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Does fiscal decentralization have a differentiated effect on structural economic transformation in Africa?

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ABSTRACT

The main objective of this article was to explore the influence or effects of fiscal decentralization on economic structural changes in developing countries based on a global indicator presented by twelve different variables measuring economic sustainable development. The current study aims to survey the weakness of the old paradigm of structural economic transformation, which for decades promoted the importation of foreign technology and capital, the prioritization of heavy industry, and the neglect of both regional population centers and small businesses. To attain this goal, we apply different methods, such as Driscoll and Kraay, GMM, and Lewbel 2SLS, to explore the socio-cultural mechanisms shaping development. The results highlight that fiscal decentralization can indeed foster structural transformation across the continent, especially in North, West, Central, and Southern Africa. Yet, fiscal decentralization slowed the rate of structural economic transformation in East Africa. The study emphasizes the importance of establishing transparent revenue collection systems and ensuring efficient resource allocation within local structures. Implementing such measures is crucial in leveraging fiscal decentralization as a driving force for promoting structural economic transformation throughout the African continent.

Contribution/Originality: It adds to the existing empirical literature by examining the effect of fiscal decentralization on each region of Africa context. It gives us deep comprehension of how political stability and corruption can also influence fiscal decentralization and its indirect effect on economic transformation depending of the context on each African region.

1. INTRODUCTION

In their search for a growth lever, many developing countries in general, and Africa in particular, have focused on the significance of fiscal decentralization in their structural economic transformation. Fiscal decentralization is the process of redistribution of financial responsibilities and decision-making powers from central government to lower levels such as states or municipalities (Yemini, 2017). In contrast (Arvanitis, AndriAnArison, & Ie, 2016) define structural economic transformation as the process of transferring resources from traditional sectors like agriculture and extractive industries to modern ones like manufacturing and services. Third, how fiscal decentralization affects structural economic transformation is an important topic of concern in determining whether such policies promote growth (Bezes, Billows, Duran, & Lallement, 2021). The relationship between

decentralization and transparency is complex and depends on local policies and the context of the reforms. Decentralization and Economic Performance: Da Costa (2021) also argues that measuring the effect of decentralization on economic performance is challenging in practice. However, there is research to suggest that fiscal decentralization can help facilitate structural economic transformation by enabling investment in modern sectors while reducing reliance on traditional sectors b(Bird & Vaillancourt, 1998; Christensen, Horn, Caldera, & Soares, 2011; Faguet, 2004; Smoke, 2003) as well as enhancing local public services provision.

The French instance presents compelling evidence for the potential role fiscal decentralization can play in driving structural economic transformation. Studies by Bezes et al. (2021) For example, see that the fiscal and spending competences delegated in France had a positive effect on economic growth through altering regional structures. Iimi (2005) showed that fiscal decentralization and economic growth have a positive relation for 51 countries, including developed ones in addition to developing nations, during 1997–2001. Blöchliger (2013) found similar results for OECD countries from 1970 to 2010. King and Ma (2001) noted lower inflation rates in decentralized countries.

Yemini (2017) identified a positive relationship between expenditure decentralization and economic growth and a negative link with revenue decentralization. Adefeso (2015) and Gemmell, Kneller, and Sanz (2013) presented contrasting results on the effects of income and expenditure decentralization. Thornton (2007) found statistically insignificant impacts for 19 OECD countries from 1980-2000. Wibbels (2000) highlighted adverse effects of fiscal federalism on macroeconomic performance. Research by Rodríguez-Pose and Ezcurra (2010) and Rodríguez-Pose and Krøijer (2009) suggested negative impacts of fiscal decentralization on economic growth. Yulindra (2012) and Smith, Park, and Liu (2019) demonstrated positive effects of fiscal decentralization on economic growth indicators in Indonesia and Mexico, respectively. In contrast, Iqbal, Din, and Ghani (2012) reported mixed results for Pakistan, showing differing effects of income and expenditure decentralization on economic growth. Martinez-Vazquez and McNab (2003) found that increased fiscal autonomy for local governments in developing nations is associated with higher economic growth. Shah and Qureshi (2007) showed that fiscal decentralization can boost economic growth by enhancing efficiency at the local level. Faguet, Fox, and Pöschl (2014) suggested that fiscal decentralization can promote income equality when local governments have sufficient resources to address social needs.

In the world of economic analysis, this emphasis on real GDP (Gross Domestic Product) growth rates as an indication of structural change in the economy may not necessarily capture all that is going on. Previous studies have tended to overlook the role of institutional quality and industrialization in economic development, but recent empirical research has highlighted that fiscal decentralization impacts are complicated. Those researchers include Faguet and Shami (2020) and Rodden, Eskeland, and Litvack (2003), who examine the effect of fiscal decentralization on economic growth, industrial sector development, agriculture, and employment. Although a bulk of the work remains Europe-focused, it is increasingly turning its gaze towards the African landscape, resulting in varied outcomes in different countries.

In the African context, both economic and public service outcomes are significantly contingent on processes of fiscal decentralization. In Kenya, for example, corruption and regulatory frameworks temper the link between fiscal decentralization and service delivery, thereby thwarting public access provision (Mwangi, Naituli, Kilika, & Muna, 2023). In contrast, the experience of South Africa offers a different story where fiscal decentralization has been associated with sustainable development and environmental benefits, thus paving way for long-term economic sustainability (Aliamutu & Mkhize, 2024).

On the contrary, Zimbabwe's experience with fiscal decentralization has been characterized by central governments increased control of local administration, compromising service delivery and perpetuating patronage networks (Nyikadzino & Vyas-Doorgapersad, 2022). This divergence of outcomes illustrates a fundamental truth for fiscal decentralization initiatives — the political and administrative environment in which they are embedded

will play as critical a role, if not more so. Technical analyses of the distributional impact and effect on employment incentives for low-income groups when means-tested benefits are replaced with or increased in value through alternative fiscal measures have been carried out using tax-benefit microsimulation models across a range of African countries, including Ethiopia, South Africa, Tanzania, Uganda (McMillan & Headey, 2014), Mozambique, and Zambia. This is captured by our analysis, which points to the fact that fiscal drag has the potential of undermining progressivity and redistributive effects of personal income taxes if not judiciously altered for fair distribution across all social classes (Shahir, Figari, & Ali, 2022).

In sum, the debate over fiscal decentralization goes far beyond conventional indicators for economic growth and involves an intricate balance of institutions' framework capacity, political dynamics, and administrative capabilities. Such an approach enables policy makers to develop more effective strategies for fiscal decentralization, perhaps less directly monetizing the value of natural resources contributing to sustainable and inclusive development.

The case of Dakar in Senegal highlights how preparations for a municipal bond, although halted by a national government decree, improved the city's financial management capacities and strengthened ties with residents, indicating a potentially positive aspect of financial governance within fiscal decentralization (Haas, 2022). These examples underline the complex and diverse consequences of fiscal decentralization in Africa, influenced by factors such as economic policies, administrative procedures, and political landscapes.

Figure 1, opposite, shows that the evolution of structural economic transformation has not followed a regular pace during the period 2000–2022, in most African countries. The same is true of the various measures of fiscal decentralization, namely the decentralization of taxes, income, and expenditure, which hovered below 20% over the period selected.

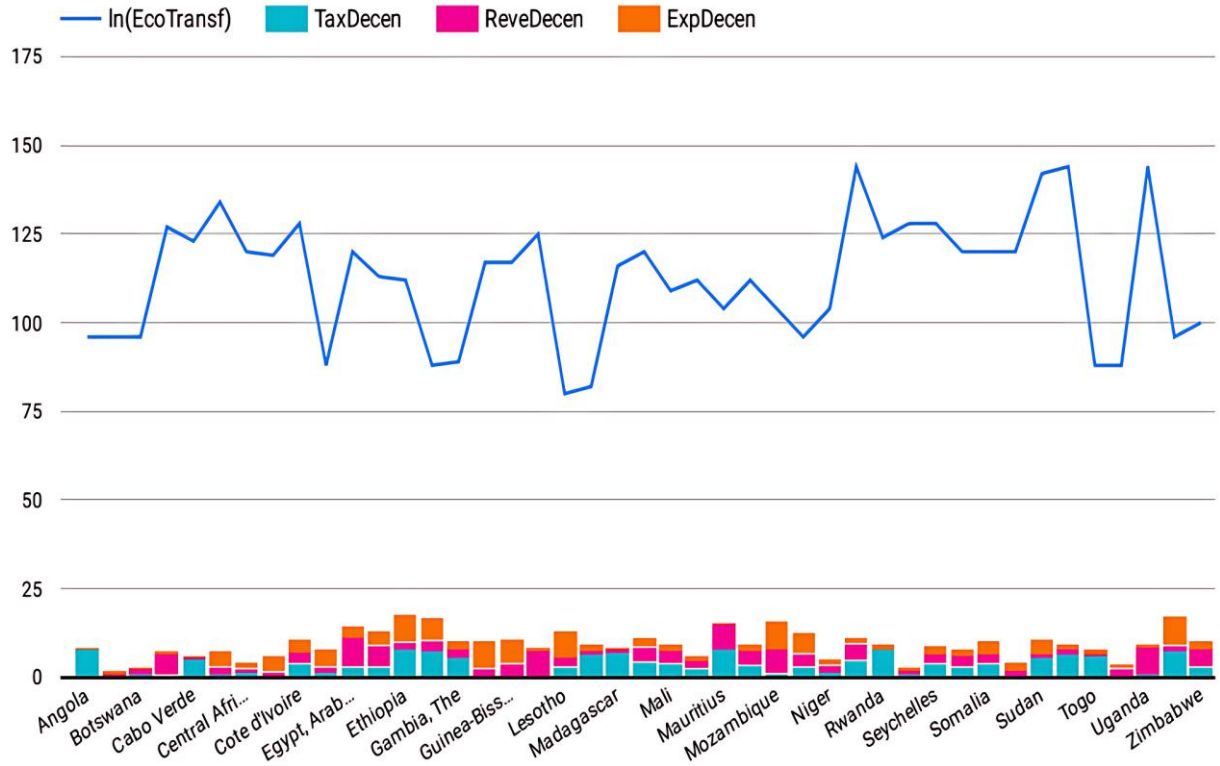

Figure 1. Comparative evolution of structural economic transformation and decentralization of taxes, revenues and expenditures during the period 2000-2022.

The gap between previous research and our study can be summarized in two points: First, there is limited research on this topic pertaining to Africa overall, with a particular scarcity of comparative analyses across its

regions (West Africa, Central Africa, East Africa, Southern Africa, and North Africa). Secondly, our study distinguishes itself from prior research by employing a composite indicator to assess structural economic transformation, incorporating 12 variables: agriculture, mining, manufacturing, public services, construction, commercial services, transportation services, business services, financial services, real estate, government services, and other services.

2. LITERATURE REVIEW OF THE EFFECTS OF FISCAL DECENTRALIZATION ON STRUCTURAL ECONOMIC TRANSFORMATION

2.1. Theoretical Review

Theoretically, studies examining the effects of fiscal decentralization on structural economic transformation have identified several key findings.

First, fiscal decentralization can promote economic growth by encouraging efficiency and innovation in local governments. In fact, the study by Besley and Case (1993) is illustrative of how decentralized authorities endowed with significant tax and fiscal autonomy are better equipped to handle region-specific needs. This empowerment leads to a better sense of resource distribution and hence benefits greater economic growth. Fiscal decentralization, too, can help improve public resource management. Studies, including those by Martínez-Vázquez, Lago-Peñas, and Sacchi (2017), show fiscal decentralization can improve accountability and transparency by making local administrators more answerable to their constituents. Still, some research points to certain perils and limitations of fiscal decentralization. For example, regional disparities may worsen when fiscal responsibilities are devolved to local authorities, and therefore, rich areas can progress at the expense of poor ones. Rodden (2003) has shown that only when coordination and equal redistribution are both strong can these hidden inequalities be addressed. However, while different theoretical analyses may lead to divergent conclusions, the empirical evidence almost uniformly converges. Findings from McMillan and Headey (2014) highlight the importance of industrialization in promoting economic growth and reducing poverty. This study emphasizes that industrialization helps create adequate formal employment, increase productivity, and raise economic contributions.

A second study, conducted by Hausmann and Klinger (2006), confirms that industrialization is also positively related to higher levels of economic growth in the long term through productive diversification. The study illustrates the crucial importance of how technological change and sectoral diversification enhance the sustainable structural economic transformation process. The first understudied concept is premature deindustrialization, which, according to the seminal work of Rodrik (2016), defines a situation where developing nations experience less industrial sectoral contribution compared to what can be observed in developed countries. However, Hausmann and Klinger (2006) researched the structural patterns of competitiveness specific to developing countries with a focus on exploring how industrialization affects economic transformation. In the case of Szirmai (2012), industrialization is considered a driver as well, and he, in fact, analyzes different paths to economic growth closely associated with industrialization. Moreover, Timmer, Szirmai, and Vries (2014), based on experiences in Europe where structural change was encouraged via industrial policy, an empirical chapter explores the effectiveness of industrial development policies for promoting socioeconomic transformation within developing countries. Similarly, Nayyar (2013) inquiry not only examines the linkage between structural economic transformation, industrialization, and human development but also explores how to harness 'socially dynamic drivers' for implementing social imperatives under a green growth framework.

2.2. Empirical Investigations

Fiscal decentralization has diverse implications for the structural economic transformation of a nation. This decentralization of fiscal authority could stimulate private investment by allowing local governments to set their tax rates and offer targeted tax breaks.

2.2.1. Boosting Investment and Real GDP

In effect, these measures can encourage entrepreneurship, increase economic diversity, and improve foreign investment appeal. Fiscal decentralization provides them with more financial power, allowing for significant investments in major infrastructure and economic development projects. Empirical work in the real world has shown that policies such as these tend to improve the business climate and increase private investment (Rodríguez-Pose, Vilalta-Bufí, & Azagra-Caro, 2013). In an international comparison, Martinez-Vazquez and McNab (2003) investigate the relationship between fiscal decentralization and economic growth using datasets from around the world. Shahbaz, Gyamfi, Bekun, and Agozie (2022) reinforced this suggestion by demonstrating that fiscal decentralization can lead to economic development through the creation of a suitable institutional framework for competition and efficiency. Meanwhile, Bird and Casanegra de Jantscher (2004) also argued that more extensive local fiscal autonomy could lead to greater investment in local infrastructure, spurring economic growth and increasing jobs.

Also, by giving resources to local governments with more freedom to address specific economic needs, fiscal decentralization helps these local administrations. They can invest in areas that grow the economy and create an aggregate demand shock from money spent on diversifying business activity by allocating resources directly. Fiscal decentralization supports entrepreneurship by allowing local authorities to design tailored policies that stimulate innovation and strengthen SMEs (small- to medium-sized enterprises). Research conducted by Faguet (2014) supports this point by finding that locally autonomous governments choose policies in favor of local firms.

Smith et al. (2019) researched the effects of fiscal decentralization on structural economic change in fifteen sub-Saharan African developing countries from 2000 to 2015. Their results indicate that indigenous investment in key sectors such as agriculture and industry can catalyze positive structural economic change supported by fiscal decentralization. Using panel data and state-of-the-art econometric techniques, the authors analyzed their contention about endogenous public finance decentralization. On the other hand, Cheah, Sarstedt, Ringle, Ramayah, and Ting (2018) compared how fiscal decentralization has impacted economic development among different Latin American countries between 1990 and 2010. They conclude that fiscal decentralization promotes economic growth by allowing resources to be distributed more effectively and function better in the local government structure. However, the impact of these effects depends on conditions related to institutional development and governance capacity at the local government level in each country.

From 2005 to 2018, Levine (2021) found that fiscal decentralization and economic diversification in Southeast Asian countries are interrelated. Their results show that fiscal decentralization helps drive changes in the economy by encouraging investments in new areas like services and possibly new technologies. However, it is also found that the quality of institutions and efficiency in intergovernmental coordination are essential to allowing fiscal decentralization to have its maximum benefits in structural transformation.

2.2.2. Stimulating Competitiveness, Public Finances, and Innovation

This fiscal decentralization arises as a necessary condition for innovation promoted by the independence of municipalities to finance policies in research and development, education, and vocational training. These contribute to regional competitiveness by developing industrial clusters and assisting in the adjustment to structural economic changes (Oates, 2005).

Nonetheless, while fiscal decentralization can have its merits for the public purse as a whole, local administrations may face difficulties in meeting their obligations when municipal revenues fail to keep up with various community expenses, and budgetary imbalances accordingly emerge. Different publications have reported that the posterior is true, and fiscal decentralization implies increasing local government financial needs (Cibils et al., 2015; Yemini, 2017).

2.2.3. Reduce Regional Disparities

Budgetary decentralization can help reduce differences between regions by giving local authorities the financial tools they need to develop and improve less developed areas. The design of services to allow firms and citizens to apply for business and use recreation service functions via telephone or internet is likely explained by Faggio and Overman (2014) through increased attractiveness for skilled labor. But the impact of fiscal decentralization on regional disparities itself needs to be cautiously examined. There is also a suggestion that economic disparities between regions might be exacerbated by fiscal decentralization if the local administrations do not appropriately use these promises of decentralized funds to promote regional growth in less developed areas (Clifford, Doran, Crowley, & Jordan, 2022; Martinez-Vazquez & McNab, 2003).

Fiscal decentralization also has risks with respect to regional inequalities, coordination deficits, and administrative capacity. There is a danger that fiscal decentralization may increase the level of regional disparities, with some regions, mostly those rich in natural resources, having a comparative advantage relative to other less favored ones. On the one hand, such an approach could lead to significant regional imbalances in terms of where economic activity is concentrated and regions that are left behind economically. Secondly, those who argue caution that it could cause a lack of coordination between different subnational and national levels, leading to incoherent economic policies that can hinder structural transformation at the national level. Bird and Smart (2002) maintain that "intergovernmental coordination is crucial to achieving efficient resource allocation, as well as coherent economic policies." Meanwhile, local administrations in quite a few jurisdictions nonetheless come up against such low administrative capacity that the effective resource management authentically handed over to them by fiscal authorities hinders these efforts toward economic transformation. The study by McLure Jr (2000) clarified that without the administrative capabilities, decentralization can lead to financial mismanagement, thus limiting the capacity of local governments in executing adequate economic policies.

With expectations of efficiency and quality public service delivery mounting, fiscal decentralization offers a possibility to strengthen the accountability of local governance units with their citizens. Consequently, the supposed improvement in local governance increases transparency and reduces corruption (Brennan & Buchanan, 1980; Ikeanyibe, Obiorji, Osadebe, & Ugwu, 2020). Second, fiscal decentralization could stimulate employment through its positive impact on private investment by relocating some elements of taxation and social welfare to the local level. Although the evidence is rather empirical, nations that allocate strong power for local authorities over economic decisions usually have higher employment rates (Eichenbaum, Johannsen, & Rebelo, 2021; Fisman & Gatti, 2002).

In a recent empirical study about fiscal decentralization and economic development, Durán-Romero et al. (2020) stated an increasing amount of literature over time. The authors emphasize the importance of localizing analyses of the relationships between various fiscal institutions and politics when devising changes, as fiscal decentralization inherently brings about change. Meanwhile, Baskaran and Min (2015); Baskaran, Feld, and Schnellenbach (2016) and De Borger and Fosgerau (2008) investigated fiscal centralization as a way to model the power relationship between local administrations and central regions. These findings suggest that fiscal decentralization could strengthen the same accountability of local governance entities, which have the power to enforce discipline.

Fiscal decentralization has received a lot of attention among those who study the structural economic transformation. Previous research has considered the consequences of fiscal decentralization with respect to economic performance, service delivery, and political accountability (Bird & Zolt, 2005; Caldeira & Rota-Graziosi, 2014; CECODES, 2012; Wilson & Tewdwr-Jones, 2021). Including a tax-spending analysis, in addition to an examination of the influence of fiscal decentralisation on tax rates as conducted by Gérard and Valenduc (2007) regarding France. Finally, a study by Valenduc, Vendramin, Krings, and Nierling (2007) also suggested that the 2003 reform was successful in removing tax expenditures and funding them through reductions in rate applications.

Different scholars have tried to investigate the effect of fiscal decentralization in promoting structural economic transformation in Africa by applying various research methods. A comprehensive analytical framework, developed by Prud'Homme (2003), is based on the distribution of functions and revenues between government tiers; intergovernmental transfers to exchange responsibilities for specific sectors at different levels with funding resources committed by other distinct layers of government; and central safeguards that focus only on certain aspects in a limited set of priority spheres/products/functions. This framework explains how things like economic efficiency and macroeconomic stability can be targeted by fiscal decentralization. Shabalala (1999) reviewed the literature on fiscal decentralization and ran a univariate linear regression to determine how changes in subnational tax and/or expenditures affected the public sector size. Moche, Monkam, and Aye (2014) used a panel GMM/VAR method to study how fiscal decentralization relates to poverty, measuring poverty through household spending per person instead. Mbau, Iraya, Mwangi, and Njihia (2019) analyzed the performance of the county governments in terms of fiscal responsibility under a devolved governance system. It was examined using three indicators of fiscal decentralization, and it was established that there is an indication of low adherence to the prudence pillar estate for direct control among others. In contrast, Mwangi et al. (2023) employed interviews and group discussions to provide insight into the qualitative measures of fiscal decentralization on public service delivery in Kenya, where spending responsibility entailed expenditure responsibilities, revenue autonomy reform, and borrowing capabilities. Together, these methodologies provide a holistic view of the multi-dimensional effects of fiscal decentralization in Africa.

Research also suggests that such transfers can lead to economic gains, stimulate local investments, and improve public-resource management and generate employment; however, fiscal instability might arise elsewhere in regions. Yet, few studies take a composite view of economic transformation and treat structural change in isolation while neglecting the importance of income coordination and redistribution from decentralization for redistributive balance.

3. METHODOLOGY

3.1. Data

We utilized cross-sectional data from diverse sources to analyze a sample of 43 nations in Africa. Panel data was employed to compute the average of all time-based variables during the timeframe of 2015-2022. The selection of this period was driven by the absence of data on these variables for specific countries within the sample.

3.1.1. Basic Model

The evaluation of the effects of fiscal decentralization on structural economic transformation is inspired by the work of Mwangi et al. (2023), who conducted a qualitative study involving interviews and focus group discussions to explore the effects of fiscal decentralization on public service delivery in Kenya, focusing on expenditure responsibilities, revenue autonomy, and borrowing powers.

$$EcoTransf = f(FiscDecen, PubSpendEduc, PolStab, Unempl, NatRess, Indust, Corrup) \quad (1)$$

Economic transformation (*EcoTransf*) is explained as a function of fiscal decentralization ($FiscDecen$), public education spending ($PubSpendEduc$), political stability ($PolStab$), unemployment ($Unempl$), national resources ($NatRess$), industrialization ($Indust$) and corruption ($Corrup$).

This functional relationship allows us to write the following econometric equation:

$$\ln(EcoTransf_{it}) = \beta_0 + \beta_1 \ln(FiscDecen_{it}) + \sum_{i=2}^{n} \beta_i Z_{it} + \varepsilon_{it} \quad (2)$$

Where $\ln(EcoTransf_{it})$ denotes the structural economic transformation taken in natural logarithm, $\ln(FiscDecen_{it})$ represents the variable of interest evaluating the effects of fiscal decentralization on the structural economic transformation in logarithm. Z_{it} is the vector of control variables having an effect on structural economic

transformation such as public spending, political stability, unemployment, natural resources, industrialization and corruption.ε_{it} represents the error term.

The Structural Economic Transformation Indicator ($EcoTransf$), also known as the Economic Performance Indicator, is a tool used to measure the ability of an economy to move from an initial to an advanced development phase. In literature, there are different methods for calculating this indicator such as the composite index method (Baldwin & Forslid, 2000), the Production Frontier Method (Coelli, Rao, & O'Donnell, 2005), and the approach based on international indicators, inspired by the work of Porter, Sachs, and McArthur (2001). Furthermore, as part of our study, we use the synthetic indicator of structural economic transformation inspired by the work of Kruse, Mensah, Sen, and De Vries (2023). It covers twelve sectors of the economy: Agriculture, mining, manufacturing, utilities, construction, business services, transportation services, business services, financial services, real estate, government services, and other services.

This article discusses fiscal decentralization by looking at studies that use the percentage of money collected by local governments compared to the total money collected by the government (revenue decentralization) and fiscal decentralization as ways to measure tax decentralization (Arzaghi & Henderson, 2005). The primary data source for fiscal decentralization indicators is the Government Finance Statistics Annual Yearbook (GFS) published by the International Monetary Fund (IMF), supplemented by data from finance ministries and the Organization for Economic Cooperation and Development (OECD) when available.

Table 1 summarizes the main sources of the study variables, as well as their abbreviations.

Table 1. Summary table of variables and their sources.

Types	Variables	Abbreviations	Sources
Endogenous	EcoTransf	Structural economic transformation	GGDC/UNU-WIDER economic transformation database (ETD)
Interests	FiscalDecen	Fiscal decentralization	IMF, GFS, OECD fiscal decentralization database
Control	PubExpEduc	Ratio to GDP of public administration expenditure	IMF database
	PolStab	Political stability index	ICRG (International country risk guide)
	Unempl	Percentage of the population unemployed or not having a job	WDI (World development indicators)
	NatRess	Total natural resource rent (%GDP)	WDI (World development indicators) & ADBDP (African development bank data portal)
	Industry	Added value of the industrial sector	WDI
	Corrupt	Corruption	ICRG

Table 2 below summarizes the main authors who have shown the ambivalent effects of the different explanatory variables on structural economic transformation.

Table 2. Summary of study variables and expected theoretical signs.

Variables	Variable definitions	Signs	Author(s)
FiscalDecen	Fiscal decentralization	+/-	Faguet and Shami (2020); Bird and Vaillancourt (1998); Liu, He, Chen, and Gao (2019) and Bezes and Palier (2018)
PubExpEduc	Ratio to GDP of public administration expenditure on human capital	-	Auerbach and Gorodnichenko (2012); Barro (1990); Cavallo and Riboni (2016); Ilzetzki, Mendoza, and Végh (2013); Mulas-Granados and Sosvilla-Rivero (2004); Garrett, Graddy, and Jackson (2008); Sahay et al. (2015) and Woo and Kumar (2015)
PolStab	Political stability index	+/-	Collier and Hoeffler (2004); Acemoglu, Johnson, and Robinson (2005); Rodrik (2008); Jones, Myerson, and Rosendorff (2017) and Rodrik and Subramanian (2005)
Unempl	Percentage of the population unemployed or not having a job	-	Acemoglu and Autor (2012); Felderer and Homburg (1992); Fitzenberger, Kohn, and Lembcke (2018); Hall (2011); Stiglitz (2012) and Summers (2014)
NatRess	Natural resources index	+/-	Auty (1993); Rosser (2016); Sachs and Warner (2001) and Dasgupta (2013)
Industry	Added value of the industrial sector	+	Rodrik, McMillan, and Rodríguez-Clare (2014); Hausmann, Hidalgo, Bustos, Coscia, and Simoes (2014); Rodrik (2016); Hausmann and Klinger (2006); Szirmai (2012); Timmer et al. (2014) and Nayyar (2013)
Corrupt	Corruption	+/-	Méon and Weill (2010); Svensson (2005); Mauro (1995); Méon and Sekkat (2005); Aizenman and Jinjarak (2008) and Wei (2000)

3.1.2. Estimation Method

In this research, we are assessing the impact of fiscal decentralization on structural economic change using data from a panel of 43 African nations from 2015 to 2022. Using ordinary least squares (OLS) to estimate Equation 2 might not give the best results because it doesn't take into account the unique characteristics of each country and can overlook important factors. Judson and Owen (1999) have argued that employing OLS to estimate a model incorporating fixed effects may introduce considerable bias, even with a substantial number of years (T).

3.1.2.1. Robustness Examination: Using the Driscoll and Kraay Method

This estimation method is carried out after the Pesaran cross-sectional dependence test. In fact, it is also robust to violations of classical assumptions of econometric models, such as the non-normality of residuals, the endogeneity of explanatory variables, the presence of auto correlational errors, etc. This capability makes it possible to deal with real situations where the basic assumptions of the model are not satisfied. It provides reliable and accurate results that contribute to a deeper understanding of economic relationships and informed decision-making in various areas of the economy.

3.1.2.2. Managing The Endogeneity Problem: Lewbel (2012) 2SLS Method

The Generalized Method of Moments (GMM) technique requires choosing specific instrumental variables that are related to the explanatory variables but not to the errors, which can be difficult. The GMM estimator works well only if two important conditions are met: there should be no repeating patterns in the error term (AR(2)), and the instruments used must be suitable (Hansen's test). Moreover, the excessive use of instruments may adversely

impact and distort the results of Hansen's Limited Identity Test; hence, the general guideline suggests that the number of instruments should be kept lower than the number of countries (Roodman, 2009). Addressing the issue of endogeneity helps to overcome the dilemma of selecting instrumental variables faced in the GMM approach. Employing the Two-Stage Least Squares (2SLS) estimation method proposed by Lewbel (2012) allows for the resolution of the endogeneity concern. Equations 3 and 4 show the simultaneity between the dependent variable (structural transformation) and the variable of interest (fiscal decentralization):

$$\begin{cases} \ln(EcoTransf_{it}) = \alpha_0 + \alpha_1 \ln(FiscDecen_{it}) + \alpha_2 \ln(PubSpend_{it}) + \alpha_3 \ln(PolStab_{it}) \\ \quad +\alpha_4 \ln(Unempl_{it}) + \alpha_5 \ln(NatRess_{it}) + \alpha_6 Indust_{it} + \alpha_7 corrup_{it} + \mu_{it} \quad (3) \\ \ln(FiscDecen_{it}) = \gamma_0 + \gamma_1 \ln(EcoTransf_{it}) + \gamma_2 \ln(PubSpend_{it}) + \gamma_3 \ln(PolStab_{it}) \\ \quad +\gamma_4 \ln(Unempl_{it}) + \gamma_5 \ln(NatRess_{it}) + \gamma_6 Indust_{it} + \gamma_7 corrup_{it} + \pi_{it} \end{cases} \quad (4)$$

We use the instrumental variables (IV) method to solve the endogeneity problem of one or more variables in linear regression. The presence of endogeneity in a model indicates that the variable of interest is associated with the error term. Moreover, the model's omission of other variables correlates with the control variables.

In fact, using system generalized moments (system GMM) to address endogeneity is not a panacea for solving the problem of reverse causality in the relationship between aquaculture and income inequality. Therefore, we use an external instrument via a surrogate instrumental variable approach (Lewbel, 2012), which is a better choice to address the potential reverse causality problem.

However, we carry out preliminary tests before any estimation, which helps avoid any bias. Rightly, far from examining the tests of Im, Pesaran, and Shin (2003) and Levin, Lin, and Chu (2002), we will present the second-generation tests like the Cross-sectional Im Pesaran Shin (CIPS) and Cross-sectional Augmented Dickey-Fuller (CADF). Next, we will examine the descriptive analysis and the correlation between the model's variables, followed by the actual estimation of the model.

4. RESULTS OF THE ECONOMETRIC MODEL

4.1. Descriptive Analysis, Stationarity Tests, and Correlation Matrix between Variables

The summary statistics of Table 3 show that the mean of the variables is greater than their standard deviation, and in addition, there is a small gap between the maximum and the minimum of the variables, signifying the low economic heterogeneity of the countries. Public education spending has the highest mean, as well as its standard deviation, among the variables retained in the model. This may suggest that the studied population has a higher value for the said variable. However, such information does not allow conclusions to be drawn about the distribution of the variable, which may be asymmetric or present extreme values. It is therefore important to complete this information with the normality test of the variables and the cross-sectional dependence test.

Table 3. Summary statistics of variables.

Variables	Obs.	Mean	Std. dev.	Min.	Max.
lnEcoTransf	344	1.402	0.216	1.002	1.837
RevDecen	344	0.437	0.364	0.001	0.999
GovExpEduc	344	4.018	2.180	-9.023	10.639
PolStab	344	2.699	0.572	0.282	3.804
lnUnempl	344	1.834	0.909	-0.631	3.395
lnNatRess	344	2.073	0.746	-0.279	5.771
lnIndust	344	3.062	0.432	0.716	3.930
Corrupt	344	-0.546	0.647	-2.127	1.633

Table 4 presents a summary of the results of the normality tests of the different variables raised in our model. It appears that the probabilities (Prob>chi2) of our variables are all significant and therefore below the 5% threshold. This allows us to validate the null hypothesis meaning that the variables all follow a normal distribution.

Table 4. Summary of the results of the normality test of the variables.

Variable	Observation	Pr(Skewness)	Pr(Kurtosis)	adj chi2	Prob>chi2
lnEcoTransf	344	0.0210***	0.0218***	14,094	0.0200***
RevDecen	344	0.0309***	0.0400***	10.123	0.0132***
GovExpEduc	344	0.0473***	0.0367***	19,054	0.0395***
PolStab	344	0.0241***	0.0184***	15,230	0.0136***
lnUnempl	344	0.0113***	0.0211***	12,249	0.0104***
lnNatRess	344	0.0253***	0.0143***	11.135	0.0235***
lnIndust	344	0.0239***	0.0221***	10.216	0.0193***
Corrupt	344	0.0192***	0.0208***	13,645	0.0189***

Note: ***p<0.01.

The issue of cross-sectional dependence can lead to biased and inconsistent results, so it is important to determine whether cross-sections are independent or not. The Pesaran cross-sectional dependence test indicates that the estimation of fixed effects produces regression residuals that are cross-sectionally dependent. As shown in the opposite, the average absolute value of the Pesaran statistic is above the 5% significance level. This value allows us not to reject the null hypothesis of the absence of cross-sectional dependence in our sample.

. *xtcsd* , *pesaran abs* is the Stata Command use to perform Pesaran's cross sectional independence test

Pesaran's test of cross sectional independence = 10.338; Pr = 0.0000.

Average absolute value of the off-diagonal elements = 0.673.

Therefore, we used second- generation unit root tests, specifically the CIPS and CADF tests, to check for the presence of a unit root in the series. These tests have the advantage of controlling cross-sectional dependence and heterogeneity in the series. According to the results of these tests reported in Table 5, with the exception of public education expenditure, all variables are stationary at level. This negates the possibility of making inconsistent estimates.

Table 5. Panel unit root test result.

Variables	Cross-sectional Im Pesaran Shin (CIPS)		Cross-sectional augmented Dikey Fuller (CADF)	
	Level	1st difference	Level	1st difference
lnEcoTransf	-3.104***	/	-3.222***	/
RevDecen	-3.983***	/	3.897***	/
GovExpEduc	-1.873	-4.500***	-1.114	4.232***
PolStab	-2.922***	/	-3.101***	/
lnUnempl	-3.134***	/	-3.569***	/
lnNatRess	-3.434***	/	-4.213***	/
lnIndust	-2.893***	/	-2.943***	/
Corrupt	-3.001***	/	-3.514***	/

Note: ***p<0.01.

Table 6 provides the correlation matrix, which displays the correlation values. These values measure the degree of linear relationship between each pair of variables. We observe a positive correlation between fiscal decentralization and three variables: fiscal decentralization, political stability, and natural resources. Furthermore, the other variables, namely public education expenditure, unemployment, industrialization, and corruption, are negatively linked to the dependent variable (structural economic transformation).

Table 6. Correlation matrix of variables.

Variables	lnEcoTr	TaxDec	GovExp	PolStab	lnUnempl	lnNatRess	lnIndust	Corrupt
lnEcoTr	1.000							
RevDecen	0.618	1.000						
GovExp	-0.401	-0.203	1.000					
polStability	0.514	-0.576	0.413	1.000				
lnUnemp	-0.593	0.469	0.409	0.471	1.000			
lnNatRess	0.426	-0.290	0.492	0.539	0.420	1.000		
lnIndust	-0.540	0.363	0.337	0.476	0.353	-0.234	1.000	
Corrupt	-0.526	0.452	0.393	0.384	0.291	0.354	0.470	1.000

All these preliminary results cannot yet allow us to draw a conclusion. Using the estimation results, we will know more.

4.2. Analysis of the Results from the Estimations

The results estimated using the Driscoll-Kraay estimators are presented in Table 7, where model (1) represents the estimates of the effects of fiscal decentralization on structural transformation in Africa, and models (2)–(6) are those of the five other regions, like North Africa, West Africa, Central Africa, East Africa, and Southern Africa. The results indicate that fiscal decentralization is positively and significantly associated with structural economic transformation. Indeed, a 1% increase in tax revenue accelerates structural economic transformation in Africa by 1,080% in general and specifically 5,380% in North Africa, 1,355% in West Africa, 1,193% in Central Africa, and 1,009% in Southern Africa. The positive effects of increased fiscal decentralization on structural economic transformation are higher in North Africa than anywhere else. In fact, important things like political stability, natural resources, and good governance in North Africa might make fiscal decentralization have a better impact on economic change than in other parts of the continent.

Table 7. Driscoll-Kraay results.

	Africa	North Africa	West Africa	Central Africa	East Africa	Southern Africa
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf
RevDecen	1.080***	5.380***	1.355***	1.193***	-1.023**	1.009***
	(0.220)	(0.638)	(0.214)	(0.578)	(0.501)	(0.155)
GovExpEduc	-0.173***	-0.148**	0.186**	-0.034**	-0.510***	-0.103**
	(0.061)	(0.062)	(0.054)	(0.014)	(0.170)	(0.048)
PoliStability	0.575***	1.039**	2.415***	1.641***	-0.459***	0.012
	(0.106)	(0.500)	(0.390)	(0.287)	(0.142)	(0.155)
lnUnempl	-0.106**	-1.638***	2.237***	-0.879***	-1.606***	-0.144***
	(0.049)	(0.296)	(0.216)	(0.200)	(0.268)	(0.011)
lnNatRess	1.217***	0.788***	1.349**	0.599	0.211	0.866**
	(0.220)	(0.158)	(0.257)	(0.411)	(0.350)	(0.337)
lnIndust	0.613***	0.441**	-0.453	0.700**	0.791	1.732***
	(0.167)	(0.049)	(0.564)	(0.350)	(0.633)	(0.435)
Corrupt	0.442**	-0.653*	-0.0879	0.662***	1,017***	-0.207
	(0.191)	(0.356)	(0.286)	(0.225)	(0.305)	(0.283)
Constant	2.401***	2.263***	2.471***	1.377***	2.029***	2.351***
	(0.172)	(0.134)	(0.232)	(0.209)	(0.286)	(0.186)
Comments	344	48	104	32	64	96
R-squared	0.578	0.793	0.638	0.953	0.603	0.517
Number of i	43	6	13	4	8	12
chi2	282.6	187.6	197.67	486.9	538.3	89.19

Note: Standard errors in parentheses.
***p<0.01, **p<0.05, *p<0.1.

Historically, the North African region has been primarily known for its relative political stability, in contrast to other regions of Africa. Research by Besbes (2018) showed that political stability is an important factor that creates an environment for effective fiscal decentralization, leading to implementable development strategies. Secondly, North Africa possesses important natural endowed resources (such as oil), which will ultimately be an advantage for local authorities in terms of tax resources through the fiscal decentralization once implemented. Moreover, the work of Justino and Martorano (2011) confirms that effective management helps to stimulate growth from these resources-based economy sector-led structural transformations within. In most situations, the level of institutional capacity and governance is higher in North African nations than in other regions throughout Africa. According to Budlender (2016), other factors critical in resulting in the success of fiscal decentralization and hence its effect on structural transformation include effective governance. In contrast, only West Africa is the lone African region where a 1% increase in fiscal decentralization substantially harms structural economic transformation to the extent of diminution for all. Most importantly, it may sow economic and social disparities across regional geographies within a country, given the resource constraints on local administrative capability to mobilize resources for enough new investments towards development of its economy. These disparities can lead to incoherence between policies and fragmentation of resources (Adoho, 2016; Jin & Véron, 2018). Additionally, fiscal decentralization can lead to tax competition between different regions, thus leading towards the implementation of tax reduction policies in efforts intended for attracting investors, and at times this reduces revenues required to finance other programs aimed at economic transformation. Finally, fiscal decentralization can also lead to inefficiencies in tax collection and management due to the lack of capacity and resources of local governments to implement effective tax policies.

4.2.1. Robustness Review

By considering the tax as a proxy variable of interest for income decentralization, the estimates lead to identical conclusions. Indeed, fiscal decentralization, as well as political stability and natural resources, significantly stimulates structural economic transformation in Africa in general and in North Africa, West Africa, Southern Africa, and Central Africa in particular (Table 8).

Table 8. Robustness result.

	Africa	North Africa	West Africa	Central Africa	East Africa	Southern Africa
	(7)	(8)	(9)	(10)	(11)	(12)
Variables	**lnEcoTransf**	**lnEcoTransf**	**lnEcoTransf**	**lnEcoTransf**	**lnEcoTransf**	**lnEcoTransf**
TaxDecen	1.145***	5.897***	1.055***	1.294***	-1.623**	1.105***
	(0.185)	(0.598)	(0.153)	(0.076)	(0.438)	(0.380)
GovExpEduc	-0.273	-0.149**	0.386	-0.0389	-0.518*	-0.108
	(0.201)	(0.070)	(0.234)	(0.060)	(0.229)	(0.085)
PolStab	1.572***	1.539***	2.486***	1.645***	-0.358	1.2105***
	(0.244)	(0.454)	(0.382)	(0.498)	(0.495)	(0.015)
lnUnempl	-0.146	-1.639***	2.248***	-0.975***	-1.697***	-0.554
	(0.170)	(0.362)	(0.272)	(0.165)	(0.294)	(0.313)
lnNatRess	1.418***	1.728**	1.339***	1.589***	-0.511	1.879***
	(0.211)	(0.1980)	(0.279)	(0.224)	(0.805)	(0.372)
lnIndust	0.853***	0.745*	-0.553	0.798	0.917	1.754***
	(0.056)	(0.289)	(0.569)	(0.632)	(0.567)	(0.372)
Corrupt	0.453	-0.853	-0.0798	1.662***	1.518*	-0.254
	(0.382)	(0.437)	(0.449)	(0.237)	(0.423)	(0.411)
Constant	3.454***	3.632***	4.471***	2.378***	2.727***	3.393***
	(0.2530)	(0.463)	(0.933)	(0.451)	(0.428)	(0.249)
Comments	344	48	104	32	64	96
R-squared	0.528	0.673	0.698	0.855	0.734	0.659
N_g	43	6	13	4	8	12
F	164.5	213.0	351.607	125.87	281.8	391.6

Note: Standard errors in parentheses.
***p<0.01, **p<0.05, *p<0.1.

4.2.2. Solving the Endogeneity Problem

Given that fiscal decentralization which is our variable of interest in the study is likely to also be an endogenous variable, we found it useful to carry out the estimation by instrumental variables. System GMMs allow us to overcome this endogeneity problem. The structural transformation of the previous year, increases that of the following year as indicated in Table 9 opposite. The conclusions remain similar to those of previous analyses.

Table 9. GMM estimation results.

	Africa	North Africa	West Africa	Central Africa	East Africa	Southern Africa
	(13)	(14)	(15)	(16)	(17)	(18)
Variables	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf
L.lnEcoTransf	0.982***	1.021***	0.925***	0.999***	0.863***	1.127**
	(0.002)	(0.012)	(0.068)	(0.020)	(0.140)	(0.548)
RevDecen	0.114***	0.593***	0.421***	0.321**	-0.483***	0.316***
	(0.014)	(0.037)	(0.038)	(0.045)	(0.052)	(0.040)
GovExpEduc	-0.020***	-0.009**	-0.009	0.026	0.070	-0.032**
	(0.001)	(0.004)	(0.023)	(0.031)	(0.074)	(0.013)
PolStab	0.067***	0.538***	0.311***	0.083***	-0.931***	0.883***
	(0.013)	(0.011)	(0.018)	(0.035)	(0.148)	(0.093)
lnUnempl	-0.018*	-0.037	-0.174	-0.358	-0.291	-0.384
	(0.011)	(0.039)	(0.235)	(0.011)	(0.354)	(0.643)
lnNatRess	0.011***	0.082***	0.134***	0.054***	-0.254***	0.171***
	(0.004)	(0.009)	(0.088)	(0.040)	(0.031)	(0.019)
lnIndust	0.066***	0.167***	0.344**	0.501***	0.482***	0.243***
	(0.011)	(0.046)	(0.111)	(0.210)	(0.137)	(0.026)
Corrupt	-0.052***	-0.077***	-0.079***	-0.087**	-0.467***	-0.632***
	(0.011)	(0.033)	(0.028)	(0.020)	(0.051)	(0.036)
Constant	0.801***	0.643	1.696	0.867	0.643	-0.366
	(0.075)	(0.490)	(1.297)	(0.945)	(0.897)	(6.283)
Comments	301	42	91	28	56	84
R-squared	0.680	0.559	0.729	0.685	0.769	0.624
Number of i	43	6	13	4	8	12
sargan	236.3	41.70	80.81	26.19	52.07	73.71
sarganp	0.255	0.143	0.356	0.125	0.283	0.190
ar2	0.570	0.648	0.972	0.781	0.668	0.617
ar2p	0.573	0.517	0.791	0.535	0.544	0.537

Note: Standard errors in parentheses.
***p<0.01, **p<0.05, *p<0.1.

Table 10. Lewbel (2012) 2SLS results.

	Africa	North Africa	West Africa	Central Africa	East Africa	Southern Africa
	(19)	(20)	(21)	(22)	(23)	(24)
Variables	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf	lnEcoTransf
RevDecen	2.885***	5.373***	1.323***	1.190***	-1.097**	1.182**
	(0.961)	(0.584)	(0.263)	(0.584)	(0.307)	(0.499)
GovExpEduc	-0.226***	-0.148*	0.186	-0.034	-0.511***	-0.104**
	(0.062)	(0.084)	(0.142)	(0.074)	(0.105)	(0.052)
PolStab	0.707***	1.040**	2.427***	1.641***	-0.189	0.853***
	(0.211)	(0.286)	(0.618)	(0.299)	(0.500)	(0.196)
lnUnempl	-0.028	-1.639***	-2.238***	-0.881***	-1.602***	-0.180
	(0.140)	(0.377)	(0.339)	(0.226)	(0.342)	(0.232)
lnNatRess	1.296***	0.788***	1.347***	0.601***	-0.202**	0.887***
	(0.155)	(0.162)	(0.387)	(0.039)	(0.044)	(0.331)
lnIndust	-0.556**	0.441	-0.450	0.698**	0.803	-1.703***
	(0.253)	(0.314)	(0.557)	(0.329)	(0.636)	(0.402)
Corrupt	-0.585***	-0.652	-0.088	-0.663**	-1.028***	-0.205***
	(0.210)	(0.420)	(0.352)	(0.326)	(0.260)	(0.027)
Constant	2.545***	2.264***	2.471***	1.378***	2.033***	2.369***
	(0.135)	(0.223)	(0.315)	(0.204)	(0.277)	(0.169)
Comments	344	48	104	32	64	96
R-squared	0.590	0.793	0.638	0.953	0.603	0.715
F	15.87	21.63	29.86	67.91	12.16	8.444

Note: Standard errors in parentheses.
***p<0.01, **p<0.05, *p<0.1.

Aware that the GMM method poses the problem of choice of instrument, we repeated the estimations using the method of Lewbel (2012) to resolve this problem. Lewbel (2012) simplifies the instrumentation process by using specific strategies to construct instruments that are easier to apply compared to the GMM method. By using more relevant and adapted instruments, it makes it possible to reduce potential biases linked to the estimation of econometric models. The findings presented in Table 10 are in accordance with previous research. All African regions, except for East Africa, observe a positive and noteworthy effect of fiscal decentralization on structural economic change. These findings mirror the conclusions drawn by prominent scholars such as Besley and Case (2017) and Faguet and Shami (2020), as well as Clifford et al. (2022), suggesting that by promoting private investment, industrialization, and employment, fiscal decentralization fosters structural economic transformation.

5. CONCLUSION AND RECOMMENDATIONS

Ultimately, fiscal decentralization can play an undeniable positive role in structural economic transformation in Africa. Several studies note that fiscal decentralization can be the main catalyst for structural transformation in countries enjoying political and economic stability and rational allocation of resources (Garone, 2020; Mwangi et al., 2023). The results of our study were conducted by estimating the basic equation of the model retained by the method of Driscoll, Kraay, GMM, and Lewbel (2012), emphasizing that fiscal decentralization measures have the capacity to strengthen structural economic transformation in four regions of Africa, such as North Africa, West Africa, Southern Africa, and Central Africa. Indeed, these regions benefit from a stable political and institutional environment and an efficient allocation of natural resources. Thus, transparency in revenue collection and allocation processes is crucial to maximize the benefits of fiscal decentralization. In turn, fiscal decentralization can be a means to stimulate diversification and economic growth. Policy-makers and political-economic practitioners should prioritize the adoption of robust fiscal decentralization measures to unleash the potential for structural transformation in the economies of different regions of Africa and specifically in East Africa.

For policymakers, our findings provide critical insights into the importance of fiscal decentralization. They can actually create plans to promote structural economic change more successfully. To put it briefly, fiscal decentralization may be a lever for long-term, steady economic growth. Strengthening political-economic stability will allow fiscal decentralization to play its leading role in sustainable development.

Efficient allocation of natural resources across African regions is also a means for fiscal decentralization to stimulate structural economic transformation. However, further research would be intriguing to assess the long-term effects of fiscal decentralization policies on structural economic transformation in Africa. Rightly, a comparative analysis across countries in the region seems necessary since fiscal decentralization policies seem necessary according to the specific context of each country or region. Accordingly, exploring the macroeconomic effects of regional fiscal decentralization policies on economic growth and structural transformation in the long run could be useful for future research.

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