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Inflation in African Countries: Do Energy Shocks Also in the Dock?

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Abstract

Globalisation is characterized, on the one hand, by the interdependence of its main actors and, on the other hand, by the spread or expansion of the neoliberal economy, which by its nature is exposed to external shocks. These shocks have consequences for both developed and developing economies. The main objective of this study is to analyze the incidence of energy shocks on inflation in 31 African countries over the period 2000-2022. The Panel-Corrected Standard Error (PCSE) method and the Two-Stage Least Squares (2SLS) method were employed to achieve our objectives. The analyses revealed that energy price shocks are a significant explanatory factor for the level of inflation in Africa.

Keywords

Energy Shocks, Inflation, African Countries

1. Introduction

African countries, much like other nations within the United Nations system, are primary actors in globalization. The process of globalization inevitably fosters interdependence among its participants. This means that the actions of one actor can have repercussions for others worldwide. A clear example is the Subprime financial crisis in the USA, which impacted other economies due to the interconnectedness of global commercial banks. Finally, another instance is the Russo-Ukrainian war, which led to a shortage of over 25% of wheat on the global market. Furthermore, sanctions imposed by the European Union on Russian gas have fueled tensions in the international gas market, highlighting the global interconnectedness described by Rodrik (2011) in his analysis of globalization's promises and perils.

An increase in international energy prices directly impacts inflation in African importing countries through several channels. Firstly, it raises companies' production costs, which are then passed on to the prices of final goods and services, thus fueling cost-push inflation, a phenomenon highlighted by Kalecki in the early 1960s and detailed by Bezbakh (2011). Secondly, higher fuel prices increase transportation costs, affecting goods distribution and making basic commodities more expensive. Thirdly, this reduces household purchasing power, as a larger portion of their budget is allocated to energy, potentially curbing consumption of other goods. Finally, reliance on energy imports puts pressure on trade balances and can weaken local currencies, leading to imported inflation through exchange rate depreciation, a factor also emphasized by Bezbakh (2011) and empirically confirmed by studies such as Gaomab (1968) in Namibia and Chipili (2021) in Zambia. In light of these salient facts, it's crucial to analyze the macroeconomic impact of external shocks, particularly energy price shocks, on inflation in Sub-Saharan Africa. Thus, this article aims to analyze inflation's response in African countries to energy price shocks on the international market.

The remainder of this article is structured into three sections. Section 2 highlights the lessons from the literature on the determinants of inflation, organized around its theoretical foundations and empirical evidence. Section 3 sheds light on the methodological approach of this study. Finally, Section 4 presents and discusses the results derived from the econometric model estimations.

2. Lesson from the Literature

The economic literature offers diverse perspectives for understanding inflation, encompassing both theoretical and empirical approaches. This section synthesizes these views by distinguishing explanatory theories from concrete observations across various global regions.

2.1. Theoretical Foundation of Inflation

Several theories attempt to explain the mechanisms of inflation, often linked to distinct schools of economic thought.

Economic literature explains inflation through various theories, including the Quantity Theory of Money (QTM), whose roots trace back to Copernicus in the 16th century and David Hume (1711-1776), and which was formalized by Fisher (1912). It postulates that excessive growth in the money supply relative to production leads to a loss of currency value and, consequently, an increase in prices. The relationship $MV = PT$ (where M is the money supply, V is the velocity of money, P is the price level, and T is the volume of transactions) illustrates this direct link. In contrast, the Keynesian approach emphasizes aggregate demand as the driver of inflation, influenced by liquidity preferences and expectations. Post-Keynesians, such as Allain (2014) and Lavoie (2014), highlight more exogenous and institutional determinants. Friedman's (1969) monetarism reasserts the QTM, viewing inflation as a purely monetary phenomenon and advocating strict control of the money supply. Other explanations include demand-pull inflation (Ndidi, 2013), which occurs when demand exceeds supply; currency depreciation, which increases import costs; fiscal stimulus and monetary stimulus, which boost demand; rapid economic growth in trading partners, which stimulates exports; and cost-push inflation (Kalecki, 1962; Bezbakh, 2011) or supply shocks (wages, raw materials), including imported inflation (rising prices of imported goods or currency depreciation).

2.2. Empirical Evidence of Inflation

Empirical studies on the determinants of inflation in developing countries reveal a plurality of causes, which can be economic, monetary, sociological, sociopolitical, or even environmental.

Empirical studies highlight the predominant importance of external factors in determining inflation across various global regions. Research by Gaomab (1968) in Namibia, Kim (2001) in Poland, Hasan and Alogeel (2008) in Saudi Arabia and Kuwait, as well as Kandil and Morsy (2009) for the Gulf Cooperation Council (GCC) countries, demonstrates a dominant influence of foreign prices and imported inflation on national price levels. Similarly, the works of Doé and Diallo (1997) and Doé and Diarisso (1998) on the West African Economic and Monetary Union (WAEMU) confirm that imported inflation, particularly price changes in France, is the main driver of inflation in both the short and long term within this monetary zone. More recently, Chipili (2021) in Zambia revealed that while the exchange rate and global non-food commodity prices determine domestic prices in the long run, exchange rate movements, energy price adjustments, imported inflation from South Africa, and maize supply constraints influence overall inflation in the short term.

However, alongside external influences, numerous studies emphasize the crucial role of internal factors. In Pakistan, Khan et al. (2007) identified inflation expectations, private sector credit, and rising import prices as significant determinants. Dammak and Bougelbène (2010) in Tunisia concluded that inflation results from mixed factors, both monetary and structural, including money supply, exchange rates, interest rates, average annual wages, import prices, and real output. In Jordan, Jaradat et al. (2011) highlighted the impact of imported inflation, credit facility growth, expatriate worker remittances, and external shocks on domestic prices. In Iran, Alavinasab (2014) observed a positive correlation between money supply and oil export revenues with inflation, and a negative relationship with GDP. Studies conducted in Algeria by Maamar and Kenniche (2016), Si Mohammed et al. (2015), and Mehyaoui (2018) consistently showed that money supply and public expenditure influence inflation, with a long-term impact from import prices and GDP.

Money supply is frequently recognized as a key determinant of inflation. Toé and Hounkpatin (2007) found a short-term relationship between money supply and the consumer price index in WAEMU, while Ntita et al. (2017) concluded that money supply has a positive and significant effect on inflation in the Central African Economic and Monetary Community (CEMAC). Studies by the BCEAO, notably Nubukpo (2003), indicate that a positive shock to key interest rates has a negative effect on inflation. Furthermore, Diallo (2003) confirmed the relationship between inflation and the food crop sectors in WAEMU member countries. Political stability is also a crucial factor, with Ntita et al. (2017) underscoring its negative and significant effect on inflation in the CEMAC zone. Finally, a study by Loungani and Swagel (2001) on 54 African and Asian countries revealed the diversity of inflation sources, with the inertial component (past inflation) often being the most significant, though money supply growth and exchange rate changes predominate in South American countries with flexible exchange rate regimes. The Bank for International Settlements (BIS, 2015) highlighted that, despite decades of research, the influence of medium- and long-term determinants on inflation remains less evident than that of immediate factors.

3. Methodological Approach

Three components structure the methodological approach of this study: data and variables, econometric model specification, and estimation techniques.

3.1. Data and Variables

With the exception of energy prices, which come from the IMF database, all other variables in this chapter are sourced from the World Bank's World Development Indicators (WDI) database. These variables cover 31 Sub-Saharan African countries (see **Table A1**) over the period 2000-2022. The dependent variable in this study is inflation. It's defined as a generalized increase in the price of goods over a given period and is commonly measured by the Consumer Price Index (Infl). This measure is widely used in recent literature (Nkemgha et al., 2023). The independent variable of interest in this paper is energy price shocks. This is captured by the cyclical component of energy prices (cycle Energy), obtained using the Hodrick-Prescott (HP) time-series filter (Hodrick & Prescott, 1997). This filter can be considered an optimal trend signal extractor for Mean Squared Error (MSE) in a smooth trend model. As for the control variables, they include Gross Domestic Product (GDP), Foreign Direct Investment (FDI), Information and Communication Technology (measured by mobile subscriptions), industrialization (measured by manufacturing value added), agricultural sector value added (AGRI), foreign trade (Trade), and transport services exports (Trans).

Based on empirical work, Dipietro and Sawhney (1999) showed no link between economic growth and inflation across 98 countries. Regarding foreign direct investment, Sayek (2009) found a negative and significant effect on inflation. Similarly, Koyuncu and Unver's (2018) work demonstrated a negative correlation between information and communication technologies and inflation. Contrary to previous determinants, Boëda (1976) showed a mixed effect of industrialization on economic growth. More recently, Mekonen (2020) found a negative correlation between the agricultural sector and inflation. Likewise, Embergenov et al. (2022) demonstrated that foreign trade significantly reduces the price level. Finally, an increase in transport services can significantly reduce the price level.

3.2. Econometric Model Specification

The objective of this study is to evaluate the effect of energy price shocks on inflation in Sub-Saharan Africa. Referring to the work of Zhao et al. (2016), we have specified the following econometric model:

$$\begin{aligned}\text{Infl}_{it} &= \gamma_0 + \gamma_1\text{Cycle\_Energy}_{it} + \gamma_2\text{Manufacturing}_{it} + \gamma_3\text{Trade}_{it} + \gamma_4\text{GDP}_{it} \\ &\quad + \gamma_5\text{FDI}_{it} + \gamma_6\text{Mobile}_{it} + \gamma_7\text{AGRI}_{it} + \gamma_8\text{Trans}_{it} + V_i + W_t + \varepsilon_{it}\end{aligned} \tag{1}$$

In this initial specification, we consider the energy price shock to be exogenous, as its price is determined on the international market without input from producing countries.

However, it's crucial to specify that the cyclical component of the energy price can result from the interplay of supply and demand for energy elements (such as gas and oil). The African continent provides a significant quantity of these energies to the rest of the world. Consequently, the cyclical component of the energy price shock could be endogenous (meaning it might be linked to the supply or demand levels of these countries). Hence, the specifications below:

$$\begin{aligned}\text{Infl}_{it} &= \gamma_0 + \gamma_1\text{Cycle}_{\text{Energy}_{it}}(\text{endog}) + \gamma_2\text{Manufacturing}_{it} + \gamma_3\text{Trade}_{it} + \gamma_4\text{GDP}_{it} \\ &\quad + \gamma_5\text{FDI}_{it} + \gamma_6\text{Mobile}_{it} + \gamma_7\text{AGRI}_{it} + \gamma_8\text{Trans}_{it} + V_i + W_t + \varepsilon_{it}\end{aligned} \tag{2}$$

$$\begin{aligned}\text{Cycle}_{\text{Energy}_{it}}(\text{endog}) &= \gamma_0 + \gamma_1\text{Manufacturing}_{it} + \gamma_2\text{Trade}_{it} + \gamma_3\text{GDP}_{it} + \gamma_4\text{FDI}_{it} \\ &\quad + \gamma_5\text{Mobile}_{it} + \gamma_6\text{AGRI}_{it} + \gamma_7\text{Trans}_{it} + V_i + W_t + \varepsilon_{it}\end{aligned} \tag{3}$$

Table 1 and **Table 2** present the descriptive statistics and the correlation matrix, respectively.

Table 1. Descriptive statistics.

Variables	Obs	Mean	Std. Dev.	Min	Max
Infl	713	13.014	102.437	−21.165	2630.123
cycle_Energy	713	0	49.03	−85.342	117.114
Manufacturing	684	10.96	4.839	0.233	25.751
Trade	713	64.511	25.649	16.352	156.862
GDP	713	4.464	5.566	−36.392	63.38
FDI	713	3.823	5.839	−17.292	64.384
Mobile	713	50.935	43.297	0	168.924
AGRI	713	21.81	13.243	0.893	60.61
Trans	644	22.25	16.632	0.126	79.494

Source: Author.

Table 2. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Infl	1.000								
(2) cycle_E	−0.003	1.000							
(3) Manufact	0.014	0.014	1.000						
(4) Trade	−0.066	0.106	−0.031	1.000					
(5) GDP	−0.128	0.236	−0.143	−0.104	1.000				
(6) FDI	−0.034	0.093	−0.169	0.352	0.062	1.000			
(7) Mobile	−0.053	0.011	0.058	0.233	−0.146	0.019	1.000		
(8) AGRI	0.020	−0.006	−0.409	−0.469	0.165	0.026	−0.422	1.000	
(9) Trans	1.000	−0.006	0.011	−0.143	0.062	−0.023	0.032	0.153	1.000

Source: Author.

3.3. Estimation Technique

For this study, the main methodology relies on the use of fixed or random effects, with the choice determined by the Hausman specification test. Subsequently, the preferred estimation will be the Prais-Winsten with Panel-Corrected Standard Error (PCSE), as suggested by Beck and Katz (1995), to ensure the efficiency and consistency of the results. A relevant alternative, despite its limitations, is the Feasible Generalized Least Squares (FGLS) estimator proposed by Parks (1967). Both FGLS and PCSE are robust to autocorrelation, heteroskedasticity, and panel correlation, as confirmed by Bai et al. (2021). However, since this study's sample has a number of cross-sections (N = 31) greater than the number of periods (T = 23), the FGLS estimator cannot be used due to its tendency to underestimate standard errors in finite samples, as pointed out by Reed and Ye (2011). The choice, therefore, naturally falls on Beck and Katz's (1995) PCSE, which is a modification of the full GLS-Parks estimator that preserves the Prais-Winsten weighting for autocorrelation but uses a sandwich estimator to incorporate the cross-sectional dependence estimator when calculating standard errors. This approach effectively addresses issues of group heteroskedasticity, cross-sectional dependence, and serial correlations. To ensure the validity of the OLS model parameters, econometric tests will be conducted to verify the homogeneity of error variance and the exogeneity of explanatory variables.

Endogeneity, a major challenge in econometrics, arises when the error term of an explanatory variable is correlated with one or more explanatory variables. This violates the assumption of residual orthogonality and biases the coefficients. The three main sources of endogeneity are simultaneity (where X and Y mutually influence each other), unobserved heterogeneity (due to an unincluded third factor), and measurement error (imprecision in variable measurement). Another source, in time-series data, is the inclusion of a lagged independent variable with autocorrelated residuals. To address endogeneity, the Instrumental Variables (IV) method is employed, allowing for unbiased parameter estimation when the covariance between explanatory variables and the error term is non-zero (Cov(x, u) = 0). The Hausman test is used to discriminate between OLS estimators (preferred under exogeneity) and IV estimators (unbiased even with endogeneity). Prior studies, such as Fisman and Svensson (2007), Dollar et al. (2005), Aterido and Hallward-Driemeier (2010), and Hallward-Driemeier and Aterido (2007), confirm the significance of this problem. The instrumental variable must be correlated with the endogenous variable (Cragg & Donald, 1993, relevance test, with Stock & Yogo's, 2005, criterion requiring an F-statistic of at least 10 for a single endogenous variable) and uncorrelated with the error (Hansen, 1982, over-identification test, based on the J-statistic). Given the endogeneity of energy price shocks in this study and the lack of established instruments in the literature, we use oil production, representing the supply side of energy prices, as an instrument. The instrumental variable approach, initially proposed by Anderson and Hsiao (1982) for panel data, aims to find instruments that correlate with the explanatory variables but not with the disturbances. Two-Stage Least Squares (2SLS) is a specific case of instrumental variable regression, comprising two distinct stages: the first stage estimates an OLS regression of each endogenous and exogenous variable on the set of instruments, and the second stage consists of a regression of the original equation where the endogenous variables are replaced by their fitted values from the first stage.

4. Results and Discussions

The presentation of this study's results will focus on three key points. The first highlights the baseline results. The Hausman specification test allowed us to differentiate between fixed and random effects. Consequently, the baseline result is obtained using the fixed effects method. The second presentation leverages the Panel-Corrected Standard Error (PCSE) method. This method is particularly robust to autocorrelation and heteroskedasticity of residuals, although it cannot address potential endogeneity issues. Finally, the last part of this presentation refers to the results derived from the Two-Stage Least Squares (2SLS) instrumental variables method. This method is appropriate for resolving potential endogeneity problems.

4.1. Baseline Results

The results from the fixed effects estimation are presented in **Table 3**. **Table 3** indicates that the energy price shock, measured here by its cyclical component, has a positive and significant impact on inflation. In other words, inflation reacts positively to an increase in energy prices. For instance, if the energy price rises by 1%, inflation will increase by 0.17%. Furthermore, variables such as industrialization, foreign trade, gross domestic product, and agriculture have a significant impact on inflation. However, this method does not account for potential issues like autocorrelation and heteroskedasticity of errors. For this reason, we employed the panel-corrected standard errors method, with its results recorded in **Table 4**.

Table 3. Effect of energy price shocks on inflation using the FE method.

Variables	Infl
cycle_Energy	0.170*
	(0.0930)
Manufacturing	−5.308***
	(1.738)
Trade	−1.672***
	(0.388)
GDP	−3.379***
	(1.135)
FDI	0.0658
	(1.109)
Mobile	0.00611
	(0.125)
AGRI	3.415**
	(1.383)
Trans	−0.201
	(0.438)
Constant	121.9**
	(48.10)
Obs	615
Nb ind	27
R-squared	0.067
Prob (F-Stat)	0.00

Source: Author. Note: Values in parentheses represent the standard deviations of the coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4. Effect of energy price shocks on inflation using the PCSE method.

	1	2	3	4	5
Variables	Infl	Infl	Infl	Infl	Infl
cycle_Energy	0.0461*	0.0471*	0.0494**	0.0555**	0.0990***
	(0.0269)	(0.0273)	(0.0246)	(0.0247)	(0.0298)
Manufacturing	−0.160	−0.131	−0.135	−0.537**	−0.555*
	(0.193)	(0.194)	(0.195)	(0.228)	(0.331)
Trade	−0.237***	−0.261***	−0.219***	−0.335***	−0.385***
	(0.0464)	(0.0501)	(0.0546)	(0.0628)	(0.0760)

Continued

GDP	−1.707***	−1.784***	−1.915***	−1.974***	−3.958***
	(0.408)	(0.428)	(0.449)	(0.447)	(0.752)
FDI		0.297*	0.230	0.361**	0.0477
		(0.180)	(0.191)	(0.181)	(0.230)
Mobile			−0.125***	−0.166***	−0.172***
			(0.0285)	(0.0305)	(0.0345)
AGRI				−0.428***	−0.268**
				(0.108)	(0.136)
Trans					−0.0739
					(0.0820)
Constant	37.56***	38.03***	42.73***	65.76***	78.25***
	(4.106)	(4.210)	(4.603)	(7.907)	(9.698)
Obs	684	684	684	684	615
R-squared	0.012	0.012	0.014	0.016	0.028
Nb of ind	30	30	30	30	27
Prob (Chi^2)	0.00	0.00	0.00	0.00	0.00

Source: Author. Note: Values in parentheses represent the standard deviations of the coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

4.2. Results of the Panel-Corrected Standard Error Method

The report of Pesaran's cross-sectional dependence tests (see Table A2) confirms that PCSE adequately addresses any detected dependence. Table 3 presents the results of the effect of energy prices on inflation using the Panel-Corrected Standard Error (PCSE) method. This table reveals that the energy price shock has a positive and significant impact on inflation. Specifically, a sudden 1% increase in energy prices leads to a 0.09% increase in inflation (Column 5). This finding can be explained by the direct loss of purchasing power for households and consumers resulting from higher energy costs. Furthermore, businesses that use energy as a primary input will pass these increased costs onto the final product price, ultimately borne by the consumer. The transport sector, for instance, is often among the most affected by rising energy prices. To compensate for these increases, this sector readjusts its prices, creating a ripple effect on other sectors, with the final consumer ultimately paying the bill. This result aligns with the findings of Kenkouo (2015), who observed that a 10% increase in oil prices leads to a 1.5% to 4% increase in inflation for CEMAC countries in the long term.

Regarding industrialization, measured in this study by the value added of the manufacturing sector, it has a negative and significant impact on inflation. Indeed, a 1% increase in the value added of the manufacturing sector leads to a 0.5% decrease in inflation (Column 5). This result can be explained by the fact that increased manufacturing value added helps to satisfy domestic demand more effectively and reduces exposure to imported inflation, for example. Industrialization will further reduce inflation if the primary sector supplies the secondary sector within the same country. This finding contrasts with Boëda's (1976) work, which found a mixed effect of industrialization on inflation.

Foreign trade has a negative and significant effect on inflation. Thus, a 1% intensification of foreign trade leads to a 0.38% decrease in inflation (Column 5). This result can be explained by the fact that a country's openness to the rest of the world through import and export operations inevitably fosters competition. Competitive firms are those that offer quality goods at lower costs. It is through this mechanism of competition that foreign trade leads to a reduction in inflation. This finding is consistent with the work of Embergenov et al. (2022), who found that international trade is negatively correlated with foreign competition.

As for economic growth, it is negatively and significantly correlated with inflation. A 1% increase in economic growth will lead to a decrease in inflation of approximately 3.95% (Column 5). This situation is justified by the fact that an improvement in economic growth will provide the necessary resources to develop infrastructure and to grant subsidies to various sectors of activity; this will allow for an increase in the supply of goods and services at a lower cost. This result is inconsistent with the work of Dipietro and Sawhney (1999), who found no link between economic growth and inflation.

Information and Communication Technologies (ICTs), captured in this study by the number of mobile phone users, also have a negative impact on inflation. A 1% increase in ICT leads to a 0.17% decrease in inflation. New information and communication technologies provide consumers with opportunities to access competitive goods and services. Furthermore, the online market often operates outside regulation in several countries, further justifying the competitiveness of products and services offered through this channel. This result is consistent with the work of Koyuncu and Unver (2018).

Finally, the value added of the agricultural sector is negatively correlated with inflation. A 1% increase in the agricultural sector's value added will lead to a 0.26% decrease in inflation. This result can be explained by the fact that an increase in agricultural production leads to a decrease in prices, as most agricultural products are perishable goods with a short shelf life. Generally, the price of widely consumed products accounts for a significant portion of the consumer price index calculation. This result is consistent with the work of Mekonen (2020), who also found a negative impact of the agricultural sector and inflation.

To test the robustness of our findings, we opted for an instrumental variables method, specifically the Two-Stage Least Squares (2SLS) approach. The results from this estimation are recorded in **Table 5**.

To ensure the validity of our instrument, we followed a rigorous procedure detailed in sub-Section 3.3. We employed several diagnostic tests to confirm its suitability. First, the Durbin-Wu-Hausman (DWH) test was used to distinguish between endogeneity and exogeneity of the variable, providing initial insights into the potential need for instrumental variables. Next, we assessed the orthogonality condition using the Sargan probability test, which helps confirm that our instrument is uncorrelated with the error term in the main equation. To establish the strength of the instrument—that is, its correlation with the endogenous variable—we relied on the Cragg-Donald F-statistic. With an F-statistic greater than 10, our instrument demonstrated sufficient strength. Finally, the Kleibergen-Paap LM (KPLM) test yielded a *p*-value of 0, leading us to confidently reject the null hypothesis of instrument underidentification. Although our instrument is overidentified, this outcome further strengthens its validity, demonstrating that it meets the necessary conditions for robust IV estimation.

Table 5. Effect of energy price shocks on inflation using the 2SLS method.

	1	2	3	4	5
Variables	Infl	Infl	Infl	Infl	Infl
cycle_Energy	0.0848*	0.0849*	0.0873**	0.0932**	0.0919*
	(0.0445)	(0.0445)	(0.0436)	(0.0439)	(0.0481)
Manufacturing	0.314	0.304	0.302	0.106	0.375
	(0.258)	(0.260)	(0.260)	(0.289)	(0.366)
Trade	−0.0441	−0.0383	−0.0374	−0.0950	−0.0778
	(0.0483)	(0.0526)	(0.0536)	(0.0650)	(0.0725)
GDP	−0.376	−0.369	−0.379	−0.404	−0.882**
	(0.253)	(0.254)	(0.256)	(0.257)	(0.347)
FDI		−0.0693	−0.0726	−0.000415	−0.189
		(0.244)	(0.245)	(0.249)	(0.290)
Mobile			−0.00376	−0.0243	−0.0194
			(0.0296)	(0.0323)	(0.0350)
AGRI				−0.208	−0.133
				(0.131)	(0.145)
Trans					0.288***
					(0.0796)
Constant	9.827**	9.797**	10.03**	21.34**	12.40
	(4.803)	(4.804)	(4.973)	(8.747)	(10.39)
Observations	626	626	626	626	563
R-squared	0.0696	0.0696	0.0688	0.0702	0.102
sarganp	0.390	0.377	0.372	0.323	0.415
KPLM	0.00	0.00	0.00	0.00	0.00
Cragg-Donal	38	38	40	39	36
DWH (cycle_Energy)	0.04	0.04	0.03	0.02	0.04

Source: Author. Note: Values in parentheses represent the standard deviations of the coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

An analysis of this table reveals that the energy price shock has a positive and significant impact on inflation, thereby reinforcing our previous findings. Furthermore, variables such as economic growth and transport services also have significant effects on inflation.

5. Conclusion

The global economy is defined by its dynamics and the interdependence of its actors. This dynamic is evident in constant shifts in supply and demand, while interdependence means that one actor's actions can influence others. A striking example is the fluctuation of energy prices, caused by imbalances between supply and demand, with repercussions felt in both exporting and importing countries. In this article, we specifically analyzed the impact of an energy price shock on inflation. Applying the Panel-Corrected Standard Error (PCSE) method revealed that an increase in energy prices is a major factor driving inflation. These findings were further corroborated by analyzing this relationship using the Two-Stage Least Squares (2SLS) instrumental variables method. These conclusions underscore the strategic importance of developing alternative energy sources to fossil fuels. This would not only reduce production costs but, more crucially, decrease economies' exposure to external energy shocks, thereby contributing to greater macroeconomic stability.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Alavinasab, S. M. (2014). Determinants of Inflation: The Case of Iran. *International Journal of Social Science and Management, 1,* 71-77.

Allain, O. (2014). Note de lecture sur le chapitre 8 de Post-Keynesian Economics: New Foundation. *Revue de la Régulation, 16,* 1-8. https://doi.org/10.4000/regulation.10919

Anderson, T. W., & Hsiao, C. (1982). Formulation and Estimation of Dynamic Models Using Panel Data. *Journal of the American Statistical Association, 77,* 603-608.

Aterido, R., & Hallward-Driemeier, M. (2010). *The Impact of the Investment Climate on Employment Growth: Does Sub-Saharan Africa Mirror Other Low-Income Regions? Policy Research Working Paper Series.* The World Bank.

Bai, J., Han, X., & Liu, K. (2021). Robustness of FGLS and PCSE Estimators to Cross-Sectional Dependence, Heteroskedasticity and Autocorrelation. *Empirical Economics, 60,* 999-1025.

Bank for International Settlements (BIS) (2015). *BIS Annual Report 2015.* Bank for International Settlements.

Beck, N., & Katz, J. N. (1995). What to Do (and Not to Do) with Time-Series Cross-Section Data. *American Political Science Review, 89,* 634-647. https://doi.org/10.2307/2082979

Bezbakh, P. (2011). *Inflation et désinflation* (6th éd.). La Découverte. https://doi.org/10.3917/dec.bezba.2011.01

Boëda, M. (1976). L'industrie: Frein ou moteur de l'inflation? *Economie et Statistique, 77,* 11-16. https://doi.org/10.3406/estat.1976.2316

Chipili, J. M. (2021). *Dynamique de l'inflation en Zambie.* Document de Politique Générale, No. 742, Consortium pour la Recherche en Afrique.

Cragg, J. G., & Donald, S. G. (1993). Testing Identifiability and Specification in Instrumental Variable Models. *Econometric Theory, 9,* 222-240. https://doi.org/10.1017/s0266466600007519

Dammak, T., & Boujelbère, Y. (2010). Déterminant de long terme et dynamique de court terme de l'inflation en Tunisie. *Apply Economics Letters, 17,* 1255-1263.

Diallo, M. L. (2003). *L'impact de l'offre locale des produits vivriers sur les prix dans l'UEMOA.* https://www.bceao.int/sites/default/files/2017-12/L_impact_de_l_offre_locale_de_produits_vivriers_sur_les_prix_dans_l_UEMOA_Diallo_MLA-_NIS_no_548_de_juin_2004-.pdf

Dipietro, W. R., & Sawhney, B. L. (1999). Does Growth Cause Inflation? Granger Causality Tests on 98 Countries. *The Indian Economic Journal, 47,* 104-109. https://doi.org/10.1177/0019466219990109

Doé, L., & Darisso, S. (1998). *De l'origine monétaire de l'inflation dans les pays de L'UEMOA.* Note d'Information et Statistiques (NIS) de la BCEAO, No. 480.

Doé, L., & Diallo, M. (1997). *Déterminants empiriques de l'inflation dans les pays de L'UEMOA.* Notes d'Information et Statistiques (NIS) de la BCEAO, No. 476.

Dollar, D., Hallward-Driemeier, M., & Mengistae, T. (2005). Investment Climate and Firm Performance in Developing Economies. *Economic Development and Cultural Change, 54,* 1-31. https://doi.org/10.1086/431262

Embergenov, B., Allayarov, P., Azam, K., Juraeva, U., Sharipova, S., Kudiyarov, K. et al. (2022). Analyzing the Impact of Trade Openness on Inflation: A Time Series Study for Uzbekistan. In *Proceedings of the 6th International Conference on Future Networks & Distributed Systems* (pp. 381-386). ACM. https://doi.org/10.1145/3584202.3584257

Fisher, I. (1912). *The Purchasing Power of Money: Its Determination and Relation to Credit, Interest and Crises.* Macmillan.

Fisman, R., & Svensson, J. (2007). Are Corruption and Taxation Really Harmful to Growth? Firm Level Evidence. *Journal of Development Economics, 83,* 63-75. https://doi.org/10.1016/j.jdeveco.2005.09.009

Friedman, M. (1969). *Inflation et système monétaire.* Calman-Levy.

Gaomab, M. (1968). *Modeling Inflation in Namibia, Research Department.* Bank of Namibia. Occasional Paper.

Hallward-Driemeier, M., & Aterido, R. (2007). In Impact of Access to Finance, Corruption and Infrastructure on Employment Growth: Putting Africa in a Global Context. In *Donor Committee for Enterprise Development's Africa Consultative Conference "Creating Better Business Environments for Enterprise Development: African and Global Lessons for More Effective Donor Practices"* (pp. 5-7). World Bank Policy Research Working Paper, WPS4349.

Hansen, L. P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica, 50,* 1029-1054. https://doi.org/10.2307/1912775

Hasan, M., & Alogeel, H. (2008). *Understanding the Inflationary Process in the GCC Region: The Case of Saudi Arabia and Kuwait.* IMF Working Paper, WP 08/193. https://doi.org/10.5089/9781451870510.001

Hodrick, R. J., & Prescott, E. C. (1997). Postwar U.S. Business Cycles: An Empirical Investigation. *Journal of Money, Credit and Banking, 29,* 1-16. https://doi.org/10.2307/2953682

Jaradat, M., AI-Zeaud, H. A., & AI-Rawahneh (2011). And Econometrics Analysis of the Determinant of Inflation in Jordan. *Middle Eastern Finance and Economics, 15,* 121-131.

Kalecki, M. (1962). Observations on the Theory of Growth. *The Economic Journal, 72,* 134-153. https://doi.org/10.2307/2228620

Kandil, M., & Morsy, H. (2009). *Inflation in GCC Countries: Causes and Consequences.* IMF Working Paper, WP/09/205.

Kenkouo, G. A. (2015). *Dynamique du prix du pétrole et inflation dans la CEMAC: BEAC Working Paper N° 08/15.* Banque des Etats de l'Afrique Centrale.

Khan, A., Bukhari, S. K., & Amed, Q. M. (2007). *Determinants of Recent Inflation in Pakistan.* MPRA Paper N° 16254.

Kim, B. (2001). *Determinants of Inflation in Poland: A Structural Cointegration Approach.* Bank of Finland, BOFIT.

Koyuncu, J. Y., & Unver, M. (2018). The Impact of Internet on Inflation in OECD Countries. In *International Balkan and Near Eastern Social Science (IBANESS) Congress Series* (pp. 261-265). Publisher.

Lavoie, M. (2014). *Post-Keynesian Economics. New Foundation.* Edward Edgar.

Loungani, P., & Swagel, P. (2001). *Sources of Inflation in Developing Countries.* IMF, Working Paper No. WP 01/198, International Monetary Fund.

Maamar, B., & Kenniche, M. (2016). Essais d'évaluation des tensions inflationnistes à court et à moyen terme de l'économie algérienne. *Revue Algérienne d'Économie de Gestion, 8,* 71-88.

Mehyaoui, O. (2018). Analyse empirique des déterminants de l'inflation en Algérie. *Revue Algérienne d'Économie de Gestion, 12,* 1-25.

Mekonen, E. K. (2020). Agriculture Sector Growth and Inflation in Ethiopia: Evidence from Autoregressive Distributed Lag Model. *Open Journal of Business and Management, 8,* 2355-2370. https://doi.org/10.4236/ojbm.2020.86145

Ndidi, D. E. (2013). Determinants of inflation in Nigeria (1970-2010). *The Business & Management Review, 3,* 106-114.
https://cberuk.com/cdn/conference_proceedings/13-dubai13.pdf

Nkemgha, G. Z., Ofeh, M. A., & Poumie, B. (2023). Growth Effect of Inflation in Central African Countries: Does Security Situation Matter? *Journal of the Knowledge Economy, 14,* 3409-3430. https://doi.org/10.1007/s13132-022-01008-8

Ntita, J., Kazadi, F., & Ntanga, J. D. (2017). *Determinants of Inflation in Central African Countries and Monetary Community (CAEMC). Munich personal, RePEc Archive (MPRA).* Université Officielle de Mbujimayi.

Nubukpo, K. (2003). *L'impact de la politique monétaire de la BCEAO sur l'inflation dans l'UEMOA.* Working Paper BCEAO.

Parks, R. W. (1967). Efficient Estimation of a System of Regression Equations When Disturbances Are Both Serially and Contemporaneously Correlated. *Journal of the American Statistical Association, 62,* 500-509. https://doi.org/10.1080/01621459.1967.10482923

Reed, W. R., & Ye, H. (2011). Which Panel Data Estimator Should I Use? *Applied Economics, 43,* 985-1000. https://doi.org/10.1080/00036840802600087

Rodrik, D. (2011). *The Globalization Paradox: Democracy and the Future of the World Economy.* W. W. Norton & Company.

Sayek, S. (2009). Foreign Direct Investment and Inflation. *Southern Economic Journal, 76,* 419-443. https://doi.org/10.4284/sej.2009.76.2.419

Si Mohammed, K., Benyamina, K., & Benhabib, (2015). The Mains Determinants of Inflation in Algeria. An ARDL Model. *International Journal of Management, 5,* 71-82.

Stock, J. H., & Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regression. In

D. W. Andrews, & J. H. Stock (Eds.), *Identification and Inference for Econometric Models* (pp. 80-108). Cambridge University Press. https://doi.org/10.1017/cbo9780511614491.006

Toé, M. D., & Hounkpatin, M. (2007). *Lien entre la masse monétaire et l'inflation dans les pays de L'UEMOA.* BCEAO, DER.

Zhao, L., Zhang, X., Wang, S., & Xu, S. (2016). The Effects of Oil Price Shocks on Output and Inflation in China. *Energy Economics, 53,* 101-110. https://doi.org/10.1016/j.eneco.2014.11.017

Appendix

Table A1. List of countries.

Botswana	South Africa	Sierra Leone
Benin	Mauritius	Tanzania
Ethiopia	Madagascar	Togo
Burkina Faso	Mozambique	Uganda
Congo	Mali	Zambia
Cameroon	Niger	Zimbabwe
Ghana	Malawi	Chad
Gabon	Nigeria	CAR
Guinea-Bissau	Namibia	Equatorial Guinea
DRC	Rwanda	
Kenya	Senegal	

Table A2. Average correlation coefficients and Pesaran's CD test.

Variables	CD-test	*p*-value	corr	abs (corr)
AGRI	16.500	0.000	0.163	0.429
FDI	6.850	0.000	0.069	0.268
GDP	17.430	0.000	0.176	0.247
CPI	22.790	0.000	0.232	0.294
Manufactur~g	2.440	0.015	0.025	0.400
Mobile	94.000	0.000	0.948	0.948
Trade	7.68	0.00	0.082	0.407
Trans	−1.36	0.174	−0.015	0.386

Source: Author. Notes: Under the null hypothesis of cross-section independence CD~N(0, 1).