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INVESTIGATING THE RELATIONSHIP AMONG FISCAL DECENTRALIZATION, PUBLIC DEBT AND ECONOMIC GROWTH: A CASE OF SELECTED ASIAN COUNTRIES

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Abstract

One of the dangers of fiscal decentralization is excessive borrowing by subnational governments. Fiscal decentralization increases public sector orderliness and leads to economic growth. This study investigates association between fiscal decentralization, public debt and economic extension in a set of panel data of selected Asian countries from 1995-2023. Study employs econometrics approaches: pooled mean group (PMG), mean group (MG), dynamic fixed effects (REM), and also uses fully modified ordinary least square (FMOLS) and dynamic ordinary least square (DOLS) tests for avoiding the endogeneity issue in the data along with Westerlund and padroni Cointegration test for non-stationary panel data analyses. This study found that decentralization of expenditure leads to a reduction in public debt, and decentralization of both expenditure and revenue has mixed effects on economic growth. Additionally, increasing government debt has negative consequences on economic growth in the short and long term, refuting the idea that public debt only has negative effects when it exceeds 90% of GDP. In summary, the study supports the view that public debt hinders economic growth. The policy implications for increasing revenue decentralization in order to meet the economic growth target are highlighted.

INTRODUCTION

Fiscal decentralization, defined as "the delegation of expenditure and revenue responsibilities to smaller governments," has the potential to impact public service delivery (Huynh & Tran, 2021; Martinez-Vazquez & McNab, 2006; Oates, 1993). In the worldwide sample, decentralization affects economic growth favorably and marginally, but negatively and irrelevantly in industrialized nations. Furthermore, in poor nations, expenditure decentralization has a positive but negligible influence on GDP growth, although RevDec has a positive and considerable impact. This suggests that revenue decentralization would improve fiscal responsibility and long-term macroeconomic policies, thereby increasing the rate of per capita GDP growth in both developing and developed countries (Baskaran, 2010a; Bodman, 2011; Enikolopov & Zhuravskaya, 2007; Martinez-Vazquez & McNab, 2006; Rodríguez-Pose & Ezcurra, 2010).

Fiscal decentralization is a process about shifting financial resources and authority for making decisions from the federal government to local and state governments, such as regional or local governments. Subnational governments are now more in charge of their own finances and are able to customize their policies and spending to meet the unique requirements and preferences of their

local communities. Fiscal decentralization may have a significant impact on national and subnational public debt. Whenever a central government decentralizes take appropriate measures to subnational governments, the national government's budget is relieved, potentially leading to a reduction in public debt.

Overall, there are many variables that affect the affiliation between fiscal decentralization and public debt, including institutional and regulatory frameworks in place, the fiscal policies of the central and subnational governments, and the overall state of the economy. Public debt, fiscal decentralization, and economic growth all have complicated relationships that depend on a variety of variables. A non-fiscal financial instrument known as public debt influences and contributes to the creation of public government revenues. Is therefore primarily borrowed from external organizations and is accustomed to finance deliberate assignments and budget deficits, among other things. Public debt is made up of supplemental liabilities such as property export, damage compensation, and restitution in addition to obligations resulting from public debt contracts.

Public debt does indeed have a negative impact on the economic growth of many countries because of the fiscal burden which interest-bearing loan repayment imposes on the economy. In terms of emerging economies, Asia is the group of nations that borrows the most, so the concern of rising public debt is particularly crucial for that continent (Asteriou et al., 2021; Thao, 2018).

Public debt's relevance and consequences on the national economy can be seen either directly or indirectly through its influence on monetary and fiscal policy. The maximum level of public debt is influenced by the economy's capacity to expand as well as where the debt will end up. The impact of public debt on employment generation, higher educational attainment, and living conditions would've been significant. The effective use of public debt does have the potential to stimulate economic growth and development (Aschauer, 1989; Devarajan; Selimaj et al., 2020).

Public debt has positive influence on economic growth. The effects of government debt on economic growth by crowding out private investment or changing the structure of government spending. Economic growth and public debt have a distinct and extremely negative relationship (Fincke & Greiner, 2015; Thao, 2018). The 4th trend of worldwide debt, which resulted from a severe economic downturn and a global health crisis, saw the largest one-year debt deluge since World War II (World Bank, 2020). The total amount of debt reached $226 trillion. Global debt increased by 28 to 256 percent of GDP (IMF). The increase seems to have been primarily caused by government borrowing, which pushed the global public debt ratio to an all-time high of 99 percent of GDP (Gómez-Puig et al., 2022).

Fiscal decentralization improves state and local governments' ability to service long-term outstanding debt but has little effect on their ability to issue long-term debt. The ability of the government to pay off the long-term debt held by both state and local governments, additionally local governments alone, is closely related to the distribution of expenditure responsibilities to both state and local governments (Chudik et al., 2017; Gómez-Puig & Sosvilla-Rivero, 2018).

Many emerging economies have devolved fiscal powers to subnational governments to promote economic growth. According to the report, since 2008, over 120 developing nations have implemented various forms of decentralization (Digdowiseiso, 2022; Göcen et al., 2017; Ivanyna & Shah, 2014). Demonstrate how revenue decentralization puts stress on local governments for collecting more taxes. A rising tax burden, on the other hand, emboldens people and businesses to participate in the informal economy, Fiscal decentralization and debt service capacity Local governments in a decentralized state with 217 ratios of debt to own-source revenue must deal with their financial issues and take risks using their own revenues with little help from the state (Huynh & Tran, 2021). Local governments and private organizations gain two things as a result of fiscal decentralization: funds to deliver decentralized functions and revenue-generating authority and discretion to decide on expenditures (World Bank).

Furthermore, the "decentralization theorem" argues that subnational governments deliver services and goods at the most appropriate level when the central government does not have a demonstrable advantage in those areas (Ivanyna & Shah, 2014; Oates, 1993).

Even though Asian states are the world's leading debtors among emerging economies, increasing public debt is a particular concern in that country. Asian economies have experienced two significant crises: the Asian financial crisis in 1998 and the global financial crisis in 2008. Both events have contributed to an increase in their public debt to GDP ratios. Asian Financial Crisis in late 1990s caused significant losses to several ASEAN countries, with one of the leading causes being "maturity mismatch," which occurred because once the short-term debt was utilized to finance domestically long-term oriented investment projects (Asteriou et al., 2021).

Government debt has already continued to rise to 35-50 percent of the GDP in Malaysia and Thailand, and 90-100 percent of the GDP in Indonesia and the Philippines as a result of financial bailouts and deficit spending to stimulate demand during the Asian crisis (World Bank, 2000). By the end of 2000, the four Southeast Asian countries' public debt to GDP ratio had exceeded the Maastricht criterion of 60%. During the crisis, ASEAN economies experienced a significant slowdown because of foreign currency depreciation, rising inflation and toxic debt, corporate and organization bankruptcies, and a high unemployment rate, in addition to a sharp intensification in public debt (Thao, 2018). Pakistan's government debt grew to 73688 PKR billion in March, up from 73035.70 PKR billion in February 2025. From 2011 to 2025, Pakistan's government debt averaged 30343.26 PKR billion, with an all-time high of 73688.00 PKR billion in March 2025 and a record low of 9266.90 PKR billion in January 2011 (state bank of Pakistan:,TradingEconomics.com).

Fiscal decentralization is positively related to state and local government capabilities to service long-term outstanding debt but has little repercussions on their capacity to issue long-term debt. The inference is that the allocation of expenditure responsibilities towards both municipalities and states is intrinsically correlated to the government's capacity to better serve long-term debt outstanding and revenues retained by state and local governments, and by local governments alone (Panizza & Presbitero, 2014; Thao, 2018).

In proposed study, fiscal decentralization effects, public debt in addition to economic growth in a sample of decentralized nations are examined from 1995 to 2022. By introducing fiscal decentralization and public debt and their effects on economic growth, a new perspective has been added to the literature. This study uses economic growth as a dependent variable, followed by indicators of fiscal decentralization and public debt as independent variables.

This research intends to contribute to the expanding literature in this topic by using proper empirical methodologies with a set of Asian countries. The study's primary goals are: To investigate the relationship between public debt and fiscal decentralization. To investigate the relationship between economic growth and fiscal decentralization. It also investigates the link between economic growth and public debt, and to advocate for some policy endorsement based on outcomes. This study used data period from 1995 to 2022 for selected Asian countries, because of data availability on the basis of decentralization. The reason for the selection of countries is that all Asian countries are not decentralized and due to unavailability of the data.

1. LITRATURE REVIEW

2.1 Fiscal Decentralization and Economic Growth

Using data from 43 developing countries collected over a 20-year period, Devarajan et al. (1996) discovered that boosting the current expenditure has a statistically significant positive effect on growth. On the other hand, there is an inverse rapport between growth and capital portion of government spending. Different researchers demonstrate that fiscal decentralization has an impact on growth, nonetheless findings are contradictory; some show that expenditure and revenue decentralization have significant and positive relationships (Baskaran et al., 2016;

Bojanic, 2018; Filippetti & Sacchi, 2016; Huynh & Tran, 2021). Faridi et al. (2012), studied Fiscal Decentralization and Employment in Pakistan and found that while fiscal decentralization has an inverse effect on inflation, it has a positive effect on employment and GDP. A fiscally decentralized economy can do this more successfully than unitary governments by improving educational opportunities and promoting economic integration.

Baskaran et al. (2016), conducted a study of fiscal federalism and economic growth from a meta-analysis. Single-country studies, for instance, tend to find that decentralization boosts growth. This may be due to their ability to evaluate the impact of decentralization within a shared institutional framework. Slavinskaitė (2017), conducted research on fiscal decentralization and economic growth of European countries from 2005 to 2014. In low-income economically developing nations, fiscal decentralization promote economic growth, but not in high-income developed economies, because it is not always a tool for fostering economic growth.

Bojanic (2018), researched the effects of fiscal decentralization on growth, inflation, and inequality in the 12 American countries. The results indicate that this process's benefits have not been as great as first thought, with revenue decentralization hurting economic growth and expenditure decentralization helping the developing Americas. Because the evidence on expenditure is inconclusive, so it is impossible to say whether decentralization has had a positive or negative impact on growth. Thanh and Canh (2020), investigated the impact of public governance in FD and economic development and findings showed, fiscal decentralization benefits Vietnam's economic growth and increase economic development. Surprisingly, the impact of fiscal decentralization becomes even greater when combined with high-quality infrastructure governance.

Hanif et al. (2020), investigated Economic Growth through Fiscal Decentralization for 15 developing countries. Decentralizing tax revenue and economic growth are positively correlated, which indicates that granting more tax authority to regional governments will increase their capacity to expand economic opportunity. The results imply a connection between economic expansion and spending decentralization in federal developing nations. Mose (2021), Fiscal Decentralization, and Economic Growth were investigated 47 Kenyan counties. The results backed up the Keynesian hypothesis that enhanced fiscal decentralization through recurrent spending boosts local economic activity. Li et al. (2021), Investigated the effects of fiscal decentralization in Pakistan on economic growth and environmental quality. An adverse revenue decentralization shock lowers both short-term and long-term economic growth as well as CO2 emissions. While a favorable revenue decentralization shock slows both long- and short-term economic development as well as CO2 emissions.

Wichowska (2021), studied how much fiscal decentralization exists in European Union (EU) nations. These countries had the highest rates of relative inflation and the lowest average household incomes. Tran (2021), examined from 2002 to 2016, insights from 23 OECD countries impacts of corruption and informality on the fiscal decentralization-economic growth nexus. The study shows that decentralizing expenditure and tax revenue boosts economic development. Additionally, corruption diminishes economic development to also beneficial concern of decentralized spending on economic growth. Mimboe (2021), Is there an appropriate time for fiscal decentralization in a developing country? Cameroon as a case study. The study concluded that a developing country's ability to implement fiscal decentralization effectively depends on the magnitude of its primary socioeconomic indicators and a certain level of security plan stability. Digdowiseiso (2022), studied that fiscal decentralization is beneficial to growth or not in Unindustrialized Countries from 1990 to 2014. Growth is negatively impacted by greater coherence in nations with weak governance, high corruption risk.

2.2 Fiscal Decentralization and Public Debt:

Baskaran (2010b), conducted research into the relationship between fiscal decentralization and

public debt of a panel of 17 OECD countries. According to the research, vertical fiscal imbalances and tax decentralization are negligible, while high levels of expenditure decentralization substantially reduce public indebtedness. Horváthová et al. (2012), investigated the correlation between public debt and fiscal decentralization in the European Union. Shi et al. (2018), explored the link to explore the affiliation between fiscal decentralization and government debt service capacity. Capital expenditure and capital financing resources like special assessments, according to statistical findings, have the greatest influence on debt service capacity. Timushev (2020), observed debt burden, local fiscal decentralization, and regional fiscal incentives. According to the study, a decrease in local fiscal decentralization correlates with an increase in regional debt load.

Ouyang and Li (2021), researched fiscal decentralization and danger of government debts in China. Decentralization of fiscal revenue has a tendency to lower the risk of local governments defaulting on their debt, whereas decentralization of fiscal spending has a tendency to raise it. Khan and Munir (2021), investigated Public Debt and Decentralization: Evidence from a Non-Arab Muslim Federation at the Subnational Level. The study concluded that an increase in VFI, ExpDec, and population density raises average public debt, whereas economic growth reduces PD accumulation. The Eighteenth Amendment furthermore increased provincial debt.

2.3 Public Debt and Economic Growth

Abdelkafi (2018), collected a practical evidence from Tunisia on the Relationship among Public Debt, Economic Growth, and Monetary Policy. Low growth rates reduce revenues, forcing the government to increase its debt to cover budget expenses. Nonetheless, the monetary policy shock caused by an increase in rate of interests raises public debt by reducing state investment and income. Thao (2018), studied the public debt effects on the economic growth in Six ASEAN countries. Regardless of whether higher amounts of public debt have a negative effect on economic growth. Economic growth was found to be significantly positively correlated with external debt service (Bajrami & Hoxha, 2020; Baskaran, 2010a; Gómez-Puig & Sosvilla-Rivero, 2018; Horváthová et al., 2012; Khan & Munir, 2021).

Bajrami and Hoxha (2020), studied impact of public debt on economic growth development in the Kosovo Republic. Study argues that, when the ratio of the state debt to GDP was between 10% and 30%, the Republic of Kosovo saw higher growth rates. Fetai et al. (2020), investigated the threshold effect of public debt on economic growth from 1995-2017 in European transition countries. Increasing tax rates to replace debt levels, corresponding to research, is not a viable approach for governments in all low-income countries especially in European transition nations.

Alexandre et al. (2021), investigated the Portuguese economy's asymmetric regional dynamics, such as debt, openness, and local revenues. These findings may strengthen the argument for greater fiscal decentralization by establishing the relationship between regional resilience and the capacity of regions to generate additional revenue. Asteriou et al. (2021), research examined how public debt affected a group of Asian nations. The results indicate that if government debt will raise, is detrimental to economic growth as whole. Fiscal decentralization reduces the public debt in all countries (Gómez-Puig et al., 2022; Rivetti, 2022).

Tran (2021), studied the decision of public debt on economic growth when capital is lost. Domestic and external debt are believed to drive public debt. If the starting level of productivity is higher than the cost of investment, debt, per the study, will promote economic expansion. Gómez-Puig et al. (2022), concerns the varying relationship between government debt and economic growth. In the manner of the neoclassical approach, rising levels of public debt (debt ratio to GDP) have a negative influence on economic growth (Bajrami & Hoxha, 2020; Cochrane, 2011; Panizza & Presbitero, 2014) in countries (Jin & Rider, 2020; Thanh & Canh, 2020).

2. EMPIRICAL MODEL

Several findings related to advanced economies in cross-country and within regions such as the OECD, EU, and Asian regions have discussed the encouragement of FD on economic growth and the relationship between public debt and economic growth, but this approach of determining the relationship between Fiscal Decentralization, PD, and growth simultaneously has not been executed in scenario of selected Asian countries. This study attempts to apply the research methods, Following (Baskaran, 2010a; Khan & Munir, 2021; Li et al., 2021), the model depicts the following link between fiscal decentralization, economic development, and public debt

$Y_{it} = = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 PD_{it} + X_{it}\alpha_j + \varepsilon_{it}$

Where, the subscripts represent the country i the year t, and the corresponding coefficients 1, 2, and j. find the error term ε_{it}. GDP yearly percentage increase is the dependent variable (Y_{it}). The independent variables are three indices of fiscal decentralization: expenditure decentralization (ExpDec), and revenue decentralization (RevDec). ExpDec is calculated as a percentage of GDP central government expenditure, and RevDec is determined as a percentage of GDP central government revenues, (Filippetti & Sacchi, 2016; Gemmell et al., 2013).

The debt-to-GDP ratio is known as the public debt (PD) and the control variables are denoted by X. As previously noted, our empirical model incorporates the moderating effects of public debt (PD), fiscal decentralization (FD), and economic development in their interactions with debt servicing, spending decentralization, and revenue decentralization, respectively (Fetai et al., 2020; Gemmell et al., 2013; Gómez-Puig et al., 2022; Khan & Munir, 2021). The equation is expressed as follows:

$Y_{it} = \alpha_0 + \alpha_1 RevDec_{it} + \alpha_2 ExpDec_{it} + \alpha_3 PD_{it} + \alpha_4 INF_{it} + \alpha_5 DS_{it} + \alpha_6 TOP_{it} + \alpha_7 FDev_{it} + \alpha_8 FDI_{it} + \alpha_9 Unemp_{it} + \varepsilon_{it}$

Where, i: Cross Sections; t: observation, GDP: (dependent variable), the annual growth rate of real GDP per capita, in percent, Debt: the public debt-to-GDP ratio, in percent, ExpDec: Expenditure Decentralization, RevDec: Revenue Decentralization, α: Constant Term, β: Coefficients of Independent Variables, ε: Error Term and X: The Vector of Control Variables.

The choice of control variables (X) is established on the theoretical association between economic variables, essential control variables, as well as other studies that investigated the influence of FD on growth, as stated by (Baskaran et al., 2016; Filippetti & Sacchi, 2016; Gemmell et al., 2013; Huynh & Tran, 2021). The control vector now includes the unemployment rate, and debt servicing (Matandare & Tito, 2018). In addition, we use inflation to ensure the economic environment's stability. Furthermore, we use trade openness to assess countries' potential to generate exports through integration into the global economy (Baskaran, 2010a; Göcen et al., 2017). To reduce the fiscal decentralization bias on GDP, the fiscal burden is additionally included as an indicator for general government revenue (GDP) (Gemmell et al., 2013; Slavinskaitė, 2017).

3. DATA AND METHDOLOGY

4.1 Data

All information for the study's empirical investigation was gathered from a variety of sources, Fiscal decentralization is from the Asian Development Bank (ADB, Asian Development Outlook ADO 1990-2022), the World Development Indicators (WDI), and Government Financial Statistics of International Monetary Fund (IMF) and all of this describes the variables' measurements, sources, in the experiential model l. The statistical summary for the variables is provided in Table 1

3.2 Econometric Methodology

The study computes the correlation coefficients between variables, which are shown in Table 2. Interpretations show that all variables are significantly and positively connected to one another, with the exception of debt servicing, expenditure decentralization, and inflation rate, which are all negatively related. These fiscal decentralization variables RevDec and ExpDec, exhibit a degree of Multicollinearity, which shows the degree of association between the variables. The Multicollinearity problem can be identified

using the pair-wise coefficient of correlation. The presence of Multicollinearity is indicated by a high correlation coefficient.

The study explores the affiliation among FD, PD and economic growth, predominantly in Asian nations, using multiple econometric models that assessed both long-run and short-run interactions. First, this study must assess whether cross-sectional dependency exists because it may be instigated by comparable geographic areas and political or economic allure (Gaibulloev et al., 2014). Study utilize the CIPS and CD tests to examine the residual features.

Study employ the ARDL panel, which Pesaran and Smith established in 1995), as well as (Pesaran et al., 1999) to investigate short- and long-run correlations. ARDL is the most recently used method for determining co-integration analysis. Co-integration analysis in ARDL has several advantages over other methodologies, and it will be applied in this study. For starters, it avoids endogeneity issues. Second, the variable's long-run impacts can be evaluated. Third, determining the sequence of variable integration (unit-root test) is not necessary. The ARDL approach can be used whether the modulators are I (0), I (1), or marginally integrated. This study used the unit root test to check I (0) and I (1). This study will use the ARDL method to conclude the long-run relationship between variables. Long-Run Cointegration Vector Estimation FMOLS, DOLS, MG and PMG estimators are listed for checking the stability of slope coefficient results. Where FD is explained with two indicators, (expenditure decentralization, and revenue decentralization (Digdowiseiso, 2022; Faridi et al., 2012; Huynh & Tran, 2021; Thanh & Canh, 2020).

Table 1 Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Max	Obs.
GDP	5.36	3.446	-6.16	20	623
PD	48.652	26.175	5.87	215.95	621
DS	7.52	6.424	.213	34.4	621
TOP	82.87	43.53	11.855	220.407	621
ExpDec	23.762	8.46	.465	59.3	621
RevDec	20.301	7.975	.492	52.5	621
INF	94.019	42.967	5.55	219	594
Unemp	5.691	4.556	.078	21.206	539
FDI	4.184	5.88	-37.173	55.07	621
FDev	54.882	39.857	2.483	211.892	621

Source: The author's calculations are between 1990 and 2021

Table 1 offers data on the description of the variables. The mean GDP of selected Asian countries is 5.36, with a Std. of 3.446, the mean

PD is 48.652, with a standard deviation of 26.175, indicating a higher debt ratio. DS has a mean value of 7.52 and a standard deviation of 6.424. The mean value of the TOP is 82.87, with a standard deviation of 42.53. ExpDec, RevDec, and INF have mean values of 23.76, 20.301, and 94.019, respectively. Unemp, FDI, and FDev mean values are 5.691, 4.184, and 57.882 respectively.

All variables are positively skewed, and the model's Skewness statistics indicate a satisfactory state. Except for the variable, the central peak of the variables has a wider peak and a thicker tail, indicating that they are Leptokurtic. It therefore verifies that the majority of values are based on the mean (Faridi et al., 2019; Fetai et al., 2020; Thanh & Canh, 2020).

Table 2 Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10
GDP	1.000									
PD	0.028 (0.492)	1.000								
DS	-0.205 (0.000)	0.282 (0.000)	1.000							
TOP	0.008 (0.852)	-0.054 (0.181)	-0.273 (0.000)	1.000						
ExpDec	-0.031 (0.446)	-0.017 (0.664)	-0.090 (0.025)	0.393 (0.000)	1.000					
RevDec	0.011 (0.791)	-0.144 (0.000)	-0.134 (0.001)	0.406 (0.000)	0.910 (0.000)	1.000				
INF	-0.162 (0.000)	-0.261 (0.000)	-0.127 (0.002)	0.006 (0.881)	0.137 (0.001)	0.191 (0.000)	1.000			
Unemp	0.008 (0.851)	-0.115 (0.008)	0.031 (0.474)	-0.006 (0.892)	0.038 (0.379)	0.103 (0.017)	-0.113 (0.009)	1.000		
FDI	0.204 (0.000)	-0.202 (0.000)	-0.242 (0.000)	0.276 (0.000)	0.089 (0.027)	0.179 (0.000)	-0.046 (0.263)	0.222 (0.000)	1.000	

FDev	0.010 (0.806)	-0.033 (0.407)	-0.189 (0.000)	0.184 (0.000)	-0.016 (0.690)	-0.003 (0.948)	0.319 (0.000)	-0.431 (0.000)	-0.141 (0.000)	1.000

Source: Author's calculation

4. RESULTS AND DISCUSSION

In the dependency test, we have p –values, of the BP-LM test, Pesaran s called LM and Pesaran C D test are less than 0.05. All these tests have the same probability value of 0.05, so we reject the null and accomplish that the dataset has a cross-sectional dependency. When data confirms cross-sectional dependency, we will move toward the second-generation tests. From unit root test, variables are mix ordered stationary and some are non-stationary at any level.

TABLE 3 Breusch-Pagan LM and Pesaran CD Test

Test	Statistic	d .f.	Prob.
Breusch-Pagan LM	708.9539	190	0.0000
Pesaran s called LM	26.62178		0.0000
Pesaran CD	18.95581		0.0000

Source: Author's calculations, Null; no cross-sectional dependence, Alt; cross-sectional dependence P-Value < 0.05 reject null
CD test shows cross sectional dependency in the variables, we have to use second generation panel unit root test, it helps to show that our data is not suffering with spurious regression. Table 5 shows that all variables are stationary at mixed level I (I), I (0), except Unemp and Debt servicing.

Table 4 Bai and Ng-PANIC and Pesaran-CIPS Unit root Tests

Variable	Bai and Ng-PANIC		Pesaran-CIPS	Stationarity
	Constant	Constant and trend		
Unemp	-	-	0.0001	I(0)
TOP	-	0.0000	0.0001	I(1)
INF	-	0.0000	0.0001	I(1)
GDP	0.0000	-	0.0001	I(0)
ExpDec	-	0.0000	0.0001	I(1)
RevDec	0.03	-	0.0001	I(0)
DS	-	-	0.0001	I(0)
PD	-	0.019	0.0001	I(1)
FDev	-	-	0.0001	I(0)
FDI	0.00840	-	0.0001	I(0)

Note: Author's calculations

Panel Cointegration Tests

Based on the findings of preliminary non-stationarity testing, panel cointegration tests are utilized here. If the variables are non-stationary, the cointegration tests (Westerlund et al., 2016) and (Pesaran et al., 1999) are used to assess cointegration (2007) and Kao test is conducted for validation of Pedroni test. These co-integration tests are predictable to indicate whether or not a long-run link exists. Three Cointegration tests are used to examine the long-run relationship between government debt and growth.

Table 5 Test for Cointegration

Pedroni Test		
	Statistic	p-value
Modified variance ratio	-	-
Modified Phillips-Perron t	1.2761	0.1010
PP t	-8.3021	0.0000
ADF t	-8.9099	0.0000
Westerlund Test		
Variance ratio	-2.0689	0.0193
Kao Test		
Unadjusted modified Dickey-Fuller t	-17.4169	0.0000
Unadjusted Dickey-Fuller t	-10.9668	0.0000

Source: Author's calculations Ho: No Cointegration, Ha: All panels are integrated: If the p-value is less than 0.05 we discard the null hypostasis of no Nonintegrated, accept otherwise.

Fixed Effect Model

One advantage of using panel data is that the fixed effects model can compact with unobserved heterogeneity. For k factors, the FEM can be articulated. The Hausman test is used in panel data studies to select between models. The Hausman test looks for endogeneity in the panel model. Panel data has advantages over cross-sectional data, and model specification is essential for producing consistent results (Sheytanova, 2015). The Hausman test, for example, is used to evaluate whether a fixed or random effects model is appropriate by detecting endogeneity in the explanatory variables.

To check the estimation results, we will look at the P-Value 0.05 of the cross-section random test. If the P-value of the Hausman test is less than 0.05, we will reject the H0. The Hausman test's Null hypothesis asks whether the REM or the FEM is more efficient. According to the Hausman results, the p-value is 0.05, which is 0.0000 and Chi-square is 37.923, so we reject the null hypothesis and accept the substitute hypothesis, demonstrating that the fixed effect model is chosen.

TABLE 6 Estimation results for model by FEM

GDP	Coef.	t-statistic	p-value	[95% Conf	Interval]
PD	-0.034*** [.011]	-3.14	.002	-.055	-.013
DS	-0.12*** [.027]	-4.47	0	-.173	-.067

TOP	0.014** [.007]	2.07	.039	.001	.028
ExpDec	-0.18*** [.044]	-4.11	0	-.265	-.094
RecDec	0.17*** [.05]	3.42	.001	.072	.268
INF	-0.01** [.004]	-2.51	.012	-.018	-.002
Unemp	-0.159*** [.057]	-2.79	.006	-.271	-.047
FDI	0.117*** [.025]	4.60	0	.067	.167
FDev	-0.031*** [.01]	-3.07	.002	-.052	-.011
Constant	10.497*** 1.022	10.27	0	8.489	12.505
R-squared			0.213		

Source: Author's calculations, Note; results show the Symbol ***, ** denote 1 percent and 5 percent significance level, St.Err. In [...]

Empirical results demonstrate that Debt negatively affects the GDP annual growth rate percentage if there is one unit increase in Debt then GDP will decrease by 0.034 percent. Debt servicing DS is also showing a negative impact on GDP, if there is one unit increase in DS it will lead to a decrease and shortfall of GDP by 0.12 percent. Results of the fixed effect model show that (INF) inflation and GDP annual growth rate are negatively related to each other. If there is one unit surge in inflation, GDP will decrease by 0.01 percent. Experiential estimation results indicate that there is a positive and significant association between trade openness (TOP) and GDP. If there is one unit increase in TOP, there will be a 0.014 percent increase in GDP. Results illustrate that GDP and foreign direct investment (FDI) are positively related to each other. If there is one unit increase in FDI, GDP will upsurge by 0.117 percent. In the model, outcomes indicate that GDP will decrease by the effect of financial development (FD). If there is a one percent increase in FD and GDP will decrease by 0.031 %.

The results show that unemployment (Unemp) negatively affects the GDP. If there is one unit increase in Unemp, GDP will decrease by 0.159 percent. Empirical results of the core variables of the model specify that government expenditure decentralization (ExpDec) is negatively associated with GDP. If there will an increase in ExpDec, GDP will decrease by 0.18, while the relationship between revenue decentralization (RevDec) and GDP is positive and significant. If there is a 1 %

increase in RevDec, GDP will increase by 0.17 percent. Debt and growth are statistically and theoretically significant and negative. Ratio of public debt-to-GDP is greater than 90% accompanied by slower economic growth (Asteriou et al., 2021; Rodríguez-Pose & Ezcurra, 2010). Our results are consistent with those (Gómez-Puig & Sosvilla-Rivero, 2018). Findings sustenance the idea that countries with greater debt-to-GDP ratio lost more GDP growth. Because of changes in interest rates and debt servicing (Bajrami & Hoxha, 2020). According to the statistical findings, inflation has a negative relationship with the factors (Faridi et al., 2019).

The findings also illustrate that TOP, as measured by export to GDP ratio, has positive impacts on regional GDP growth. Exports of goods and services generate significant foreign exchange earnings, alleviating pressure on the balance of payments. There are many factors that contribute to economic growth, and while exports constitute one of the most important (Maličká & Martinková, 2018; Selimaj et al., 2020; Wichowska, 2021). FDI have its positive and significant effects on economic growth for selected Asian countries. Our results are compatible with FDev is positively linked with economic growth (Faridi et al., 2019; Thao, 2018; Timushev, 2020). The current study used the annual INF to analyze the performance of the economy using inflation. Inflation can have an impact on growth both positively and negatively (Wichowska, 2021). Decentralization of expenditure has a negative and statistically significant impact on economic growth. According to the findings of the study, a high degree of expenditure decentralization tends to substantially reduce public indebtedness. These results are consistent with empirical data from studies of fiscal decentralization and economic expansion (Davoodi & Zou, 1998).

Eventually, findings show that central governments' total revenues have a positive, statistically significant impact on economic growth at the 1% level positive revenue economic growth is negatively impacted by expenditure decentralization, which is statistically significant. We discovered that a high notch of expenditure decentralization reduces public indebtedness significantly. These findings are consistent with empirical evidence from FD and economic growth analyses. The fiscal decentralization indicators of ExpDec have a negative impact on overall economic growth. This study's main objective was to investigate the impact of fiscal decentralization on the economic development of particular Asian nations (as assessed by central government spending and revenue) (Alexeev et al., 2019; Baskaran, 2010a; Enikolopov & Zhuravskaya, 2007; Jin & Rider, 2020). The analysis generated mixed but significant results, namely that revenue decentralization boosted economic growth while expenditure had the opposite effect. Foreign direct investment, trade openness, and financial development all have a significant positive effect on economic growth, according to the findings.

Long-Run Cointegration Vector Estimation FMOLS, DOLS, MG and PMG estimators are listed for checking the stability of slope coefficient results (Mehmood et al., 2014).

TABLE 7 Long Run Cointegration Tests

	ARDL		FMOLS and DOLS	
Variables	MG	PMG	FMOLS	DOLS
PD	-.0389358 (0.671)	-.0322539 (0.012)	-0.0335 (0.0150)	-0.0339 (0.0088)
DS	-1.337697 (0.302)	-.0759459 (0.002)	-0.1217 (0.0003)	-0.1203 (0.0002)
TOP	-.008095 (0.908)	.0236073 (0.004)	0.0048 (0.5603)	0.01443 (0.0834)
ExpDec	.299574 (0.457)	.0586033 (0.231)	-0.1297 (0.0181)	-0.01795 (0.0006)

RevDec	.1925909 (0.621)	-.0654741 (0.291)	0.0874 (0.1693)	0.1700 (0.0043)
FDI	.1959744 (0.539)	.233701 (0.000)	0.1437 (0.0000)	0.1168 (0.0001)
FDev	. 0598587 (0.539)	-.0404429 (0.000)	-0.0123 (0.3286)	-0.0314 (0.0104)
Unemp	-.782383 (0.265)	-.2183253 (0.011)	-0.1208 (0.0150)	-0.1589 (0.0200)
INF	-.0881527 (0.044)	-.0021132 (0.636)	-0.0119 (0.0168)	-0.0101 (0.0360)
Short run Results of ARDL				
EC	-.9354142 (0.000)	-.6532752 (0.000)		
cons	17.60103 (0.017)	6.193887 (0.000)		

Source: Authors' calculations, P-values in (...)

The results' demonstration is that debt has a negative and significant correlation with growth rate. A 1%increase in debt will 2% increase in GDP in long run at a 5% significant level from DOLS and FMOLS, and (0.12%) in the PMG and MG test. The negative and significant association between DS and economic growth with a long-run relationship with 98 percent of p-values in PMG, FMOLS and DOLS but insignificant results in the MG test. ExpDec has a negative and significant relationship with growth rate from DOLS and FMOLS but Positive and insignificant affiliation, a long-run relationship with 99% of p-values that are (0.457, 0.231) for MG and PMG respectively. According to all long run estimators RevDec has a positive and significant relationship with growth rate have a long-run relationship of less than 10%. Coefficient values shows MG and PMG (0.1959744, 0.233701) the significantly Positive long-run relationship between FDI and economic growth with 5% significant level from all estimators. The MG test shows a positive significant long run at less than a 5%
relationship between financial development and economic growth (0.0598587), whereas negative in the PMG test (-0.0404429) and FMOLS and DOLS. The positive significant and long run relationship between trade openness and GDP with a long-run relationship in the PMG, FMOLS and DOLS tests but negative relationship in MG. Long-run relationship between Unemp and economic growth that is negative and insignificant. Unemp in GDP will fall by 23% with a long run relationship of less than 5% if there is a one-unit increase, the negative and not highly significant long-run relationship between INF and economic growth from all four tests.
The error correction terms are undesirable and important once more, indicating long-run convergence. In terms of the ECM significances, MG results has the utmost speed of adjustment of 93% (0.9352), suggesting a correction of 65% (0.6532) for the estimation discrepancy.

5. Conclusion and policy recommendation

This study expands on Devarajan et al. (1996), work by including public debt and revenue decentralization. Empirical studies looked at relationship concerning economic growth and government spending, revenue, and debt compositions of GDP percentage. Using a global data sample of 23 Asian countries from 1997 to 2022, the panel ARDL, PMG, MG method was used in the study to scrutinize how the correlation among the public debt-to-GDP ratio, fiscal decentralization, and economic growth deviates countries. By addressing the issue of endogeneity, the study used the fixed effect method and the Hausman test. The panel Cointegration test was used in the study for finding and exploring the

long run relationships between variables. Westerlund's panel Cointegration test and Pedroni's Cointegration test were used. The main findings of are summarized below: The public debt ratio has a detrimental impact on economic growth as whole, and this impact is amplified when the study uses common correlated variables to solve the problem of cross-sectional dependence. As a result, short-term economic growth is negatively impacted by increases in short-term public debt, while the opposite is true for short-term public debt decreases.

Findings and conclusions of this study suggest that countries should financially decentralized in order to enable them to achieve self-sufficiency and to increase revenue generations and decrease debt levels. Fiscal decentralization is an effective tool for encouraging employment while discouraging increased wages, which leads to greater inflation rates. Inflation and the exchange rate both have a negative influence on countries experiencing economic growth. The global village has evolved into a more open world in recent years. Easy trade could lead to more job opportunities both inside and outside the country. Begin with the expenditure side when developing a proper fiscal balance between levels of government. Prior to deciding on the distribution of expenditure responsibilities, it is impossible to determine the suitable dissection of local taxing and borrowing powers, as well as the "right" level of transfers. Predicated on the findings of the study, countries could perhaps develop their own fiscal initiatives to combat rising debt levels in the interests of promoting economic growth. It is not a good strategy for governments in some Asian nations, especially in low-income nations, to raise tax rates to replace debt levels.

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