ones to maintain price stability through interest rate channels, which could explain their increasing adoption of a zero interest rate policy. Furthermore, we find evidence of threshold effects that, if overlooked, could result in biased conclusions.

Keywords: Central bank independence; Inflation; Islamic authoritarian regime; Non-Islamic authoritarian regime; Nonstationary heterogeneous panels; Panel smooth transition regression.

JEL Classifications: E58; E31; C33; O57.

Article history:

Received : May 20, 2024

Revised : May 25, 2025

Accepted : June 17, 2025

Available Online : October 8, 2025

<https://doi.org/10.59091/2460-9196.2571>

I. INTRODUCTION

This study differentiates authoritarian regimes from other systems of government in analysing the connection between Central Bank Independence (CBI) and price stability. Generally, democracies are thought to significantly facilitate freedom within an economy, which can be extended to the functioning of institutions, including the central bank. Therefore, it is reasonable to assume that in democratic republics, a strong connection exists between CBI and price stability (Hayo and Voigt, 2008; Bodea and Hicks, 2015; Salisu *et al.*, 2022; Anwar, 2023; Garriga and Rodriguez, 2023; Abou Hamia, 2024; Jácome and Pienknagura, 2025; and Leek and Bischi, 2025). In this context, existing literature typically reports a negative relationship between CBI and inflation in most industrialized, fully democratic economies (Alesina and Summers, 1993; Berger *et al.*, 2001; and Arnone and Romelli, 2013) as well as in some emerging economies (Anwar, 2023; Jácome and Pienknagura, 2025). This negative relationship is also observed, albeit with less evidence, in developing countries with less advanced democracies (Bagheri and Habibi, 1998; Desai *et al.*, 2003; Crowe and Meade, 2007; and Garriga and Rodriguez, 2020). A question that remains unanswered in the literature is whether the negative relationship between CBI and inflation can be extended to non-democratic (authoritarian) regimes, where the degree of institutional independence is low or may not exist at all. This inquiry represents the main contribution of this study.

For this study, a country is under an authoritarian regime if it is consistently ranked as such by the Economist Intelligence Unit (EIU). The EIU has released multiple publications that systematically rate nations according to their democratic status and classify them into distinct regime types utilizing 60 variables categorized into five domains, assessing pluralism, civil rights, and political culture (EUI, 2016). They are so-called authoritarian states given the non-existent democratic institutions, absence of or inconsistent electioneering processes, and largely state-controlled media in the countries. The list of the selected countries is presented in the appendix (Table A1). We disregard countries that consistently switch between two extreme systems of government, say from democracy to authoritarian regime and vice versa, as this may defeat the objective of this study, in which the principle of ideology about governance plays a role. We do believe that countries whose choice of government is grounded on certain beliefs will not experience such shifts within a short period. In other words, countries that exhibit the latter (incessant shifts) may be due to certain circumstances rather than ideology.

Generally, countries under authoritarian regimes often face different economic realities as compared to countries under democratic rule. The dominant view among political economists is that democracies perform better economically than non-democracies, or otherwise, authoritarian countries (WESP, 2019). This is not unconnected with the claims that authoritarian regimes build resistance to contemporary trends in economic globalization efforts (see Jensen, 2003; Steinberg and Malhotra, 2014) and pursue largely protectionist policies that create barriers to international trade (Leblang, 1999; Broz, 2002; Milner and Kubota, 2005; Eichengreen, 2007; Eichengreen and Leblang, 2008; Milner and Mukherjee, 2009; Bearce and Hallerberg, 2011; and Gallo, 2021). It is not then surprising to expect Central Bank Independence (CBI, hereafter) to be hindered and the ability of

central banks to commit to tidy monetary policies that deliver low inflation to be significantly hampered in such countries.

We are, however, observant of the presence of distinct ideological features among countries under an authoritarian regime type of government. For instance, China, a communist state, aims to preserve price stability and growth, as well as balance of payments and stability of the Chinese financial system (see Liu and Zhang, 2007). Meanwhile, Saudi Arabia, an Islamic monarchy, seeks to maintain price stability, including the Riyal exchange rate, as well as financial sector stability and development (Almounsor, 2015). Thus, there is a great deal of diversification within the 'authoritarian world,' each pursuing its ideology.¹ Against the backdrop of this divergence, it is imperative to underline the ideology of these authoritarian regimes and their influence on economic policy. Thus, our second contribution relates to the consideration of these distinct ideological features. Consequently, we further partition the selected countries under authoritarian regimes into two groups, namely the Islamic and the non-Islamic groups. This partition becomes crucial as the two groups differ in their governance ideology/belief, which may also impact their policy actions, including their perception about monetary policy instruments with attendant implications on price stability. We use the membership of the Organisation of Islamic Cooperation (OIC) (www.oic-oci.org) to isolate countries with Islamic beliefs from the list of countries under authoritarian regimes. Notwithstanding, there are situations where countries perceived to exhibit Islamic beliefs do not belong to the OIC. In this case, the percentage of the Muslim population (>50%) is used as a criterion.

There are several attractions to the consideration of distinct analyses for the two groups under the authoritarian regime. First is the role of ideology in shaping ethical and social behaviour among its followers and the society at large (Richardson, 2013). Religion plays a critical role in modelling societal values and behaviour. It significantly affects the constitution of private and public institutions (Gursoy *et al.*, 2017). Second, the growing recognition of the innovative contributions of Islamic countries to the global economy, specifically in Islamic banking and finance, Islamic bonds and securities (Sukuk) and Islamic insurance (Hossain, 2014; Hanif *et al.*, 2024) has gained prominence among researchers and policymakers. Thus, empirical research that complements our understanding of the behaviour of these non-democratic regimes will be far-reaching.

Despite acknowledging the differences between Islamic and non-Islamic authoritarian regimes, certain prominent characteristics inherent to empirical modelling persist. Among these features is the presence of endogeneity bias arising particularly from the inclusion of the first lag of the dependent variable (typical of most inflation models) to capture persistence and/or the isolation of a single predictor when analysing variations in the dependent variable (see Salisu and Isah, 2018; Salisu *et al.*, 2018). We encounter two sources of endogeneity bias in inflation models; consequently, we adopt the methodology of Chudik and Pesaran (2015), Chudik *et al.* (2016), and Westerlund *et al.* (2017), which addresses the intrinsic endogeneity bias by systematically integrating unobserved common correlated

¹ While authoritarian regimes are driven by different ideologies, chief amongst them are: communism, socialism and theocracy (in this case, Islamic Shariah).

effects into the estimation process (details are provided in the methodology section). The second notable characteristic pertains to the heterogeneity in the relationship, a common aspect of most panel data models with substantial time (T) and cross-sections (N). To address this concern, we utilize the nonstationary heterogeneous panel data methodology established by Pesaran and Smith (1995) and further developed by Chudik and Pesaran (2015), Chudik *et al.* (2016), and Westerlund *et al.* (2017). This approach accommodates cross-sectional variation in regression coefficients and mitigates potential nonstationarity issues that could distort regression results. While the second feature incorporates variation in regression coefficient, this is only due to cross-sections, whereas there may be evidence of time-variation in regression coefficient, which needs to be resolved if found to be significant, particularly where its consideration can overturn the outcome of the existing model. To assess this feature, we partition our analyses into sub-samples based on certain macroeconomic conditions, and thereafter, we conduct distinct analyses on them. The fourth feature involves the presence of a threshold effect or nonlinearity. Notwithstanding the first three considerations, the relationship between central bank independence and inflation is assumed to be linear, which may not be entirely correct. For instance, Salisu and Isah (2018) find that the relationship between oil price and inflation is nonlinear and establish that incorporating this feature in the estimation process will produce better forecast accuracy for inflation. To examine potential nonlinearity between the two variables of interest, we estimate the Panel Smooth Transition Regression (PSTR) model proposed by Gonzalez *et al.* (2005), which posits that transitions between regimes occur gradually, in contrast to the threshold regression method by Hansen (1999), which assumes abrupt transitions (Hmiden and Cheikh, 2016; Giannellis and Koukouritakis, 2019).

Overall, we find evidence of a statistically significant negative relationship between central bank independence and inflation rate for the two groups, albeit in the long run. This appears to suggest that the use of the interest rate channel may not give the non-Islamic countries under an authoritarian regime a better hedge to maintain price stability over their Islamic counterparts. Can we associate this outcome with increasing zero-interest rate policy adoption in many non-Islamic countries? This may be a subject for future research. Further results suggest the presence of threshold effects, implying some form of nonlinearity in the nexus.

II. DATA AND METHODOLOGY

The first responsibility of this study in relation to data compilation is to determine countries that consistently fall under an authoritarian regime. As previously mentioned, we follow the various reports of the Economist Intelligence Unit (EIU, 2016) that groups countries into different regime types using 60 indicators aggregated into five different categories, measuring pluralism, civil rights and political culture (see the appendix, Table A1, for the list of the selected countries). The consideration for the selected countries has been previously justified. Also, the motivation for partitioning the countries into two groups, Islamic and non-Islamic countries under an authoritarian regime, has been previously discussed (under Section 1 of the study). The data scope ranges from 1990 to 2023 for the selected countries determined by the available data for the Central Bank Independence (CBI) index.

The data utilized consists of yearly inflation figures obtained from the International Financial Statistics (IFS) and a Central Bank Independence (CBI) index obtained from Garriga (2016, 2025). Garriga's legal CBI index is constructed based on the methodology established by Cukierman (1992) entails the coding of variables that encapsulate the institutional characteristics of central bank leadership, encompassing appointment and dismissal procedures, tenure duration, and policymaking authority, including the entities responsible for establishing and finalizing monetary policy, the bank's impact on fiscal decisions, its articulated objectives, and legal limitations on government lending. These elements are quantified and aggregated into a composite score ranging from 0 to 1, indicating no independence to full independence (Garriga and Rodriguez, 2020).

An initial examination of the CBI patterns in Islamic and non-Islamic authoritarian governments reveals that both exhibit comparable levels of independence on average, underscoring their characteristic nature as authoritarian systems, although the latter generally possesses marginally greater independence (see, Figures A1 and A2 in the Appendix).

In selecting a method to analyse the objectives of this study, we face two options: homogeneous and heterogeneous panel data techniques. The main distinction between these two approaches lies in how the slope coefficient is treated. The homogeneous method assumes a common slope coefficient across countries and time, indicating uniformity in the regression coefficients. In contrast, the heterogeneous method relaxes this assumption, allowing for distinct slope coefficients for each country, which implies variability in the regression coefficients.

We choose heterogeneous panels due to the presence of large N and large T in our panel datasets. Therefore, we will follow the heterogeneous panel data techniques outlined by Chudik and Pesaran (2015), Chudik *et al.* (2016), and Westerlund *et al.* (2017) to develop a predictive panel data model for inflation, using central bank independence as the sole predictor (see, Salisu *et al.*, 2022):

$$\pi_{it} = \gamma_i \pi_{it-1} + \delta_i \text{cbi}_{i,t-1} + \alpha_i + e_{it}; \quad (1)$$

$$e_{it} = \lambda_i f_t + u_{it} \quad (2)$$

$$i = 1, 2, \dots, N; t = 1, 2, \dots, T.$$

where π_{it} is the annual inflation computed from the consumer price data for country, i , at period t ; $\text{cbi}_{i,t-1}$ is the measure of central bank independence following Garriga (2016, 2025); α_i and δ_i are the time-invariant (state-variant) intercept and slope coefficient, respectively; and e_{it} is the error term. Note that e_{it} is a composite error term comprising an unobserved common factor loading (f_t) accompanied by a heterogeneous factor loading (λ_i) and the remainder error term (u_{it}). Since there is a lagged dependent variable term in the model, the estimated parameter for CBI in equation [1] is for short run. The long-run parameter for CBI is calculated as

$\frac{\bar{\delta}}{1-\bar{\gamma}}$, where $\bar{\delta}$ and $\bar{\gamma}$ are the average of the individual cross-sectional coefficients (Liddle, 2017).

III. RESULTS AND DISCUSSION

A. Main Findings

The main findings involve using the full data to analyse the response of inflation to central bank independence of countries operating Islamic authoritarian and non-Islamic authoritarian regimes. The results presented in Table 1 suggest the presence of a long-run negative impact on the inflation rate of both Islamic and non-Islamic authoritarian regimes, albeit with a positive short-run effect only in the latter case. This suggests that inflation rates decline in the long run under Islamic and non-Islamic authoritarian regimes. Thus, the use of the interest rate channel does not give non-Islamic authoritarian countries a better hedge to maintain price stability than their Islamic counterparts. This may partially be responsible for the increasing adoption of zero interest rate policy in many non-Islamic countries (Fujiwara, 2006; Oda and Nagahata, 2008; Alstadheim, 2016; Salisu et al., 2022). Our findings on the negative relationship between central bank independence and inflation dynamics in both Islamic and non-Islamic authoritarian regimes align with those of Anwar (2023), Garriga and Rodriguez (2023), and Jácome and Pienknagura (2025), who report similar results for developing countries. However, our results contrast with those of Abou Hamia (2024), who find no significant effect of CBI on inflation in the MENA region.

Table 1.
CBI-inflation Nexus for Islamic and Non-Islamic Authoritarian Countries

This table reports CBI-inflation associations for Islamic and non-Islamic states in the short and long run. Here, the variable, *cbi*, representing Central Bank Independence, is differenced (*D*) once. The square brackets and parentheses comprise of the standard error and the probability value, respectively. ***, ** and * denote 1%, 5% and 10% significance levels, respectively.

Variables	Islamic Authoritarian			Non-Islamic Authoritarian		
Short run						
<i>D.cbi</i>	0.0420	[0.0558]	(0.452)	0.2247***	[0.0489]	(0.000)
Long run						
Constant	-0.9420	[0.6202]	(0.129)	0.3550	[0.3293]	0.281
<i>Cbi</i>	-0.6161***	[0.0911]	(0.000)	-0.7345***	[0.0922]	(0.000)
No. of countries	22			20		
Period	21			21		
Observations	462			420		

B. Controlling for Other Determinants of Inflation and Threshold Effects

We specifically examine the threshold effect by assessing the influence of income level, represented by GDP, and financial development level, quantified by the ratio of broad money to GDP, as the threshold factors. To this end, we employ the Panel Smooth Transition Regression (PSTR) model introduced by Gonzalez *et*

al. (2005), a more recent advancement in threshold modelling techniques. Unlike the conventional threshold regression approach that Hansen (1999) developed, which presumes abrupt and discrete regime shifts, the PSTR framework allows for gradual and continuous transitions across regimes. This feature makes it particularly suitable for capturing nuanced nonlinear dynamics in panel data contexts (Hmiden and Cheikh, 2016; Giannellis and Koukouritakis, 2019).

Table 2 reveals the PSTR results for the CBI-inflation nexus when income level is used as the threshold variable, while Table 3 presents the PSTR results when financial development level is employed as the threshold variable. Table 2 also indicates that the null hypothesis of no threshold (Homogeneity) is rejected in favour of the alternative hypothesis of at least one threshold under both Islamic Authoritarian and Non-Islamic Authoritarian regimes. This indicates a nonlinear relationship between income level and the CBI-inflation nexus in Islamic Authoritarian and Non-Islamic Authoritarian countries. There exists a notable threshold effect regarding income levels in the analysis of the CBI-inflation relationship for both Islamic and Non-Islamic Authoritarian nations. The nonlinear slope parameters for both situations in Table 2 are statistically significant, hence justifying this assertion.

Regarding the regime switch, we find that in the first regime, the significant (negative) relationship between CBI and inflation is noticed only in the second regime for the Islamic authoritarian regime. This implies that CBI does not significantly affect the inflation rate of countries under an Islamic authoritarian regime when the level of income is low but significantly affects their inflation when the level of income is high. This outcome further highlights the income effects of inflation in the Islamic authoritarian regime, where deviations in GDP cause significant movements in inflation. However, the results for the non-Islamic authoritarian regime do not seem to change significantly between the two regimes. Apparently, the level of income seems to matter for the CBI-inflation nexus in Islamic authoritarian regimes, while it does not for the non-Islamic counterparts. Put differently, the nexus does not seem to respond differently to high and low levels of income when the non-Islamic authoritarian regime is considered.

Meanwhile, as evident in Table 3, the null hypothesis of no threshold (Homogeneity) as against the alternative of at least one threshold cannot be rejected in both cases. Thus, the level of financial development has no threshold effect in the nexus, perhaps because the financial system of the two categories has not changed significantly over the period under consideration.

Table 2.
PSTR Results for the CBI-inflation Nexus with Income Level as the Threshold Variable

This table presents the PSTR results for the CBI-inflation relationship using income level as the threshold variable. The square brackets contain the standard error, and the parentheses include the probability value of the estimated coefficients. *cbi* denotes Central Bank Independence. LM *F*-statistic tests for linearity (or homogeneity) in the model. ***, ** and * denote 1%, 5% and 10% significance levels, respectively.

Coefficients	Islamic Authoritarian	Non-Islamic Authoritarian
<i>LM F</i> -statistic		
Linear model vs. one threshold	4.179** (0.0415)	14.22*** (0.0001)
<i>Estimated parameters of the model</i>		
First regime linear coef. of <i>cbi</i>	-25.280*** [5.597]	-41.83 [98.92]
First regime nonlinear coef. of <i>cbi</i>	1.735 [2.776]	34.91 [92.20]
Second regime nonlinear coef. of <i>cbi</i>	-23.54*** [8.540]	-6.920 [7.103]
Nonlinear Slope parameter	1.8780*** [0.1708]	1.0230** [0.4197]

Table 3.
PSTR Results for the CBI-inflation Nexus with the Financial Development Level as a Threshold Variable

This table presents the PSTR results for the CBI-inflation relationship with financial development as a threshold variable. The standard error and probability value of the estimated coefficients are indicated within square brackets and parentheses, respectively. *cbi* denotes Central Bank Independence. LM *F*-statistic tests for linearity (or homogeneity) in the model. ***, ** and * denote 1%, 5% and 10% significance levels, respectively.

Coefficients	Islamic Authoritarian	Non-Islamic Authoritarian
<i>LM F</i> -statistic		
Linear model vs. one threshold	0.8951 (0.3446)	1.869 (0.1723)
<i>Estimated parameters of the model</i>		
First regime linear coef. of <i>cbi</i>	-41.83 [98.92]	-0.642 [3.892]
First regime nonlinear coef. of <i>cbi</i>	34.91 [92.20]	1.7340 [0.8817]
Second regime nonlinear coef. of <i>cbi</i>	-6.920 [7.103]	1.092 [3.235]
Nonlinear Slope parameter	1.0230 [0.4197]	1.1940 [0.8581]

IV. CONCLUSION

This paper explores the influence of the authoritarian system of government on the connection between Central Bank Independence (CBI) and inflation dynamics. It particularly focuses on whether CBI influences inflation control differently in Islamic versus non-Islamic authoritarian states. The analysis employs the Dynamic Common Correlated Effects (DCCE) estimator, a recently developed methodology

in nonstationary heterogeneous panel data introduced by Chudik and Pesaran (2015) and Westerlund *et al.* (2017). This technique is especially advantageous due to its robustness against non-stationarity, cross-sectional dependence, and parameter heterogeneity, making it well-suited for panels with large time (T) and cross-sections (N), as well as for shorter time (T) panels.

We also consider the impact of other factors influencing inflation, such as the income and financial development levels of the countries, using the threshold approach developed by Gonzalez *et al.* (2005), described as the Panel Smooth Transition Regression (PSTR) model.

The findings support the long-run relationship between central bank independence and inflation in both regime categories. This finding suggests that non-Islamic authoritarian countries do not utilize the interest rate channel more effectively than their Islamic authoritarian counterparts to maintain price stability. This discrepancy may contribute to the growing trend of adopting zero interest rate policies in many non-Islamic countries (see Fujiwara, 2006; Oda and Nagahata, 2008; Alstadheim, 2016). Our additional results indicate the presence of threshold effects linked to income levels, suggesting that the effectiveness of monetary policy may be dependent on other macroeconomic fundamentals, and overlooking these factors could lead to inaccurate decisions likely due to lack of coordination (see also Adediran *et al.*, 2025). Therefore, enhancing central bank independence can effectively mitigate inflation, even in authoritarian regimes; nevertheless, such a monetary policy strategy must include larger economic conditions, including income levels. Furthermore, investors should also take caution of inflationary patterns in authoritarian countries as they respond asymmetrically to changes in central bank independence (and/or institutional reforms), especially when income thresholds are crossed.

Nevertheless, our study does not examine the impact of central bank independence on inflation dynamics in inflation-targeting compared to non-inflation-targeting regimes. Future study may explore these characteristics to deliver a more thorough examination of how CBI moderates inflation within these classes.

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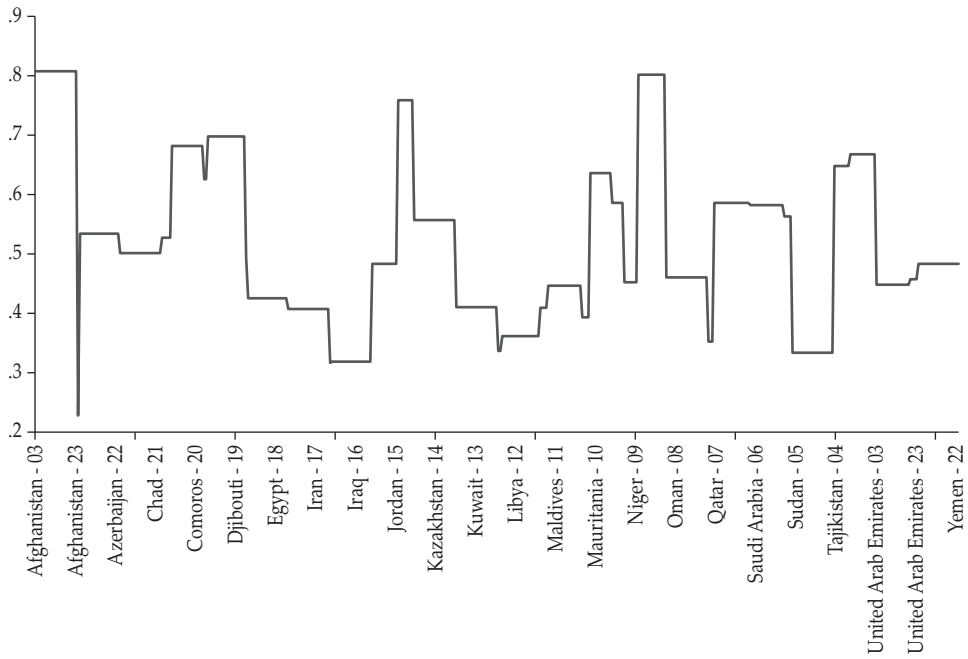
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APPENDIX

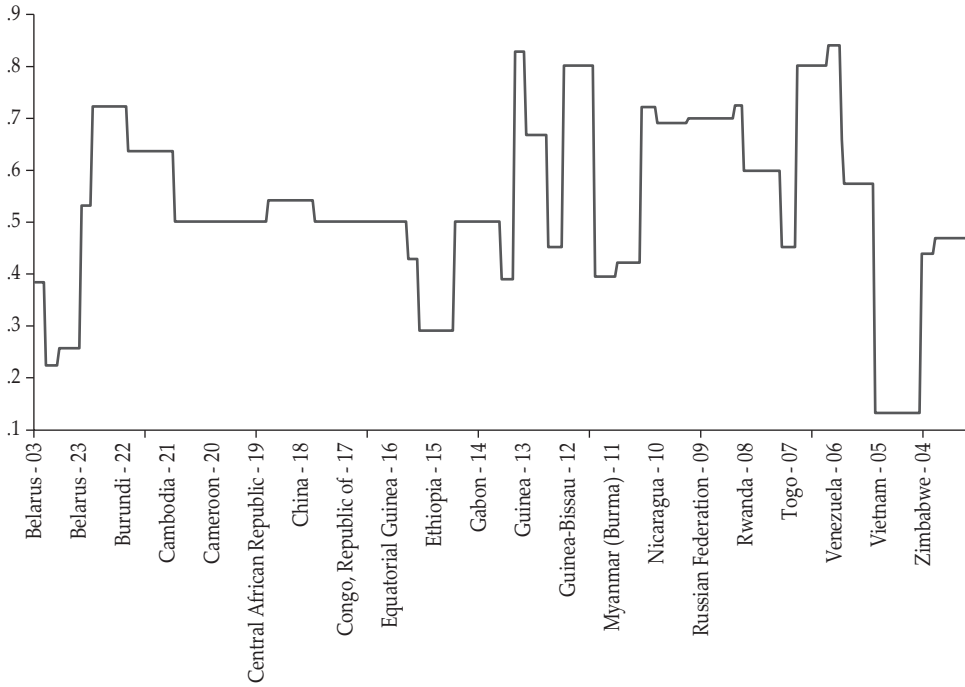
Table A1.
List of Islamic Authoritarian and Non-Islamic Authoritarian Countries

Islamic Authoritarian Countries	Non-Islamic Authoritarian Countries
Afghanistan	Belarus**
Azerbaijan**	Burundi
Chad	Cambodia
Egypt	Cameroon
Iran	Central African Republic
Iraq**	China
Jordan	Myanmar
Kazakhstan	Congo Republic
Kuwait	Equatorial Guinea
Libya	Ethiopia
Maldives	Gabon
Mauritania	Guinea**
Niger	Guinea-Bissau**
Oman	Nicaragua
Qatar	Russia
Saudi Arabia	Rwanda
Sudan**	Togo
Tajikistan	Venezuela
United Arab Emirates	Vietnam
Yemen	Zimbabwe
Comoros	
Djibouti	

Figure A1:
Stacked Plot of CBI under Islamic Regime



**Figure A2:
Stacked Plot of CBI under Non-Islamic Regime**



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