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Article

Fiscal decentralization and macroeconomics stability nexus: Evidence from the Sub-national governments context of Ethiopia

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FINANCIAL ECONOMICS | RESEARCH ARTICLE

Fiscal decentralization and macroeconomics stability nexus: Evidence from the Sub-national governments context of Ethiopia

Million Adafre Bushashe^{1*} and Yitbarek Bayiley²

Abstract: This study aimed to investigate the effects of fiscal decentralization on Ethiopia's regional (Sub-national) macroeconomic stability. The study followed a causational research design employing data from 2005–to 2018. The units of analysis in the study are sub-national governments (SNGs). The study utilized the two-step System General Methods of Moment (SYS-GMM) model since it resolves econometric issues, including endogeneity, autocorrelation, and Heteroscedasticity. The study findings revealed that revenue and composite decentralization have significantly shielded macroeconomic instability. In contrast, expenditure and fiscal dependency are significantly aggravating macroeconomic instability. Among the control variables used in the study, regional economic growth and school enrollment significantly reduce macroeconomic instability; Foreign Direct Investment (FDI), population growth, unemployment rate, welfare, and public investment claimed the opposite effect on macroeconomic stability. The primary implication is



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PUBLIC INTEREST STATEMENT

Scholars investigated the relationship between fiscal decentralization and macroeconomic stability and found a contradicting result that justifies the need for more studies. Therefore, this paper attempted to answer whether fiscal decentralization affects macroeconomic stability in Ethiopia's Subnational Governments (SNGs). The study measured this stability using the Misery Index (MI), a summation of the unemployment and inflation rate of SNGs. It primarily relies on the fiscal condition of the SNG since increased spending can increase aggregate demand, reduce unemployment and foster MI. However, this expenditure increment might bring an inflation rate and worsen MI. The study employed the two-step System General Methods of Moment (SYS-GMM) model. The study finding revealed that expenditure decentralization and fiscal dependency harm MI. However, revenue and composite decentralization enhance MI. The study urges stakeholders to have a robust institutional mechanism to neutralize the adverse effect of fiscal decentralization on macroeconomic stability.

that the federal government needs to give fiscal autonomy to SNGs since fiscal dependency is causing macroeconomic instability. Expenditure decentralization is also exacerbating macroeconomic instability; it is essential to have a mechanism to engender budget constraints and make SNGs accountable for their expenditure. Besides, to grasp the shielding effect of revenue decentralization from macroeconomic instability, there should be incentive devices to boost SNG's tax collection efforts. Since capital and welfare expenditures exacerbate macroeconomic instability, the study urges the government to follow a contractionary fiscal policy by cutting its expenditure. Finally, as opposed to prior studies, the present study used multiple fiscal decentralization indicators, making the study more thorough and closing the knowledge gap.

Subjects: Development Policy; Political Economy; Economics; Finance

Keywords: fiscal decentralization; fiscal dependency; macroeconomic stability; SYS-GMM

1. Introduction

Macroeconomic stability refers to occurrences that increase the predictability of the domestic macroeconomic environment. According to theory, there will be less competition for fiscal resources between the state and federal governments as fiscal decentralization results in a defined revenue-sharing system. Moreover, this would improve macroeconomic stability because fiscal competition between different levels of government undermines national fiscal policy goals, notably by encouraging pro-cyclical fiscal policy (Thornton, 2007). The government's stabilization function is carried out successfully and efficiently at the national level since the subnational government's attempts at stabilization policy are doomed to failure because locally sponsored fiscal policy is likely to benefit regions other than the one funding it. Therefore, the federal level of government is best for managing stabilization policies. Consequently, the claim is that only the central government should control macroeconomic policy (Musgrave, 1959; Oates, 1972).

According to Oates (2005), the limited borrowing alternatives available to subnational governments limit their ability to implement fiscal policy. Macroeconomic stability is jeopardized for two reasons: first, when subnational governments have overborrowed; second, central governments have taken on the responsibility of paying off the debt (Prud'homme, 1995; Tanzi & Ahmad, 2002). This theoretical argument is based on the presumption that economic shocks are symmetrically distributed (Martinez-Vazquez & McNab, 2003). Fiscal decentralization policies can produce conflicting effects on economic growth and macroeconomic stability. In addition, many costs are incurred to finance the proper implementation of the decentralization policy (Agénor & Lim, 2018). However, properly allocating government expenditures will enhance stability in the economy.

Economists' publications have reflected empirical investigations of the impact of decentralization on macroeconomic stability (e.g., Bojanic, 2018; Feltenstein & Iwata, 2002; Iqbal & Nawaz, 2010; Jalil et al., 2012; Makreshanska-Mladenovska & Petrevski, 2020; King & Ma, 2001; Martinez-Vazquez & MacNab, 2006; Melnyk et al., 2018; Neyapti, 2004; Osmani & Tahiri, 2022; Palienko et al., 2017; Shah, 2006; Treisman, 2000). Nevertheless, despite a significant amount of research, empirical evidence regarding the link between financial decentralization and macroeconomic stability needs to allow for drawing firm conclusions regarding the strength or direction of the relationship. Furthermore, most empirical research saw fiscal decentralization as a successful means of fostering economic growth, yet, the evidence linking to macroeconomic stability needs to be more conclusive. Unlike previous studies that used one or two indicators, the present study employed four indicators: revenue, expenditure, composite decentralization, and fiscal dependency, making the study more complete and filling the literature gaps.

International institutions like the World Bank (WB) and International Monetary Fund (IMF) propagate a neo-liberal agenda; to this end, the decentralization program becomes a prerequisite for getting loans and aid. It has led many nations, particularly developing nations, to embrace decentralization without weighing the risks associated with such a policy. Many countries like Ethiopia believe decentralization solves all their problems, including political issues, macroeconomic stability, effective allocation and redistribution, and economic growth. With five tiers of government (federal, regional state, Zone, woreda, and local), each of which has a nearly identical structure in the executive, legislative, and judicial branches, Ethiopia's government began a decentralization program in 1991 based on ethnic federalism (Ghebrehiwet, 2015; Lee, n.d.).

The country is facing a big macroeconomic shock; it indicates the need to examine whether fiscal decentralization fosters macroeconomic stability since it is a precondition for a healthy, stable, and prosperous economy. Moreover, to the researcher's knowledge, this is the first study conducted in the context of Ethiopia. Therefore, the study investigates the nexus between fiscal decentralization and macroeconomic stability in line with earlier theoretical and empirical studies. The work also makes a theoretical contribution to the field by expanding on what is already known. Finally, based on the study's findings, it offers practical implications and recommendations for policymakers and government bodies.

The following sections comprise the remainder of the paper. Section 2 examines the literature; Section 3 discusses the methods; Section 4 presents the results, and Section 5 discusses the findings. The final section presents the conclusion, policy implications, and areas for further research.

2. Literature review

2.1. Theoretical review

Musgrave (1959) divided the three allocation, distribution, and stability tasks under the heading of economic functions of government. The stabilization process involves the maintenance of price stability, fiscal policy, and total demand. The tax and transfer-based distribution function ensure that a certain level of economic efficiency is consistent with moral ideas about the fair allocation of household earnings. The allocation functions focus on producing and providing public goods and services, which the market economy could have produced more effectively.

Fiscal decentralization is affected by the three roles that the government plays. The government's stabilization function is carried out successfully and efficiently at the national level since the subnational government's attempts at stabilization policy are doomed to failure because locally sponsored fiscal policy is likely to benefit regions other than the one funding it. Therefore, the federal government is best for managing those stabilization policies. The stabilization process involves the maintenance of price stability, fiscal policy, and total demand. The tax and transfer-based distribution function ensure that a certain level of economic efficiency is consistent with moral ideas about the fair allocation of household earnings.

The allocation functions focus on producing and providing public goods and services, which the market economy could have produced more effectively. The SNG is better positioned to provide a policy response than the federal government when macroeconomic shocks are genuinely distributed asymmetrically (Martinez-Vazquez & McNab, 2003). Another argument stems from the idea that central governments in more centralized economies have more duties than those in decentralized economies, which may lead to the central government needing to be more productive and produce effective policy outcomes. Finally, a change in the revenue distribution to SNG lessens rivalry for financial resources among subnational governments (Thornton, 2007).

SNGs advance pro-cyclical fiscal policies as they compete for resources, destabilizing national fiscal policy objectives. According to the theory, the central government should stabilize the

economy because of four crucial factors: First, a problem may occur when granting the SNG independent authority over its money supply. Second, the local economy is primarily free; hence local fiscal policy has an adverse effect. Thirdly, deficit financing is viewed as inappropriate locally due to repayment-related issues requiring large intergovernmental transfers (IGT) of actual revenue to creditors based elsewhere than the jurisdictions of debtors. Fourthly, the types of revenue that local governments appeared to find acceptable tended to be inelastic in revenue, which limited their ability to implement the appropriate fiscal policy.

Expansionary or “loose” fiscal policy is defined as one that directly boosts aggregate demand through an increase in government spending. On the other hand, fiscal policy is frequently regarded as contractionary or “tight” if it lowers demand through lower spending.

It impacts a region where fiscal decentralization can widen vertical imbalances, making SNG more dependent on IGT (Guo et al., 2022). Therefore, giving rise to the negative effect of decentralization, there is a gap in job search rates (Mergele & Weber, 2020). Increased government spending can increase aggregate demand, tighten the job market, and reduce unemployment, whereas increased government spending can reduce the risk of more unemployment (Albertini et al., 2021).

2.2. Empirical review

Despite no comprehensive study, scholars have investigated the causal link between fiscal decentralization and macroeconomic stability. However, the misery index (sum of the inflation rate and unemployment rate) is the most important for measuring macroeconomic stability (Martinez-Vazquez & MacNab, 2006); many studies employed the inflation rate as a proxy for macroeconomic stability. The present study summarized various empirical studies as follows.

A study by Treisman (2000) discovered that expenditure decentralization had a conducive impact on macroeconomic stability. It indicates that expenditure decentralization does dampen macroeconomic instability in developed countries more than in developing ones. In their study of emerging nations, King and Ma (2001) discovered that revenue decentralization negatively affects macroeconomic stability, indicating that it suppresses macroeconomic instability. Feltenstein and Iwata (2002) found that fiscal decentralization reduces the inflation rate, which fosters macroeconomic stability. Neyapti (2004) also discovered that revenue decentralization, as determined by the percentage of tax income going to sub-national governments, negatively affected macroeconomic stability.

On the other hand, Thornton (2007) discovered that revenue decentralization has no significant effect on macroeconomic stability is insignificant. Furthermore, Iqbal and Nawaz (2010) found that revenue decentralization significantly negatively affects macroeconomic stability. Nevertheless, expenditure decentralization has no effect. The study also revealed that investment significantly negatively affects macroeconomic stability. However, the population has no significant effect on the inflation rate. Jalil et al. (2012) showed that expenditure and revenue decentralization significantly negatively affect macroeconomic stability, indicating that it fosters macroeconomic stability.

Moreover, Okonkwo and Godslove (2015) provided strong evidence that revenue decentralization and investment significantly preserve macroeconomic stability. However, fiscal dependence positively affected macroeconomic stability, indicating escalating instability. Makreshanska and Petrevski (2015) reported that decentralizing revenue and expenditure has favorable contributions, indicating escalating instability. On the other hand, Palienko et al. (2017) study revealed that expenditure decentralization has a significant positive effect on macroeconomic stability, indicating a worsening the macroeconomic stability. However, revenue decentralization has no significant effect. Besides, the population has a significant positive effect on macroeconomic stability; but GDP exhibited no significant effect.

A study by Ali and Batool (2017) found that revenue and expenditure decentralization brings stability to the economic condition of Pakistan. The study also showed that the unemployment rate, investment, and GDP harm macroeconomic stability in Pakistan. Similarly, Melnyk et al. (2018) found that revenue and expenditure decentralization significantly negatively affects macroeconomic stability. Bojanic (2018) revealed that decentralization on the revenue side prevents inflation, while it seems to foster it on the expenditure side. Furthermore, GDP per capita and FDI uphold macroeconomic stability. Dadgar and Nazari (2018) analyzed the effect of economic growth on economic stability (Iran's misery index). The study demonstrated, employing a Vector Autoregressive method, that economic growth (GDP) negatively correlates with the misery index. A study by Lago-Peñas et al. (2019) employed general government primary balance (as a percentage of GDP) to proxy country stability and found that expenditure decentralization significantly enhances macroeconomic stability in OECD countries.

On the other hand, Ahmad, Shah, Mazhar, Khan, and Javaid (2022) demonstrate that revenue and expenditure decentralization improves economic stability, encourages resource allocation, and promotes economic stability in Pakistan. Besides, Rauf et al, 2021 study used fiscal transfer as a proxy for fiscal decentralization. They suggested that fiscal dependency and population growth adversely affect the stability of the economy of Pakistan. Besides, Osmani and Tahiri (2022) found that revenue decentralization, years of education, and population growth harm the unemployment rate in Kosovo. It means that they are escalating macroeconomic instability.

Moreover, Sheikh et al, 2020 study revealed that expenditure decentralization is a successful tool for promoting employment activities; meanwhile, it discourages the rise in nominal wages, contributing to a higher inflation rate. Therefore, it can enhance macroeconomic stability. However, the study found a negative effect of revenue decentralization on employment activities.

A study by Mariani et al. (2022) revealed that fiscal decentralization proxied through the Regional Original Revenue budget, Special Allocation Fund, General Allocation Fund, and Capital Expenditure significantly reduces the unemployment rate in Indonesia. Since Misery Index is a summation of inflation and unemployment rate, reducing the unemployment rate brings macroeconomic stability. Similarly, Adindu and Ugondah (2021) showed that an increase in government capital expenditure reduced the misery index in Nigeria. It indicates providing the needed infrastructure to improve the business environment, increase investment, create jobs, and keep Nigeria's low misery index.

3. Methods

Arellano and Bond (1991) and Arellano and Bover (1995) provided a generalized method of moments (GMM) for models based on dynamic panel data, in which instrumental variables are used to determine the parallel moment conditions. The system GMM model also aggregates the results of other estimation methods, such as maximum likelihood, two-stage least squares, and ordinary least squares (OLS). It was then used for the first time by Blundell and Bond (2000) to resolve the issue of potential endogeneity in growth regression models. The most significant advantage of the fundamental technique is that it does not require any additional instrument to use.

Any endogeneity issues brought on by the explanatory factors might be resolved using internal instruments to avoid simultaneity or reverse causation (Blundell & Bond, 2000). By taking year-fixed effects into account, the estimating method also takes into account unobserved heterogeneity. Following Arellano and Bover's (1995) recommended specification tests, the current study empirically evaluated the validity of the instruments employed in GMM estimation.

The first step is to modify the Arellano-Bond test for serial correlation to look for second-order serial correlation in the first-differenced residuals. The null hypothesis is the serial uncorrelation of the residuals. It indicates that there is no second-order serial correlation and that the if the null hypothesis cannot be ruled out, the GMM estimator is accurate. Second, the Sargan test helps to detect endogeneity because when instrumental variables are strictly exogenous, the residuals are used to regress the variables.

The null hypothesis of the valid instrumental variables should be accepted if the p-value of the Sargan test is more than 0.1, according to general rules (Baum et al., 2003). The analysis on Stata with xtabond2 does not require the post-estimation of these tests because the Sargan and Hansen tests for over-identification and the serial autocorrelation of the error component are provided directly (Roodman, 2009).

3.1. Data and sample

Using secondary data, evaluating actual events is becoming simpler. The secondary data was gathered from The Ministry of Finance and Economic Cooperation (MoFEC). The study's analytical unit is the nine regional state governments and one city administration from 2005 to 2018. The study's sample size is 140 observations (10 units of analysis x 14 years).

3.2. Specification and estimation procedures

The lagged levels of explanatory variables are inadequate instruments for the first difference equation; Blundell and Bond (1998, 2000) recommend using two-step system GMM estimators because they produce consistent estimates in the presence of a lagged dependent variable and correct the residuals for Heteroscedasticity. The loss of significant observations similarly impacts the first-differences GMM estimation. In these situations, first-differences GMM estimation is expected to perform poorly and needs better finite sample characteristics (bias and imprecision). Instead, Arellano and Bover (1995) suggested a system GMM estimator.

The system GMM estimator combines the standard set of first differences equations with an additional set of levels equations. Equation 1 expressed the system GMM model of the present study:

$$MI_{it} = f(FD_{it}, X_{it}, C_{it}, \mu_{it}) \quad (1)$$

Where FD is fiscal decentralization, Misery Index (MI) measured macroeconomic stability, X_{it} and C_{it} represent explanatory and control variables of the cross-section in t time, and μ_{it} is the error term, respectively. The i and t represent countries and years, respectively. Fiscal decentralization is measured in four ways: revenue decentralization, fiscal dependency, expenditure decentralization, and composite decentralization. Equations 2, 3, 4, and 5 provide the system GMM models for the four fiscal decentralization indicators.

$$MI_{it} = \beta_0 + \delta(MI_{it-1}) + \beta_1(RevDec_{it}) + \beta_2(FDI_{it}) + \beta_3(Popgr_{it}) + \beta_4(Unemp_{it}) + \beta_5(Welfare_{it}) + \beta_6(Publicinv_{it}) + \beta_7(Enrollment_{it}) + \beta_8(RGDPgr_{it}) + \mu_{it} \quad (2)$$

$$MI_{it} = \beta_0 + \delta(MI_{it-1}) + \beta_1(Dependency_{it}) + \beta_2(FDI_{it}) + \beta_3(Popgr_{it}) + \beta_4(Unemp_{it}) + \beta_5(Welfare_{it}) + \beta_6(Publicinv_{it}) + \beta_7(Enrollment_{it}) + \beta_8(RGDPgr_{it}) + \mu_{it} \quad (3)$$

$$MI_{it} = \beta_0 + \delta(MI_{it-1}) + \beta_1(ExpDec_{it}) + \beta_2(FDI_{it}) + \beta_3(Popgr_{it}) + \beta_4(Unemp_{it}) + \beta_5(Welfare_{it}) + \beta_6(Publicinv_{it}) + \beta_7(Enrollment_{it}) + \beta_8(RGDPgr_{it}) + \mu_{it} \quad (4)$$

$$MI_{it} = \beta_0 + \delta(MI_{it-1}) + \beta_1(CompDec_{it}) + \beta_2(FDI_{it}) + \beta_3(Popgr_{it}) + \beta_4(Unemp_{it}) + \beta_5(Welfare_{it}) + \beta_6(Publicinv_{it}) + \beta_7(Enrollment_{it}) + \beta_8(RGDPgr_{it}) + \mu_{it} \quad (5)$$

3.3. Research variables

The present study considered several significant elements while defining and developing an empirical model. The following sub-sections present dependent, independent, and control variables used in the study (See Table 1).

Table 1. Research Variables

Variables	Operational Definitions	Computed	Expected Sign
Dependent Variable			
Macroeconomics Stability (MI)	It is the predictability of domestic economic conditions.	Misery Index (MI) = Inflation rate + Unemployment rate	+/-
Independent Variables			
Expenditure decentralization (Exp Dec)	It is the regional government's expenditure autonomy for their assigned responsibility.	Exp Dec= SNG expenditures/Federal government expenditures	+/-
Fiscal Dependency	It is the SNG's reliance on federal grants.	Dependency = Federal grant/Total SNG expenditure.	+/-
Revenue Decentralization (Rev Dec)	It is the magnitude of regional government revenue autonomy to cover their expenses from their revenue share and the level of dependency on the federal grants.	Rev Dec= SNG own revenues/Total SNG revenues	+/-
Composite Decentralization (Comp Dec)	It is a combined effect of expenditure and revenue decentralization.	Comp Dec= Rev Dec/ 1-Exp Dec	+/-
Control Variables			
Foreign Direct Investment (FDI)	Foreign direct investment (FDI) is international capital flows linked to companies in which a foreign investor gets a controlling position.	FDI= FDI/GDP	+/-
Population Growth Rate (POPgr)	It is the annual growth rate of the population	POPgr= %change in population/initial year population	+/-
Unemployment Rate (Unemp)		Unemp = Annual % change in total unemployment in SNG	+/-
Welfare	It is the provision of service for social well-being and development.	Welfare= annual SNG social development expenditure per capita	+/-
Public investment (Public inv)	It is a productive investment of SNG.	Public inv= annual SNG Economic development expenditure per capita	+/-
School Enrollment	It is the access of children to primary education.	Enrollment= % of Children that have access to primary education	+/-
Regional Gross Domestic Product Growth Rate (GDP)	It is the annual economic growth rate of SNG.	GDPgr = %change in GDP/Base year RGDP	+/-

Source: Developed by Researcher (2020).

3.3.1. Dependent variable

There are various definitions of macroeconomic stability in literature. For instance, price stability measures macroeconomic stability, which uses inflation as a proxy (King & Ma, 2001; Neyapti, 2004; Shah, 2006; Thornton, 2007; Treisman, 2000). Iqbal and Nawaz (2010) and Martinez-Vazquez and MacNab (2006) propose utilizing the Misery Index (MI), which blends unemployment and

inflation, as a proxy for gauging macroeconomic stability. The study used MI to quantify macroeconomic stability, like prior studies.

3.3.2. Independent and control variables

Independent variables were chosen for this inquiry depending on how theoretically related they were to the Dependent Variable. The study used revenue, expenditure, composite decentralization, and fiscal dependency as explanatory variables for macroeconomic stability. Additionally, the study used control variables such as Foreign Direct Investment (FDI), public investment (Public inv), population growth rate (Popgr), and unemployment rate. Welfare, School enrollment, and Regional Gross Domestic Product growth rate (RGDPgr).

4. Results

4.1. Descriptive statistics

As presented in Table 2, the average value of MI is 2.9428, with a minimum value of 1.361 and a maximum value of 3.761. The mean and standard deviations of independent and control variables are presented as follows, regarding explanatory variables, Rev Dec (Mean = 0.518; Std. Dev = 2.184), Exp Dec (Mean = 3.103; Std. Dev = 3.42), Fiscal Dependency (Mean = 0.22; Std. Dev = 0.222), and Comp Dec (Mean = 0.354; Std. Dev = 1.478). Besides, regarding the control variables, FDI (Mean = 1.422; Std. Dev = 1.456), POPgr (Mean = 2.819; Std. Dev = 0.066), unemployment rate (Mean = 7.843; Std. Dev = 1.316), Welfare (Mean = 4.862; Std. Dev = 1.679), Public inv (Mean = 1.036; Std. Dev = 0.23), Enrollment (Mean = 4.467 Std. Dev = 0.427), and GDP (Mean = 22.741; Std. Dev = 1.812)

Log transformation is a technique to reduce data variability, particularly in data sets that contain outlying observations (Feng et al., 2012). Additionally, using the logarithm of variables improves the model's fit by transforming the distribution features (Feng et al., 2012). Since Misery Index (MI) is not fulfilling the normality assumption, the study used a log-transformed variable of MI and alleviated the normality issues. Since it is essential to analyze the data, all variables in the study have a normal distribution (See Table A1 in the Appendix). Moreover, the variables have no multicollinearity issues (See Table A2 in the Appendix).

Finally, the study investigated the effect of fiscal federalization on macroeconomic stability. There are many ways to measure macroeconomic stability; however, in this paper, macroeconomic stability is the summation of unemployment and inflation rate, i.e., MI. The study made cross-sectional comparisons using a trend analysis graph of each SNG's inflation and unemployment

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
MI	140	2.9428	.3968	1.361	3.761
Rev Dec	140	.518	2.184	.066	26.052
Exp Dec	140	3.103	3.422	.003	16.2
Dependency	140	.22	.222	0	1.421
Comp Dec	140	.958	1.112	.037	4.304
FDI	140	1.422	1.456	.109	4.143
POP Gr	140	2.819	.066	2.71	2.89
Unemp	140	7.843	1.316	4.70	11.196
Welfare	140	4.862	1.679	.588	7.968
Public Inv	140	1.036	.023	.997	1.061
Enrollment	140	4.467	.424	3.04	5.201
GDP	140	22.741	1.812	18.653	25.965

Source: Study Panel Data (2005—2018).

rate. The graphs showed that for each SNGs, unemployment and inflation rates have been increasing without any significant divergence from other SNG (See [Graph A1](#) in the [Appendix](#)).

4.2. Unemployment and inflation rate of regions

Decentralization can reduce or escalate the inflation rate and unemployment depending on the economic activities and policies of SNGs. It can control inflation by providing public goods at stable prices and reducing prices by innovating a better production method. Besides, it can reduce unemployment by enhancing job opportunities and preserving a conducive environment for investment, making private enterprises flourish in the regions. Therefore, the activities of SNGs play a crucial role in determining inflation and unemployment rate.

As presented in [Table 3](#), considering each Region's 14 years average unemployment rate, their rank from the highest to the lowest are Dire Dawa, Harari, Afar, Somalia, SNNP, Amhara, Gambela, Benishangul, Oromia, and Tigray, respectively. Similarly, concerning the Inflation rate, they are ranked SNNP, Somalia, Amhara, Oromia, Afar, Harari, Gambela, Dire Dawa, Tigray, and Benishangul, respectively (See [Table 3](#)).

4.3. Misery Index (MI)

Arthur Okun defined the MI, and it has been further extended by others, assuming that higher rates of MI generate essential economic and social shocking difficulties. The MI is a mixture of the unweighted sum of unemployment and the inflation rate, which indicates the macroeconomic condition of various countries or regions within a single country. Therefore, MI is used to measure the welfare of the economy. An increase in the MI shows the commonness of a country's deteriorated economic and public well-being. In this context, the MI is used to measure economic well-being, which shows the condition of a country. There is an average difference between data points; as a result, a spike occurs in [Graph 1](#) and other graphs.

Different graphs can be used in data analysis because each kind is best for particular purposes. Lowess smoothing graphical technique is non-parametric because it does not assume any specific form for the underlying trend; this makes it flexible and adaptable to different types of data and patterns (Cleveland, 1981; Wilcox, 2017). Therefore, to avoid spikes and improve the quality of the graphs, the study utilized the lowess smoothing technique to draw all graphs.

As [Graph 1](#) demonstrates, the MI of the SNGs of Ethiopia is not stable over time. It indicates the fluctuation in the deterioration of the economic and public well-being of SNGs. Besides, the MI of each SNG is also unstable over time (See [Graph A2](#) in the [Appendix](#)).

Graph 1. The Overall Trends of Misery Index (MI).

Source: Study Panel Data (2005—2018).

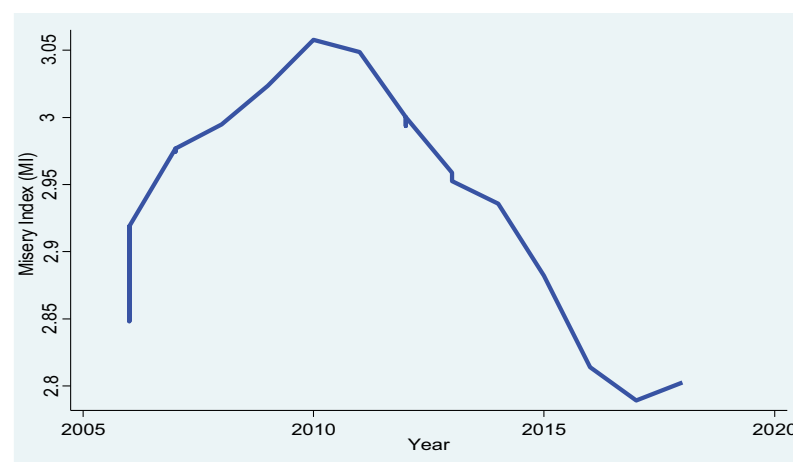


Table 3. Summary of Unemployment and Inflation Rate of Each Region					
Variable	Obs	Mean	Std.Dev.	Min	Max
Tigray (Region = 1)					
Unemp	14	6.928	1.483	4.701	9.085
Inflation	14	11.834	8.597	0	28.924
Afar (Region = 2)					
Unemp	14	8.281	1.055	6.532	9.646
Inflation	14	12.761	5.851	2.357	22.560
Amhara (Region = 3)					
Unemp	14	7.717	1.440	5.674	11.196
Inflation	14	12.870	7.443	0.724	25.777
Oromia (Region = 4)					
Unemp	14	7.129	1.226	5.383	8.954
Inflation	14	12.833	8.482	1.113	28.146
Somalia (Region = 5)					
Unemp	14	7.788	0.993	5.796	9.488
Inflation	14	12.885	7.129	6.261	30.630
Benshangul/Gumuz (Region = 6)					
Unemp	14	7.441	0.800	6.283	8.644
Inflation	14	3.118	21.125	-45.140	30.408
Southern Nations, Nationalities, and Peoples (SNNP) (Region = 7)					
Unemp	14	7.950	1.170	5.965	9.927
Inflation	14	13.222	8.108	3.867	27.833
Gambela (Region = 8)					
Unemp	14	7.545	0.839	6.111	8.581
Inflation	14	12.315	10.508	-3.394	35.965
Harari (Region = 9)					

(Continued)

Table 3. (Continued)						
Variable	Obs	Mean	Std.Dev.	Min	Max	
Unemp	14	8.329	1.574	5.797	10.622	
Inflation	14	12.391	7.344	1.083	29.794	
Dire Dawa City Administration (Region = 10)						
Unemp	14	9.327	0.943	7.316	10.672	
Inflation	14	12.054	6.367	2.953	25.018	

Source: Study Panel Data (2005–2018)

4.4. Panel data unit root test

Recent literature advocates that panel-based unit root tests have higher power than the unit root test based on individual time. A panel unit root test was conducted to investigate whether any variables in the model were non-stationary; it helps avoid spurious results. Panel unit root tests that researchers commonly use are Levin et al. (2002), Breitung (n.d.), Im et al. (2003), and the Fisher-Type test. The LLC test performs better when the time and cross-sectional dimensions are small. Therefore, the present study relied on the LLC test, which suggests the following hypotheses:

Ho: Each time series contains a unit root

Ha: Each time series is stationary

Table 4 revealed that the LLC test rejects the null hypothesis; therefore, all variables stationary at level (0). Besides, except Comp Dec, which is significant at a 5% level, all other variables are statistically significant at a 1% significance level.

4.5. Revenue decentralization and macroeconomics stability

The study's first objective is to measure the effect of revenue decentralization on macroeconomic stability. Table 5 presents the Chi square-test statistics indicating the model's goodness-of-fit—the Sargan test for the validity of the robustness of instruments in the GMM estimations. The second-order autocorrelation rejected through AR (2) test indicates no second-order autocorrelation.

4.6. Fiscal dependency and macroeconomic stability

The study's second objective is to examine the effects of fiscal dependency on macroeconomic stability. As shown in Table 6, the AR (2) test showed the absence of second-order autocorrelation. The over-identifying of the Sargan test showed that the instruments are valid, and the Chi-square test revealed that the model is appropriate.

4.7. Expenditure decentralization and macroeconomic stability

Examining the effects of expenditure decentralization on macroeconomic stability is the third objective of the study. Table 7 presented the absence of second-order autocorrelation, and the

Table 4. Unit-root Test

Variable	Levin-Lin-Chu Test			
	Level	Unadjusted t value.	Adjusted t value.	P value.
MI	0	−5.6498	−3.2484	0.000***
Rev Dec	0	−6.7768	−3.1627	0.000***
Exp Dec	0	−7.0491	−3.8524	0.000***
Dependency	0	−6.7768	−3.1627	0.000***
Comp Dec	0	−4.6285	−1.7234	.0.042**
FDI	0	−15.7518	−12.5139	0.000***
POP Gr	0	−6.1735	−2.6206	0.004***
Unemp	0	−7.3518	−3.8245	0.000***
Welfare	0	−5.0189	−3.5200	0.000***
Public Inv	0	−6.7318	−5.8066	0.000***
Enrollment	0	−4.3574	−2.6042	0.004***
GDP	0	−16.5183	−10.3301	0.000***

Source: Study Panel Data (2005—2018).

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ implies statistically significant at 1%, 5% and 10% level respectively.

Table 5. Effect of Revenue Decentralization on Macroeconomics Stability

MI	Coef.	St. Err.	t value	p-value
Lag of MI	-.846	.354	-2.39	.017**
Rev Dec	-.505	.278	-1.82	.069*
FDI	.486	.207	2.35	.019**
POP Gr	5.605	1.934	2.90	.004***
Unemp	7.581	2.474	3.06	.002***
Welfare	.195	.064	3.06	.002***
Public Inv	.039	.023	1.68	.094*
Enrollment	-7.49	2.724	-2.75	.006***
GDP	-.075	.039	-1.92	.055*
Constant	6.502	3.357	1.94	.053
Number of observations 109				
		AR (2) test	Z=-.64683	0.5177
Sargan Test of Overid. Restrictions		Chi2 (19)	5.10e-16 .999	
Model test		Wald chi2(9)	27.35***	.001

Source: Study Panel Data (2005—2018).

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ implies statistically significant at 1%, 5% and 10% level respectively.

As presented in Table 5, lags of MI ($P = 0.017$; $\beta = -0.846$), revenue decentralization ($P = 0.069$; $\beta = -0.505$), Enrolment ($P = 0.006$; $\beta = -7.49$) and GDP ($P = 0.055$; $\beta = 0.075$) have significant negative effect on macroeconomic stability. It indicates that an increase in these variables reduces macroeconomic instability. On the other hand, FDI ($P = 0.019$; $\beta = 0.486$), POPgr ($P = 0.004$; $\beta = 5.605$), Unemp rate ($P = 0.002$; $\beta = 7.581$), and Welfare ($P = 0.002$; $\beta = 0.195$), and Public inv ($P = 0.094$; $\beta = 0.039$), have a statistically significant positive effect on macroeconomic stability. It implies that an increase in these variables escalates macroeconomic instability.

Table 6. Effect of Fiscal Dependency on Macroeconomics Stability

MI	Coef.	St. Err.	t value	p-value
Lag of MI	-.757	.314	-2.41	.016**
Dependency	.085	.041	2.08	.038**
FDI	.294	.165	1.79	.074*
POP Gr	3.181	1.784	1.78	.075*
Unemp	5.97	2.075	2.88	.004***
Welfare	.143	.05	2.86	.004***
Public Inv	.015	.021	0.72	.474
Enrollment	-5.115	2.144	-2.39	.017**
GDP	.019	.029	0.65	.513
Constant	3.843	2.391	1.61	.108
Number of observations 109				
		AR (2) test	Z=-.58104	0.5612
Sargan Test of Overid. Restrictions		Chi2 (19)	4.43e-18 .998	
Model test		Wald chi2(9)	920.34***	.000

Source: Study Panel Data (2005—2018).

As presented in Table 6, the lags of MI ($P = 0.016$; $\beta = -0.757$) and Enrolment ($P = 0.017$; $\beta = -5.115$) negatively affect macroeconomic stability. It indicates that an increase in these variables reduces macroeconomic instability. On the other hand, Dependency ($P = 0.038$; $\beta = 0.85$), FDI ($P = 0.074$; $\beta = 0.294$), POPgr ($P = 0.075$; $\beta = 3.181$), Unemp rate ($P = 0.004$; $\beta = 5.97$) and Welfare ($P = 0.004$; $\beta = 0.143$) have a statistically significant positive effect on macroeconomic stability. It implies that an increase in these variables escalates macroeconomic instability. However, Public inv and GDP have no significant effect on macroeconomic stability.

Sargan test showed that the instruments used in the study are valid. Besides, the Chi-square test confirmed the appropriateness of the model.

Lag-dependent variables (LDV) have been used in regression analysis to provide robust estimates of the effects of independent variables. In empirical work, the coefficient of the LDV may be slightly over one but not substantially different from 1. It might be a feature of the data and is not a guarantee that something needs to be corrected. Serious questions about the proper specification of the model or estimator are raised when the coefficient estimates for the LDV are (much) bigger than 1. In such circumstances, researchers advise reducing instruments (either by limiting instrument lags or employing collapsed instruments). However, in the present study, some of the lag values of MI are not significantly greater than 1. Therefore, it could not be a problem.

4.8. Composite decentralization and macroeconomics stability

The final objective of the study is to investigate the effects of composite decentralization on macroeconomic stability. As shown in Table 8, the AR (2) test disclosed no second-order autocorrelation. Moreover, Sargan and the Chi square-test statistics confirmed the validity of the instruments and the model, respectively.

5. Discussion

While fiscal decentralization and macroeconomic stability nexus remain an ongoing research interest, empirical results still need to be conclusive, with positive and negative outcomes spanning different strands of the literature. Therefore, the study examined the cause-effect relationship between fiscal decentralization variables and macroeconomic stability.

Regarding the lag-dependent variables, the study findings showed that the lag of MI for all GMM models' estimations has a statistically significant negative effect on MI; this signals that every

Table 7. Effect of Expenditure Decentralization on Macroeconomics Stability

MI	Coef.	St. Err.	t value	p-value
Lag of MI	-1.091	.447	-2.44	.015**
Exp Dec	2.392	1.22	1.96	.05**
FDI	.773	.308	2.51	.012**
POP Gr	9.88	3.628	2.72	.006***
Unemp	13.75	4.741	2.90	.004***
Welfare	.31	.1	3.10	.002***
Public Inv	.039	.022	1.72	.085*
Enrollment	-12.74	4.806	-2.65	.008***
GDP	-.166	.095	-1.75	.08*
Constant	-2.449	1.791	-1.37	.171
Number of observations 109				
		AR (2) test	Z=-.27875	.7804
Sargan Test of Overid. Restrictions		Chi2 (19)	2.07e-16 .999	
Model test		Wald chi2(9)	191.79***	.000

Source: Study Panel Data (2005—2018)

As presented in Table 7, lags of MI ($P = 0.015$; $\beta = -1.091$), Enrolment ($P = 0.008$; $\beta = -12.74$), and GDP ($P = 0.08$; $\beta = -0.166$) have a significant adverse effect on macroeconomic stability. It indicates that an increase in these variables reduces macroeconomic instability. On the other hand, Exp Dec ($P = 0.05$; $\beta = 2.392$), FDI ($P = 0.012$; $\beta = 0.773$), POPgr ($P = 0.006$; $\beta = 9.88$), Unemp rate ($P = 0.004$; $\beta = 13.75$) and Welfare ($P = 0.002$; $\beta = 0.31$), and Public inv ($P = 0.085$; $\beta = 0.039$) have a statistically significant positive effect on macroeconomic stability. It implies that an increase in these variables escalates macroeconomic instability.

Table 8. Effect of Composite Decentralization on Macroeconomics Stability

MI	Coef.	St. Err.	t value	p-value
Lag of MI	−1.065	.426	−2.50	.012**
Comp Dec	−.702	.339	−2.07	.038**
FDI	.194	.156	1.24	.214
POP Gr	3.21	1.803	1.78	.075*
Unemp	5.28	2.001	2.64	.008***
Welfare	.153	.05	3.04	.002***
Public Inv	.057	.028	2.03	.042**
Enrollment	−4.24	2.037	−2.08	.037**
GDP	.006	.026	0.22	.828
Constant	3.66	2.226	1.64	.10
		AR (2) test	Z=−1.0535	0.2921
Sargan Test of Overid. Restrictions		Chi2 (19)	4.74e-18 .997	
Model test		Wald chi2(9)	611.57***	.000

Source: Study Panel Data (2005—2018)

As presented in Table 8, lags of MI ($P = 0.012$; $\beta = -1.065$), composite decentralization ($P = 0.038$; $\beta = -0.702$), and Enrolment ($P = 0.037$; $\beta = -4.49$) has a significant negative effect on macroeconomic stability. It indicates that an increase in these variables reduces macroeconomic instability. On the other hand, FDI ($P = 0.019$; $\beta = 0.486$), POPgr ($P = 0.004$; $\beta = 5.605$), Unemp rate ($P = 0.008$; $\beta = 5.28$), and Welfare ($P = 0.002$; $\beta = 0.153$), and Public inv ($P = 0.042$; $\beta = 0.057$) have a statistically significant positive effect on macroeconomic stability. It implies that an increase in these variables escalates macroeconomic instability.

previous year's macroeconomic stability enhances the recent year's stability status. The findings support studies highlighting the significant positive effect of expenditure decentralization on macroeconomic stability (Bojanic, 2018; Martinez-Vazquez & MacNab, 2006; Palienko et al., 2017; Treisman, 2000). However, it opposed studies that found expenditure decentralization negatively affects macroeconomic stability (Makreshanska-Maladenovska & Petroski, 2020; Jalil et al., 2012, Ali & Batool, 2017; Sheikh et al., 2020; Lago-Peñas et al., 2019; Ahmad et al., 2022; Mariani et al., 2022). It is further inconsistent with studies that exhibited an insignificant revenue effect on macroeconomic stability.

The study finding of the study validates studies that found a negative effect of revenue decentralization on macroeconomic stability (King & Ma, 2001; Neyapti, 2004; Iqbal & Nawaz, 2010; Jalil et al., 2012, Ali & Batool, 2017; Ahmad et al., 2022; Mariani et al., 2022). Nonetheless, it disagrees with the study that found a positive effect of revenue decentralization on macroeconomic stability (Okonkwo & Godslope, 2015; Makreshanska & Petrevski, 2015; Palienko et al., 2017; Osmani and Tahiri (2022). Moreover, it contradicts studies that showed revenue decentralization has no significant effect on macroeconomic stability (Palienko et al., 2017; Shah, 2006; Thornton, 2007). On the other hand, the study finding agrees with Okonkwo and Godslope (2015) and Rauf et al. (2021), who revealed that fiscal dependency positively affects macroeconomic stability.

Furthermore, regarding the control variables, the study agrees with Bojanic (2018), who found that FDI positively affects macroeconomic stability. The study's finding disagrees with this studies that showed a positive effect of GDP per capita on macroeconomic stability (Ali & Batool, 2017; Bojanic (2018), indicating that economic growth adversely affects macroeconomic stability. On the other hand, the study found that government expenditure for social welfare adversely destabilizes macroeconomics. This rising expenditure reduces resources that can help to foster human capital and infrastructure, bringing macroeconomic instability.

The study found an adverse effect of public investment on macroeconomic stability. It is because policies that increase aggregate expenditure will raise prices, leading to economic instability. Though the study finding is consistent with Ali and Batool (2017), it disagrees with Adindu and Ugondah (2021) and Mariani et al. (2022) studies that revealed a negative effect of capital expenditure on macroeconomic stability, indicating that public investment is preserving macroeconomic stability. However, it contradicts studies that found a negative effect of investment on macroeconomic stability (Iqbal & Nawaz, 2010; Okonkwo & Godslove, 2015). Regarding the unemployment rate, the study finding is consistent with Ali and Batool (2017), which found that unemployment rates fuel macroeconomic instability.

On the other hand, population growth failed to bring macroeconomic stability to Ethiopia. A conceivable explanation can be that high population growth engenders a growth in demand, increasing the burden on infrastructure, which causes a decrease in production, and therefore prices and unemployment rise. The study finding is consistent with Palienko et al. (2017), Rauf et al. (2021), and Osmani and Tahiri (2022) studies that found population growth adversely affects macroeconomic stability. However, it contradicts Iqbal and Nawaz (2010), who found an insignificant effect. The study finding is consistent with Dadgar and Nazari (2018), who found a negative effect of GDP on the MI. Moreover, the study contradicts Palienko et al. (2017), who found that GDP has no significant effect on MI. Finally, the finding contradicts Osmani and Tahiri (2022), who found that education aggravates macroeconomic instability.

In summary, the study findings suggest that the fiscal decentralization of Ethiopia does not generate settings to obstruct macroeconomic instability. Besides, the findings also uncover that poor design or implementation of decentralization policies may promote SNG's reckless and rampant expenditure. Because of the IGT design of Ethiopia advocates, SNG, with high fiscal gaps, receives large federal grants. Therefore, it engendered excessive competition among SNGs for the shared pool rather than fostering revenue collection efforts, which may induce macroeconomic instability. Finally, rapid population growth puts pressure on infrastructure and reduces production capacity, ultimately destabilizing the economy by increasing unemployment and inflation.

6. Conclusion

The intricate nexus between fiscal decentralization and macroeconomic stability has been examined empirically, but no conclusive evidence has yet surfaced. Some studies have revealed a negative relationship between fiscal decentralization and macroeconomic stability, while others have found the opposite. Therefore, the empirical investigations are less reliable and inconclusive, requiring additional studies. Therefore, the study investigated the effect of fiscal decentralization on macroeconomic stability. For empirical analysis, the study employed two steps of GMM estimation. The Chi-square test shows that the models used in the study are reliable. The Sargan and autocorrelation tests proved the validity of the instruments and models used in the study, respectively.

The study revealed that expenditure decentralization and fiscal dependency aggravate macroeconomic instability. Contrarily, revenue and composite decentralization significantly cause macroeconomic stability. Among the control variables, population growth, unemployment rate, FDI, and welfare have been intensifying macroeconomic instability; however, GDP and School enrollment are suppressing macroeconomic instability. Nevertheless, public investments and welfare hurt macroeconomic stability in most regression models.

Macroeconomic stability depends on the fiscal situation of the subnational entities; therefore, fiscal dependence is concerning since SNG has yet to implement initiatives to increase internally generated revenue because they depend on federal grants. Additionally, financial autonomy is a crucial component of fiscal federalism to understand the macroeconomic stabilizing effect of revenue devolution. Subnational governments should have access to sufficient resources and

a sense of responsibility to carry out their assigned tasks. Therefore, problems engendered by ethnic-based federalism should be explicitly considered and alleviated to secure Ethiopia's macroeconomic stability. Besides, the apparatus of fiscal relations among various levels of government should accustom to accomplishing the appropriate policy objectives, guaranteeing a stable macroeconomy. In line with the findings, the study recommends that the government follow a contractionary fiscal policy since the current expansionary policy aggravates macroeconomic instability because social and capital expenditures bring instability to the economy.

The study's limitations are: First, it excluded Addis Ababa City Administration because it often gets federal grants. Besides, the analysis did not include the newly established regional states (Sidama and South-Western). From the perspective of future research, refining the measures of fiscal decentralization and macroeconomic stability to include migration, government quality, public sector efficiency, democracy, and other dimensions should be the next step of future work. Another avenue for future research will be employing a mixed research strategy because it allows using qualitative data to triangulate quantitative findings.

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Appendix

Table A1. Test of Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
MI	140	0.000	0.000	25.960	0.000
Rev Dec	140	0.000	0.000	.	0.000
Exp Dec	140	0.000	0.075	23.050	0.000
Dependency	140	0.000	0.000	58.570	0.000
Comp Dec	140	0.000	0.289	20.350	0.000
FDI	140	0.000	0.000	22.300	0.000
POP Gr	140	0.067	.	.	.
Unemp	140	0.001	0.001	16.850	0.000
Welfare	140	0.000	0.000	48.610	0.000
Public Inv	140	0.060	.	.	.
Enrollment	120	0.000	0.000	38.020	0.000
RGDP	140	0.000	0.000	52.190	0.000

Source: Study Panel Data (2005—2018).

Table A2. Test of Multicollinearity

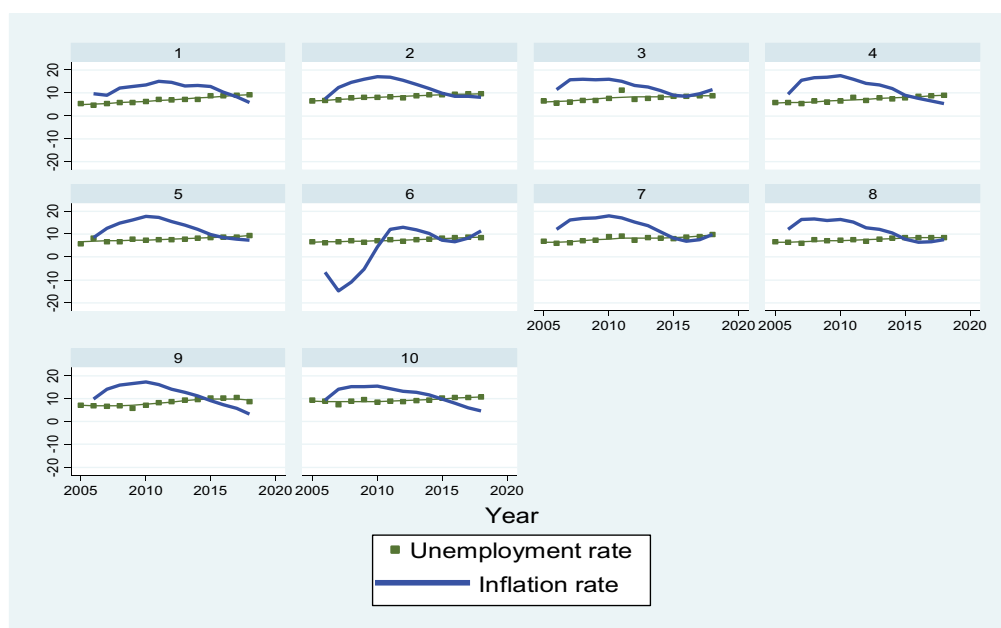
Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) MI	1.000											
(2) Rev Dec	-0.260	1.000										
(3) Exp Dec	0.015	-0.081	1.000									
(4)Dependency	0.181	-0.391	0.858	1.000								
(5) Comp Dec	0.412	-0.238	-0.194	-0.146	1.000							
(6) FDI	0.595	0.353	-0.080	-0.261	0.096	1.000						
(7) POP Gr	0.551	-0.400	0.051	0.251	-0.091	-0.876	1.000					
(8) Unemp	0.552	-0.441	0.103	0.255	-0.104	-0.640	0.676	1.000				
(9) Welfare	0.250	0.000	-0.026	-0.088	0.426	0.540	-0.531	-0.523	1.000			
(10) Public Inv	0.121	-0.053	0.553	0.429	-0.268	0.189	-0.201	-0.252	0.496	1.000		
(11)Enrollment	-0.124	0.200	0.240	0.223	0.255	0.189	-0.187	-0.228	0.128	0.014	1.000	
(12) GDP	-0.205	0.048	-0.516	-0.460	0.772	0.409	-0.387	-0.419	0.517	-0.367	0.121	1.000

Source: Study Panel Data (2005–2018).

Graph A1. Unemployment and Inflation Rate of each SNG (Region).

Source: Study Panel Data (2005—2018)



Graph A2. Misery Index (MI) of each SNG (Region).

Source: Study Panel Data (2005—2018)

