Growth Effects of Non-Devolved Government Expenditure: Evidence from ARDL Approach to Co integration

Naftaly G. Mose [1*]   Symon K. Kiprop [2]   Lawrence K. Kibet[2]
1.School of Economics , University of Eldoret, Kenya
2.Department of Economics, Egerton University, Kenya

Abstract
Although it is theoretically expected that fiscal decentralization leads to efficient provision of local public services and induces economic growth, there is a mixed outcome of the non-devolved and devolved effect on economic expansion across earlier empirical studies. This could be due to non growth-enhancing expenditures that crowd-out outlays that are meant to boost economic growth. Further, devolved allocation is small, about 15 % of total revenue, to full stimulate economic growth in Kenya. However, national government spends a substantial amount in counties to complement devolved expenditure. Therefore, the issue of which non-devolved expenditure by national government can foster permanent movements in county economic growth becomes core. The panel ARDL and Kao co integration technique were used to test the linkage between non-devolved expenditure and economic growth in Kenya during the period, 2013-2017. The panel ARDL regression results revealed that the effect of non-devolved expenditure on economic growth was positive and significant in both long-run and short-run. The findings provide a basis for recommendation on the need for national government to increase budget allocation and execution in counties to complement devolved expenditure and also stimulate county economic growth in long-run.
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1. Introduction
Devolution is expected to make county public expenditure more efficient (Omolo, 2010; ICPAK, 2014), create opportunities for county government to mobilize around sustainable development goals (Muriu, 2013) and contribute to a better coordination between various county stakeholders. In addition, significantly, devolution is expected to provide each devolved unit the autonomy to pursue a development strategy tailored to its own economic strength (Muriu, 2013; KIPPRA, 2016), thus contributing to greater national economic increase (Omolo, 2010).

With reference to African experiences, it is said that decentralization programmes have failed to unravel the economic, political and institutional challenges of African development (Omolo, 2010; Muriu, 2013). At the same time, antagonists of devolution argue that devolution can undermine growth potential through: capture of benefit by county elites; poor managerial and technical capacity; high bureaucratic burden; and separation of spending and taxing responsibilities. This can undermine efficiency and lead to arrears; and newly created counties that may face capacity constraints (Iftikhar, 2011; World Bank, 2016; OCOB, 2019). Thus, need for continued spending (non-devolved) in counties by national government in Kenya.

The County non-devolved Spending is projected to stimulate demand for products, which in turn allows suppliers to increase use of their productive capacities by hiring more capital, labor and thus to expand production in county economy. The analysis of Kenya's economic expansion and corresponding total county expenditure in billions by economic classification is presented in Table 1 below.

Table 1 County Expenditure Allocations and Economic Growth

Financial Year (FY)	% GCP Growth	Capital Expenditure	%	Recurrent Expenditure	%	Total Devolved Expenditure	Absorption Rate	Non-devolved Expenditure
2014/2015	5.4	90	35.1	167	64.9	**258**	79.1%	**1139**
2015/2016	5.7	103	35.0	191	65.0	**295**	80.4%	**1374**
2016/2017	5.9	168	43.1	222	56.9	**390**	79.9%	**1634**
2017/2018	4.9	139	33.9	271	61.1	**410**	74.0%	**1960**

Source: IMF (2016); OCOB (2014-2019).

Table 1 reveals that county capital expenditure has been lower than the recurrent expenditure in most of the years since inception of devolution. Thus, national government spending on counties is only remedy to jump start infrastructure development since counties are mostly spending on recurrent spending. Implying, an increase in recurrent spending was likely to reduce growth rate given that in order to finance them, higher taxes must be introduced which has a negative effect on investment decisions by the private sector and therefore on economic growth in the long-run. Table 1, further reveals that county expenditure (devolved) has been lower than the national

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expenditure (non-devolved) since inception of devolution. Also, the non-devolved government spending in counties increased from Kshs 1139 in 2014/15 to Kshs 1960 billion in 2017/18 (OCOB, 2018). However, economic growth during the same period presents a mixed outcome (KIPPRA, 2016; ICPAK, 2014). Despite the widespread government strategies to foster economic expansion, increase in devolved and non-devolved expenditure has tended to grow faster than that of economic growth. The trends reveal a widening gap between government size and economic expansion and therefore a concern that this paper is interested in. Therefore this study attempts

    i.   To investigate the long-run and short-run effect of county non-devolved expenditure on county economic growth in Kenya.

2 Theoretical Literature

As evidenced, in the neoclassical growth theory, if the incentive to invest in new capital is affected by fiscal policy, this alters the equilibrium capital output ratio and therefore the level of output path, but not its slope (with transitional effects on growth as the economy moves onto its new path). The novel feature of the public policy endogenous growth model of Barro and Sala-i (2003); and Madhumita *et al.* (2019) is that fiscal policy can determine both the level of output path and the steady state county growth rate.

The Keynesian paradigm treats government expenditure as an exogenous policy determined variable and economic growth as endogenous and explained by the county spending. A key factor in the Keynesian model is that the expansion of aggregate effective demand and lower taxes should contribute to economic expansion and pull the county economy out of the depression cycle (Barro and Sala-i , 2003; Iftikhar, 2011; Madhumita *et al.*, 2019).

Overall, despite a recently growing empirical literature on the government expenditure policy, several issues require further investigation. Existing empirical studies for example, Iftikhar (2011), do not provide better understanding on the process by which expenditure policies shape the prospect of economic growth for economies as they are not only a significant difference in the composition (non-devolved and devolved) of public expenditure between county and national level, but the difference is also profound in the role of public expenditures on economic growth.

3 Methodologies

This study employed historical research design so as to capture the trend of county economic growth and non-devolved county expenditure. This was carried out in the period 2013 - 2017 using annual series secondary data for 47 Kenyan counties and panel ARDL technique, resulting in 235 county-year observations. The data was from previous publications which could only be sourced from secondary sources.

3.1 Model Specification

This process consisted of selecting an appropriate functional form for the model and choosing which variables to include. Building on previous studies (Facchini & Melki, 2013; Gisore, 2017), a simple growth model was formulated as.

$$\ln Y_{i,t-1} = \beta \ln X_{i,t-1} + \gamma \ln G_{i,t-1} + \mu_i + v_t + \varepsilon_{i,t} \qquad (1)$$

Where, $\ln Y_{i,t}$ - the dependent variable - County economic growth

    $lnX_{i,t-1}$ - set of explanatory variables apart from non-devolved expenditure

    $\ln G_{i,t-1}$ – the non-devolved expenditure variables

    β and γ - are parameters to be estimated

    μ_i – county fixed effects v_t – time fixed effects $\mathcal{E}_{i,t}$ – the error term

    and the subscripts *i* and *t* represent county and time period respectively.

Economic Growth) -is total value of output - goods and services - produced in the county economy. The GCP variables data were obtained from Gross County Product (GCP) report.

County Non-devolved Government Expenditure – As the observed link between county expenditure and economic growth may be a spurious correlation resulting from ignoring existing differences in the size of the national government public sector in the various counties (Ezcurra & Rodríguez-Pose, 2010). Thus non-devolved was measured as the share of total national government expenditure (less county government expenditure), which is a better indicator of national government activity on counties. To estimate non-devolved expenditure, the study distributed national government spending (less county spending) among the sub-national units in proportion to their share of the population. Also, data was obtained from annual national Budget Implementation Review Report and Statistical Abstracts. Further, this study used corruption (ln cr), total crime rate (ln tc), human capital (ln hc), electricity consumption (ln ec) and absorption rate of expenditure (ln ar) in counties as the control variables.

3.2 Panel Data Analysis Techniques

The panel unit root tests allow investigating mean-reversion (stationarity) in the group (panel) of series. Macroeconomic time series data are generally characterised by stochastic trend which can be removed by

differencing (Greene, 2012), because the variables should be integrated of the same order. If the series feature a unit root, they are better characterized as non-stationary processes that have no tendency to return to a long-run deterministic path (Greene, 2012). The standard test for unit root is to use Augmented-Dickey Fuller (ADF) test, Im-Pesaran-Shin (IPS), Levin-Lin-Chu (LLC), Harris–Tzavalis (HT) and Phillips - Perron (PP) test.

Kao panel co integration was used to estimate this study. These tests allow various cross-sectional interdependences along with other different individual effects to establish the co integration (Greene, 2012). The cointegrating relationship does not give information about the long-run and short-run dynamics of the variables. In order to establish long-run and short-run elasticities, the study applied the panel ARDL technique which is more suitable for small or finite sample size when compared to the other co integration methods. Thus, equation 1 was reformulated as a panel ARDL model, to determine the underlying relationship between dependent and independent variables, to obtain model (2). The error correction framework of the series can be represented as follows:

$$\Delta ln Y_{i,t-1} = \sum_{i=0}^{k} \beta \Delta ln X_{i,t-1} + \sum_{i=0}^{k} \gamma \Delta ln\ G_{i,t-1} + \gamma ECM_{i,t-1} + \varepsilon_{i,t} \qquad 2$$

In this model γ_t is the short-run impact multiplier that measures the immediate impact that a change in G_t will have on change in Y_t. On the other hand ECM_{t-1} is the adjustment effect, and shows how much of the disequilibrium is being corrected, that is, the extent to which any disequilibrium in the previous period effects any adjustment. Theoretically, the coefficient of ECM_{t-1} variable is supposed to have negative sign for convergence. The variable ECM_{t-1} is the error correction term which captures the long-run relationship in the model.

The estimation results are biased, inconsistent and inefficient if econometric problems such as heteroscedasticity, serial correlation, model mis-specification and correlation of error term occur in the regression model. Therefore, diagnostic checking is essential to ensure the panel model is free from econometric problems.

4 RESULTS AND DISCUSSIONS
4.1 Panel Unit Root Tests
This study applied panel Harris–Tzavalis (HT) technique to test for stationarity. This test allows for heterogeneous serially correlated errors, and suitable for data sets with small number of panels like in this study. Accordingly, HT, (Harris–Tzavalis, 1999) test was applied at level and at first difference and result reported in Table 2 below.

Table 2 Results of the Panel Unit Root Tests Using HT

Variable	Statistic	Z	P-Value	Variable	Statistic	Z	P-Value	Order of Integration
ln y	0.5352	0.495	0.6896	Δln y	-0.6761	-12.758***	0.0000	I(1)
ln ng	0.4469	-0.747	0.2276	Δln ng	-0.0938	-5.854***	0.0000	I(1)

Notes: *The null hypothesis is that the series is non stationary or the series has a unit root. *** 1% significance level, and** 5% significance level, Δ Symbol indicates that the first difference of the variable was taken.*

The results of Table 2 indicate that all variables were non stationary at 5 percent level of significance. However, they become stationary after the first difference implying that the variables are integrated of order one, I (1). However, differencing of a non stationary series solves the problem of spurious regression output, it leads to a loss of important information about long-run properties of the study variables.

4.2 Panel Co integration Test
Next step was to check if the variables have long-run relationship, the study applied the panel co integration tests developed by Kao (2001). In addition, Kao cointegration tests is residuals based taken from Engle and Granger two step tests. But Johansen Fisher cointegration test is a system based cointegration test for the whole panel set. Thus, Panel Kao cointegration is more comprehensive (Narayan & Smyth, 2005). Table 3 below presents Kao cointegration results.

Table 3 Kao Panel Co integration Test Result

	t- statistic	P- Value
ADF	-5.551445***	0.0000
Residual Variance	0.000421	
HAC variance	0.000308	

Notes: *The null hypothesis is that No co integration, *** 1% significance level, and** 5% significance level*

In the case of Kao residual panel co integration test, from the result on Table 3 above, all the statics were statistically significant at 1 percent level, confirming support for co integration. To determine the long-term elasticities, this study employed the panel ARDL technique. The main strength of *ARDL* test is that it is more

robust and performs better for small sample size like in this study (Narayan & Smyth, 2005).

4.3 Long-Run Effect of County Non-Devolved Expenditure on Economic Growth
The finding on effect of county non-devolved expenditure (Ng) on county economic growth in the long-run is presented in Table 4 below.

Table 4 Long-Run Regression Result Based on AIC-ARDL (2, 0, 3, 1, 1, 2)

Variable	Coefficient	Standard error	t- Statistics	P-value
ln ng	0.435375***	0.104916	4.149759	0.0000
ln ar	0.625605***	0.240412	2.602222	0.0099
ln cr	0.326320***	0.083228	3.920807	0.0001
ln ec	0.217309***	0.050008	4.345518	0.0000
ln hc	0.111927	0.123588	0.905650	0.3661
ln tc	-0.203137*	0.113608	-1.788058	0.0752
Cons	0.197757	0.209700	0.943047	0.3467
LM Test		$F(4,210) = 0.614170$	$\text{Prob} > F =$	0.6529
Breusch - Pagan Test		$F(17,214) = 6.762369***$	$\text{Prob} > F =$	0.0000
Pesaran CD		$(z) = -1.345198$	$\text{Pr} =$	0.1786
Ramsey-Reset Test		$F(1,214) = 0.970425$	$\text{Pr} =$	0.3257
F statistics = 85.63725*		P-value(F) = 0.0000		
Goodness of Fit Test		$R^2 = 0.864370$	Adjusted $R^2 =$	0.854277

Notes: *** *denotes significant at 1 percent,* ** *significant at 5 percent, and* * *significant at 10 percent*
$ln\ y$ *-County real GCP per Capita,* $ln\ tc$ *- County Total Crime rate,* $ln\ ng$ *-County non-devolved expenditure,*
$ln\ cr$ *- Corruption rate,* $ln\ ar$ *- Absorption rate,* $ln\ hc$ *- Human capital,* $ln\ ec$ *-Electricity Consumption*

Effect of non-devolved government expenditure on real GCP per capita was positive and statistically significant at 5 percent level, suggesting that the productivity of national spending exceeded the negative effect of higher taxes and transfer payment to fund expenditure budget and accelerate equitable income distribution. This implies that 1 percent increase in non-devolved expenditure will lead to a 0.44 percent increase in county growth in long-run. The advantages of increased non-devolved spending by national government include: the use of fiscal policies like income taxes and transfer payments which can lead to more equitable redistribution of income in long - run; the supply of pure public county goods which may constitute a sizeable component of county aggregate demand; and the role of national government as facilitator in the county markets with imperfect information. FY 2016/17, non-devolved expenditure was Ksh. 1959.6 billion in comparison to aggregate devolved expenditure of Ksh. 319.1 billion (OCOB, 2017). Hence considering low allocation to counties, national government expenditure is an important factor in stimulating economic expansion in long-run through increased capital accumulation. The result is consistent with other studies, Kimaro *et al.*, 2017; and Madhumita *et al.*, 2019, conclusion, that non-devolved expenditure accelerates growth in long-run. In contrast, other panel studies like Dar and Khalkhali (2002); and Ezcurra and Rodríguez-Pose (2010) showed negative relationship exists.

Corruption was positive and statistically significant at 5 percent level of significance in counties. The result was against prior expectation that corruption perceptions rate has negative effect when linked to GCP growth. The result showed corruption may be a factor inducing growth in long-run. However, this result can be attributed to the data on the number of reported cases to EACC which under-estimate considering that not many corruption cases are actually reported in Kenya. Some studies considers corruption a 'grease the wheels' instrument. In this view, corruption helps to overcome cumbersome bureaucratic constraints, inefficient provision of county services, and rigid laws, especially when countries' institutions are weak (Nguyen *et al*., 2017).

Effect of electricity consumption on real GCP per capita is positively related and significant at 5 percent level of significance in long-run. This implies that 1 percent increase in electricity consumption lead to a 0.22 percent increase in county growth. An increase in power consumption use is expected to lead to higher GCP growth and its deficiency may cause a slowdown in the growth process, and economic growth may also affect the demand for energy significantly. Empirical results support the findings, for instance, Bayer (2014); and Hammed (2016) but Javid *et al.* (2013) contrasted the outcome.

The coefficient of human capital was positive and insignificant at the 5 percent level in the long-run. A possible explanation for insignificant result is the low level of county government spending in capital expenditure (infrastructure on education and health), probably because effects from education sector would have very long lags, cost of education and inequity in access, market failure, under-enrollment, school drop-out, low education expenditure absorption rate and corruption (OCOB, 2018). This result is consistent with several studies, Cardenas (2007); and Gisore, (2017), found human capital to be insignificant.

The estimated coefficient of County budget absorption rate is positive and statistically significant in the long-run at 5 percent level. Specifically, an increase in the absorption rate of expenditure by 1 percent will induce a

0.63 percent increase in GCP of counties in the long-run. The Low absorption rate growth rate affects both the consumption and the production of a county's economy. The findings are in agreement with Becker *et al.* (2012) study on Europe but contrast Claudia and Goyeau (2013) study in Europe, and Ionica *et al.* (2017) study on Romania.

The results of the regression analysis support the hypothesis that crime rate has a 10 percent statistical significant negative effect on county economic growth. The effects of crime on county businesses can involve diverting resources to crime prevention measures and otherwise discouraging private investment and thus decelerating county growth. Many studies report that crime has a very significant negative influence on economic growth (Cardenas, 2007; McCollister *et al.*, 2010), whereas other conclude that the effect is absent (Ray & Ishita, 2009).

4.4 Short- Run Impact of County Non-Devolved Expenditure on Economic Growth
Table 5 presents the result on impact of Non-devolved expenditure (Ng) on economic growth in the short-run.

Table 5 Short-Run Regression Result Based on AIC-ARDL (1, 2, 0, 3, 1, 1, 2)

Variable	Coefficient	Standard error	t- Statistics	P-value
$\Delta ln\ y$	0.143475**	0.073209	1.959795	0.0514
$\Delta ln\ ng$	0.191894***	0.022247	8.625697	0.0000
$\Delta ln\ ar$	0.145664***	0.047517	3.065544	0.0025
$\Delta ln\ cr$	-0.022017**	0.008606	-2.558305	0.0112
$\Delta ln\ hc$	0.100426***	0.025627	3.918730	0.0001
$\Delta ln\ ec$	0.201325***	0.015135	13.30220	0.0000
$\Delta ln\ tc$	-0.105820***	0.021968	-4.816972	0.0000
ect_{t-1}	-0.232838***	0.032550	-7.153178	0.0000
$Cons$	0.197757***	0.027947	7.076188	0.0000
LM Test	F(4,218) = 0.000682		Prob > F = 0.9792	
Breusch - Pagan Test	F(10,222) =7.162507***		Prob > F = 0.0000	
Pesaran CD	(z) = -0.881094		Pr = 0.3783	
Ramsey-Reset Test	F(1,221) = 0.965530		Pr = 0.3257	
F statistics = 37.40427*	P-value(F) = 0.0000			
Goodness of Fit Test	R^2 = 0.628598		Adjusted R^2 = 0.611793	

Notes: *** *significant at 1 percent,* ** *significant at 5 percent,* α?? - *First difference operator,* ect_{t-1} - *representing the error -correction term.*

Impact of county non-devolved government expenditure on real GCP per capita was positive and statistically significant at 5 percent level. This demonstrates that 1 percent increase in non-devolved spending will lead to a 0.19 percent increase in county growth in short-run. This outcome is consistent with the long-run result. Hence considering low allocation to counties, national government expenditure is a prerequisite for county economic growth in short-run through increased county capital accumulation. Non-devolved expenditures increase county population purchasing power for products, which in turn allows producers to increase use of their productive capacities by hiring new factors of production to expand production in county economy. Some studies for instance Kimaro *et al.* (2017), revealed that non-devolved funds have significant positive relation with economic growth in short-run, hence supporting the findings of this study. In addition, Muguro (2017), found insignificant impact in Kenya in the short-run. In contrast, the findings by other model estimation, Dar and Khalkhali (2002); and Ezcurra and Rodríguez-Pose (2010) revealed a negative relation in short-run.

County corruption rate was negative and statistically significant at 5 percent level in the short-run. The empirical results indicate that a 1 percent increase in corruption rate will lead to 0.02 percent decline in economic growth. There are several channels, through which corruption hinders county growth in short-term. They include reduced county domestic investment, overblown public spending, distorted allocation of expenditure away from education, health, and the maintenance of infrastructure and towards less-efficient county public projects that provide more scope for manipulation and bribe-taking opportunities in counties (Hanousek & Kocenda, 2011; Choe *et al.*, 2013). This result is similar to those of Murphy *et al*. (1991); and Choe *et al.* (2013) that corruption negatively affects economic performance in the economy. Also, other studies find ambiguous effects of corruption (Mo, 2001; Hanousek & Kocenda, 2011).

Effect of electricity consumption on real GCP per capita is positively related and statistically significant at 5 percent level of significance in short-run. This implies that 1 percent increase in electricity consumption lead to a 0.20 percent increase in county growth. Energy provision can affect an economy positively. Especially, low real energy prices reduces the greater cost of doing business, leading to a positive effect on economic growth in the short-run. Empirical results illuminate with the findings of Hammed (2016), but Javid *et al.* (2013) contrasted the result.

The coefficient of county human capital was positive and significant at the 5 percent level. From the finding, it meant a 1 percent increase in human capital will lead to a 0.10 percent increase in economic growth in short-run. This result can be attributed to increase in net enrollment in secondary school as a result of subsidised secondary education and free primary education in Kenya. Such findings are consistent with the endogenous growth theories which argue that an improvement in human capital (skilled) improves productivity (Gisore, 2017). The result illuminate with the conclusion of Gebrehiwot (2015); and Kartal *et al.* (2017) that the relationship is positive in short-run.

County budget absorption rate was positive and significant to at 5 percent level in short-run. Specifically, an increase in the absorption rate of expenditure by 1 percent will induce a 0.15 percent increase in real GDP per capita of counties in the short-run. Economic growth is often tied to public spending, failure to spend budgeted money directly affects the rate at which the county economy expands in the short-run. The finding is consistent with those of Becker *et al.* (2012) study on Europe but contrast Claudia and Goyeau (2013) study in Europe, and Ionica *et al*. (2017) study on Romania on effect of fund utilization on economic development.

County Crime rate was negative and significant at 5 per cent level of significance in relation to economic growth. That implies that 1 per cent increase in crime rate will result to 0.11 per cent decrease in county growth in the short-run. Crime increase imposes large costs to private and public sectors which have a negative effect on investment and county growth in short-run. Most studies report that crime has a negative influence on growth (Cardenas, 2007; McCollister *et al.*, 2010), whereas other concludes that the effect is insignificant in short-run (Ray & Ishita, 2009).

The loading factor (error correction term), indicated that convergence process would converge each year at 23%. This means the speed of adjustment is 23 percent which is relatively low where 23 percent of disequilibrium is corrected in the first year. This means the adjustment process towards equilibrium is relatively low meaning that disequilibrium can exist for a long period. Consistent with the long-run results, the short-run dynamic regression model passed all the diagnostic tests carried out in this study except heteroscedasticity, which was corrected by use of panel robust standard error. Adjusted R^2 and p-values for these model showed that the overall goodness of fit of the regression models was satisfactory.

5 CONCLUSION AND RECOMMENDATION
5.1 Conclusion
Non-devolved expenditure has a significant positive effect in both long-run and the short-run. Thus, considering low allocation to counties, national expenditure is an important factor in accelerating county growth in long-run and short-run through increased county capital accumulation. Past data indicate that almost half of the counties are spending less than the average 22 percent of actual spending on development which implies that the counties delivery of services may be negligible in core service sectors. Especially in counties where there exists inadequate infrastructural facilities as provided by counties and where the private sector is not developed enough to play its expected role in the county economy. The Findings on control variables used in this study confirm the importance of absorption rate of expenditure, human capital and electricity consumption as key determinants of economic growth in counties. In contrast, corruption and crime were seen to be detrimental in Kenyan counties.

5.2 Recommendation
Empirical finding obtained in this study has shown that non-devolved government expenditure has a marginal positive and significant effect on county expansion. National Government expenditure has the potential to stimulate the county economy and remove economic growth sticking points or even reduce market failures in counties. However, national government budget decisions are highly influenced by several factors that vary by county. This is highlighted in the county specific analysis of government expenditure composition. Therefore, if national government expenditure policy is not well designed to fit the county economy it is subject to failure and the public bares the costs. This study therefore recommends that national government should increase its spending on infrastructure, social and economic activities in counties to induce private investment and economic growth in long -run.

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