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The Dynamics of Inflation-Growth Nexus: Empirical Evidence from Small-Sample Panel Data

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Abstract:
The conventional understanding that inflation and economic growth have an inverse relationship is not fully supported by empirical evidence. In contrast to this, we show that the growth of key sectors in a number of low-income developing economies is robustly associated with higher inflation. Hence, employing a blanket rule that assumes a 'negative inflation-growth relationship' for all sectors of the economy may lead to deceptive interpretations. The takeoff point of this study is the companion paper by Ayyoub and Woerz (2016). By utilizing a panel dataset consisting of 10 developing economies with low-income status, spanning the years 1981 to 2015, we have uncovered a negative relationship between inflation and economic growth when the share of value-added output contributed by the agricultural sector surges beyond a critical threshold of 50 percent. The results of our study reveal that the impact of inflation varies significantly across sectors, thus validating the argument that inflation-growth dynamics in low-income African countries and Nepal are specific to their respective regions. Therefore, when analyzing the transmission mechanism of monetary policy, it is essential for central bankers in these economies to give particular consideration to the differing sectoral-growth-dynamics.

Keywords: Developing Economies, Economic Growth, Inflation.

I. Introduction

What is the precise essence of the relationship between inflation and economic growth, especially in developing economies, and how should it ideally be manifested? To answer this policy question for developing economies, despite an extensive body of literature, three vitally important concerns are still alive and seek the attention of the policy makers. First is the conjecture that developing economies exhibit inherent disparities in the dynamics of various sectors, such as agriculture, industry and services. Generally for developing economies, according to Ayyoub and Wörz (2021), the agricultural sector explains major differences between the industrial and services sectors. However, in a companion paper which examined the 'inflation-growth nexus', Ayyoub

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and Woerz (2016) concluded that, generally, the central bankers of developing economies need not pay specific attention toward the agricultural sector.

Since this observation raises an obvious question, a proposal has been put forth to conduct a small-sample panel study focusing on the African region and Nepal. This is crucial as these areas have shown that the value-added share of the agricultural sector in their overall output surpasses the critical level of 50 percent. It is important to note that among all developing countries with low to middle income, only Burundi, Chad, Ethiopia, Ghana, Lao People's Democratic Republic, Liberia, Nepal, Niger, Sierra Leone and Uganda meet this criterion. The question at hand pertains to understanding how an increased rate of inflation impacts long-term output dynamics when the value-added share of a specific sector exceeds a certain threshold level. This is the potential agenda for this study.

Secondly, in most of the panel data growth studies, the lagged growth rate appears as a significant explanatory variable suggesting persistence in the growth rate. However, a panel estimator relevant for a persistent dependent variable is not usually employed. Finally, an additional question which has not been addressed previously, and raised by few experts (e.g., Karras, 1993; Arai et al., 2004; Hineline, 2007, 2010) on the so-called ‘negative-inflation growth relationship’, both for growth regressions and time-series studies, is that it is mainly driven by supply shocks dominating data. Therefore, it can be argued that the hyperinflationary episodes of the 1970s can result in the misleading findings on inflation growth dynamics. An overview of the existing empirical literature on inflation-growth nexus in considered African economies that addresses mainly aggregate economic growth and finding the acceptable threshold level of inflation reveals that, for example, for the Southern African Development Community (SADC) region, Seleteng et al. (2013) reported a threshold level of 18.9%, more recently, Iyke and Odhiambo (2017) revealed a range of 10.73%–29.83% for the economy of Ghana, and, according to Ndoricimpa (2017), 9% for low-income African economies. Therefore, we can claim that we are the first to empirically address the so-called ‘negative-inflation-growth relationship’ on the basis of sectoral growth.

On the basis of these observations, we believe that Ayyoub and Woerz (2016) still have something to add, and we can additionally claim that this study is an elaborated version of it. This study fills this gap by: providing the empirical evidence of a small-sample dynamic panel dataset; taking into account the sectoral heterogeneity of low-income developing economies; considering an estimator that is suited for dynamic panels; excluding the supply shock years (i.e., 1973-1980) from the dataset and by extending the data coverage up to 2015.

We aim to address a research question that has not been explored before, taking into consideration the potential concerns mentioned earlier and factors like unobserved time and country heterogeneity. Our objective is to investigate the impact of marginal changes in inflation rate on sectoral growth rate, while considering the value-added share of the agricultural sector and utilizing an appropriate estimator. Is the agricultural sector's value-added contribution to overall output significant in low-income developing economies? Do the central banks of these economies need to prioritize sectoral growth, particularly in agriculture, and address any inflation concerns related to it?

Our research makes two contributions to the existing literature on 'inflation and economic growth'. Firstly, we consider the sectoral heterogeneity in different sectors of the economies under study. Secondly, we ensure reliable statistical analysis by excluding observations of inflation caused by supply shocks in the 1970s from our dataset. We use a bias corrected estimator, rather than relying solely on robust standard errors. Additionally, our study validates and complements the findings of Ayyoub and Woerz (2016) regarding the relationship between inflation and economic growth in developing economies.

The end result of this empirical evaluation is that, due to the existing sectoral heterogeneity in the economy, the 'conventional' 'negative-inflation-growth relationship' does not exist if the value-added share of the agricultural sector in the aggregate output increases the threshold level of 50%. In this situation, central bankers are required to pay specific attention towards sectoral growth, in general, and toward the agricultural and industrial sectors in particular. The key findings concluded from the panel dataset encompassing 10 low-income developing nations spanning the period between 1981 and 2015 can be succinctly summarized in the following manner: Contrary to the existing 'well established' findings, the relationship between inflation and growth rates of agricultural and industrial sectors is significantly positive and linear in nature.

We provide evidence that the growth of agricultural and industrial sectors are enhanced by about 0.047 and 0.11 percentage points respectively due to an annual increase of 10 % in the average inflation rate, and the same rate of inflation tends to reduce the growth of services sectors by about 0.06 percentage points. By this, we validate the conjecture—if we take into account the sectoral heterogeneity existing in different sectors of the developing economies, a threshold level of 50% value-added contribution of the agricultural sector to GDP growth exists beyond which the relationship turns to be positive—for Nepal and 9 low-income African economies.

This paper is structured in the following manner: Section 2 delineates the empirical approach utilized for quantifying the relationship between sectoral growth and inflation in selected developing economies. Subsequently, Section 3 presents a comprehensive depiction of the data and variables involved, followed by Section 4 which reveals the primary findings of this study. The final section culminates with a concise conclusion to summarize this article.

II. The Mechanism and Implementation Strategy

On the basis of Barro (1995); Barro and Sala-i-Martin (1995) (i.e., an extended neoclassical viewpoint that holds some standard growth determinants as constant), and following the empirical implementation strategy of Huo (1997) and Ayyoub and Wörz (2021), the underlined hypothesis is tested by employing a system of regression equations. Derived from the theory, the base-line dynamic econometric model for a thin panel dataset is presented in Equation 1, which not only helps gauging the impact of inflation on the sectoral growth of the selected economies but also quantifying and explaining the linkages between inflation and other relevant factors and sectoral growth of considered economies.

$$Y_{it}=\beta_1 y_{(I,t-1)}+\beta_2 \pi_{it}+\beta_3 X_{it}+\mu_{it} \quad \dots \quad (1)$$

Where I = 1, 2, ..., 10 denotes the economies and t = 1, 2, ..., 35 is the time for each i. y_it is the annual sectoral growth rate (of agricultural, industrial and services sectors) of country I at time t. y_(I,t-1) is the first lagged growth rate of each sector and π_it is the actual annual rate of inflation and X_it is a vector of control variables for each sector. The disturbance term, containing time invariant country-specific effects (μ_it), unobserved country-characteristics (ϑ_i), and observation-specific errors (ϵ_it), is specified as:

$$\mu\_it=\vartheta\_i+\epsilon\_it \quad \dots \quad (2)$$

Due to the limited number of cross-sections (i.e., N = 10) and corresponding observations in our panel dataset, the conventional dynamic panel data estimator (such as the GMM methods introduced by Arellano and Bond (1991), which assume large sample properties) may yield biased results. Hence, we employ the bias-corrected least square dummy variable (LSDVC) estimator originally proposed by Kiviet (1995), further developed by Kiviet et al. (1999) and Bun and Kiviet (2003), and subsequently expanded by Bruno in both his 2005a and b publications for unbalanced dynamic panel data models that adhere to a strictly exogenous selection rule. We initialize the fixed-effects (FE) approach for an approximation of O(1/NT). To ensure the bias-correction procedure is met, we employ the methods used by Sequeira and Maçãs Nunes (2008), Binici et al. (2012), and Bittencourt et al. (2015). Additionally, to incorporate estimates that are consistent in the first round, we utilize the Blundell and Bond (1998) estimator.

According to Bruno (2005b), compared with instrumental-variables (IV) and GMM estimators, traditional least square dummy variable (LSDV) estimators produce inconsistent estimates with a relatively small variance. Kiviet (1995) demonstrated that in terms of bias and root mean squared error (RMSE), LSDVC estimator outperforms IV-GMM estimators. Since, according to Roodman (2009), a thin panel does not lend itself to a dynamic framework, Judson and Owen (1999) propose that the LSDV estimator is the best choice. In order to account for correlations among the observed country heterogeneity and unobserved effects is necessary to avoid biased estimates, fixed-effects (FE) or random-effects (RE) panel approach suggested by Wooldridge (2010) and similar to Gillman and Harris (2010) is used for all three models. The choice between FE and RE is based on the Hausman Test. This also helps in comparing the results with our preferred LSDVC estimates.

Facing a typical tradeoff in achieving our research objectives, likewise, all other empirical studies, acknowledging the limitations of data and approach is absolutely necessary. While relying upon the LSDVC and fixed-effects estimators over the system GMM estimator, we compromised on the endogeneity and simultaneity issue of considered variables. However, since the data is based on 5-year averages of all the variables, and the number of observations is small, we can safely assume inflation as an exogenous variable. This empirical setting is also supported due to disaggregation of the aggregate GDP growth into three sectors' growth rates as dependent variables.

III. Data and Variables

In line with the standard growth literature, by using an unbalanced secondary panel dataset of 10 countries for 35 years (i.e., 1981-2015), our findings on the determinants of long-term sectoral growth are built on 5-year averages which gives a maximum of 70 observations. This also helps to attain permanent and systematic component of the data on all variables. The data are taken mainly from the IMF (IFS), Penn World Tables 8.1, World Bank (WDI), Polity IV Project and, for a few observations, individual country sources are also consulted. For all considered economies, sectoral growth rate, the dependent variable, is expressed and considered as value-added % growth of each sector ($agrg_{it}$, $indg_{it}$ and $srvg_{it}$ for agricultural, industrial and services sectors respectively) is the dependent variable. Inflation (π_it^~), main independent variable, is considered as semi-log transformation of the annual rate of CPI inflation. This type of transformation helps avoiding the distortion of the regression results caused by a few high-frequency inflationary observations and to get rid of the negative observations. It has been done by following Khan and Senhadji (2001), David et al. (2005) and Kremer et al. (2013) as:

$$\tilde{\pi}_{it} = \pi_{it} - 1 \text{ if } \pi_{it} \leq 1\%$$

and

$$\tilde{\pi}_{it} = \ln(\pi_{it}) \text{ if } \pi_{it} \geq 1\%$$

Other than our key variables, the k-dimensional vector of explanatory variables, X_it, for each sector is comprised of the lag of growth rate of the relevant sector (lag(−1)), natural logarithm of GDP per capita in constant (USD 2010) terms of the previous period to catch the convergence effect ($initial_{it}$); rural ($popr_{it}$), urban ($popu_{it}$) and overall ($popg_{it}$) population growth rates (annual%) are used in agricultural, services and industrial growth model respectively; gross domestic savings share (%) in GDP (gds_{it}); secondary school enrolment ($enroll_{it}$) as % of gross. Due to data scarcity for the selected economies, we are unable to consider the variable of investment to GDP ratio. However, we do include the gross domestic savings as a % share in aggregate GDP. This variable indicates the degree of the increase in the sectoral growth that in classical and endogenous growth theory can cause a boost in the growth rate.

Whereas, sector-specific additional control variables are contained by X_it for each of the three models in question, the industrial sector growth model contains lag of the natural log of exchange rate ($xr_{(i,t-1)}$), political stability index ($polstab_{it}$) and trade openness defined as the sum of the shares of exports and imports in GDP ($opns_{it}$). Similarly, X_it for the agricultural sector growth model specifically comprises agricultural land % of land area ($agland_{it}$), livestock production index (2004-2006=100) ($livestock_{it}$) and forest area as % of land area ($forest_{it}$), and the services sector growth model additionally covers human capital index (hci_{it}) on the basis of years of schooling and returns to education, lag of the natural log of exchange rate ($xr_{(i,t-1)}$), and political stability index ($polstab_{it}$).

IV. Results and Discussion

A. Descriptive Statistics

On the basis of 5-years averages, Table 1 presents descriptive statistics of all the considered variables of the sample dataset. Although average growth rate of agricultural, industrial and services sectors for the considered economies over the period was 2.65%, 5.93% and 4.09% respectively, we can observe a volatile growth pattern (ranging from a low of some −7.2% (i.e., agricultural and industrial sectors) to a high of 34.72% of the industrial sector). Semi-log transformed inflation, in general, was high and volatile. On average, population growth rates (i.e., rural, overall and urban) ranged from 2.21% in rural areas (overall around 2.7%) to 4.5% in the urban areas. Gross domestic savings as the share of GDP was found relatively volatile (ranged from around −88% to 25.24%) around the mean value of 2.6%. Like-wise, dispersion in secondary school enrolment (3.24%—65.17%) of the sample economies is high. In our sample, an interesting indicator is that average political stability index for all economies is not positive. For all other considered control variables, a relatively steady display of facts can be observed from the descriptive statistics of the considered data (Table 1).

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std.Dev.	Min.	Max.
$agrg_{it}$	70	2.654	3.722	-7.221	13.264
$indg_{it}$	70	5.933	7.403	-7.219	34.715
$srvg_{it}$	70	4.085	4.891	-6.397	18.884
$\pi_{it}^{\sim}$	70	2.010	1.603	-4.437	14.870
$initial_{it}$	70	6.047	0.498	5.180	7.342
$popg_{it}$	70	2.695	1.083	-0.880	6.592
$popu_{it}$	70	4.512	1.612	-3.964	7.265
$popr_{it}$	70	2.206	1.565	-6.0148	7.186
gds_{it}	60	2.592	16.964	-7.221	25.239
$enroll_{it}$	70	24.952	15.453	-87.974	65.169
xr_{it}	70	4.188	3.331	3.237	9.227
hci_{it}	70	1.484	0.326	-5.277	2.340
$polstab_{it}$	70	-9.674	20.937	1.031	8
$opns_{it}$	70	56.825	33.002	-85.8	216.414
$agland_{it}$	70	12.352	1.242	10.153	14.052
$forest_{it}$	60	27.933	22.236	0.921	79.649
$livestock_{it}$	70	89.226	29.947	33.892	196.464

Note: *Table 1 displays common descriptive statistics for the sample, over the period 1981-2015. Obs. indicates total observations. Mean, Std.Dev., Min. and Max. represent the average mean value, standard deviation, minimum and maximum values, respectively.*

B. Empirical Results

The regression results for panel data (Table 2) validate our suppositions about parameter estimates, as all the estimates for our control variables align with the findings of existing empirical literature. By keeping in mind the robustness of the coefficients and to compare the estimates with the findings obtained from biased-corrected LSDVC estimator (i.e., our preferred choice of estimator), we also estimate our sample with either the fixed-effects or within (FE) or random-effects (RE) estimator. Our results indicate that the choice of the estimator plays an important role in deriving the inference from the results. The underlying reason is that, at the very least in terms of the significance of variables, there is not a noteworthy difference between the two sets of estimations. For instance, some of the parameter estimates are highly significant in LSDVC estimates whereas the same estimates are insignificant in FE-RE set of estimates. However, we have found the LSDVC estimates as a preferred set of estimates on the basis of two potential reasons. Firstly, these estimates demonstrate a better level of confidence in the comprehensive understanding of the factors that influence sectoral growth. Secondly, the LSDVC estimates exhibit a strong evidence of robustness in all specifications to demonstrate the significance of most of the considered variables.

Although, in first instance, both sets of findings are accompanied by a comprehensive range of specification tests. However, our favored estimation method (i.e., LSDVC) has also undergone and successfully completed the requisite diagnostic checks. After running the FE model, for instance, the joint test to examine whether the year dummies are equal to zero is conducted. The motivation was to check if the fixed-effects of time-factor are needed. The results (p-values of 0.0217 and 0.0801 in industrial and agricultural sectors respectively) reveal that the time fixed-effects are required. In order to examine the existence of country-specific fixed effects, we conduct the Hausman test assuming that the Random Effects (RE) model provides a more suitable fit compared to the Fixed Effects (FE) model. Considering that the p-value, specifically 0.0002, obtained in the growth model of the Industrial sector is below the threshold of significance of 0.05, it can be deduced that employing the Fixed Effects (FE) model would be more suitable for executing analyses pertaining to this particular sector. However, our results indicate that RE-GLS estimation is better for the Agricultural and Services sector models. The Sargan (1958) test, under the null hypothesis, that all restrictions are valid, was used to check for over-identification restrictions. Arellano and Bond (1991)'s AR(1) and AR(2) was used to test each regression for serial correlation, with the assumption that the residuals demonstrate no serial correlation.

In order to choose between the RE and OLS regressions, we have conducted the LM test assuming a null hypothesis that there is zero variance across all cross-sections. Upon conducting the RE-model, our findings from the LM test (p-values of 0.0801 and 0.7359 in Agricultural and Services sector models respectively) provide substantial evidence (at a significance level of 90%) indicating the presence of differences across units (referred to as panel effect) in the agricultural model (Panel–A). Conversely, this is not observed for the services sector model (Panel–C). We can reject the null hypothesis and conclude that implementing a simple ordinary least squares (OLS) analysis is unsuitable for the regression of the agricultural sector model. Similarly, when examining the industrial sector model (Panel–B), we also employed the Modified Wald test to ascertain group-wise heteroscedasticity in fixed effects (FE) regressions, assuming homoscedasticity under the null condition.

Our findings (i.e., Wald χ^2=53.73, p-value=0.000) provide evidence to reject the null hypothesis, consequently indicating the existence of heteroscedasticity. As serial correlation can lead to underestimated standard errors and a higher R2, the Wooldridge serial correlation test is employed to ascertain the presence or absence of such correlation. The results (i.e., F=21.337 (p>F=0.0017), F=0.054 (p>F=0.8226) and F=0.693 (p>F=0.4292) in Agricultural, Industrial and Services sector models respectively) reveal that most of the data do not suffer from the first-order autocorrelation. Based on the above mentioned diagnostic tests and their reported estimates, we can safely claim that our preferred choice of estimator and the inference derived from the chosen set of estimations is econometrically credible.

In general, sectoral growth in selected low-income countries is found to be increased, at 95 % confidence interval, by an increased share of gross domestic savings, growth rate of population, the standard of the quality human capital and augmentation in secondary school enrolment, more openness of economies, increased exchange rate and consistency in stability of the democratic institutions. Specifically, the growth of the agricultural sector is positively associated with increased agricultural land, forest area and livestock production in the economy. As our results are in accordance with those of Huo

(1997) and Ferraro and Peretto (2017), we lend support to their theoretical considerations too.

Similarly, the findings regarding the considered control variables align closely with established literature. For instance, the estimated coefficients of ($polstab_{it)}$ and ($enroll_{it)}$) are in line with those reported by Easterly and Levine (1997), Aisen and Veiga (2013) and Bittencourt et al. (2015). The point estimates attached with ($xr_{(i,t-1)}$) are also in accordance with the viewpoint that increments in rate of exchange (i.e., depreciation) of a country adversely impacts that country's imports and put a favourable effect on exports by making them less expensive.

Consistent with our hypothesis, the sign attached with the coefficient of inflation (π_it^~), our key in-dependent variable, is not only highly significant but also found to be different in various considered sectors. By holding all other controls, an annual increase of 10 percent in average inflation rate tends to increase the growth of industrial and agricultural sectors by about 0.11 and 0.047 percentage points respectively, and the same causes a reduction by about 0.06 percentage points in the services sectors growth. More precisely, by employing a suitable methodology for the small-sample panel dataset, the well-defined indication for the differentiating effect of inflation across sectors cannot be ruled out, and we can summarize, as Hineline (2007) concluded for aggregate growth, that inflation is found to be as a robust variable within the specifications that affect sectoral growth. Now we discuss and highlight the mechanism of inter-play between various sectors by explaining the key parameter estimates of our analysis.

Firstly, considering the agricultural sector growth and inflation, the results (Table 2, Panel–A) show that, given the point estimates, the inflation rate causes an increase in the agricultural sector's growth of the considered economies. In both set of results (i.e., Column 1 and 2), inflation is not only significant but the difference in the coefficients is very minor. The convergence hypothesis also holds in the agricultural sector model, and the rate of convergence oscillates around 0.03%. Other significant determinants of the growth of agricultural sector are rural population growth, gross domestic savings, agricultural land, forest area and livestock production in the economy. No statistically significant dependence of the agriculture sector growth on secondary school enrolment is detected, and the lag of the growth of agricultural sector depicts negative association with the current growth rate of the sector in question.

From the magnitude of the respective coefficients, we can interpret the results as for how significantly the higher inflation rate in low-income developing economies induces a higher growth of the sector. One interpretation is that, once the major determinants of the agricultural sector are accounted for, significant positive inflation effects are seen in the agricultural sector model. One noteworthy point is that our key result for this sector is in contrast with those of Hineline (2010) who found the agricultural sector to be negatively impacted by high impulses of inflation in a study of seven advanced economies. Our point estimates for this sector partially invalidate the conclusion of Dornbusch (1996) who reported that nobody had claimed inflation (at any level) is good for economic growth, and we conclude that inflation could be desirable for helping the agricultural sector growth of selected low-income developing economies.

Secondly, estimates of the industrial sector growth model, Panel–B of Table 2 presents evidence that there exists a great difference of significance and magnitude between the two set of estimates (i.e., Column 3 for FE estimates and Column 4 for LSDVC estimates). For instance, regarding significance, the lag of the industrial sector growth and gross domes-tic savings variables are significant only in FE estimates. Whereas, convergence variable, population growth and school enrolment variables are statistically insignificant only in the LSDVC estimates. Trade openness, lag of the exchange rate in the previous period and political and institutional stability are other significant determinants of the industrial sector growth of the economies in question. Furthermore, Table 2 (Panel–B) displays that, similar to the agricultural-sector model (Panel–A), higher inflation is linked to more growth in the industrial sector of the considered economies. However, the magnitude of the coefficient estimates of inflation variable is almost twice of the coefficient estimate of the model of agricultural sector whereas the coefficient of the convergence variable is smaller than that of the agricultural sector model. No statistically significant dependence of industrial sector growth on the lagged industrial sector growth and gross domestic savings variable is detected.

Finally, from the results of services sector growth model, Panel–C of Table 2 (Column 6), we can see that fairly robust evidence supports, contrary to the other two sectors, the existence of negative impact of inflation on the services sector growth rate of the considered economies. This finding appears to be consistent with evidence from Binici et al. (2012) who reported, in a different panel setting for OECD countries, a significant negative relationship between inflation and sectoral productivity growth. Moreover, convergence variable, urban population growth, school enrolment, lag of exchange rate and human capital index variables are statistically significant in both of the RE and LSDVC estimates. However, in both sets of the estimates, no statistically significant dependence of the dependent variable on lagged services sector growth, gross domestic savings and political stability index variables is detected.

One explanation for differing sectoral dynamics of an economy with more than one sectors is that any increments in inflation tend to reduce the potential demand of the services sector and its productivity, which, in turn, decreases the growth of the sector by causing an increase in implicit tax on capital. The potential explanation for such effect is that, when the ‘intertemporal effect’ of inflation exerts its impact on services sector’s growth, the ‘distributional effect’ also comes into action to play the role for the growth of ‘other’ sectors such as industrial and agricultural sectors. As a consequence, relative demand for such ‘other’ sectors tends be high as predicted by Huo (1997). Consequently, more factor inputs (such as capital) are required, and the increased factor demand causes an alteration in the supply of factor inputs. Thus, a rise in the prices of alternative factor inputs (such as wages) is caused, which results in rise in demand for the production of industrial and agriculture sectors, and the general price level of the economy is induced, hence, the output of the industrial and agricultural increase. All in all, this mechanism creates the growth enhancing effect of inflation for the two sectors in question.

Table 2: Inflation and Sectoral Growth in Selected Low-Income Developing Economies: Panel Data Estimates

(A)		(B)	(C)
dep. variable	$agrg_{it}$	$indg_{it}$	$srvg_{it}$

	(1) *RE-GLS*	(2) *LSDVC*		(3) *RE-GLS*	(4) *LSDVC*		(5) *RE-GLS*	(6) *LSDVC*
lag_{t-1}	-0.450 *** (0.104)	-0.465 *** (0.095)	lag_{t-1}	-0.620 *** (0.209)	0.011 (0.182)	lag_{t-1}	-0.232 (0.106)	0.140 (0.120)
$\pi_{it}^{\sim}$	0.512 ** (0.225)	0.469 ** (0.225)	$\pi_{it}^{\sim}$	1.806 * (0.979)	1.073 * (0.602)	$\pi_{it}^{\sim}$	-0.458 (0.291)	-0.640 ** (0.316)
$initial_{it}$	-4.244 *** (1.194)	-3.178 *** (0.5004)	$initial_{it}$	-8.122 *** (5.902)	-2.406 *** (0.873)	$initial_{it}$	-7.086 *** (2.053)	-2.908 *** (0.704)
$popr_{it}$	1.142 *** (0.339)	1.423 *** (0.305)	$popg_{it}$	-0.687 (1.401)	2.735 *** (0.998)	$popu_{it}$	1.337 *** (0.388)	1.831 *** (0.376)
gds_{it}	0.097 *** (0.020)	0.093 *** (0.018)	gds_{it}	0.317 *** (0.098)	0.086 (0.072)	gds_{it}	0.003 (0.032)	-0.027 (0.028)
$enroll_{it}$	0.051 (0.033)	0.033 (0.030)	$enroll_{it}$	-0.117 (0.243)	0.167 ** (0.0688)	$enroll_{it}$	1.110 *** (0.038)	0.085 ** (0.040)
$agland_{it}$	1.206 *** (0.393)	0.983 *** (0.354)	$xr_{i,t-1}$	2.633 ** (1.279)	0.442 * (0.275)	$xr_{i,t-1}$	0.297 * (0.166)	0.330 ** (0.168)
$forest_{it}$	0.107 *** 0.022)	0.119 *** (0.020)	$polstab$	0.142 ** 0.058)	0.082 * (0.052)	$polstab$	-0.011 (0.029)	-0.016 (0.030)
$livestock_{it}$	0.041 ** 0.020)	0.028 ** (0.013)	$opns_{it}$	0.1399 ** 0.064)	0.096 ** (0.044)	hci_{it}	9.779 *** (2.442)	6.962 *** (2.185)
$Observatio$	52	52		52	52		52	52
$Groups$	10	10		10	10		10	10
$Wald\ \chi^2$ $/p > \chi^2$	90.58(0.000)	190.45(0.000)		3.29(0.000)	117.7(0.000)		58.92(0.000)	153.32(0.000)
$R^2 - within$	0.715	--		0.622	--		0.487	--
$R^2 - between$	0.792	--		0.040	--		0.646	--
$R^2 - overall$	0.710	--		0.028	--		0.584	--
$Hausman\ T$	2.93(0.711)	--		32.12(0.000)	--		3.04(0.96)	--
AB Test for AR(1)	--	-1.87(0.062)		--	-1.83(0.068)		--	-1.82(0.069)
AB Test for AR(2)	--	0.16(0.871)		--	-0.10(0.918)		--	0.46(0.643)
$Sargan\ Tes$ $/p > \chi^2$	--	28.46(0.075)		--	9.47(0.004)		--	17.420(0.562)

Notes: *Table 2 reports the coefficient estimates of three sectoral growth model estimated by FE, RE and LSDVC estimators. The dataset contains annual secondary data over the period 1981-2015, for a panel of Nepal and 9 low-income African economies. The standard errors are reported in parentheses beneath the coefficient estimates. The estimations are derived from the average values of all variables over a period of 5-years.*

*The dependent variables are the growth rate of the relevant sector, and ***, **, and * indicate the level of significance at 1%, 5%, and 10% respectively.*

In sum, theoretically, our results provide support for Huo (1997) from the sectoral growth perspective, and empirically validate the findings of Ayyoub and Woerz (2016) and Ayyoub and Wörz (2021). One interpretation is that, for considered low-income developing economies, once the high-frequency values of data on inflation (such as the observations from period of 1970s) are omitted, and correct choice of estimator and sectoral heterogeneity are accounted for, various sectors react differently to the episodes of increased inflation, and it depends mainly on the capital-intensity of the sector. More precisely, in accordance with Ayyoub and Wörz (2021), we can argue that, whenever the impulses of inflation come into action in the economy, the response in the growth of various sectors depends mainly on sectoral heterogeneity, and, as a result, it emerges as more of a sector-specific subject, and the central bankers, in devising and making decisions regarding the optimal monetary policy, should be careful about such sectoral heterogeneity.

V. Concluding Remarks

The findings of this empirical study imply that inflation may be helpful to boost the growth of certain sectors given the capital-intensities and value-added shares of such sectors in aggregate output. The services sector will be negatively affected due to the distributional effect of inflation and alteration in supply of factor inputs. However, it is clear that agricultural and industrial sectors are going to be the main sectors impacted. By taking into account sectoral heterogeneity and correcting the biasedness of usual least square dummy variable estimators, we find evidence that inflation in 9 low-income African economies and Nepal come along with increased agricultural and industrial sector growth. The opposite applies to services sector growth. Undisclosed previously, the empirical evidence aligns with the hypothesis that economic growth and inflation are positively linked only when the value-added share of the agricultural sector in total output surpasses a critical threshold of 50 percent. Conversely, lower levels exhibit an inverse relationship between these variables. Our small-sample panel dataset's results support the notion that central bankers in Nepal and a few low-income African economies should prioritize sectoral heterogeneity when examining the transmission mechanism of monetary policy.

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