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Abstract

Research background: Public debt arises mainly from debt-financed deficits. More and more countries are resorting to additional public indebtedness to raise additional financial resources to meet government funding needs, which are unattainable by the usual tax means. As a result, increasingly, government spending is rising faster than revenue is received, and the excess is financed mainly through domestic and external borrowings. Expensive borrowings by a government (in an environment of increasing interest rates) may be harmful to inflation and the macroeconomic stabilisation process. This trend is raising concerns among policymakers as it undermines macroeconomic stability, especially in developing economies with relatively weak and dependent monetary authorities in the formulation and implementation of monetary policies. Hence, the association between public debt and inflation is of importance in the inflationary process of an economy.

Purpose: In this paper, theoretical and empirical literature on the link between public debt and inflation has been surveyed in detail. The focus of the paper was centred on the review of literature on the link between total public debt, external public debt, domestic public debt and inflation.

Research methodology: This paper presents an extensive review of scholarly studies on the link between public debt and inflation based on their results. The paper analysed, synthesised, and critically evaluated previous studies on the relationship between public debt and inflation on both the theoretical and empirical fronts.

Results: The literature reviewed revealed the association between public debt and inflation. The surveyed literature shows that the relationship between public debt and inflation varies from country to country, with
Introduction

The global financial crisis of 2008 showed that debt undoubtedly had negative consequences for the economy, and failure to evaluate the size and evolution properly might affect the ability of monetary policies to achieve inflation stability (Bank for International Settlements, 2012). Global public and private debt has changed significantly over the past few decades, with an all-time high of $184 trillion in nominal terms, and the equivalent of 225% of GDP in 2017 (Mbaye, Badia, 2019). Global public debt has gone up since the 1970s with the world’s advanced economies at the top, and of late, followed by emerging and low-income developing countries. Public debt in advanced and emerging market economies has continued to grow at a slower rate when compared to increasing rates in low-income developing countries, even though the most indebted economies in the world are also the richer ones. The tightening of financial conditions in many countries and the prospects of bringing debt down remains uncertain (Mbaye, Badia, 2019).

Public debt arises mainly from debt-financed deficits. More and more countries are resorting to additional public indebtedness to raise additional financial resources to meet government funding needs, which are unattainable by the usual tax means. As a result, increasingly, government spending is rising faster than revenue is received, and the excess is financed mainly through domestic and external borrowings. According to Sims (2012, 2013, 2014), persistent and growing fiscal deficit finance through government borrowings will eventually produce inflationary pressures, regardless of the policies followed by the Central Bank. Hence, debt-financed deficits will require effective coordination with the monetary authority to avoid high and unstable inflation rates that may be harmful to macroeconomic stability. Expensive borrowing
by governments (in an environment of increasing interest rate) may be harmful to inflation and macroeconomic stabilisation process. For instance, S. Wijnbergen and N. Budina (2001) showed the importance of public debt management in the inflation and macroeconomic stabilisation process in Poland. They used a simple framework in an environment of sparse data and structural change to establish links between inflation, fiscal deficits, and public debt. Effective public debt management together with a restrictive monetary policy has successfully removed obstacles to achieving a stable and sustainable inflation process in Poland (Wijnbergen, Budina, 2001). Public debt trends is raising concerns amongst policymakers as it undermines macroeconomic stability, especially in developing economies with relatively weak and dependent monetary authorities in the formulation and implementation of monetary policies. Hence, the link between public debt and inflation is worth exploring, considering its importance in the inflationary and macroeconomic stabilisation process in these economies.

The aim of this paper, therefore, is to provide an extensive review of previous scholarly studies on the link between public debt and inflation on both the theoretical and empirical fronts. The study aims to explore the argument of whether the relationship between public debt and inflation is positive or negative. The study is expected to contribute to the literature on public debt and inflation. The study will also provide policy recommendations on public debt in the inflationary process.

The rest of the paper is organised as follows: Section 2 of the paper presents a brief discussion of the theoretical links between public debt and inflation. Section 3 reviews the empirical literature on the impact of public debt on inflation, and section 4 concludes the paper.

1. **Theoretical link between public debt and inflation**

There are different views in the literature on the relationship between public debt and inflation. The most widely accepted school of thought on inflation is that it is a monetary phenomenon, and its control is mainly within the purview of monetary authorities. According to M. Friedman (1968), an expansionary monetary policy will increase both real output and general price level in the short-term, while in the long-term, only the price level will increase. The monetarist theory of price level determination is based on the argument that monetary authority has total control over prices. This is defined by an active monetary policy and a passive fiscal policy operating within a Ricardian framework (Erdogdu, 2002). There are two competing views on the interaction between monetary and fiscal policy and their effects on price stability. The classical view of Ricardian is that it is the demand for liquidity and its progress over time that
defines the path of prices. With such a rule, fiscal policy is passive, suggesting that government bonds are not net wealth, and monetary policy works through interest rates to determine prices. Hence, the Ricardian view assumes that price levels are mainly determined by money supply in the long-term (Attiya, Umaima, Abdul, 2008). The Ricardian equivalence, according to R.J. Barro (1974, 1989), argues that, based on the monetarist inflation view, government debt does not have a significant impact on the determination of price levels, suggesting that government bonds are not net wealth. R.J. Barro (1974, 1989) argues that household wealth is effectively reduced because of the existence of uncertainty with respect to individual future tax liabilities, which implies that the public debt issues may increase the overall risk contained in household balance sheets.

According to E.M. Leeper (1991), T. Davig and E.M. Leeper (2007, 2011) and A. Marzieh (2015), an active monetary policy with a passive fiscal policy would yield a Ricardian equilibrium, suggesting that debt management policy has no monetary significance. An active monetary policy and a passive fiscal policy with a fiscal policy that adjusts taxes sufficiently in response to government debt will produce the monetarist outcome that inflation is always a monetary phenomenon. O.S. Erdogdu (2002) shows that the relationship between the real value of government debt and price level can be a Ricardian or non-Ricardian policy, depending on the fulfilment of government budget constraints. It is Ricardian policy if government budget constraints are satisfied for all price levels, with an endogenous determination of monetary and fiscal policy variables. The Ricardian policy assumes that the Ricardian Equivalence Theorem holds. This means that fiscal policy does not create any wealth effects. For the non-Ricardian policy, intertemporal government budget constraint is an equilibrium condition not satisfied for all price levels. Before the price level is determined, the level of surplus is set, such that any threat to the solvency of budget constraint is met by market mechanisms moving the price level.

Contrary to the monetarist view that only monetary aggregates drive inflation, in a non-Ricardian environment with active monetary and fiscal policy, the price level is only a function of fiscal policy variables. According to non-Ricardian policy, an increase in the value of government bonds affects the households’ lifetime budget set, and fiscal disturbances affect the price level through the wealth effect on private consumption demand (Woodford, 1998; Erdogdu, 2002). The validity of Ricardian policies has been questioned in developing economies and, for most periods, in developed economies. As such, the anti-inflationary policies followed by the apex banks in these economies may not have been sufficient to guarantee price stability, requiring an appropriate mix of monetary and fiscal policies (Loyo, 1999; Christiano, Fitzgerald, 2000; Attiya et al., 2008).
One of the pioneering studies on government debt and the inflation process was by R.A. Musgrave (1949). The study opened up a debate on the relationship between public debt and inflation, and focused on the contribution of domestic debt policy to economic stability and, in particular, to checking inflation. R.A. Musgrave (1949) pointed out that if during some period, the private holders of government securities endeavoured to liquidate all or a major portion of their portfolios, and if fiscal authorities were the only buyers, the volume of bank credit would expand rapidly. Such an expansion would not, in all probability, have any direct connection with the legitimate needs of the economy, and thus generate extremely powerful inflationary pressures (Musgrave, 1949).

According to A. Nastansky and H.G. Strohe (2015), the relationship between public debt and inflation can either be direct or indirect. It is direct when the central bank buys public bonds. On the other hand, it is indirect when the demand for public bonds is by the private sector. It may also be indirect through the banking sector’s demand for public bonds, and through inflation expectation of the economic agents owing to high levels of public debt. As is shown in G. Kwon, L. McFarlane and W. Robinson (2006), the two main channels through which public debt affects inflation are monetisation and the wealth effect channel. The wealth effect of government debt is an additional channel of fiscal influence on inflation that is consistent with the predictions of a non-Ricardian policy. This means that the establishment of a significant relationship between public debt and inflation does not necessarily answer whether the link is from monetisation or the wealth effects of public debt. Hence, this study focuses on the studies which empirically examined the impact of public debt on inflation.

2. An empirical literature review of the impact of public debt on inflation

Contemporary empirical findings on the relationship between public debt and inflation are mixed for both developed and developing countries. The links between public debt and inflation have generally been studied for many countries by different authors using different estimation techniques. One of the most referenced pioneering empirical work on government debt and the inflationary process was the study by T.J. Sargent and N. Wallace (1981). After this study, other researchers such as E.M. Leeper (1991), C.A. Sims (1994, 1997), M. Woodford (1995, 1998), J. Cochrane (1999), R. Castro, C. Resende and F.J. Ruge-Murcia (2003), G. Kwon et al. (2006) and C.E. Walsh (2010) assessed from an empirical perspective how monetary and fiscal policies interacted in establishing links between public debt and inflation.
M. Wheeler (1999) investigated the macroeconomic impacts of government debt for the United States. The study used variance decompositions and impulse response functions derived from a vector autoregressive (VAR) model to analyse the United States government debt effects on interest rates, output and price levels during the 1980s and 1990s. The paper showed that an increase in government debt led to decreases in interest rates, output and price levels. Based on these findings, the study concluded that there was significant negative impact of government debt on inflation, suggesting non-existence of inflationary pressures.

M. Taghavi (2000) investigated the relationships between public debt, growth and inflation in Germany, Italy, France and the United Kingdom (large European economies) over the period of 1970 to 1997. The study used the vector auto regression (VAR) estimation technique. Even though these four countries exercised much greater control over deficit than over debt, the study showed that debt appeared to be inflationary in most cases in the long term with no clear pattern on inflation in the short term. The study also found with the pair-wise causality test that government debt Granger-caused inflation in three- and five-year lags in all of these countries. The paper, however, based on cumulative empirical findings, suggested that for these economies, public debt could have significant adverse effects on inflation.

N. Janssen, C. Nolan and R. Thomas (2002) investigated how monetary and fiscal policy affected the path of price levels in the United Kingdom over the period of 1702 to 1996. The study used the VAR estimation framework techniques across different sample periods, focusing on interactions between public debt, deficit, monetary base and price level. The study, in relation to government debt and price level relationship, found an insignificant relationship. The study further concluded that government debt appeared insignificant in explaining the inflationary process in the United Kingdom.

Castro et al. (2003) examined the interdependence between fiscal and monetary policies, and their joint role in the determination of the price level for the Organisation for Economic Co-operation and Development (OECD) countries over the period of 1948 to 1999. The study used the dynamic ordinary least square (DOLS) and VAR techniques. The paper found no evidence that government debt had a significant role in the determination of price levels. This finding suggested that government debt played an insignificant role in the determination of price levels in these countries. M. Bleaney (1996) also corroborated these findings for 15 OECD countries in another study that investigated the relationship between public debt and inflation in these countries in the period of 1973 to 1989. The study, which focused on debt denominated in domestic currency, used a correlation analysis technique and ordinary least square (OLS) estimation methods. The study found that by using a simple correlation analysis between the
ratio of nominal debt denominated in domestic currency to GDP and average inflation, for the period of 1973 to 1982, a positive mean correlation of 0.36, while for the period of 1983 to 1989, a negative correlation of −0.19 was revealed for these countries. The paper also found using the OLS estimation method for these countries over the sample period of 1973 to 1982 (high-inflation period) and 1983 to 1989 (low-inflation period) that increasing government debt levels were associated with less inflation. Based on these results, the author concluded that domestic currency debt did not show any significant impact on inflation for the OECD countries.

G. Kwon et al. (2006) provided comprehensive empirical evidence that supported the hypothesis that an increase in public debt was typically inflationary in countries with large public debt. The study used the VAR estimation technique on a sample of 71 countries for a maximum period of 1962 to 2004. The main findings of the paper were that an increase in public debt was typically inflationary in indebted developing countries, and weak in other developing countries that were not indebted. Compared to developed countries, this relationship did not hold in general. The paper further emphasised the role of fiscal policy in inflationary processes because money supply alone might not be sufficient to pin down the time path of inflation. Hence, the effectiveness of monetary policy in controlling inflation depended critically on its coordination with fiscal policy. Findings from this study also corroborated T.J. Sargent and N. Wallace’s (1981) “unpleasant monetarist arithmetic”.

M.U. Karakaplan (2009) empirically tested the hypothesis that external public debt was less inflationary in a well-developed financial market, and that the effects of the determinants of inflation were heterogeneous across countries. The study used an unbalanced panel data set and GMM estimation method on a sample of 121 countries, including both developed and developing countries over the period of 1960 to 2004. The study results showed that external public debt was less inflationary in economies with well-developed financial markets. The study further revealed that the effects of external public debt on inflation varied across countries.

C.M. Reinhart and K.S. Rogoff (2010) examined the systemic relationship between high public debt levels, growth and inflation in a sample of 20 advanced economies, namely, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom, and the United States as well as 24 emerging market countries that included Argentina, Bolivia, Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Korea, Malaysia, Mexico, Nigeria, Peru, the Philippines, South Africa, Thailand, Turkey, Uruguay and Venezuela over the period of 1946 to 2009. In the case of public debt and inflation relationship for the study, findings revealed that for advanced economies, there was no systemic relationship between high public debt levels and
inflation. On the other hand, results for emerging market economies showed that high public debt levels coincided with higher inflation episodes.

E. Faraglia, A. Marcit, R. Oikonomou and A. Scott (2012), using the dynamic stochastic general equilibrium (DSGE) model, assessed the implications for optimal inflation of changes on the level and maturity of government debt under the assumption where fiscal and monetary policies were coordinated, and, in the case of an independent central bank, followed Taylor’s rule. As a result, they found evidence that inflation depended on the sign, size and maturity of public debt. The main conclusion for the study was that higher public debt levels led to higher inflationary episodes, and longer maturity periods led to more persistent inflationary episodes.

M.J. Ahmad, M.R. Sheikh and K. Tariq (2012) assessed the impact of domestic debt on inflation in Pakistan for the period of 1972 to 2009 using the ordinary least squares estimation technique. The study found that domestic debt and domestic debt servicing had a positive and significant effect on general price levels. Domestic debt in Pakistan is largely dominated by treasury bills, which are short-term securities with high interest rates and the return on them enhances high aggregate demand and price levels. Based on these results, the study concluded positive and significant effects of domestic debt on inflation, and domestic debt service on inflation in Pakistan.

C.A. Sims (2014) followed up on public debt and inflation relationship. In this study, he explains that when a government wants to pay off debt without increasing taxes and printing money, a government then pays off the old debt by issuing new debt (Sims, 2014). However, the effect of simply rolling over debt is not default, but inflation. The paper concluded that persistent and growing borrowings by a government would eventually produce inflation regardless of policies followed by the monetary authorities.

J. Lopes da Veiga, A. Ferreira-Lopes and T. Sequeira (2016) analysed the relationship between the limits of public debt to GDP ratio, economic growth and inflation in a group of 52 African economies over the period of 1950 to 2012. The study found that the relationship between public debt and inflation depended on the level of indebtedness. High levels of public debt reflected a reduced rate of economic growth and increasing rates of inflation. The study further underlined the importance of different levels of public debt to GDP ratio (namely, <30%, 30–60% 60–90%, >90%) relationship with inflation. The higher this ratio, the higher the corresponding inflationary pressures.

T.A. Ngerebo (2014) examined the impact of domestic borrowings on inflation in Nigeria using the ordinary least square estimation method over the period of 1970 to 2010. The study found that total domestic debt stock had a positive and significant relationship with inflation
in the short-term, while in the long term, domestic debt stock and inflation had a negative and significant relationship. The study further showed that when total domestic debt stock was decomposed into total short-term debt stock and total long-term debt stock, the relationship with inflation was significantly positive and negative respectively. In another study by C.B. Ezirim, A.E. Amuzie and K. Mojekwu (2014), they also found for Nigeria evidence of a significant and positive short-term relationship between total public debt stock outstanding and inflation. On the other hand, the study confirmed a significant negative relationship between total public debt stock and inflation in the long-term for the country.

I. Bilan and A. Roman (2014) analysed specific interconnections established between public indebtedness and inflation both from the perspective of considering inflation as a result of public indebtedness through means of internal and external borrowing (in foreign currency), and of voluntarily promoting inflation to reduce the (real) value of public debt for 22 developing and developed countries over the period of 1990 to 2012. The analysis revealed, in some cases, that public indebtedness through means of public borrowing could lead to an increase in money supply and thus created favourable conditions for the manifestation of inflationary pressures. Results from the study pointed out the existence of possible inflationary effects of public indebtedness in some of the countries, especially, with developing countries. For instance, the assessments with regard to Romania revealed the contribution of public debt to the proliferation of inflation in the country.

A. Nastansky and H.G. Strohe (2015) examined the relationship between public debt and inflation in Germany. The study used the vector error correction model (VECM) estimation technique on quarterly data over the period of 1991 to 2014. The study found evidence of a significant positive relationship between public debt and consumer prices. The study further revealed that money supply, macroeconomic demand and inflation expectation also played a very important role in the relationship between public debt and inflation in Germany.

V.B. Nguyen (2015) assessed the relationship between public debt and inflation in a sample of 60 developing countries in Asia, Latin America and Africa over the period of 1990 to 2014. The study used the difference GMM estimation technique proposed by M. Arellano and S. Bond (1991) to examine this linkage. The study found, from the direction of public debt to inflation, that public debt had a significant positive effect on the inflationary process, while in the opposite direction; inflation had a significant negative effect on public debt. V.B. Nguyen's (2015) conclusion from this paper confirmed the inflationary episodes of public debt in these economies.
S.N. Essien, N.T.I. Agboegbulem, M.K. Mba and O.G. Onumonu (2016) investigated the impact of public sector borrowings on prices, interest rates and output in Nigeria over the period of 1970 to 2014. The study used the VAR framework estimation technique to test for a causal relationship among these variables. The paper found that the level of external and domestic debt did not significantly impact general price level and output. The study concluded on the non-inflationary effects of external and domestic debt in Nigeria for the study period.

J.P.B. Romero and K.L. Marin (2017) examined the relationship between public debt, economic growth, money supply growth and inflation in a sample of 52 net debtor countries over the period of 1961 to 2015. The study used VAR panel data estimation method, and found that for countries whose public debt was already high, that further increases in public debt were inflationary. The regression results also showed that an increase in the debt to GDP ratio was significant and strongly associated with high inflation in indebted developing countries. On the other hand, the findings also indicated that this relationship was not significant for developed countries.

A. Afonso and Y. Ibraimo (2018) examined the macroeconomic effects of public debt for the Mozambique economy using quarterly data over the period of 2000 to 2016. The study used the structural VAR estimation method for describing the dynamic behaviour of interaction between these variables. The paper considered public debt effects separately and in aggregate form, namely, external debt, domestic debt, external debt service, domestic debt service, total debt and total debt service. The main findings of the paper were that the study could not conclude for external and total debt having an inflationary tendency. On the other hand, the paper confirmed that domestic debt had a positive effect on price levels in the short term and recovery in the long term. The study also found that debt service variables (external, domestic and total debt service) had a positive effect on general price level, suggesting the existence of inflationary episodes (Afonso, Ibraimo, 2018). Table 1 provides a summary of some of the empirical studies reviewed in this study.
| Author(s) | Title | Region/Country | Variables | Methodology | Positive/Negative Association |
|-----------|-------|----------------|-----------|-------------|------------------------------|
| M. Bleaney (1996) | Inflation and public debt | 15 OECD countries | Consumer price index, Central bank independence, Political stability, Labour market index, Initial debt/GNP ratio, Political stability | Ordinary Least Square | Positive (1973–1982) Negative (1983–1989) |
| M. Wheeler (1999) | The macroeconomic impacts of government debt: An empirical analysis of the 1980s and 1990s | United States | Consumer price index, Privately-held gross federal debt, Real military expenditure, Money stock, Industrial production, Interest rate | Vector autoregressive model, Impulse response function, Variance decomposition | Negative |
| M. Taghavi (2000) | Debt, growth and inflation in large European economies: A vector auto regression analysis | France, Germany, Italy and the United Kingdom | Consumer price index, Real GDP growth, Real public debt-GDP ratio, Real fixed capital formation-GDP ratio | Hybrid cointegration analysis, Vector autoregressive models | Positive (long-term association) No clear short-term association |
| M.U. Karakaplan (2009) | The Conditional effects of external debt on inflation | 121 countries | Inflation rate, External debt, GDP growth, Money growth | Panel generalised method of moments (GMM) Arellano-Bond | Negative (in economies with well-developed financial markets) |
| C.M. Reinhart and K.S. Rogoff (2010) | Growth in a time of debt | 20 advanced economies 24 emerging market countries | Annual GDP growth, Gross external debt (public and private), Exchange rate, Inflation rate, Countries’ historical circumstance | Analysis of relevant statistical data | Negative (advance economies) Positive (emerging economies) |
| T.A. Ngerebo (2014) | Domestic debt burden, debt overhang and inflationary pressure in Nigeria | Nigeria | Total Domestic Debt Stock (short-term and long-term), Interest rate on Treasury Bills, Minimum rediscount rate, Inflation | Ordinary Least Square (OLS) | Positive |
| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| I. Bilan and A. Roman (2014) | Interconnections between public indebtedness and inflation in contemporary economies | 22 developed and developing countries | – Total Public debt, – External public debt, – Domestic public debt, – Inflation rate, – Money supply, – GDP | – Analysis of relevant statistical data | Positive |
| A. Nastansky and H.G. Strohe (2015) | A vector error correction model for the relationship between public debt and inflation in Germany | Germany | – Public debt, – Consumer price index, – Money supply (M3), – Long-term interest | – Vector Error Correction Model, – Generalised Impulse Response analysis, – Multivariate Beveridge-Nelson trend/cycle decomposition | Positive |
| V.B. Nguyen (2015) | The effects of public debt, inflation, and their interaction on economic growth in developing countries: empirical evidence based on the difference panel GMM | 60 developing countries (22 in Asia, 11 in Latin America and 27 in Africa) | – Real GDP, – Public debt (% of GDP), – Inflation rate, – Private investment (% of GDP), – Labour force, – Government revenue (% of GDP), – Infrastructure development, – Trade openness (% of GDP) | – Panel generalised method of moments (GMM) Arellano-Bond | Positive |
| S.N. Essien et al. (2016) | An empirical analysis of the macroeconomic impact of public debt in Nigeria | Nigeria | – Domestic debt stock, – External debt stock, – Real GDP, – Consumer price index, – Prime lending rate | – VAR framework, – Granger causality analysis, – Impulse response function, – Variance decomposition | Negative |
| A. Afonso and Y. Ibraimo (2018) | The macroeconomic effects of public debt: An empirical analysis of Mozambique | Mozambique | – Real GDP, – Consumer price index, – Prime lending rate, – 91-day TB rate, – Nominal exchange rate, – Domestic public debt, – External public debt, – Total public debt, – Domestic debt service, – External debt service, – Total debt service | – Vector Autoregression model, – Impulse response functions, – Variance decomposition | Positive |

Source: authors' compilation.
Concluding remarks

This study has reviewed both theoretical and empirical literature on the link between public debt and inflation using the literature on both developed and developing economies gathered from accredited journals based on the document review technique. The literature reviewed provided an understanding on this relationship for these variables from a country-specific and mixed-countries perspective. The outcome from the available literature reviewed on the link between public debt and inflation varies from country to country, with either a positive or negative relationship. However, in the majority, the link between public debt and inflation tilts towards a positive relationship. A positive relationship is more prominent in indebted countries with higher levels of public debt and a less-developed financial market. The reverse is the case for countries with high levels of public debt and a well-developed financial market. Although there is no consensus on the positive or negative relationship between public debt and inflation, based on the results of the study, the hypothesis that public debt and inflation have a positive relationship can be largely concluded for this study.

The policy implication of these results is that controlling inflationary pressures does not only depend on monetary policy but also on the effectiveness of public debt management, especially in developing countries that are ravaged by high levels of public debt, dominant fiscal regime and a weak financial market. Hence, public debt should be given due consideration by policymakers when making policy decisions on the control of inflationary pressures.

The study further provides opportunities for future studies. We plan to extend the research by investigating the impact of public debt on inflation, and the causal link between these variables using data from some selected developing countries through a robust estimation technique.

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