

# Fiscal Decentralization, Institutional Quality, and Government Size: An Asymmetry Analysis for Asian Economies

**Sidra Sohail**

Pakistan Institute of Development Economics

**Sana Ullah** (✉ [Sana\\_ullah133@yahoo.com](mailto:Sana_ullah133@yahoo.com))

Quaid-i-Azam University <https://orcid.org/0000-0003-3431-9776>

**Ilhan Ozturk**

Cag Universitesi

**Attiya Yasmin Javid**

Pakistan Institute of Development Economics

---

## Research

**Keywords:** Fiscal decentralization, Institutional quality, Government size. NARDL, Asian economies

**Posted Date:** December 1st, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-114619/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

**Fiscal Decentralization, Institutional Quality, and Government Size: An Asymmetry Analysis for Asian Economies**

**Sidra Sohail**

Pakistan Institute of Development Economics (PIDE) Islamabad, Pakistan.

Email: [sidrasohail\\_14@pide.edu.pk](mailto:sidrasohail_14@pide.edu.pk)

**Sana Ullah**

Quaid-i-Azam University, Islamabad, Pakistan.

Email: [sana\\_ullah133@yahoo.com](mailto:sana_ullah133@yahoo.com)

**Ilhan Ozturk**

Cag University, 33800 Mersin, Turkey.

Email: [ilhanozturk@cag.edu.tr](mailto:ilhanozturk@cag.edu.tr)

**Attiya Yasmin Javid**

Pakistan Institute of Development Economics (PIDE) Islamabad, Pakistan.

Email: [attiyajavid@pide.org.pk](mailto:attiyajavid@pide.org.pk)

## **Abstract**

The aim of this study is to examine the asymmetric effects of fiscal decentralization and institutional quality on government size by employing asymmetric autoregressive-distributed lag (ARDL) methodology by using the time series data of Asian economies from 1984 to 2017. The results show that positive shocks in expenditures decentralization (ED) enhance government size in Japan, Kazakhstan, Thailand, Turkey, and reduces it in Korea, Rep. in long run. While negative shock in ED reduces government size in Pakistan, Thailand, Turkey and increases it in Kazakhstan and Mongolia in long run. Whereas asymmetric results in the long show that a positive shock in revenue decentralization (RD) increase government size in Pakistan, Japan, Kazakhstan, Thailand, and Turkey, and a negative shock in RD is also decreased government size in Pakistan, Mongolia, Thailand, and Turkey. The results also disclosed that positive shock in institutional quality (IQ) increases government size in Azerbaijan, Japan, Thailand and negative shock in IQ also increases government size in Pakistan, Azerbaijan, Japan, Kazakhstan, Thailand, in the long run. While short-run asymmetric results of fiscal decentralization and institutional quality on government size have robust in the public sector. Based on the empirical outcomes, some economic policy implications are proposed for the provincial and federal governments of Asian economies.

**Keywords:** Fiscal decentralization. Institutional quality. Government size. NARDL. Asian economies.

## **Introduction**

Due to a disastrous event throughout the world in the first half of the 20<sup>th</sup> century, the need for fiscal decentralization and strong national governments increased. Two world wars and a great depression are major factors that lead to countries' increased dependence on central governments. The peak of decentralization came in the 1950s and then began to decline. Again a heavy trend towards decentralization began in the early 1970s which became commonly referenced as a "prescription for growth" for developing economies. After the failure of the Soviet Union, decentralization's momentum accelerated across the globe, especially in China and Latin American nations. By the 1990s countries began to converge to mid-levels of decentralization (Thiessen 2003). Both developed and developing countries have been improving their public sector performance while turning towards the devolution of their responsibilities towards local governments (Oates 1999).

Decentralization of powers most commonly refers to fiscal decentralization that is the transmission of powers from central to sub-national governments. In other words, it is the transmission of policymaking

concerns from the federal authority to local authorities regarding expenditure and revenue collection. It is believed that fiscal decentralization is an important instrument for policymakers to gain financial efficiency and ensure good governance as the local governments are given financial independence. Furthermore, fiscal devolution is the easiest dimension to quantify and compare. The most common measures of fiscal decentralization are sub-national shares of authority revenue and expenditures. Therefore, decentralization is a route through which the responsibilities and resources are transferred to subnational governments in such a way that resources can be used in a better way, public living standards can be improved and workload can be shared among all levels of governments. In low-income countries, decentralization has been opted to eradicate poor governance and macroeconomic instability, however, in western countries it is opted to offer public goods in a more cost-effective manner. Decentralization originated in Latin American countries due to the political pressure of their citizens for pursuing democratization. In short, decentralization is thought to carry political authorities closer to the general public and bring out equality in the establishment of public goods to various localities of the same country.

Fiscal decentralization theories can be expressed in two groups of development; first-generation theory of fiscal decentralization and second-generation theory of fiscal decentralization. The basic idea of fiscal decentralization is given by Hayek (1945), who noted that fiscal decentralization improves economic efficiency in the provisions of the public sector and local authorities provide the goods and services that better reflect the preferences of the peoples. The first-generation theory of fiscal decentralization is developed by Hayek (1945), Tiebout (1956), Musgrave (1959), Oates (1972), and Brennan and Buchanan (1980). In modern times, a new theory linked to fiscal decentralization has been developed is called the second generation theory (Oates 2005), who noted that political institutions improve the economic efficiency with fiscal institutions. The second-generation theory draws on insights from various economic theories like the theory of principal-agent, theory of contract, theory of firms, theory of asymmetric information (Oates 2005).

However, one of the benefits of decentralization is that local governments are supposed to have a greater knowledge of public choices than that of the central government and it is noticed when local governments are involved in decision making it results in enhancing the overall efficiency of the government. Furthermore, tax collection increases in the decentralized setup of governments because local governments have direct access to the local community. It is expected that due to decentralization the relative size of government gets affected. The debate on this issue starts from the “Leviathan hypothesis” formulated by Hayek (1945), Musgrave (1959), and Brennan and Buchanan (1980) which states that “government intrusion into the economy

will be smaller when the public sector is decentralized". Many researchers investigated this Leviathan Hypothesis empirically mostly for samples of Latin American countries and OECD economies. The existing studies on fiscal decentralization effect on government size have two main strands: the first one indicates a negative link of fiscal decentralization on size of government (Marlow 1988; Ehdaie 1994; Rodden 2003; Cassette and Patty 2010; and Golem and Perovick 2014; Carniti et al. 2019); while the second strands establish a positive link between fiscal decentralization and size of government (Nelson 1986; Grossman 1989; Wu and Lin 2012, Canavire-Bacarreza et al. 2020). However, the present study is important to improve the existing literature of economics by giving the asymmetric results of fiscal decentralization and institutional quality on government size in the context of Asian economies because past studies have also found positive and negative results on this nexus.

The link between institutions and government size is also one of the most interesting research areas which need to be explored adequately. As the government plays the role of an endogenous element in the economic and political system so the government is responsible for the implementation of economic policy. However, the behavior of the government is directly and indirectly determined by the numerous institutional limitations that include the political system (Snowdon and Vane 2005). Furthermore, the political system is tense with certain conflicts of interests like exploitation of political power and misuse of public funds, conflict over the allocation of redistributive transfers; and clash over the distribution of resources among themselves. Political bodies play a significant role in the resolution of these kinds of conflicts of interest. The literature revealed that the stability of the good quality of political institutions affects the relative size of government (Arora & Chong 2018). However, economists also argue that government institutions show a key function in forming government size and efficiency in the world. Placek et al. (2020) familiarized the key determinants of local government efficiency in analysis namely fiscal centralization, information asymmetry, competition among municipalities, bureaucratic behavior, intergovernmental grants and transfers, fiscal illusion, municipality size, and institutional environment. Khan and Hanif (2020) found that institutional quality in determining the relationship between output growth and government size in Pakistan.

Many studies have tried to validate the symmetric impacts of fiscal decentralization and institutional quality on the size of government by using annual data from different countries. For instance; Stein (1999) for Latin America, Chong and Gradstein (2007) for developing and developed economies, Prohl and Schneider (2009) for 29 economies, Makreshanska et al. (2016) for Europe, and Thanh and Canh (2019) for Vietnam. These studies report mixed findings, some studies report significant impacts of fiscal decentralization on the size

of government while some studies report insignificant impacts of fiscal decentralization on the size of government. None of the above-mentioned studies related to the globe have considered the asymmetric impacts of fiscal decentralization and institutional quality on the government size. We fill this gap by employing Shin et al.'s. (2014) asymmetric ARDL methodology that examines the asymmetric effects of institutional quality and fiscal decentralization on the government size in Asian economies.

In general perception, fiscal decentralization along with good quality institutions enhances the size of sub-national governments while lessening the overall size of the public sector. Thus, there is essential to examine the direction of impact between fiscal decentralization, institutional quality, and government size with an exact focus on the query whether decentralization of fiscal resources leads to a decrease or an upsurge in the magnitude of the public sector. A common proposition behind previous empirical literature is that the impacts of fiscal decentralization and institutional quality on government size are symmetric, meaning that centralization improves the government size, decentralization must worsen it. In the asymmetric analysis, a positive shock to the institutional quality means that an increase in institutional quality (rich quality of institutions) and a negative shock to the institutional quality means that a decrease in institutional quality (poor quality of institutions). While positive shock in institutional quality enhances the government size and negative shock in institutional quality must worsen it. How useable is this proposition? Could the impacts of decentralization and institutional quality on government size be asymmetric? Therefore, the aim of this paper is to test this hypothesis by using the annual time series data of ten Asian economies. The ten Asian economies are selected on the basis of availability of the dataset. From the previous literature issues, understanding the asymmetric/nonlinear association between fiscal decentralization, institutional quality and government size in Asia at the country level is of great significance for academia and policy-makers. Based on the literature of earlier studies relating to fiscal decentralization, institutional quality, and government size, this study is the pioneer of its kind in this area.

The main contribution of this empirical study is to explore broadly the decentralization debate and experience in the case of Asian economies. In this way, the study makes an effort to gauge the impacts of expenditure and revenue decentralization on government size in Asian economies. The study also incorporates the quality of institutions in assessing the function of fiscal decentralization in determining the size of the government. One of the significances of the present study is that it is a fresh attempt to empirically analyze the asymmetric link between government size, institutional quality, and fiscal decentralization in Asian economies. This study is very important in policymaking in Asian economies as well as in other nations.

The rest of the paper is structured as follows: Section 2 deals with the literature review and section 3 describes the details of the model, data description, and variables. While section 4 describes a detailed discussion of results; and section 5 gives the conclusion with some policy recommendations.

## **Literature review**

Decentralization is a controversial topic whose merits have been debated by economists and policymakers for decades. The efficient provision of public goods is the predominant argument in favor of decentralization. This section delivers literature relating to fiscal decentralization, institutional quality, and government size. Brennan and Buchanan (1980) are the pioneers in originating the Leviathan hypothesis and noted that “total government intrusion into the economy should be smaller, *ceteris paribus*, the greater the extent to which taxes and expenditures are decentralized”. Their study assumes the inseparability of revenue and expenditure decentralization. Furthermore, the study depicts that the government plays the role of a gigantic monster, which tries to achieve maximum revenues through money creation, increase in taxation, and debt. This kind of role of government leads to expanding the government size. Under this strategy, the centralized government tries to disguise and promote its selfish interests. Another issue is that the government does not have any access to regulate on taxpayers. Brennan and Buchanan (1980) suggest two methods to control this Leviathan. One way is the provision of a balanced budget and inadequacy of government tax and other fiscal instruments through constitutional constraints and another way is the decentralization of government’s power through expenditure and revenue decentralization. Jia et al. (2020) show that fiscal decentralization reform is simultaneously improving the tax autonomy of the economy. Song et al. (2018) results indicate that fiscal decentralization can stimulate total green factor productivity in China. Canavire-Bacarreza et al. (2020) find that a subnational expenditure decentralization has stimulated GDP per capita growth by 0.82% and revenue decentralization has stimulated GDP per capita growth by 0.57%. The results also show that expenditure decentralization is comparatively more effective on GDP per capita growth than revenue decentralization. While Carniti et al. (2019) identify the bell-shaped in nexus of expenditure decentralization and growth in European economies.

In the earlier study, Oates (1985) investigates the link between fiscal decentralization and size of government for a sample of 43 developing and developed countries and 48 states of the United States. Tax receipts are used to measure relative government size. The study finds no significant relationship in both samples. Similarly, Nelson (1986) also reports nonexistence of the Leviathan hypothesis for the US. It is argued

that instead of using tax receipts to measure government size, most of the studies are using the portion of government expenditures in the economy as a proxy to measure government size. It can be justified as an expenditure-based measure of government size that provides complete resource absorption of government as compared to revenue receipts. In a study for US, Marlow (1988) uses the ratio of total government expenditure to the gross national product as a proxy for measuring government size. The study measures decentralization as a sub-national expenditure as a portion of total government expenditures. The paper also reports a negative significant link between fiscal decentralization and government size. Grossman (1989) investigates the Leviathan hypothesis for the US by incorporating the role of grants. Government size is regressed on expenditure decentralization and vertical imbalance. The study reports a positive relationship between fiscal decentralization and government size. The study suggests that grants play a positive role in the expansion of the public sector. Ehdiaie (1994) investigates the Leviathan hypothesis on two samples. Sample one includes 26 countries in 1977 and sample two consists of 30 countries in 1987. The study reports a negative influence of fiscal decentralization on the relative size of government. Tanzi and Schuknecht (1997) argue in their study that probable social gains could be availed with smaller government size whose expenditure ranges between 30 to 40 percent of GDP.

Shadbegian (1999) also tries to examine the influence of fiscal decentralization on the relative size of government for the US. Direct general expenditures relative to gross state products are employed to measure government size. Results specify a positive association between government size and decentralization along with the negative effect of collusion on fiscal discipline. On the other hand, Stein (1999) makes an effort to explore the Leviathan hypothesis for 19 Latin American and Caribbean countries and OECD countries. The study highlights that the allocation function of government is mostly related to decentralization. Along with expenditure decentralization, the study also uses fiscal imbalance and some institutional variables in the empirical analysis. Government size is measured as the size of the public sector as a share of GDP. The study concludes that decentralization tends to enlarge government size.

To inspect the influence of fiscal decentralization on the sub-national, national, and aggregate governments sizes, Jin and Zou (2002) conducted a panel analysis of thirty-two industrial and developing economies. The results conclude that expenditure decentralization decreases the size of national governments and revenue decentralization increases the size of subnational governments but the increase is less than the reduction in the size of the national government, which leads towards the smaller total government. In count, the vertical imbalance leads to enhanced subnational governments sizes, national governments, and the total number of overall governments. On the other hand, Rodden (2003) investigates the association between government size,

quality of institutions, and fiscal decentralization for 29 OECD countries. The study concludes that fiscal decentralization limits the development of government size in decentralized economies. Fiva's (2006) study also incorporates the role of institutions in investigating the Leviathan hypothesis for 18 OECD countries and revealed that revenue decentralization reduces the size of government, however, expenditure decentralization enlarges the size of government.

Chong and Gradstein (2007) propose that neither the government size nor the tax burden deteriorates economic performance. To test this hypothesis the study comes up with a theoretical model in which the growth effect of taxes is mediated through the law enforcing the ability of the state. The study reports a positive significant link between government size and institutional quality as the relative size of the public sector expands with the enforcement ability of institutions. The findings of the study also concluded that the quality of all facilities delivered by the government as well as its efficiency tends to increase significantly as the quality of institutions improves. Carmignani's (2009) study is based on three presumptions regarding the relationship between government instability, institution quality, and income redistribution. Firstly, it proposes that poor quality institutions lead to income inequality, however, redistribution declines income inequality. Secondly, a positive trend in income inequality enhances the chances of government termination and lastly, higher chances of government termination lead to enhance income distribution. The results of the study strongly support these three proposed conjectures. The study suggests that poor quality of institutions increasing income inequality, but this effect can be vanished out if the authority has the choice to embrace redistributive policies. While taking into account the role of institutions, Prohl and Schneider (2009) study reports a strong negative link between decentralization and government size.

Cassette and Paty (2010) also incorporate the role of institutions in investigating the Leviathan hypothesis for 15 European Union economies. The findings show that decentralization also reduces the central government size while enhances the sub-national government's size. Moreover, vertical imbalances have also improved the sizes of subnational and national governments sizes. However, Wu and Lin (2012) found a statistically insignificant association between fiscal decentralization and the size of government in China. While taking into account the role of institutional quality, Ashworth et al. (2013) stated that expenditure decentralization improves the size of government, while revenues decentralization is raised by sub-national governments' size of the economy. Liberati and Sacchi (2013) conclude that property tax is negatively and significantly affecting local government size while grants lead to the expansion of government size. Golem and Perovick (2014) examine the Leviathan hypothesis for a sample of 23 OECD countries. The results show a

negative association between government size and revenue decentralization. Afonso and Jalles (2016) advocate that large government size has a negative effect on the level of real GDP; however, institutions have a positive influence on the real GDP per capita as well as government size. Furthermore, the results show that weak institutions have a negative influence on government size, while strong institutions have a positive effect on government size in the economy. Most recently, Qiao et al. (2019) investigate this relationship in 76 developing and developed economies for the period of 1972-2013. The study finds a strong negative link between fiscal decentralization and government size.

While previous studies have assumed that institutional quality and fiscal decentralization and institutional have a symmetric influence on government size. The main drawback of the above studies and findings is that they assumed institutional quality and fiscal decentralization to have symmetric effects on the government size. We are unable to find a single study having a focus on examining the asymmetric impacts of fiscal decentralization and institutional quality on government size in the case of Asain economies as well the globe. The present study is a move in this direction to fill the gap in the stock of literature affecting fiscal decentralization, institutional quality, and government size debate.

## **Model, Methodology, and Data**

### **Materials & Methods**

To test the hypothesis that fiscal decentralization and institutional quality have asymmetric effects on government size at Asain economies, we hold the model specification of Cassette and Paty (2010), therefore the econometric specification is given as:

$$GS_t = \delta_0 + \delta_1 FD_t + \delta_2 IQ_t + \delta_3 GDP_t + \varepsilon_t \quad (1)$$

Where time-series data ranges from 1 to t, GS is government size, FD is fiscal decentralization includes i.e., expenditure decentralization and revenue decentralization, IQ is the institutional quality index, and GDP is a control variable. The model is measured from the government size of Asain economies, therefore, we suppose the coefficient of  $\delta_1$  to be negative and  $\delta_2$  to be positive based on empirical literature. Equation (1) gives us long-run coefficients estimates of OLS or any other method, while the error-correction approach also provides short-term effects. However, a methodology that gives the results of long and short-run effects is called the Pesaran et al.'s (2001) linear ARDL which we propose equation (1) in an error-correction model (ECM) as follows:

$$\begin{aligned} \Delta GS_t = & \alpha_0 + \sum_{i=1}^n \phi_i \Delta GS_{t-i} + \sum_{i=0}^n \lambda_i \Delta FD_{t-i} + \sum_{i=0}^n \sigma_i \Delta IQ_{t-i} + \sum_{i=0}^n \eta_i \Delta GDP_{t-i} + \delta_1 GS_{t-1} + \delta_2 FD_{t-1} \\ & + \delta_3 IQ_{t-1} + \delta_4 GDP_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$

Pesaran et al. (2001) endorse the typical F statistics to test the null hypothesis  $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$  against the alternative of  $H_1: \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \text{ and } \delta_4 \neq 0$ . If the F statistic is significant in the model, this means that cointegration also exists, for which they tabulate new small sample's critical values in this process. In equation (2), the estimates of the coefficients devoted to the "delta" indicators reproduce short-run coefficients impacts and estimates of  $\delta_2$ - $\delta_4$  normalized on  $\delta_1$  reflect long-run impacts. Indeed, under the ARDL method, all variables of the model could be a mixture of both, but not  $I(2)$ . A major assumption behind equation (2) is that a shock in the fiscal decentralization and institutional quality variable has linear behavior and effects on the government size in Asian economies separately. While we deviate from the conventional assumption, therefore fiscal centralization improves government size, the fiscal decentralization must worsen it. Therefore, partial sum processes of negative and positive changes in the IQ variables are also added in the empirical analysis. More precisely:

$$FD^+_t = \sum_{n=1}^t \Delta FD^+_t = \sum_{n=1}^t \max(\Delta FD^+_t, 0) \quad (3)$$

$$FD^-_t = \sum_{n=1}^t \Delta FD^-_t = \sum_{n=1}^t \min(\Delta FD^-_t, 0) \quad (4)$$

$$IQ^+_t = \sum_{n=1}^t \Delta IQ^+_t = \sum_{n=1}^t \max(\Delta IQ^+_t, 0) \quad (5)$$

$$IQ^-_t = \sum_{n=1}^t \Delta IQ^-_t = \sum_{n=1}^t \min(\Delta IQ^-_t, 0) \quad (6)$$

Shin et al's. (2014) offered to replace the positive shocks ( $FD^+_t$  and  $IQ^+_t$ ) and negative shocks ( $FD^-_t$  and  $IQ^-_t$ ) variables in the error-correction model of equation (2). Negative and positive shocks have the same means as negative and positive changes in variables. Therefore, both terms (negative & positive changes and negative & positive shocks) have been similarly used in prior literature. The result is the asymmetric/nonlinear ARDL model given by equation (7):

$$\begin{aligned}
\Delta GS_t = & \alpha_0 + \sum_{i=1}^n \theta_i \Delta GS_{t-i} + \sum_{i=0}^n \phi_i \Delta FD^+_{t-i} + \sum_{i=0}^n \psi_i \Delta FD^-_{t-i} + \sum_{i=0}^n \varphi_i \Delta IQ^+_{t-i} + \sum_{i=0}^n \sigma_i \Delta IQ^-_{t-i} \\
& + \sum_{i=0}^n \eta_i \Delta GDP_{t-i} + \delta_1 GS_{t-1} + \delta_2 FD^+_{t-1} + \delta_3 FD^-_{t-1} + \delta_4 IQ^+_{t-1} + \delta_5 IQ^-_{t-1} \\
& + \delta_6 GDP_{t-1} + \varepsilon_t \quad (7)
\end{aligned}$$

Although equation (7) seems symmetric/linear, they are usually denoted to as asymmetric/nonlinear ARDL models due to the two-time series variables. Shin et al's. (2014) establish a latest econometric approach is called nonlinear model (eq 7) by using OLS, while diagnostic tests will remain the same. Once the asymmetric ARDL is estimated, a few additional suppositions can be tested. First, if  $\Delta FD^+_{t-i}$  ( $\Delta IQ^+_{t-i}$ ) and  $\Delta FD^-_{t-i}$  ( $\Delta IQ^-_{t-i}$ ) accept dissimilar lag orders in either model, it will show the short-run asymmetries. Second, if the coefficient estimate of  $\Delta FD^+_{t-i}$  ( $\Delta IQ^+_{t-i}$ ) and  $\Delta FD^-_{t-i}$  ( $\Delta IQ^-_{t-i}$ ) is different at the same lag (i), it will show the short-run asymmetric impacts. Finally, we will apply the Wald test for the short and long-run dynamic asymmetries of FD and IQ on government size. However, both the symmetric equation (2) and asymmetric model equation (7) are measured in the next section.

### Data description and variables

The empirical study covers the period from 1984 to 2017 for selected ten Asian economies, namely, Pakistan, Armenia, Azerbaijan, Iran, Japan, Kazakhstan, Korea, Rep., Mongolia, Thailand, and Turkey. These economies are selected in Asia on the availability of the dataset. All the required data is retrieved from the World Development Indicators of World Bank and Government Financial Statistics of International Monetary Fund (IMF), and the International Country Risk Guide (ICRG). While Pakistan's dataset of expenditure decentralization and revenue decentralization is taken from the State Bank of Pakistan. This study is used the overall public sector. While separately analysis of various government levels is not econometrically possible due to small data observation when we break the dataset. The detailed variables description is also described in Table 1. Government size is calculated as total government expenditures as a (% of GDP) in the economy. The study has used two measures of fiscal decentralization (FD); for instance, expenditure decentralization and revenue decentralization. Expenditure decentralization is calculated as the ratio of own spending to general government spending and revenue decentralization is measured as the ratio of own revenues to general government revenues. The degree of expenditure and revenue decentralization with government size is reported in Table 2 for ten selected Asian economies. While the institutional quality index is used the six indicators, for instance,

government stability, law and order, control over corruption, democratic accountability, military in politics, and bureaucracy quality. These variables dataset is taken from ICRG. While GDP per capita is our control variable in this analysis and taken by WDI.

**Table 1: Descriptive statistics of data**

Variables	Symbol	Definition	Data source
Government Size	GS	Total government expenditures as a percentage of GDP	WDI
Expenditure Decentralization	ED	Expenditure decentralization (ratio of own spending to general government spending)	IMF
Revenue Decentralization	RD	Revenue decentralization (ratio of own revenues to general government revenues)	IMF
Institutional quality	IQ	Institutional quality is the index of six indicators, include government stability, control over corruption, military in politics, law and order, democratic accountability and bureaucracy quality	ICRG
GDP per capita	GDP	GDP per capita (constant 2010 US\$)	WDI

**Table 2: Expenditure and revenue decentralization in Asian economies**

	Pakistan	Armenia	Azerbaijan	Iran	Japan	Kazakhstan	Korea, Rep	Mongolia	Thailand	Turkey
GS	16.07	12.53	14.73	12.19	16.90	12.28	12.22	16.69	13.29	12.13
ED	0.45	0.05	0.03	0.06	0.42	0.47	0.56	0.29	0.12	0.10
RD	0.25	0.06	0.003	0.56	0.27	0.32	0.23	0.18	0.07	0.04

## Empirical results and discussion

The goal of the paper is to explore the asymmetric impacts of fiscal decentralization and institutional quality on government size in ten selected Asian economies from 1984 to 2017. Therefore, as a first step to estimate the model, stationarity properties of data are analyzed by using the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root statistics. The ADF statistics indicate that GS, ED, RD, and GDP are non-stationary at the level or  $I(0)$  and become stationary at the first difference  $I(1)$  in Pakistan in Table 3. While IQ is stationary at a level in Pakistan which implies that the variables of the models fulfill all the conditions of the ARDL approach. However, PP statistics revealed that all indicators are non-stationary at the  $I(0)$  and become stationary at  $I(1)$  in Pakistan. The results are also recapped that Armenia, Azerbaijan, Iran, Japan, Kazakhstan, Korea, Rep., Mongolia, Thailand, and Turkey variables are a mixture of  $I(0)$  and  $I(1)$ , and none of the indicators are integrated  $I(2)$  in Table 3.

**Table 3: Unit root tests**

	GS		ED		RD		IQ		GDP	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
<b>Pakistan</b>										
$I(0)$	-1.497	-1.46	-1.423	-1.423	0.197	0.222	-2.787*	-1.752	-1.007	-0.997
$I(1)$	-5.953***	-5.963***	-7.442***	-11.97***	-5.211***	-5.205***		-4.219***	-4.528***	-4.462***
<b>Armenia</b>										
$I(0)$	-1.663	-1.746	-1.053	-1.016	-2.633*	-2.379	-1.614	-1.630	-0.137	-0.373

I(1)	-5.118***	-5.098	-6.165***	-6.219***		-4.784***	-4.549***	-4.453***	-3.710***	-3.635***
<b>Azerbaijan</b>										
I(0)	-1.874	-1.729	-1.752	-1.126	-1.056	-0.802	-1.097	-1.151	-1.712	-0.726
I(1)	-5.631***	-5.811***	-6.756***	-9.676***	-6.898***	-6.913***	-7.727***	-7.749***	-2.658*	-2.916*
<b>Iran</b>										
I(0)	-2.548	-2.548	-3.056***	-3.076*	-1.161	-1.161	-1.714	-1.714	-0.043	-0.329
I(1)					-5.576***	-5.576***	-2.906*		-4.186***	-4.121***
<b>Japan</b>										
I(0)	-0.220	-0.447	-1.158	-1.154	-0.855	-1.484	-1.180	-1.443	-3.892***	-3.909***
I(1)	-3.701***	-3.733***	-10.26***	-10.54***	-3.146***	-3.091***	-3.536***	-3.511***		
<b>Kazakhstan</b>										
I(0)	-2.769*	-2.648*	-0.683	-0.917	-1.335	-1.388	-2.178	-2.207	-0.275	-0.598
I(1)			-4.397***	-4.375	-4.851***	-4.843***	-4.876***	-4.821***	-3.224***	-3.303**
<b>Korea, Rep</b>										
I(0)	0.030	0.188	-1.539	-1.273	-3.160*	-2.989**	-1.996	-2.074	-4.662***	-7.533***
I(1)	-6.177***	-6.201***	-7.299***	-8.313***			-4.028***	-3.873***		
<b>Mongolia</b>										
I(0)	-2.140	-1.869	-1.834	-1.688	-2.262	-2.028	-1.714	-1.945	-1.548	0.710
I(1)	-7.309***	-8.319***	-7.183***	-7.426***	-9.713***	-11.34***	-2.991**	-2.973**	-2.614*	-2.761*
<b>Thailand</b>										
I(0)	-0.308	-0.816	-1.212	-1.261	-3.363**	-3.301**	-0.665	-0.894	-2.660*	-2.668*
I(1)	-2.900**	-3.017**	-4.230***	-4.299***			-4.884***	-4.880***		
<b>Turkey</b>										
I(0)	-1.611	-1.609	-1.339	-0.502	-3.470***	-3.412***	-1.918	-2.214	0.289	0.461
I(1)	-5.813***	-5.807***	-7.132***	-8.867***			-3.975***	-3.834***	-5.995***	-6.020***

Table 4 describes the long-and short-run outcomes of linear ARDL. In panel A, the short-run coefficients of ED transmit a negative impact on government size in Pakistan, Armenia, and Iran. However, the short-run coefficient of ED has a positive significant impact on government size in Japan and Kazakhstan. Coefficients of the short run for the Pakistan, Armenia, and Azerbaijan show that RD has a significant and positive impact on government size. Contrary results have been revealed in Iran and Turkey, in which, ED has a negative significant impact on government size. Also, short-run outcomes indicate that IQ has a negative impact on government size in Pakistan and Mongolia, while IQ has a positive impact on government size in Azerbaijan, Japan, Thailand. Furthermore, in the short-run, only GDP has a positive impact on government size in Pakistan while, GDP has found negative coefficients in Armenia, Japan, Korea, Rep., Mongolia, and Thailand.

In panel B, ED and RD have a significant and positive impact on government size in Pakistan and Kazakhstan in the long run. Similarly, the results also show that RD has a significant positive impact on government size in Armenia and Mongolia. This implies that higher expenditure and revenue decentralization expand the government size and also these findings contradict the Leviathan Hypothesis in Pakistan. This finding is consistent with the evidence documented by Stein (1999) for Latin America, Jin and Zou (2002) for 32 developing and industrial countries, Wu and Lin (2010) for China, Baskaran (2011) for 18 OECD countries, and Ashworth et al. (2013) for 28 countries. However, the coefficient of institutional quality is significant and positive effects in Pakistan and Azerbaijan it shows the valuable quality of institutions is rising the government

size in the long term. The coefficient on GDP is significant and negative in Pakistan and Mongolia which indicates that an upsurge in GDP tends to decline the government size. This result also conflicts with Wagner's law who noted that income level increases the government size. While Wagner's law predicts in Armenia, Azerbaijan, Kazakhstan, and Thailand.

Panel C reports the diagnostic statistics of the ARDL model. The result displays that F-test statistics are significant in 6 out of 10 economies, which implies that the long-run relationship also exists in the model. The ECM test is another test for cointegration that is significant in 7 economies, which implies that cointegration is supported by F-test and ECM. Moreover, the long-run estimates are reliable because of significant ECM and F-tests in 6 and 7 cases. The diagnostic statistics reveal that models are autocorrelation and heteroscedasticity problems free. While RESET test statistics are also insignificant, it implies that all models are correctly specified. Additionally, CUSUM and CUSUM square tests also show stability in estimated coefficients of ARDL models.

**Table 4: Long and short-run estimates of ARDL**

	Pakistan	Armenia	Azerbaijan	Iran	Japan	Kazakhstan	Korea, Rep	Mongolia	Thailand	Turkey
<b>Short run estimates</b>										
$\Delta ED_t$	-8.301**	-2.056*	2.862	-	0.246*	1.049*	0.039	0.072	-0.045	0.808
				10.47**						
	4.302	1.726	0.254	2.216	1.741	1.677	0.210	0.177	0.123	0.254
$\Delta ED_{t-1}$	6.965*				0.601			0.440		
	1.872				0.587			1.142		
$\Delta ED_{t-2}$	9.806**									
	2.273									
$\Delta RD_t$	1.357*	5.025***	6.572*	-0.114*	0.164	0.416	-0.274	0.205	1.207	-8.988*
	1.779	3.212	1.711	1.755	0.437	1.126	0.381	0.296	0.975	1.672
$\Delta RD_{t-1}$	0.283				-0.681**					
	0.376				1.965					
$\Delta RD_{t-2}$	-1.088*									
	1.708									
$\Delta IQ_t$	-4.271**	0.120	0.796***	0.043	0.016*	-0.108	0.022	-0.324***	0.041*	-0.010
	4.146	1.186	4.485	0.054	1.853	1.121	1.245	2.845	1.754	0.575
$\Delta IQ_{t-1}$	-0.612			0.156**					0.135	
	0.496			2.545					0.533	
$\Delta IQ_{t-2}$	7.578**									
	4.737									
$\Delta GDP_t$	4.231**	-0.265*	-0.123	-0.038	-	0.079	-0.931***	-2.099***	-0.654***	0.086
					0.866***					
	2.505	1.782	0.232	0.156	8.232	0.123	5.287	3.176	3.054	0.655
$\Delta GDP_{t-1}$	-7.603	-	-0.959***			-0.719***	0.389	0.787		
		0.542***								
	0.412	2.684	2.232			3.421	1.625	1.333		
$\Delta GDP_{t-2}$	16.03	0.272*								
	1.263	1.802								
<b>Long run estimates</b>										
ED	4.863**	-3.192*	2.075	-8.959	-21.19	1.648***	0.307	-0.405*	-0.188	-7.346
	5.148	1.702	0.254	0.689	0.462	5.654	0.198	1.712	0.112	0.233
RD	7.171*	7.798***	3.373*	0.099	-12.92	1.022***	-2.144	2.747***	5.023	-6.302
	1.662	4.327	1.688	0.457	0.425	10.25	0.374	4.255	0.845	0.867

IQ	5.335**	-0.063	0.577***	-0.012	0.233	-0.059	0.368	-0.272***	-0.023	-0.078
	3.116	0.413	6.565	0.184	0.354	1.121	0.914	10.32	0.847	0.454
GDP	-6.785**	0.225**	0.087**	-0.090	-6.047	0.181***	0.067	-0.103*	0.439**	0.618
	7.533	2.265	2.352	0.154	0.421	4.215	1.125	1.715	2.556	0.736
C	35.41***	0.603	1.248***	3.066	3.075**	-0.073	-0.442	3.215***	1.458***	5.664
	7.782	0.853	2.977	0.785	2.115	0.155	0.123	3.234	5.255	1.235
<b>Diagnostic statistics</b>										
ECM <sub>t-1</sub>	-0.50**	-0.64***	-0.67***	-	0.12	-0.81***	-0.12	-0.67***	-0.24***	-0.14
				0.42***						
	2.41	3.40	6.54	2.58	0.42	5.85	1.51	6.01	3.24	-1.15
F-test	4.97*	2.06	5.58**	2.27	9.63**	12.4**	0.71	8.45**	6.31**	1.44
ADJ.R2	0.97	0.97	0.88	0.92	0.89	0.84	0.89	0.89	0.96	0.87
LM	1.02	0.72	0.78	0.26	0.52	1.84	0.21	1.94	1.52	0.19
Hetero	0.54	1.30	1.49	0.54	1.05	1.42	0.89	1.27	0.68	4.24
RESET	0.18	1.07	1.71	0.79	0.47	2.44	0.57	1.63	0.07	1.59
CUSUM	US	S	S	S	S	S	S	S	S	S
CUSUM square	S	S	S	S	S	S	S	S	S	US

**Note:** \*\*\*, \*\*, and \* indicate 1%, 5%, and 10% significance level, respectively. Bounds F-tests critical values; 4.15 at 10% and 5.01 at 5% level of significance. The critical values of LM and RESET tests statistics are 2.71(3.84) at 10% (5%) significance level.

Table 5 describes the long run and short run NARDL regression results. In short-run estimates, the positive shock of ED has a negative significant influence on government size in Armenia, Iran, and Mongolia while the positive shock of ED exerts a positive significant impact on government size in Japan, Thailand, and Turkey. While the negative shock of ED has a negative significant influence on government size in Pakistan, Japan, Thailand, and Turkey while the negative shock of ED exerts a positive significant impact on government size in Mongolia. This implies that ED has an asymmetric influence on government size in terms of magnitude and direction. Furthermore, the negative and positive shock of ED has similar results in the long and short term.

Similarly, negative and positive shock in RD has a similar direction in magnitude in Azerbaijan, Armenia, Korea, Rep., Iran, Kazakhstan, while the opposite direction in magnitude in Pakistan, Japan, Mongolia, Thailand, and Turkey in negative and positive shock of RD in the short run. Empirical results of negative and positive shocks in RD are maintained in the long run. Overall asymmetric results of fiscal decentralization are not signifying the linear Leviathan Hypothesis in our study. The findings get support from results obtained by Jin and Zu (2002) for the 32 industrial and developing economies, Wu and Lin (2010) for China, Baskaran (2011) for the 18 OECD countries, Golem and Perovick (2014), and Stein and Caro (2017) for the panel of Latin American and OECD countries.

From the long term estimates of IQ, it is evident that positive shock in IQ has significant impacts on government size in Pakistan, Azerbaijan, Japan, and Thailand in long run, while effects are significantly different in magnitude. This finding is consistent with Sobhee (2010), who noted that institutional quality improves the government size in Sub-Saharan economies. This implies that institutional quality has increased the institution's work efficiency, in results, increases the government size in Azerbaijan, Japan, Thailand. This also suggests that

the institution's quality also matters in regulating the government size in the economy. While positive shock in institutional quality shrank the government size in Pakistan and Mongolia in long run. The possible reason is that institutional reforms improve governance quality by shrinking the government size in Pakistan and Mongolia. Interestingly, a negative shock also improves the government size in Pakistan, Azerbaijan, Japan, and Thailand in long run. Short-run asymmetric results of IQ are maintained and similar to long-run estimates. GDP is a positive impact on the size of government and the coefficient is statistically significant in Pakistan, Azerbaijan, Kazakhstan, Korea, Rep, Mongolia in the long term. The results also show that the GDP has a significant effect on government size in the long-run suggesting that the increase in GDP meaningfully contributes to determining the size of government in Pakistan. However, the opposite result is found in Turkey, which suggests that GDP decreases government size in the long run.

We have also described a few extra diagnostic tests of NARDL model in panel C. The ECM values in all Asian economies are negative and significant, it infers that the rate of adjustment towards the long-run equilibrium is about 36%, 45%, 77%, 39%, 19%, 83%, 17%, 45%, 34%, and 84% over each year for Pakistan, Armenia, Azerbaijan, Iran, Japan, Kazakhstan, Korea, Rep., Mongolia, Thailand, and Turkey respectively. Regarding the presence of co-integration, only in 6 economies is asymmetry cointegration supported by F test in NARDL diagnostic estimates. The results show that LM, RESET, and heteroskedasticity test statistics values are insignificant in our models, which implies that residuals are autocorrelation free, no problem of heteroskedasticity, and the model is not suffering from misspecification. We have further functional the CUSUM and CUSUM of square tests to the estimated residuals. All models show the stability which is specified with “S” for the stable, except three models. In the Wald test, the results of asymmetries suggest that negative and positive changes in ED and RD affect government size differently in Pakistan, Armenia, Iran, Japan, Kazakhstan, Korea, Rep., Mongolia, Thailand, and Turkey in the short and long run in panel C.

**Table 5: Long and short run estimates of NARDL**

	Pakistan	Armenia	Azerbaijan	Iran	Japan	Kazakhstan	Korea, Rep	Mongolia	Thailand	Turkey
<b>Short run estimates</b>										
$\Delta ED_t^+$	2.020	-2.102*	4.363	-4.622***	1.410***	0.406	-0.019	-0.762*	1.726**	2.094**
	0.928	1.732	0.312	2.632	5.865	0.321	0.210	1.682	2.521	2.392
$\Delta ED_{t-1}^+$			0.278				0.178*			
			1.112				1.912			
$\Delta ED_t^-$	-6.561**	-2.343	2.984	-2.215	-0.287*	0.811	-0.029	0.923**	-1.378**	-2.766***
	5.194	0.392	0.265	0.356	1.672	0.871	0.282	2.112	2.073	3.883
$\Delta RD_t^+$	0.063	-1.525**	3.331	-3.035***	0.912***	0.469	-0.321*	-0.927*	1.267**	1.605*
	0.106	1.972	0.309	3.902	4.502	0.319	1.674	1.827	1.912	1.664
$\Delta RD_{t-1}^+$	0.983				0.124					
	1.637				0.986					

$\Delta RD_t^-$	-2.100*	-2.400	1.842	-3.523	-0.294*	0.807	-0.038*	0.783*	-1.708**	-1.986*
	1.873	0.278	0.359	0.895	1.697	0.717	1.821	1.782	2.738	1.839
$\Delta IQ_t^+$	-7.309**	0.091	0.901***	-0.034	0.045***	-0.182	-0.062	-0.452**	0.102***	-0.015
	4.541	0.462	2.178	0.394	4.752	1.052	1.225	3.475	3.224	0.276
$\Delta IQ_{t-1}^+$	-3.151*	0.452		0.192**						
	1.782	1.592		2.201						
$\Delta IQ_t^-$	5.970**	0.297	0.631***	0.012	-0.021*	-0.062	0.027*	-0.283***	0.042***	-0.035
	3.865	2.014	3.245	0.123	1.672	0.263	1.872	2.691	2.856	0.736
$\Delta IQ_{t-1}^-$	1.912	-0.339		0.233	0.094***	-0.312				
	1.523	2.121		1.902	4.563	1.302				
$\Delta GDP_t$	0.239	-0.261*	-0.141	-0.080	-0.825***	0.117	-0.830***	-0.335	-0.715***	-0.586***
	0.032	1.674	0.365	0.233	10.09	0.894	5.653	0.492	3.684	3.293
$\Delta GDP_{t-1}$	-6.859	-0.521***	-0.921			-0.799***				
	0.980	2.612	0.885			3.578				
$\Delta GDP_{t-2}$		0.272				0.123				
		1.523				0.145				
<b>Long run estimates</b>										
$ED^+$	1.482	-3.296	3.165	-4.256	4.645*	1.126**	-1.708**	-0.728	2.681**	2.101***
	0.978	0.966	0.355	0.365	1.788	2.086	1.966	1.226	2.163	3.156
$ED^-$	-9.211**	-3.671	2.165	-5.635	3.005	1.821***	-0.167	0.883**	-4.006***	-2.775***
	4.990	0.296	0.245	0.364	1.121	5.346	0.268	2.116	2.786	3.786
$RD^+$	0.722**	1.678	1.598	1.321	2.508*	1.602*	-1.823	1.288	2.100**	1.610*
	1.967	1.602	1.303	1.243	1.877	1.787	1.236	0.698	2.105	1.701
$RD^-$	-1.988**	1.147	1.598	1.562	2.514	1.108**	1.170	-0.563*	-3.615**	-0.897*
	2.020	1.017	0.509	1.340	1.154	2.004	0.789	1.870	2.017	1.689
$IQ^+$	-3.716**	-1.011	0.603***	0.015	0.075***	-0.123	0.485	-0.231***	0.275***	-0.043
	4.888	2.801	2.425	0.067	6.152	1.175	0.339	6.320	2.896	0.576
$IQ^-$	4.860**	0.524	0.423***	-0.321	0.182***	0.175*	0.238	-0.145***	0.112**	-0.235
	6.235	2.467	3.965	1.384	6.852	1.852	0.682	3.325	2.296	0.123
$GDP$	12.61***	0.213	0.090*	-0.204	0.733	0.256***	0.966**	0.567*	-0.266	-0.588***
	3.935	1.466	1.756	0.231	1.146	3.346	2.356	1.947	1.277	4.847
$C$	-17.5**	3.211	1.375***	4.136	-8.343	0.172	-5.462	-0.529	3.465***	7.258***
	3.260	1.233	2.655	0.545	0.978	0.254	1.565	0.214	2.595	6.565
<b>Diagnostic statistics</b>										
$ECM_{t-1}$	-0.36***	-0.45*	-0.77***	-0.39***	-0.19*	-0.83***	-0.17**	-0.45***	-0.34***	-0.84**
	7.27	1.85	6.45	2.43	1.87	7.52	2.20	4.12	4.31	2.56
F-test	7.03**	3.56	4.56*	2.12	6.44**	10.5**	4.56*	3.45	7.17**	2.56
ADJ.R2	0.98	0.95	0.94	0.92	0.92	0.94	0.92	0.92	0.95	0.92
LM	0.08	0.23	0.87	0.65	1.33	2.02	2.20	3.95**	1.47	0.46
Hetero	1.13	0.45	1.54	0.74	0.99	0.85	1.42	2.15	0.31	0.59
RESET	0.78	0.12	1.87	1.94	0.21	2.01	0.56	1.01	0.56	1.66
CUSUM	S	S	S	S	S	S	S	S	S	S
CUSUM square	S	S	US	S	S	S	US	US	S	S
Wald-ED-SR	3.34*	3.37*	0.39	4.31**	3.31**	1.08	0.38	3.57*	3.58*	13.23**
Wald-ED-LR	2.34*	0.19	2.67	1.04	2.93*	4.57*	2.35	3.36*	5.39**	1.25
Wald-RD-SR	4.09**	2.89*	2.38	3.50*	3.39*	1.09	8.51***	3.58**	5.51**	3.38*
Wald-RD-LR	3.35*	2.61	1.60	2.08	3.95**	5.09**	3.455*	4.39**	5.03**	4.33**

**Note:** \*\*\*, \*\*, and \* indicate 1%, 5%, and 10% significance level, respectively. Bounds F-tests critical values; 4.15 at 10% and 5.01 at 5% level of significance. The critical values of LM and RESET tests statistics are 2.71(3.84) at 10% (5%) significance level.

## **Conclusion and and policy recommendations**

Since the last few decades, it has been realized that decentralized governments are more accountable and their performance is more welfare enhancing. Decentralization is a process in which the transfer of controls from the central or federal authority to sub-national authorities. Under fiscal decentralization, central governments perform their stabilization and redistributions functions more efficiently and allocative efficiency is improved when subnational governments are allowed to generate their resources to collect taxes and govern their expenditures. In this context, the issue arises on how decentralization is affecting the size of central and sub-national governments. Therefore, this empirical investigation examines the asymmetric effects of fiscal decentralization and institutional quality on the size of government by using the annual dataset of selected Asian economies from 1984 to 2017.

The results show that positive shock in ED has a positive significant effect on government size in Japan, Kazakhstan, Thailand, and Turkey, while negative shocks in ED have a negative effect on government size in the long term in Pakistan, Thailand, and Turkey. The asymmetric long-term results reveal that negative shocks in ED tend to increase government size in Kazakhstan and Mongolia. Similarly, the positive shock of RD has a positive effect on government size in Pakistan, Japan, Kazakstan, Thailand, and Turkey. However, a negative shock to RD has reduced the government size in Pakistan, Mongolia, Thailand, and Turkey while the adverse impact is found in negative shock in Kazakhstan in the long run. The results show that short-run asymmetries exist in FD and RD in some selected Asian economies. The Asymmetric findings show that the Leviathan hypothesis is incorrect in the case of fiscal decentralization in Asia. The findings also show that asymmetric effects have deviated from the systematic effects in Asian economies.

The results also disclosed that positive shock in IQ increases government size in Azerbaijan, Japan, Thailand and negative shock in IQ also increases government size in Pakistan, Azerbaijan, Japan, Kazakhstan, Thailand, in the long run. This implies that IQ expands the size of the government in most Asian economies. The attained outcomes show that an asymmetric effect also exists in terms of magnitude and direction and asymmetric effects are also deviating from the symmetric effect. In NARDL models, coefficients on the control variables are significant and hold expected signs. While, GDP has a significant positive impact on government size in Pakistan, Azerbaijan, Kazakhstan, Korea, Rep, Mongolia, which implies that economic size also increases the government size in Pakistan, Azerbaijan, Kazakhstan, Korea, Rep., Mongolia. However, economic size is contracted the government size in Turkey.

Based on the empirical outcomes, some economic policy implications are suggested for the provincial and federal governments of Asian economies as well as developing economies. The policymakers may attention to the fiscal decentralization and quality of institutions by formulating the size of the public sector. As for the applicable research in the future, more empirical studies can be carried out by using asymmetric ARDL methods, which would provide clues to the researchers to reach more comprehensive results concerning the fiscal decentralization, institutional quality, and government size nexus, especially in developing economies. Indeed, the applications of asymmetric causality could be more helpful and fruitful, this would be essential for more targeted policy implications.

**Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Competing Interests:** The authors declare that they have no conflict of interest.

**Funding:** Not applicable.

**Authors Contributions:** This idea was given by Sidra Sohail. Sidra Sohail, Sana Ullah, and Ilhan Ozturk, analyzed the data and wrote the complete paper. While Attiya Yasmin Javid read and approved the final version.

**Acknowledgements:** Not applicable

## References

- Afonso, A., & Jalles, J. T (2016) Economic performance, government size, and institutional quality. *Empirica* 43(1): 83-109
- Arora, P., & Chong, A (2018) Government effectiveness in the provision of public goods: the role of institutional quality. *J. Appl. Econ* 21(1): 175-196
- Ashworth, J., Galli, E., & Padovano, F (2013) Decentralization as a constraint to Leviathan: a panel cointegration analysis. *Public Choice* 156(3-4): 491-516
- Baskaran, T (2011) Fiscal decentralization, ideology, and the size of the public sector. *Eur. J. Political Econ.* 27(3): 485-506
- Brennan, G., & Buchanan, J. M (1980) *The power to tax: Analytic foundations of a fiscal constitution.* Cambridge University Press.
- Canavire-Bacarreza, G., Martinez-Vazquez, J., & Yedgenov, B (2020) Identifying and disentangling the impact of fiscal decentralization on economic growth. *World Dev.* 127: 104742

- Carmignani, F (2009) The distributive effects of institutional quality when government stability is endogenous. *Eur. J. Political Econ* 25(4): 409-421
- Carniti, E., Cerniglia, F., Longaretti, R., & Michelangeli, A (2019) Decentralization and economic growth in Europe: for whom the bell tolls. *Reg. Stud* 53(6): 775-789
- Cassette, A., & Paty, S (2010) Fiscal decentralization and the size of government: a European country empirical analysis. *Public Choice* 143(1-2): 173-189
- Chong, A., & Gradstein, M (2007) Institutional quality and government efficiency (No. 606). Working paper.
- Ehdaie, J (1994) Fiscal decentralization and the size of the government: an extension with evidence from cross-country data (No. 1387). World Bank.
- Fiva, J. H (2006) New evidence on the effect of fiscal decentralization on the size and composition of government spending. *FinanzArchiv/Public Finance Analysis* 62(2): 250-280
- Golem, S., & Perovic, L (2014) An Empirical Analysis of the Relationship between Fiscal Decentralization and the Size of Government. *Finance a Uver: Czech Journal of Economics & Finance* 64(1): 30-58
- Grossman, P. J (1989) Fiscal decentralization and government size: An extension. *Public Choice* 62(1): 63-69.
- Hayek, F. A (1945) The Use of Knowledge in Society, *Am Econ Rev* 35(4): 519-530
- Jia, J., Ding, S., & Liu, Y (2020) Decentralization, incentives, and local tax enforcement. *J. Urban Econ.* 115: 103225
- Jin, J., & Zou, H. F (2002) How does fiscal decentralization affect aggregate, national, and subnational government size?. *J. Urban Econ.* 52(2): 270-293
- Liberati, P., & Sacchi, A (2013) Tax decentralization and local government size. *Public Choice* 157(1-2): 183-205
- Makreshanska, S., & Petrevski, G (2016) Fiscal decentralization and government size across Europe. MPRA Paper No. 82472
- Marlow, M. L (1988) Fiscal decentralization and government size. *Public Choice* 56(3): 259-269
- Musgrave, R. A (1959) *The Theory of Public Finance—A Study in Public Economy*, New York: McGraw Hill
- Nelson, M. A (1986) An empirical analysis of state and local tax structure in the context of the Leviathan model of government. *Public Choice* 49(3): 283-294
- Oates, W. E (2005) Toward a Second-Generation Theory of Fiscal Federalism, *J Int. Tax Public Finance* 12(4): 349-373
- Oates, W. E (1985) Searching for Leviathan: An empirical study. *Am. Econ. Rev.* 75(4): 748-757

- Oates, W. E (1999) An essay on fiscal federalism. *J. Econ. Lit.* 37(3): 1120-1149
- Pesaran, M. H., Shin, Y., & Smith, R. J (2001) Bounds testing approaches to the analysis of level relationships. *J. Appl. Econ.* 16(3): 289-326
- Plaček, M., Ochrana, F., Půček, M. J., & Nemeč, J (2020) Fiscal Decentralization Reforms and Local Government Efficiency: An Introduction. In *Fiscal Decentralization Reforms* (pp. 1-49). Springer, Cham.
- Prohl, S., & Schneider, F (2009) Does decentralization reduce government size? A quantitative study of the decentralization hypothesis. *Public Finance Rev.* 37(6): 639-664
- Qiao, M., Ding, S., & Liu, Y (2019) Fiscal decentralization and government size: The role of democracy. *Eur. J. Political Econ.* 59: 316-330
- Rodden, J (2003) Reviving Leviathan: fiscal federalism and the growth of government. *Int. Organ.* 57(4): 695-729
- Shadbegian, R. J (1999) Fiscal federalism, collusion, and government size: evidence from the states. *Public Finance Rev* 27(3): 262-281
- Shin, Y., Yu, B., & Greenwood-Nimmo, M (2014) Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In *Festschrift in honor of Peter Schmidt* (pp. 281-314). Springer, New York, NY.
- Snowdon, B., & Vane, H. R (2005) *Modern macroeconomics: its origins, development and current state*. Edward Elgar Publishing.
- Sobhee, S. K (2010) Would Better Institutional Quality Contribute towards Reducing the Size of Government in Sub-Saharan Africa?. *Margin: J. Appl. Econ.* 4(3): 265-278
- Song, M., Du, J., & Tan, K. H (2018) Impact of fiscal decentralization on green total factor productivity. *Int. J. Prod. Econ.* 205: 359-367
- Stein, E (1999) Fiscal decentralization and government size in Latin America. *J. Appl. Econ.* 2(2): 357-391
- Stein, E., & Caro, L (2017) Ideology and Taxation in Latin America. *Journal of the Latin American and Caribbean Economic Association* 17(2): 1-27
- Tanzi, V., & Schuknecht, L (1997) Reconsidering the fiscal role of government: the international perspective. *Am. Econ. Rev.* 87(2): 164-168
- Thanh, S. D., & Canh, N. P (2019) Local Governance: Impacts of Fiscal Decentralization on Government Size and Spending Composition in Vietnam. *Asian Economic Journal* 33(4): 311-340

- Thiessen, U (2003) Fiscal decentralisation and economic growth in high-income OECD Countries. *Fiscal Studies* 24(3): 237-274
- Tiebout, C. M (1956) A Pure Theory of Local Expenditures, *J Polit Econ* 64(5): 416-424
- Wu, A. M., & Lin, M (2012) Determinants of government size: Evidence from China. *Public Choice* 151(1-2): 255-270