ECONOMIC RESEARCH - EKONOMSKA ISTRAŽIVANJA
2025, VOL. 38 NO. 2, (1 - 40)
https://doi.org/10.32728/er-ei.38.2.1

Faculty of Economics and Tourism "Dr. Mijo Mirković"

ARTICLE HISTORY
Received 01 June 2024
Accepted 17 July 2025

NET LENDING SHOCKS AND INFLATION IN SOUTH AFRICA: A SECTORAL ANALYSIS

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KEYWORDS:
Inflation Drivers, Net Lending Shocks, Monetary and Fiscal Policies

JEL CLASSIFICATIONS:
E31; E44; H62

ABSTRACT

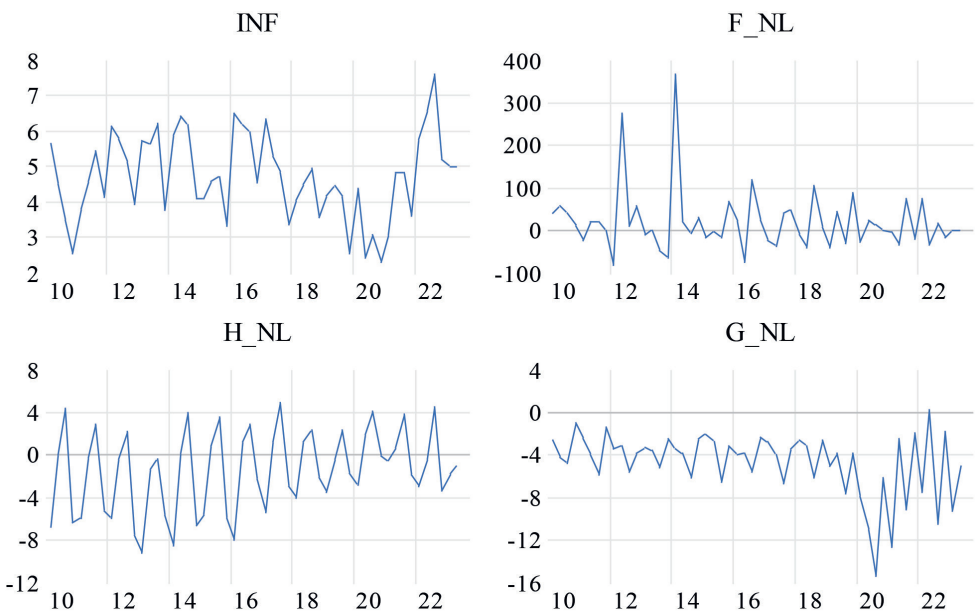
This study addresses the critical issue of identifying sectoral drivers of inflation in the South African economy, an area with limited empirical research. By examining net lending shocks from the financial, household, and government sectors over an extensive period from Q1 1960 to Q3 2022, the research aims to clarify the mechanisms underlying inflationary dynamics. Utilizing a Vector Error Correction (VEC) model, the findings indicate that net lending shocks from financial corporations have a mitigating effect on inflation, suggesting that increased lending in this sector can support price stability. In contrast, shocks from household and government sectors significantly contribute to inflationary pressures. This disparity highlights the complex interactions between different economic sectors and their distinct impacts on inflation. The results emphasize the need for a coordinated strategy that integrates both fiscal and monetary policies to effectively manage inflation in South Africa. By providing critical insights into how various sectors influence inflation, this study offers valuable insight for policymakers in designing targeted interventions. Overall, this research significantly enhances the understanding of sector-specific influences on inflation, contributing to more effective economic policy formulation in the context of South Africa's dynamic economic environment.

1. INTRODUCTION

In recent years, a growing body of literature has sought to explore the complex and evolving relationships between inflation, financial stability, and various financial indicators, reflecting the heightened importance of understanding these dynamics in a rapidly changing global economy. Gong and Qian (2022), Ehigiamusoe, Narayanan and Poon (2022), Abbate, Eickmeier and Prieto (2023) and Kaehler and Weber (2023) have made significant contributions to this discourse, particularly in their examinations of how monetary policies, financial shocks, and the characteristics of specific financial crises interact with inflation and financial stability. However, these studies, while informative, fall short of providing a unified conclusion on the direct relationship between financial debt and inflation, often focusing on intermediary factors and contextual variables that shape inflationary outcomes. This lack of consensus in the literature suggests the need for further refinement in understanding the mechanics of debt-inflation linkages. In a parallel strand of research, the interrelationships between household debt, monetary policy, and inflation have garnered attention. Studies by Turdaliev and Zhang (2019), Orchard (2020), Coibion, Gorodnichenko and Weber (2021) and Saha (2022) reveal that the effects of household debt on inflation are contingent upon a variety of factors, including economic policy responses and household behavior under different economic conditions. These findings underscore the complexity of household debt's influence on inflation, where policy measures and

the economic environment play pivotal roles. However, the variability in outcomes across different studies indicates that no definitive model has yet emerged to explain the precise mechanisms by which household debt contributes to inflationary pressures. Conversely, the relationship between government debt and inflation has been explored by several prominent scholars, including Ogrokhina and Rodriguez (2018), Bassetto and Galli (2019), Sunder-Plassmann (2020), Dumitrescu, Kagitci and Cepoi (2022), U Aimola and M Odhiambo (2022) and Enongene and Etape (2023). Despite their efforts, the literature remains inconclusive, with no clear estimation of the direct effect of government debt on inflation. This ambiguity persists even as government debt levels in many economies have reached unprecedented heights, particularly in the aftermath of the COVID-19 pandemic, which necessitated expansive fiscal interventions. The divergence in findings suggests that the interaction between government debt and inflation may be influenced by contextual factors such as fiscal policy stance, central bank credibility, and the structural characteristics of economies.

Figure 1. Economic variables. Sourced: SARB (2023). The economic variables are *INF* inflation rate, *F_NL* net lending rate from the financial corporation, *H_NL* net lending rate of household and *G_NL* net lending rate of government



In South Africa, the interaction between inflation and net lending rates across key sectors—namely financial corporations , households , and the government plays a crucial role in shaping the country's broader economic trajectory. These variables not only influence each sector's financial health but also contribute to systemic risks and opportunities for growth, particularly in a macroeconomic environment

characterized by rising inflationary pressures. Figure 1 illustrates the behavior of these variables over time, providing insight into the country's economic vulnerabilities and potential policy responses.

South Africa's inflation rate has been on an upward trajectory, frequently approaching or exceeding the upper limits of the South African Reserve Bank's (SARB) target range of 3% to 6%. This persistent inflationary pressure poses a considerable challenge to macroeconomic stability, as it erodes purchasing power, increases the cost of borrowing, and can lead to higher interest rates. Inflation's interaction with net lending rates complicates the financial outlook, particularly as inflation affects both the real value of assets and liabilities, influencing decisions by financial corporations, households, and the government alike. The net lending rate of financial corporations has exhibited slower growth and increasing volatility, suggesting instability within the financial sector. This volatility can be attributed to a range of factors, including fluctuating market conditions, regulatory changes, and shifts in investor sentiment. A highly volatile indicates that financial corporations are experiencing uncertain periods of credit extension and repayment, reflecting broader economic uncertainty. Such fluctuations in the financial sector's net lending could signal potential risks to financial stability, particularly if regulatory frameworks fail to adapt quickly to market changes. Additionally, the financial sector's ability to extend credit is crucial for economic growth, as it influences business investment, consumer spending, and overall liquidity in the economy. The erratic behavior of , therefore, raises concerns about the sector's capacity to support sustainable economic expansion.

Conversely, households' net lending rate has consistently remained in negative territory, indicating chronic overspending relative to income. This trend reflects a deeper issue within household financial management, where consumption consistently outpaces savings, leading to mounting levels of household debt. The negative suggests that households are increasingly dependent on borrowing to finance their expenditures, which poses a risk to long-term financial stability. Rising inflation exacerbates this issue, as higher prices reduce disposable income and increase the cost of servicing debt. Should inflation continue to rise, the burden on households could intensify, leading to higher default rates on loans and potentially sparking a broader financial crisis. Moreover, the growing debt burden of households limits their ability to contribute to economic growth through consumption, a critical driver of GDP in South Africa. The government's net lending rate follows a similarly concerning trend, with persistent deficits indicating that the government has increasingly relied on borrowing to finance its expenditures. This borrowing dependency reflects structural imbalances in South Africa's fiscal framework, where government revenues fail to keep pace with rising spending needs, particularly in areas such as social services, infrastructure development, and debt servicing. The continuous negative suggests that the government's fiscal health is deteriorating, raising questions about the sustainability of public debt in the medium to long term. Persistent fiscal deficits increase the cost of borrowing, as investors demand higher yields to compensate for

the perceived risk of lending to the government. Moreover, this trend may limit the government's ability to respond effectively to economic crises, as rising debt levels constrain its fiscal space the capacity to implement expansionary policies without jeopardizing debt sustainability.

In terms of broader economic implications, the interaction between inflation and net lending rates has the potential to create a feedback loop that exacerbates economic vulnerabilities. For instance, rising inflation increases the cost of borrowing for both households and the government, leading to higher debt levels and reduced spending capacity. In turn, higher debt levels may reduce confidence in the financial system, leading to more volatile lending patterns by financial corporations, as reflected in the fluctuating . If left unchecked, these dynamics could lead to a destabilizing cycle of rising inflation, reduced investment, and lower growth, further straining South Africa's already fragile economic situation. To mitigate these risks, South African policymakers must carefully evaluate both monetary and fiscal policies. On the monetary side, the SARB may need to tighten monetary policy by raising interest rates to curb inflation, although this comes at the cost of higher borrowing costs for households and the government. On the fiscal side, the government must address its structural deficits by improving revenue collection, prioritizing essential expenditures, and reducing reliance on borrowing. Additionally, targeted financial reforms could help stabilize the financial sector's lending behavior, reducing the volatility of and promoting more consistent credit extension to productive sectors of the economy.

1.1. Problem Statement

The direct relationship between financial debt particularly from the financial, household, and government sectors and inflation remains poorly understood, despite its critical importance in shaping macroeconomic stability. Existing literature has explored the intricate relationships among inflation, financial stability, and various financial indicators, yet there is no unified conclusion on the specific effects of financial debt on inflation dynamics. Ogrokhina and Rodriguez (2018), Bassetto and Galli (2019), U Aimola and M Odhiambo (2022) and Enongene and Etape (2023) have examined these interactions, but their findings tend to focus on intermediary factors like monetary policies and financial shocks rather than the direct impact of net lending from these sectors on inflation. Moreover, uncertainty persists regarding the short-run effects of household and government debt on inflation, particularly in the context of developing economies such as South Africa. This lack of clarity presents a significant gap in the literature that requires further investigation. Given the rising debt levels and inflationary pressures in South Africa, understanding how net lending shocks from these key sectors influence inflation is vital for both academic discourse and policy formulation.

1.2. Gap in the Literature

The gap identified in the literature centers on the lack of a clear and unified conclusion regarding the impact of financial debt especially from the financial, household, and government sectors on inflation. While scholars have provided valuable insights into the broader interactions between inflation and financial stability, there is a lack of consensus on how these sectors' debt directly influences inflationary pressures. This gap is particularly pronounced in the context of South Africa, where the economy faces rising debt levels and inflation, yet limited empirical studies exist to explain how shocks in net lending from these sectors affect inflation dynamics in the short run. Furthermore, existing research has not sufficiently explored the use of variance decomposition of net lending to provide insights into inflation determinants in the South African context. This presents a critical area of inquiry, as addressing this gap would contribute to a more comprehensive understanding of inflation and its driving forces.

1.3. Objectives and Significance of the Study

This study seeks to address this gap by investigating the effects of net lending shocks from the financial, household, and government sectors on inflation in South Africa. Specifically, the study aims to explore how short-run shocks in net lending from these sectors contribute to inflationary dynamics. Using variance decomposition, the study will identify the factors most responsible for inflation fluctuations, offering a nuanced perspective on inflation determinants in South Africa. By focusing on the South African economy, which faces both high levels of debt and inflationary pressures, this study will provide insights that are not only relevant for understanding inflation but also for informing effective macroeconomic management. The significance of the study lies in its potential to enhance the understanding of how debt from different economic sectors impacts inflation, which is critical for both academic research and policy formulation. By filling the gap in existing research, this study aims to provide a more detailed and sector-specific view of inflationary pressures, offering empirical evidence that can inform better debt management strategies in South Africa and similar developing economies. The study's focus on short-run dynamics is particularly important, as it provides timely insights into how immediate policy interventions may influence inflation in the near term.

1.4. Economic Implications for Policymakers

The findings of this study are expected to have significant economic implications for policymakers, particularly in the areas of debt management and inflation control. Understanding the dynamics between net lending from the financial, household, and government sectors and inflation will enable policymakers to design more targeted fiscal and monetary policies. For instance, if the study reveals that government debt has a stronger short-run impact on inflation, fiscal authorities might prioritize debt reduction and focus on policies that reduce government borrowing to contain inflationary pressures. Similarly, if household debt is shown to be a significant driver of inflation, monetary authorities could consider implementing tighter credit controls to curb excessive lending. Furthermore, the use of variance decomposition in this study will provide policymakers with a clearer understanding of which sectors contribute most to inflation volatility, allowing for more informed decision-making. For South Africa, where inflation and debt management are critical concerns, the results could guide efforts to balance debt accumulation with inflation control, ultimately leading to more sustainable macroeconomic outcomes. This study's findings could also be relevant to other developing economies facing similar challenges, providing a framework for understanding how different types of debt contribute to inflationary pressures and what policy responses are most effective in addressing them.

1.5. Summary of the finding

This study addresses a critical gap in the literature by empirically investigating the sectoral drivers of inflation within the South African economy, with a particular emphasis on the repercussions of net lending shocks emanating from financial, household, and government sectors over an extensive period spanning from Q1 1960 to Q3 2022. Given the escalating levels of debt and persistent inflationary pressures in South Africa, understanding the dynamics of these sectoral influences is essential for effective policy formulation. Employing a vector error correction (VEC) model for estimation, this research rigorously analyzes how shocks in net lending from these three sectors interact and affect inflation in the short run. The findings reveal that net lending shocks originating from financial corporations exert a mitigating effect on inflation, suggesting that increased credit availability from the financial sector can alleviate inflationary pressures by stimulating economic activity and investment. In contrast, shocks originating from household and government sectors significantly contribute to inflationary pressures, indicating that rising debt levels in these areas can exacerbate inflation by increasing consumption demand and fiscal spending without corresponding economic output.

These results underscore the necessity for a well-calibrated strategy that integrates both fiscal and monetary policies to achieve and sustain price stability in the

South African context. The complex and nuanced interactions between the different economic sectors and policy measures illustrate that a one-size-fits-all approach may not be sufficient for effective inflation management. Policymakers must consider the distinct roles that each sector plays in influencing inflation dynamics and tailor their interventions accordingly. Furthermore, this study contributes significantly to the understanding of sector-specific influences on inflation, offering valuable insights for policymakers tasked with navigating the intricate landscape of macroeconomic stability. By highlighting the differential impacts of net lending shocks from the financial, household, and government sectors, this research paves the way for targeted policy measures that can effectively address inflationary challenges in South Africa. Ultimately, the study emphasizes the importance of a comprehensive approach to inflation management, one that considers the interdependencies among sectors and the implications of their respective lending practices on overall price stability.

The rest of the study highlights the following. First, section 2 outlines the literature review. Secondly, section 3 discusses the methodology. Third, section 4 discusses descriptive statistics and empirical results. Finally, section 5 outlines the conclusions of the study.

2. LITERATURE REVIEW

Several empirical studies highlight the intricate relationships between inflation, monetary policy, and the banking sector across various periods and regions. Notable contributions to this field include the works of Van Dinh (2020), Galati, Kakes and Moessner (2021), Almansour et al. (2021) and Subramaniam and Masron (2022). Van Dinh (2020) reveals that, in the short term, inflation can stimulate economic growth through a loose monetary policy characterized by lower lending rates. This finding underscores the potential for inflationary environments to foster a more accommodative credit landscape, ultimately enhancing economic activity. Conversely, Galati, Kakes and Moessner (2021) uncover that financial institutions have responded to changing economic conditions by shifting towards long-term funding mechanisms. This strategic pivot is aimed at navigating regulatory constraints while safeguarding their lending operations, thereby maintaining stability within the banking sector despite external pressures. In contrast, Almansour et al. (2021) identify a strong negative relationship between the inflation rate and banks' performance. Their analysis indicates that inflation adversely affects the operational efficacy of banks, suggesting that elevated inflationary pressures may lead to deteriorating financial health within the banking sector. This interplay highlights the vulnerability of financial institutions to macroeconomic fluctuations. Furthermore, Subramaniam and Masron (2022) advocate that financial depth, when exceeding a certain threshold, can exacerbate inflationary levels. Their findings suggest that, particularly in the top ten countries studied, a higher degree of financial intermediation may be a contributing factor

to elevated inflation. This conclusion necessitates a critical examination of the role that financial development plays in influencing inflation dynamics, particularly in economies characterized by significant financial sector growth.

The intricate dynamics between inflation, monetary policy, and financial stability continue to be a focal point in empirical research, particularly in the works of Gong and Qian (2022), Ehigiamusoe, Narayanan and Poon (2022), Abbate, Eickmeier and Prieto (2023) and Kaehler and Weber (2023). Gong and Qian (2022) provide critical insights into inflation-targeting monetary policy frameworks, highlighting their non-negligible side effects on financial stability. Their analysis dissects various financial crises, revealing that the adverse impacts are especially pronounced in the context of banking crises, inflation crises, external debt crises, and stock market crashes. This underscores the inherent trade-offs involved in pursuing inflation-targeting policies, as they may inadvertently expose financial systems to heightened instability during periods of economic turbulence. Meanwhile, Ehigiamusoe, Narayanan and Poon (2022) find no significant evidence of a non-linear impact of inflation on financial development when assessing the overall panel. However, their country-specific estimations suggest that localized economic conditions can lead to a non-linear relationship between inflation and financial development. This disparity highlights the importance of contextual factors and indicates that generalized assumptions may obscure important variations in the inflation-financial development nexus. Further contributing to the discourse, Abbate, Eickmeier and Prieto (2023) demonstrate that contractionary financial shocks can temporarily elevate inflation levels. This finding is significant as it helps to clarify why inflation did not decline more sharply following the financial crisis. Their research indicates that financial shocks have a persistent influence on inflation, challenging conventional wisdom that anticipates a swift recovery in price stability after economic downturns. Kaehler and Weber (2023) reveal a noteworthy association between financial crises marked by elevated financial debt levels and increased inflation rates. Their findings suggest that high levels of financial leverage can exacerbate inflationary pressures, raising critical questions about the sustainability of such debt in relation to macroeconomic stability.

The insights provided by Gong and Qian (2022), Ehigiamusoe, Narayanan and Poon (2022), Abbate, Eickmeier and Prieto (2023) and Kaehler and Weber (2023) together underscore the need for a more nuanced understanding of these dynamics. Policymakers must recognize that inflation-targeting strategies carry inherent risks that could destabilize financial systems, particularly during periods of economic turbulence. Furthermore, the contextual factors influencing the relationship between inflation and financial development highlight the necessity for tailored approaches that consider the unique economic circumstances of individual countries. Ultimately, continued empirical research is essential to unravel these complexities and inform more effective monetary policy frameworks that promote both price stability and financial resilience.

Several studies have explored the intricate relationship between household debt dynamics and inflation, notably including the works of Meniago, Mukuddem-Petersen et al. (2013), (Meng, Hoang and Siriwardana 2013), Mutezo (2015), Svensson (2018), Alpanda and Zubairy (2019) and Hedlund (2019) among others. Meniago, Mukuddem-Petersen et al. (2013) highlight that increased household debt in South Africa is significantly influenced by positive changes in the consumer price index (CPI), gross domestic product (GDP), and household consumption. While these factors are critical to understanding household borrowing behaviors, the study notably omits a comprehensive analysis of inflation's specific impact on debt dynamics. This oversight creates a significant gap in our understanding of how inflation interacts with other economic variables to shape household financial decisions, particularly in a South African context characterized by unique socio-economic challenges. In contrast, the work of Meng, Hoang and Siriwardana (2013) heds light on the Australian landscape, revealing that household debt is positively influenced by housing prices, GDP, and population growth, while negatively impacted by interest rates, unemployment, new dwelling construction, and inflation. Their findings suggest a nuanced relationship between inflation and household debt, where rising prices may serve as both a driver and a constraint on borrowing. This duality indicates that while inflation can stimulate demand for housing and, by extension, increase household debt, it also imposes a burden on households through higher costs of living, thereby potentially limiting their borrowing capacity. Such insights emphasize the need for a more contextualized understanding of inflation's role, particularly in light of differing economic conditions across countries. Mutezo (2015) further expands the discussion by demonstrating that in South Africa, household debt is significantly linked to disposable income, net wealth, and inflation. This relationship suggests that rising inflation can lead to increased borrowing as households strive to maintain consumption levels amidst eroding purchasing power. However, Mutezo's findings that there is no direct relationship between household debt and lending rates raise critical questions about the factors driving household borrowing. This disconnect highlights a potential oversight in the literature, suggesting that the broader economic environment marked by factors such as credit availability, consumer confidence, and regulatory frameworks may exert a more substantial influence on household debt dynamics than interest rates alone. Svensson (2014) provides a critical perspective on the implications of household debt burden and associated risks, noting the minimal effects of policy rates on household indebtedness. The study's revelation that lower-than-expected inflation can exacerbate household debt burdens raises important considerations regarding inflation expectations and their role in shaping household financial decisions. This finding suggests that the effectiveness of monetary policy in managing household debt may be contingent upon a nuanced understanding of inflation dynamics and expectations, particularly in a low-inflation environment. Alpanda and Zubairy (2019) ontribute significantly to this discourse by positing that monetary policies may be less effective during periods of high household debt. Their observation that the inflation

response is initially muted but rises with a delay raises critical questions about the timing and efficacy of monetary interventions. This lagged response may indicate that high debt levels inhibit the immediate impact of policy measures, necessitating a re-evaluation of conventional monetary policy frameworks that do not adequately account for the complexities introduced by household debt. Hedlund (2019) rounds out this critical exploration by illustrating that temporarily raising the inflation target can yield modest or even counterproductive effects on household debt dynamics. This complexity is particularly evident during significant economic events, such as the Great Recession, when inflation can spur house prices and consumption while dramatically reducing foreclosure rates, especially in environments dominated by fixed-rate mortgages. This finding underscores the need for policymakers to carefully consider the potential unintended consequences of inflation-targeting strategies, particularly in the context of existing household debt levels and financial stability.

The multifaceted and often contradictory relationship between household debt and inflation, underscoring the necessity for a more nuanced and critical approach to understanding these dynamics. The varied findings across different contexts suggest that policymakers must adopt comprehensive strategies that account for the complex interplay of economic variables influencing household financial behavior. Additionally, further empirical research is essential to fill the existing gaps in the literature, particularly regarding inflation's specific role in shaping household debt dynamics in diverse economic environments. Only through rigorous examination of these relationships can we better equip policymakers to navigate the challenges posed by rising household debt and inflation, ultimately fostering greater economic resilience and stability.

Several studies have explored the intricate relationship between household debt dynamics and inflation, notably including the works of Meniago, Mukuddem-Petersen et al. (2013), Meng, Hoang and Siriwardana (2013), Mutezo (2015), Svensson (2014), Alpanda and Zubairy (2019) and Hedlund (2019) among others. Meniago, Mukuddem-Petersen et al. (2013) highlight that increased household debt in South Africa is significantly influenced by positive changes in the consumer price index (CPI), gross domestic product (GDP), and household consumption. While these factors are critical to understanding household borrowing behaviors, the study notably omits a comprehensive analysis of inflation's specific impact on debt dynamics. This oversight creates a significant gap in our understanding of how inflation interacts with other economic variables to shape household financial decisions, particularly in a South African context characterized by unique socio-economic challenges. In contrast, the work of Meng, Hoang and Siriwardana (2013) heds light on the Australian landscape, revealing that household debt is positively influenced by housing prices, GDP, and population growth, while negatively impacted by interest rates, unemployment, new dwelling construction, and inflation. Their findings suggest a nuanced relationship between inflation and household debt, where rising prices may serve as both a driver and a constraint on borrowing. This duality indicates that while inflation can stimulate

demand for housing and, by extension, increase household debt, it also imposes a burden on households through higher costs of living, thereby potentially limiting their borrowing capacity. Such insights emphasize the need for a more contextualized understanding of inflation's role, particularly in light of differing economic conditions across countries. Mutezo (2015) further expands the discussion by demonstrating that in South Africa, household debt is significantly linked to disposable income, net wealth, and inflation. This relationship suggests that rising inflation can lead to increased borrowing as households strive to maintain consumption levels amidst eroding purchasing power. However, Mutezo's findings that there is no direct relationship between household debt and lending rates raise critical questions about the factors driving household borrowing. This disconnect highlights a potential oversight in the literature, suggesting that the broader economic environment marked by factors such as credit availability, consumer confidence, and regulatory frameworks may exert a more substantial influence on household debt dynamics than interest rates alone. Svensson (2014) provides a critical perspective on the implications of household debt burden and associated risks, noting the minimal effects of policy rates on household indebtedness. The study's revelation that lower-than-expected inflation can exacerbate household debt burdens raises important considerations regarding inflation expectations and their role in shaping household financial decisions. This finding suggests that the effectiveness of monetary policy in managing household debt may be contingent upon a nuanced understanding of inflation dynamics and expectations, particularly in a low-inflation environment. Alpanda and Zubairy (2019) ontribute significantly to this discourse by positing that monetary policies may be less effective during periods of high household debt. Their observation that the inflation response is initially muted but rises with a delay raises critical questions about the timing and efficacy of monetary interventions. This lagged response may indicate that high debt levels inhibit the immediate impact of policy measures, necessitating a re-evaluation of conventional monetary policy frameworks that do not adequately account for the complexities introduced by household debt. Hedlund (2019) rounds out this critical exploration by illustrating that temporarily raising the inflation target can yield modest or even counterproductive effects on household debt dynamics. This complexity is particularly evident during significant economic events, such as the Great Recession, when inflation can spur house prices and consumption while dramatically reducing foreclosure rates, especially in environments dominated by fixed-rate mortgages. This finding underscores the need for policymakers to carefully consider the potential unintended consequences of inflation-targeting strategies, particularly in the context of existing household debt levels and financial stability.

Collectively, Meniago, Mukuddem-Petersen et al. (2013), Meng, Hoang and Siriwardana (2013), Mutezo (2015), Svensson (2014), Alpanda and Zubairy (2019) and Hedlund (2019) reveal a multifaceted and often contradictory relationship between household debt and inflation, emphasizing the necessity for a more nuanced and critical approach to understanding these dynamics. The varied findings across

different contexts suggest that policymakers must adopt comprehensive strategies that account for the complex interplay of economic variables influencing household financial behavior. Additionally, further empirical research is essential to fill the existing gaps in the literature, particularly regarding inflation's specific role in shaping household debt dynamics in diverse economic environments. Only through a rigorous examination of these relationships can we better equip policymakers to navigate the challenges posed by rising household debt and inflation, ultimately fostering greater economic resilience and stability.

The exploration of the intricate interplay between household debt, monetary policy, and inflation has been a focal point in recent economic research, with seminal contributions from Turdaliev and Zhang (2019), Orchard (2020), Coibion, Gorodnichenko and Weber (2021) and Saha (2022) among other notable scholars. Turdaliev and Zhang (2019) argue that monetary policy, when reactive to household debt levels, inadvertently increases inflation volatility while simultaneously diminishing borrowers' welfare. This finding underscores a fundamental tension within monetary policy: the challenge of balancing the need to manage inflation with the potential adverse effects on household financial health. The authors propose macroprudential policies, such as lowering the loan-to-value ratio limit, as a means to enhance borrower welfare. However, this approach invites a critical examination of the effectiveness and feasibility of such measures in different economic contexts, particularly in countries facing varying levels of household indebtedness and economic vulnerability. The study highlights a gap in understanding how these macroprudential measures can be effectively implemented and monitored to ensure their intended outcomes are achieved. Orchard (2020) utilizes an extensive dataset covering purchases from 40,000-60,000 households between 2004 and the post-2008 financial crisis to illustrate how increased inflation imposes additional costs on households. While this empirical analysis is commendable, it also raises questions about the generalizability of the findings beyond the specific temporal and geographical context of the study. The impact of inflation on household welfare may vary significantly across different economic climates and demographic groups, suggesting that further research is needed to capture these nuances. Coibion, Gorodnichenko and Weber (2021) contribute to the discourse by discovering that current levels of debt or deficit have minimal impact on inflation expectations. In contrast, they find that news regarding future debt significantly influences expectations of higher inflation, both in the short and long run. This finding is particularly critical, as it suggests that the perceptions of future fiscal policy can have immediate effects on economic behavior, potentially influencing spending and saving decisions among households. However, the authors do not delve deeply into the mechanisms through which such expectations are formed and propagated, leaving a gap in understanding the psychological and informational factors at play. Saha (2022) notes that inflation is a common phenomenon in both developed and developing countries, highlighting its widespread implications across diverse economic landscapes. While this observation is important, it necessitates a

more nuanced discussion regarding the distinct drivers of inflation in these different contexts. For instance, the structural characteristics of economies, including labor market dynamics, fiscal policies, and monetary frameworks, can significantly influence how inflation manifests and affects household debt levels. A more granular analysis of these variables would enhance the understanding of inflation's role in shaping household debt dynamics globally.

The intricate dynamics between monetary policy, government debt, and inflation in developing countries are discussed by Ogrokhina and Rodriguez (2018), Bassetto and Galli (2019), Sunder-Plassmann (2020), Dumitrescu, Kagitci and Cepoi (2022), U Aimola and M Odhiambo (2022) and Enongene and Etape (2023) among others. Ogrokhina and Rodriguez (2018) conduct a thorough analysis of the inflation-targeting experiences of developing countries, employing a difference-in-differences model to assess its effectiveness as a monetary policy tool. Their findings indicate that inflation targeting has resulted in a notable reduction of 3%–6% in foreign currency exposure, highlighting its potential for enhancing monetary stability. Moreover, they observe that inflation targeting has contributed to an increase in international debt among targeting countries compared to non-targeting countries. This raises critical questions regarding the trade-offs inherent in adopting such frameworks, particularly in the context of developing nations that may already grapple with high levels of external debt. Bassetto and Galli (2019) further contribute to the discourse by examining the post-2008 financial crisis landscape, where they establish that government debt influences price levels across countries. Their introduction of the "original sin" theory a phenomenon where countries borrow in foreign currencies adds another layer of complexity, suggesting that reliance on external financing can exacerbate inflationary pressures. This perspective underscores the vulnerabilities faced by developing countries, as fluctuations in exchange rates can significantly impact debt servicing costs and, consequently, inflation. Sunder-Plassmann (2020) offers valuable insights into the differential effects of nominal debt depending on its holder's location. The study finds that nominal debt held abroad tends to be inflationary, whereas debt held domestically lowers inflation. This nuanced view highlights the importance of understanding the structure of debt in shaping inflation dynamics, particularly in a globalized financial environment where capital mobility can influence domestic economic conditions. Dumitrescu, Kagitci and Cepoi (2022) provide evidence that public debt does not necessarily incur the welfare costs typically associated with higher inflation. Their findings suggest that, in certain contexts, public debt can coexist with moderate inflation without imposing additional burdens on the economy. However, they caution that in countries where the shadow economy exceeds 24.3% of GDP, the macroeconomic costs in terms of inflation are significantly greater. This observation emphasizes the need for policymakers to consider the informal sector's role when assessing inflationary pressures and crafting effective monetary policies. U Aimola and M Odhiambo (2022) highlights an asymmetric relationship between total public debt and inflation, indicating that this dynamic persists in both the short

and long run. Their findings challenge the assumption of a uniform relationship, suggesting that variations in economic conditions, debt composition, and external factors can lead to differing inflationary outcomes. This complexity necessitates a more granular approach to understanding how public debt influences inflation across diverse contexts. Enongene and Etape (2023) contribute to the conversation by examining the impact of external debt on inflation. Their results reveal that while the long-run effect of external debt stock on inflation is positive and significant, short-run dynamics exhibit a more complex interplay, with positive and negative external debt stocks respectively exerting negative and positive impacts on inflation. This duality underscores the importance of considering both short- and long-term perspectives when analyzing the relationship between external debt and inflation.

The direct relationship between financial debt particularly from the financial, household, and government sectors and inflation is critically important for macroeconomic stability yet remains poorly understood. Existing literature has explored the intricate relationships among inflation, financial stability, and various financial indicators; however, there is no consensus on the specific effects of financial debt on inflation dynamics. For instance, studies by Ogrokhina and Rodriguez (2018), Bassetto and Galli (2019), U Aimola and M Odhiambo (2022), and Enongene and Etape (2023) have examined these interactions, but their findings primarily focus on intermediary factors such as monetary policies and financial shocks rather than on the direct impact of net lending from these sectors on inflation. Moreover, uncertainty persists regarding the short-run effects of household and government debt on inflation, particularly in developing economies like South Africa. This lack of clarity presents a significant gap in the literature that requires further investigation. The existing research does not adequately analyze the direct effects of financial debt on inflation dynamics, which limits understanding of how net lending from various sectors influences inflation rates. Additionally, the uncertainty surrounding the short-run effects of household and government debt calls for more contextual analysis, especially given the rising debt levels and inflationary pressures in South Africa. Addressing these gaps is vital for informing effective economic policies and advancing academic discourse in this area.

3. METHODOLOGY

The study uses the time series data from the South African Reserve Bank (SARB) spanning from Q1 1960 to Q3 2022, Table 1 presents a comprehensive overview of key economic variables that are essential for understanding the economic landscape of South Africa. The inflation rate serves as a primary indicator of price stability, reflecting the average change in prices of goods and services over time. It is crucial to monitor this metric as it impacts purchasing power and can influence monetary policy decisions. High inflation can erode consumer confidence and savings, while low inflation may

signal weak demand and economic stagnation. Understanding the trends in inflation allows policymakers to implement appropriate measures to stabilize the economy. The influence of the money supply on inflation is a critical area of analysis. An increase in the money supply can lead to higher inflation if it outpaces economic growth, as more money chases the same amount of goods and services. Conversely, a restrained money supply may help contain inflation but could also stifle economic growth. Examining the dynamics of the money supply in relation to inflation provides valuable insights into monetary policy effectiveness and its role in maintaining price stability. Money velocity, defined as the rate at which money is exchanged in the economy, offers essential insights into the relationship between economic activity and inflation. A higher velocity indicates that money is circulating more quickly, often associated with robust economic activity and spending, which can contribute to inflationary pressures. Conversely, a decline in velocity may signal reduced economic activity, potentially leading to deflationary conditions. Understanding changes in money velocity is crucial for analyzing the broader economic environment and forecasting inflation trends. The GDP growth rate is a fundamental indicator of economic health, measuring the rate at which a country's economy is expanding or contracting. A positive growth rate generally reflects increased production and consumption, often correlating with rising inflation as demand for goods and services outstrips supply. Conversely, negative growth can indicate economic recessions, where falling demand may lead to lower inflation or deflation. Analyzing the GDP growth rate in conjunction with inflation provides a nuanced understanding of the economic cycle and the effectiveness of fiscal and monetary policies.

Table 1. Economic variables used

Variable	Description	Sourced
INF	Inflation rate from CPI	SARB (2023)
M	Money supply m3 rate	SARB (2023)
V	Velocity of the circulation of money	SARB (2023)
Y	Gross domestic product growth rate	SARB (2023)
F_NL	Net lending rate from a financial corporation	SARB (2023)
H_NL	Net lending rate of households	SARB (2023)
G_NL	Net lending rate of government.	SARB (2023)

Source: The table is the author's computation

The net lending rates used are for the financial corporations' net lending which reflect the lending behavior of financial corporations and their role in influencing inflation. A higher net lending rate may indicate that financial institutions are willing to lend more, potentially stimulating economic activity and contributing to inflationary pressures as consumers and businesses increase spending. Conversely, a

lower lending rate could reflect tighter credit conditions, which may dampen inflation by restricting access to financing. The household net lending rate reflect the household net lending rate reveals consumer borrowing and saving behaviors, highlighting their potential impact on inflation dynamics. A higher household net lending rate indicates increased borrowing, which can boost consumption and, consequently, demand-driven inflation. Conversely, if households are saving more and borrowing less, it may lead to reduced consumption and slower inflation. Understanding the trends in household lending provides insights into consumer confidence and economic sentiment. On the other hand, government net lending rate reflects the fiscal stance of the government, influencing inflation dynamics through its spending and borrowing activities. An expansionary fiscal policy, characterized by increased government borrowing and spending, can lead to higher inflation as it injects more money into the economy. Conversely, a contractionary fiscal stance may help to control inflation but could also limit economic growth. Monitoring the government net lending rate is essential for understanding how fiscal policies interact with inflationary pressures.

The Vector Error Correction (VEC) model is particularly suitable for this study due to its capacity to effectively analyze the dynamic interactions among multiple economic variables over both the short and long run. Given the intricate relationships between inflation, net lending shocks, and economic output across different sectors in South Africa, the VEC model provides a robust framework for capturing these complexities. Unlike traditional Ordinary Least Squares (OLS) regression, which may overlook long-term equilibrium relationships, the VEC model is adept at identifying co-integration among variables, allowing for a more nuanced understanding of how shocks in financial, household, and government lending influence inflation rates. This capability is essential in the context of South Africa's economic landscape, where various sectors are interdependent, and shocks can have ripple effects across the economy.

Moreover, the VEC model's foundation in the unrestricted Vector Autoregressive (VAR) framework enables it to incorporate both endogenous and exogenous variables, thus accommodating the diverse influences at play in the South African economy. This flexibility is critical, as it allows the model to reflect the simultaneous interactions between inflation and net lending shocks, which are often subject to shifts in macroeconomic conditions. By employing the VEC model, the study can accurately estimate the short-run dynamics and long-run relationships between these variables, thereby providing insights that are not only theoretically sound but also empirically relevant for policymakers. This characteristic is particularly important in developing economies like South Africa, where understanding the interplay of various economic forces can lead to more effective policy interventions.

Lastly, the ability of the VEC model to handle non-stationary time series data further underscores its appropriateness for this analysis. In the context of South Africa, where inflationary pressures and lending behaviors have demonstrated significant volatility, the VEC model offers a comprehensive approach to understanding these

phenomena. This is especially pertinent given the historical fluctuations in inflation rates and the evolving nature of lending practices in response to both domestic and global economic conditions. By addressing the endogeneity and ensuring the stability of relationships over time, the VEC model serves as a vital analytical tool, enabling the study to contribute meaningfully to the existing literature on inflation dynamics and lending behavior in emerging markets. In summary, the VEC model's strengths in capturing both the short- and long-term relationships among economic variables make it an ideal choice for this research, ultimately enhancing the study's relevance and impact.

3.1. Theoretical formwork

The theoretical framework used is the quantity theory of money (QTM) reflected in Equation 1.

$$M_t V_t = P_t Y_t \tag{1}$$

where is the money supply, is the velocity of money, is the initial price level, is the real output and is the subscript for time. The theoretical framework in Equation 1 is extended by starting to define the inflation rate as the percentage change in the price level over a specific period, as reflected in Equation 2.

$$\pi_t = \left[\frac{(P_t - P_{t-1})}{P_{t-1}}\right], \tag{2}$$

In Equation 2 represents the price level at the end of the period, and represents the initial price level. Then, we rearrange the QTM in Equation 1 to isolate P as reflected in Equation 3.

$$P_t = \frac{M_t V_t}{Y_t} \tag{3}$$

We then substitute this expression for in Equation 3 into Equation 2 to obtain QTM in the inflation framework, as reflected in Equation 4.

$$\pi_t = \left[\frac{\left(\frac{M_t V_t}{Y_t - P_{t-1}}\right)}{P_{t-1}}\right] * 100 \tag{4}$$

To estimate Equation 4, it is linearized in Equation 5.

$$\pi_t = \beta_0 + \beta_1 M_t + \beta_2 V_t + \beta_3 Y_t + \varepsilon_t \tag{5}$$

Equation 5 then includes the economic variables of interest in the study, as reflected in Equation 6.

$$INF = \pi_t = \beta_0 + \beta_1 M_t + \beta_2 V_t + \beta_3 Y_t + Z \begin{cases} \beta_4 F\_NL_t \\ \beta_5 H\_NL_t \\ \beta_6 G\_NL_t \end{cases} + \varepsilon_t \quad (6)$$

Where is the net lending rate from the financial corporation is the net lending rate of households and is the net lending rate of the government.

3.2. Model specification of VEC

The VEC model is built in from the unrestricted vector autoregressive (VAR), as shown in Equation 7.

$$y_t = \beta_0 + \sum_{j=1}^{p} \beta_j X_{t-1} + e_t \quad (7)$$

where is an vector of endogenous variables, is a d vector of exogenous variables , is an vector of constants, is the number of lags, is an matrix of estimable parameters, and is an vector of independent and identically distributed error terms. The VEC model can handle co-integrated and different economic variables. Therefore, the VAR model is rewritten as the VEC model, as shown in Equation 8.

$$\Delta y_t = \beta_0 + \sum_{j=1}^{p} \Gamma_j \Delta X_{t-1} + \sum_{j=1}^{p} \Pi_j X_{t-1} + \gamma_j Ec + e_t \quad (8)$$

where is the difference operator, and the VECM specification contains information on both the short-run and long-run adjustments to changes in via the estimated parameters and , respectively. Equation 5 from the theoretical framework is mirrored in Equation 9.

$$INF_t = \beta_0 + \sum_{j=1}^{p} \Gamma_j \Delta \begin{cases} \beta_1 M_t \\ \beta_2 V_t \\ \beta_3 Y_t \\ \beta_4 \begin{cases} F\_NL_t \\ H\_NL_t \\ G\_NL_t \end{cases} \end{cases} + \sum_{j=1}^{p} \Pi_j \begin{cases} \beta_1 M_t \\ \beta_2 V_t \\ \beta_3 Y_t \\ \beta_4 \begin{cases} F\_NL_t \\ H\_NL_t \\ G\_NL_t \end{cases} \end{cases} + \gamma_j Ec + e_t \quad (9)$$

4. RESULTS

Table 2 presents the descriptive statistics. The inflation rate at 4.727% surpasses South Africa's 3%–6% target range. Money supply and velocity average 6.947% and 6.294%, respectively. High velocity can spur inflation if it outpaces real economic growth. Increased money supply without a corresponding rise in production can also drive inflation. GDP growth, averaging 1.755%, falls short of the 5% target in the National Development Plan of 2013. Financial corporations lend more than they borrow, with a 19.979% average net lending rate. However, households borrow more than they save, reflected in an average -1.43% net lending rate. The government runs a budget deficit, averaging -4.713%, where spending surpasses revenue collection.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
INF	54	4.727	1.207	2.32	7.63
M	54	6.947	1.936	.99	10.42
V	54	6.294	0.513	4.88	7.19
Y	54	1.755	3.422	-17.07	16.46
F_NL	54	19.979	73.97	-80.38	368.49
H_NL	54	-1.43	3.831	-9.2	4.9
G_NL	54	-4.713	3.001	-15.4	0.3

Source: The table is the author's computation.

Table 3 presents the correlation of the economic variables examined in this study. The money supply rate and the velocity of circulation of money show correlation values of 0.067 and 0.130, respectively, with the inflation rate. This indicates that an increase in both the money supply rate and the velocity of money circulation corresponds to an increase in the inflation rate.

Table 3. Matrix of correlations

Variables	*INF*	*M*	*V*	*Y*	*F_NL*	*H_NL*	*G_NL*
INF	1.000						
M	0.067	1.000					
V	0.130	-0.070	1.000				
Y	0.092	0.293	0.139	1.000			
F_NL	0.061	-0.075	0.129	-0.027	1.000		
H_NL	0.064	0.059	-0.253	0.000	-0.069	1.000	
G_NL	0.102	-0.051	0.467	-0.049	-0.037	-0.530	1.000

Source: The table is the author's computation.

The GDP growth rate correlates positively with the inflation rate correlation of 0.092, indicating a modest relationship. Additionally, net lending rates from financial corporations, households, and the government show correlations of 0.061, 0.064, and 0.102, respectively, with inflation, suggesting a modest association between increased net lending rates and higher inflation. Table 4 displays the lag-order selection criteria AIC, HQIC, and SBIC, with a consensus pointing to an optimal lag order of 2 for the model estimation. This agreement supports the choice of a lag order of 2 as the most suitable for the analysis.

Table 4. Lag-order selection criteria

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
1	-729.688	288.870	49	0.000	107128	31.427	32.243	33.569
2	-639.158	181.060	49	0.000	2278.80	29.766*	31.2954*	33.782*
3	-574.870	128.580	49	0.000	16998.5*	29.155	31.397	35.044
4	-515.726	118.29*	49	0.000	22888	28.749	31.705	36.512

Selection-order criteria. Sample: 2011q1 - 2023q2. A number of obs = 50.
Endogenous: *INF M V Y F_NL H_NL G_NL*. Exogenous: _cons

Source: The table is the author's computation.

Table 5 Johansen co-integration tests reject the null hypothesis for the zero co-integrating equations at a significance level of 0.05. This compelling evidence supports a long-run relationship among the variables, justifying the use of the VEC model for estimation because the identified co-integration indicates a stable and enduring relationship.

Table 5. Johansen tests for co-integration

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	56	-797.8	0.00	256.3234	124.24
1	69	-739.437	0.89404	139.5972	94.15
2	80	-711.812	0.65441	84.3476	68.52
3	89	-691.84	0.53614	44.4024*	47.21

Source: The table is the author's computation.

Table 6 shows the vector error correction short run. Estimation 1 shows the net lending rate from the financial corporation lag 2 has a negative coefficient of 0.002 and is significant at alpha 1%. Specifically, a 1% increase in the net lending rate from financial corporations is associated with a 0.002% decrease in the inflation rate. These results are similar Van Dinh (2020), Gong and Qian (2022) and Ehigiamusoe, Narayanan and Poon (2022) among others. Negative coefficients imply higher interest

rates might reduce inflation, reflecting conventional wisdom. However, elevated rates can curb economic activity by increasing borrowing costs for businesses and consumers, potentially slowing growth.

Table 6. Short-run results of VEC

Estimation 1		**Estimation 2**		**Estimation 3**	
Variables	*INF*	Variables	*INF*	Variables	*INF*
Ec	-0.147	Ec	-0.466	Ec	-0.414
	(0.09712)		(0.12481)		(0.17288)
INF_{t-1}	-0.344	INF_{t-1}	-0.218	INF_{t-1}	-0.142
	(0.16369)		(0.14400)		(0.15431)
INF_{t-2}	-0.126	INF_{t-2}	0.275	INF_{t-2}	0.105
	(0.16548)		(0.12848)		(0.14387)
M_{t-1}	-0.083	M_{t-1}	0.008	M_{t-1}	-0.135
	(0.11993)		(0.07596)		(0.08923)
M_{t-2}	-0.069	M_{t-2}	-0.053	M_{t-2}	-0.121
	(0.11978)		(0.07603)		(0.09275)
V_{t-1}	1.302	V_{t-1}	1.091	V_{t-1}	-1.415
	(1.74251)		(1.14970)		(1.38680)
V_{t-2}	-0.121	V_{t-2}	1.438	V_{t-2}	-1.259
	(2.07021)		(1.30694)		(1.49851)
Y_{t-1}	-0.097	Y_{t-1}	0.021	Y_{t-1}	-0.130
	(0.12781)		(0.08177)		(0.11412)
Y_{t-2}	-0.042**	Y_{t-2}	-0.035**	Y_{t-2}	-0.058***
	(0.05112)		(0.03224)		(0.03865)
F_NL_{t-1}	-0.005**	H_NL_{t-1}	0.081	G_NL_{t-1}	0.073
	(0.00421)		(0.06634)		(0.12174)
F_NL_{t-2}	-0.002***	H_NL_{t-2}	0.030*	G_NL_{t-2}	0.128**
	(0.00275)		(0.05532)		(0.08680)
C	0.073	C	0.108	C	-0.007
	(0.18624)		(0.12072)		(0.14007)
N	248	N	248	N	248

Note: *t* statistics in parentheses, values that are in ( )Z values and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: The table is the author's computation.

Table 6 shows that estimation 2 shows the net lending rate of household lag 2 has a positive efficiency of 0.030 and is significant at alpha 5%. This indicates that a 1% increase in the net lending rate of household results in a 0.030% increase in the inflation rate. The results suggest that higher net lending rates of households, indicating increased borrowing or spending, may contribute to higher inflation. The results are similar to those of (Meng, Hoang and Siriwardana 2013) and Mutezo (2015) among others. On the other, these results suggest that consumer spending patterns have a positive impact on overall price levels. Therefore, policymakers should closely monitor trends in consumer credit and household borrowing to assess potential inflationary pressures. Interventions may be necessary if household borrowing patterns pose risks to price stability. Table 6, estimation 3 shows the net lending rate of government lag 2 has a positive coefficient of 0.128 and is significant at alpha 1%. This indicates that a 1% increase in the net lending rate of the government results in a 0.128% increase in the inflation rate. The results suggest that an expansionary fiscal policy, as reflected in higher government net lending rates, may lead to an increase in inflation. This result is similar to that of Ogrokhina and Rodriguez (2018), Sunder-Plassmann (2020) and Enongene and Etape (2023) among others. Given the results, policymakers should carefully calibrate fiscal policies, considering their potential impact on inflation. Balancing the need for economic stimulus to maintain price stability is crucial.

Table 7. Serial correlation

Null hypothesis: No serial correlation at lag h						
Lag	**LRE* stat**	**Df**	**Prob.**	**Rao F-stat**	**df**	**Prob.**
1	41.64437	49	0.7629	0.823561	(49, 116.1)	0.7762
2	34.03125	49	0.9486	0.654097	(49, 116.1)	0.9525

Source: The table is the author's computation.

Table 7 shows the serial correlation. Using lag, the probability that the results are more than 0.05, we reflect the three-serial correlation in the model estimation.

Table 8. Skewness and distribution

Variables	Skewness	Chi-sq	df	Prob.*	Kurtosis	Prob.	Jarque-Bera	Prob.
INF	-0.181575	0.280240	1	0.5965	3.045072	0.9476	0.284556	0.8674
M	-1.722196	25.21066	1	0.0000	7.765050	0.0000	73.46028	0.0000
V	-1.406421	16.81317	1	0.0000	8.616419	0.0000	83.84452	0.0000
Y	-0.252355	0.541305	1	0.4619	2.932747	0.9219	0.550916	0.7592
F_NL	-0.143362	0.174698	1	0.6760	2.998839	0.9986	0.174701	0.9164
H_NL	-0.039109	0.013001	1	0.9092	2.376313	0.3633	0.839596	0.6572
G_NF	1.065598	9.651737	1	0.0019	4.990422	0.0037	18.07052	0.0001

Source: The table is the author's computation.

Table 8 shows the skewness and distribution of the question estimations and the economic variables considered in this study. Most variables, including , exhibit slightly negative skewness, suggesting a mild leftward skew. Kurtosis measures the peak or flatness of a distribution. Positive kurtosis, as seen in , and , indicates heavier tails and a more peaked distribution compared with a normal distribution. The chi-square test assesses the goodness of fit between the observed and expected distributions. Variables in , and , show significant chi-square values above 0.05, indicating a departure from the expected distribution. The Jarque-Bera test combines skewness and kurtosis to test for normality. High Jarque-Bera values and associated low probabilities $p > 0.05$ for in , and , suggest non-normality. Using the chi-square test highlights an overall departure from the expected distribution across variables with $p > 0.05$. This underscores the collective influence of variables on overall distributional characteristics.

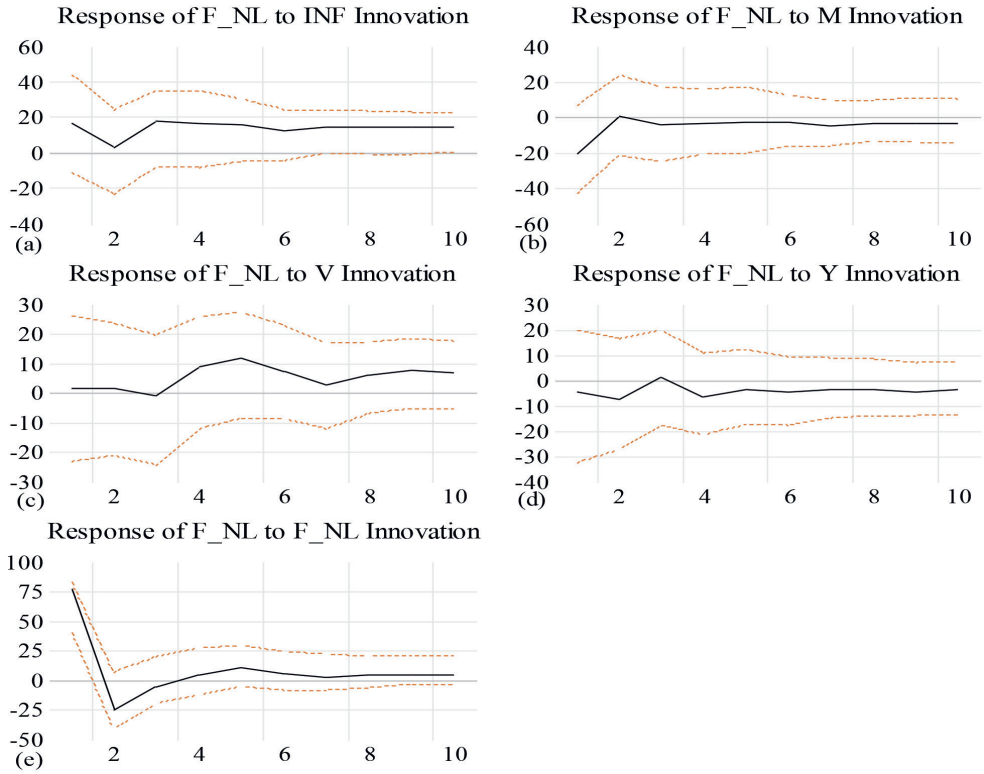
Table 9. Residual Heteroskedasticity

VEC Residual Heteroskedasticity Tests (Levels and Squares)		
Joint test		
Chi-sq	df	Prob.
821.5530	840	0.6690

Source: The figure is the author's computation.

Table 9 shows the residual Heteroskedasticity. This result does not provide sufficient evidence to reject the null hypothesis of homoscedasticity, as indicated by the relatively high p-value of 0.6690. This suggests that there is no significant departure from homoskedasticity in the VEC model's residuals when considering both levels and squares.

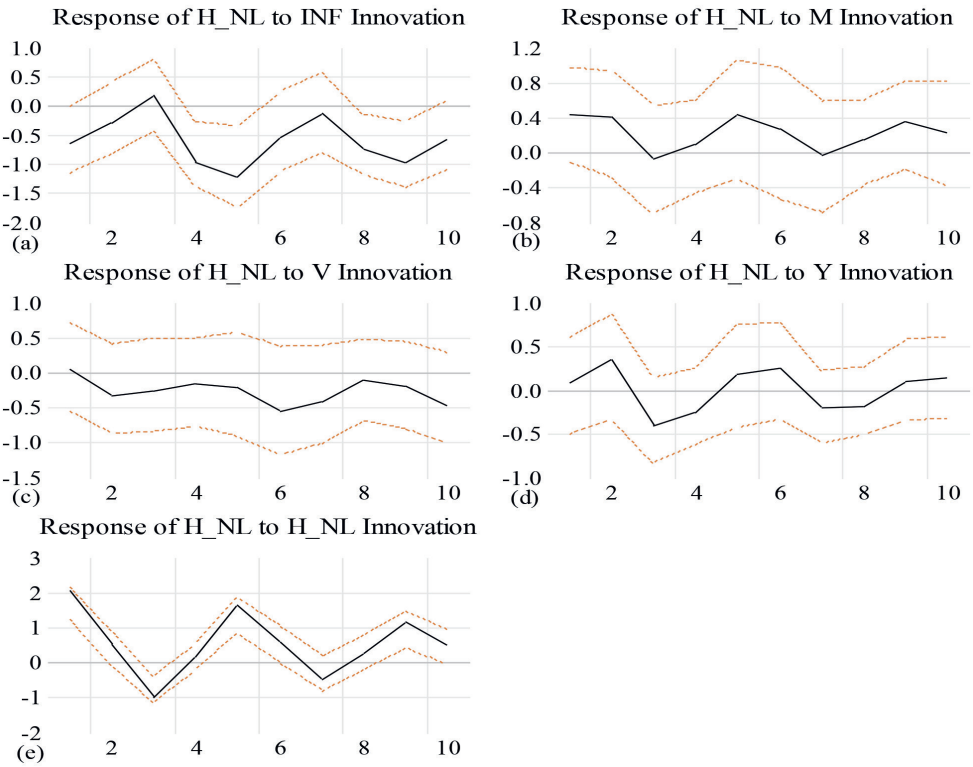
Figure 2. The shock of *F_NL* on economic variables



Source: The figure is the author's computation. Response to Cholesky One S.D. (d.f. adjusted) Innovations 95% CI using Hall's studentized bootstrap with 999 bootstrap repetitions and 499 double bootstrap reps

Figure 2 shows the shock of on economic variables. In Figure 2, diagram (a), it is found that net lending rate from financial corporation shocks results in a decrease in the inflation rate in the first two quarters. The observed decrease in inflation indicates that the central bank's decision to increase lending rates has been effective in reducing inflationary pressures. Other scholars have found the same result as Van Dinh (2020) and Gong and Qian (2022) among others. However, the net lending rate from the financial corporation shock started to increase inflation and operate above the equilibrium reflecting the persistence of inflationary pressure. In graph (e), the net lending rate from the financial corporation shock on itself is found to result in the reduction in the net lending rate from the financial corporation.

Figure 3. The shock of *H_NL* on economic variables

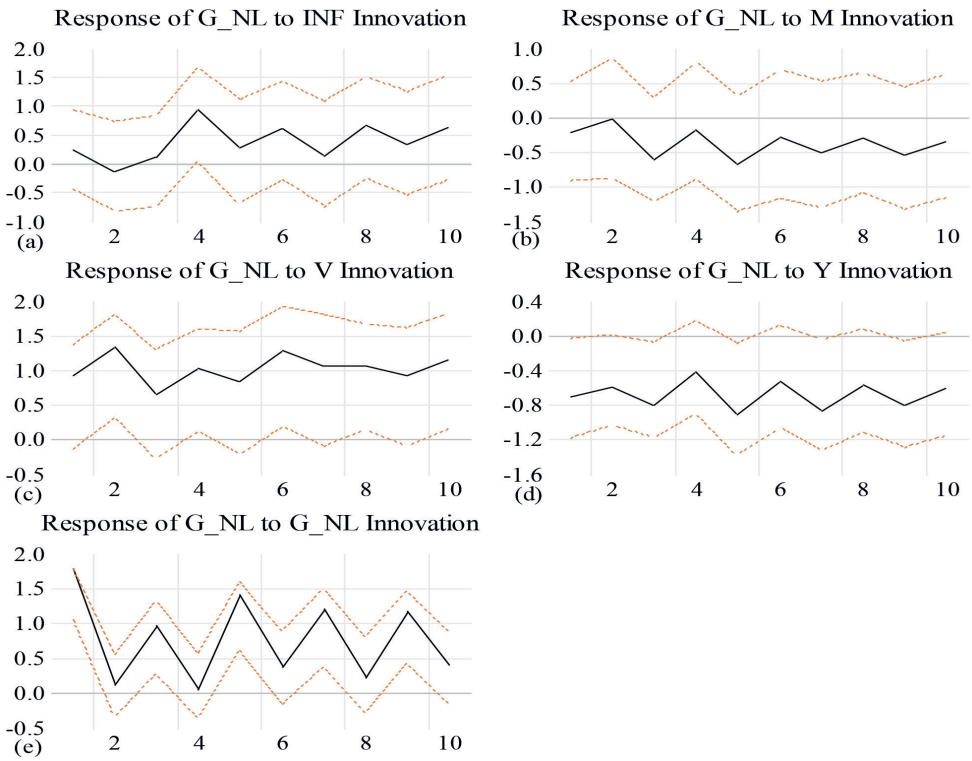


Source: The table is the author's computation. Response to Cholesky One S.D. (d.f. adjusted) Innovations 95% CI using Hall's studentized bootstrap with 999 bootstrap repetitions and 499 double bootstrap reps

Figure 3 illustrates the impact of shocks on the net lending rate of households. In Figure 3, specifically in diagram (a)[1], it is observed that shocks in the net lending rate of households lead to an increase in the inflation rate during the first three quarters. This result is similar to that of (Meng, Hoang and Siriwardana 2013) and Alpanda and Zubairy (2019). Subsequently, inflation begins to decline until it reaches its lowest level in the fifth quarter, with a reduction of 1.3%. The decline in inflation indicates that the initial impact is not sustained, and the economy experiences deflationary pressures. This may be linked to factors such as reduced consumer spending, changes in lending practices, or other economic adjustments. The inflation rate operates below equilibrium, indicating a cyclical movement with the shock-induced dynamics.

1 Shocks in the net lending rate of households may lead to changes in consumer behavior, affecting spending patterns. The initial increase in inflation could be driven by a surge in consumer demand, whereas the subsequent decline may reflect adjustments in spending habits.

Figure 4. The shock of *G_NL* on economic variables

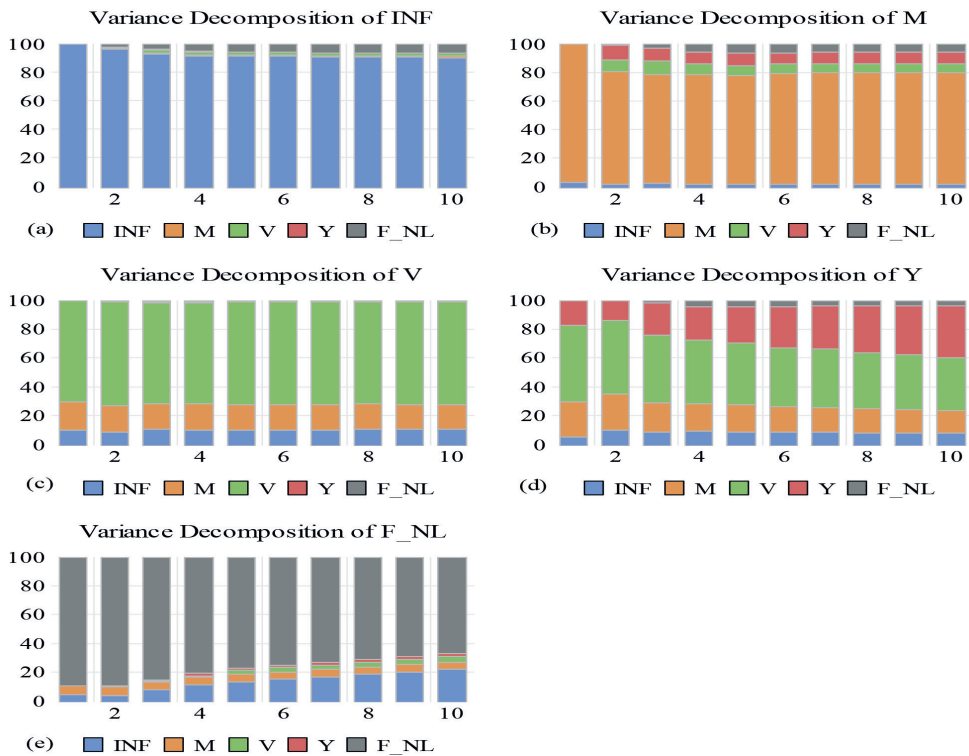


Source: The figure is the author's computation. Response to Cholesky One S.D. (d.f. adjusted) Innovations 95% CI using Hall's studentized bootstrap with 999 bootstrap repetitions and 499 double bootstrap reps

Figure 4 depicts the impact of shocks in the net lending rate of the government on economic variables. In Figure 4, specifically in diagram (a), it is observed that shocks in the net lending rate of the government led to a decrease in the inflation rate during the first two quarters. The subsequent increase in inflation indicates that the economy rebounds from the initial deflationary impact. This may be attributed to various factors such as the lagged effects of fiscal policy and changes in consumer and investor behavior. Subsequently, inflation begins to increase until it reaches a peak rise of 0.9%, operating above equilibrium levels. These results are similar to those of Sunder-Plassmann (2020), Dumitrescu, Kagitci and Cepoi (2022) and Enongene and Etape (2023). The inflation rate operating above equilibrium levels after the initial shock implies an overshooting of the equilibrium. This suggests a period of heightened inflationary pressures, potentially driven by factors that go beyond the direct impact of government net lending rate shocks. Policymakers should recognize the potential

for delayed and multi-phased effects of fiscal policy changes on inflation. Flexibility in policy adjustments may be warranted to address evolving economic conditions.

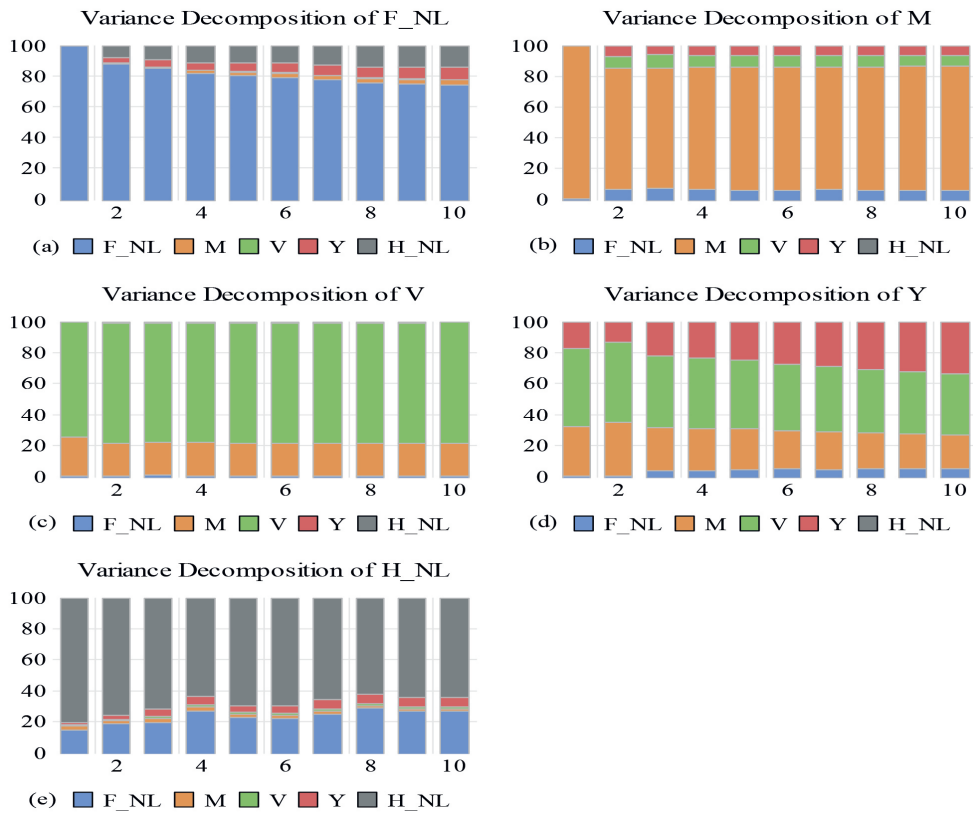
Figure 5. Variance decomposition focusing on the contribution of *F_NL*



Source: The figure is the author's computation

Figure 5, diagram (a) shows the variance decomposition with a focus on the contribution Ing net lending rate from financial corporations. The variance decomposition analysis focused on the contribution of the net lending rate from financial corporations to the variance of inflation over multiple quarters. The finding indicates that this contribution starts at 2% in quarter 2 and gradually increases, reaching 6% by quarter 10. Despite the variance being lower than that of another variable. The increasing contribution of the net lending rate from financial corporations to inflation variance suggests a growing influence of financial factors on inflation dynamics. This could be due to changes in interest rates, lending practices, or other financial market conditions that affect the broader economy. Policymakers should be aware of this sensitivity and consider adjusting monetary policy in response to developments in the financial sector.

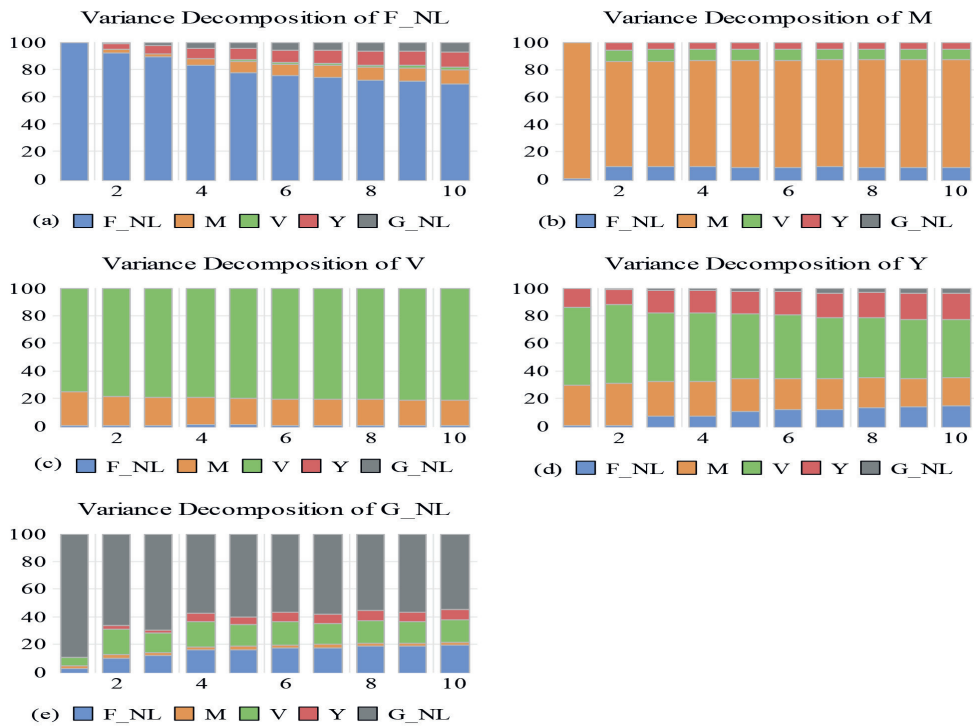
Figure 6. Variance decomposition with a focus on the contribution of *H_NL*



Source: The figure is the author's computation

Figure 6 diagram (a) shows the variance decomposition with a focus on the contribution of the net lending rate of households. The net lending rate of household variance contributed 5% to inflation in quarter 2 and gradually increased to 18.5% in equator 10. The growing influence of household net lending on inflation suggests the need for tailored monetary policy responses. Adjustments in interest rates or other tools may be necessary to manage potential economic imbalances. It is crucial to consider broader economic factors; increased household borrowing driving investment in productive capacity could positively impact the supply side and help moderate inflationary pressures.

Figure 7. Variance decomposition focusing on the contribution of *G_NL*. The variance decomposition was found using Cholesky (d.f. adjusted) factors.



Source: The figure is the author's computation

Figure 7, diagram (a) shows the variance decomposition with a focus on the contribution of net lending rate of the government. It is found that the net lending rate of government variance contributed 2% to inflation in quarter 2 and gradually increased to 7.5% in equator 10. Results imply evolving economic trends or structural changes affecting the government's net lending rate and inflation relationship in the first 10 quarters. Policymakers should coordinate monetary and fiscal policies to ensure stability, considering the time lag for the impact of government net lending on inflation. The historical decomposition is depicted in Figures A.1, A.3, and A.2.

5. AUTHORS DISCUSSION

The results reflected that the shocks to lead to an initial decrease in the inflation rate during the first two quarters. The initial effectiveness of increased lending rates in curbing inflation underscores the importance of monetary policy as a tool for inflation

control. However, the later rebound in inflation suggests that monetary policy may have limitations in addressing entrenched inflationary dynamics. This points to the need for a more nuanced approach that considers the underlying structural factors driving inflation. The findings highlight the necessity for policymakers to adopt a more adaptive monetary policy framework that can respond to evolving economic conditions. Given the cyclical nature of inflation responses, continuous monitoring and timely adjustments to policy measures are essential to avoid overshooting inflation targets. While the initial decrease in inflation supports the premise that higher lending rates can dampen inflationary pressures, the subsequent inflationary rebound raises questions about the longer-term efficacy of this approach. The transition from a deflationary impact to one of inflationary overshooting suggests a potentially delayed and multifaceted response mechanism that may not be fully captured in traditional economic models. This necessitates a deeper exploration of the mechanisms at play, particularly regarding how financial market dynamics interact with broader economic variables. Additionally, the observed reduction in the net lending rate from financial corporations following the shock raises important considerations about the potential long-term effects of aggressive monetary tightening. A contraction in lending could stifle economic growth, particularly if households and businesses face restricted access to credit, leading to adverse outcomes for aggregate demand. The findings reveal a cyclical pattern in inflation responses, suggesting that initial shocks may not have a sustained impact. This cyclical behavior necessitates a reevaluation of how economic policymakers interpret and respond to inflation signals, emphasizing the need for a more dynamic approach to policy formulation. The study highlights the intricate relationship between lending practices and inflationary dynamics, suggesting that the financial sector plays a pivotal role in influencing inflation trajectories. Policymakers must recognize this interplay and consider how changes in lending behavior affect the broader economic environment.

The shocks to result in an initial increase in the inflation rate over the first three quarters. The immediate increase in inflation following shocks in suggests that household borrowing plays a pivotal role in stimulating aggregate demand. As households access more credit, spending typically rises, contributing to upward pressure on prices. This finding reinforces the necessity for central banks to monitor household debt levels closely as part of their inflation-targeting frameworks, recognizing the potential for heightened inflation in response to increased borrowing. Notably, after the initial inflation spike, there is a marked decline in inflation, reaching its lowest point in the fifth quarter, with a reduction of 1.3%. This suggests that the inflationary impact of increased borrowing is not sustained and gives way to deflationary pressures. Factors contributing to this decline may include reduced consumer spending due to over-leveraging, tighter lending conditions, or broader economic adjustments. Policymakers must be attentive to these dynamics, as prolonged deflation can hinder economic growth and stability.

The cyclical movement of inflation below equilibrium after initial shocks raises essential questions regarding the underlying economic mechanisms at play. The observed decline in inflation indicates that the initial increase in borrowing may not lead to a corresponding and sustainable rise in economic activity. Instead, it suggests that households may face constraints limiting their ability to maintain spending levels after the shock. This phenomenon necessitates a reevaluation of current economic models, particularly those that fail to adequately account for the lagged effects of shocks and the cyclical nature of inflation. Moreover, the decline in inflation operating below equilibrium reflects a potential gap between aggregate demand and supply. This insight is critical for understanding the broader economic context, as it indicates the need for policies aimed at stimulating demand while carefully managing household debt levels.

The findings contribute to the understanding of cyclical inflation dynamics, emphasizing that inflationary pressures may be temporary. The transition from an initial increase to a subsequent decline suggests that short-term shocks can lead to longer-term economic adjustments, highlighting the need for adaptive policy responses. The analysis accentuates the importance of household net lending as a crucial driver of economic activity. Policymakers should consider the influence of fluctuations in household borrowing on inflation dynamics, ensuring that monetary policy responses are calibrated to mitigate potential negative impacts on the economy. The implications of this research extend to several key theoretical considerations. The cyclical behavior of inflation in response to shocks in suggests that linear models may be insufficient to capture the complexity of these dynamics. Future economic models should incorporate nonlinear relationships and account for the potential lagged effects of shocks on inflation. The findings support the integration of behavioral economics into traditional economic theories. Understanding how household perceptions and behaviors evolve in response to lending rates can enhance insights into inflation dynamics, informing policymakers' interventions. The relationship between household net lending and inflation emphasizes the necessity for coordinated monetary and fiscal policies. A comprehensive approach that considers the interaction between consumer borrowing, spending, and inflation will enable more effective economic management and stability. The shocks to the household net lending rate provides critical insights into the complexities of inflation dynamics in South Africa. The findings illustrate the dual role of household borrowing as both a catalyst for inflation and a potential source of subsequent deflationary pressures. Policymakers must remain vigilant to these evolving dynamics, ensuring that strategies are adaptable to the cyclical nature of inflation. By leveraging these insights, policymakers can foster sustainable economic growth while maintaining stability in the face of shocks.

The observed rebound in inflation following the initial decline, culminating in a peak increase of 0.9%, indicates a more nuanced response to fiscal shocks. This trajectory suggests that the economy adjusts over time, with increased consumer and investor confidence leading to heightened demand as the effects of government

borrowing filter through the economy. Policymakers must be cognizant of the time-lag effects associated with fiscal interventions, as the eventual increase in inflation can reflect a recovery in economic activity rather than a direct consequence of government lending practices. The inflation rate operating above equilibrium levels after the initial shock implies a potential overshooting, raising concerns about sustained inflationary pressures. This overshooting phenomenon may be driven by factors extending beyond the immediate impact of government lending shocks, such as external market influences, commodity price fluctuations, or changes in consumer expectations. The necessity for careful monitoring of inflation trends becomes paramount, as persistent inflation can undermine economic stability and erode purchasing power.

6. CONCLUSION

This study has provided a comprehensive examination of inflationary dynamics in South Africa by analyzing the effects of net lending shocks across the financial, household, and government sectors. Utilizing a robust dataset spanning from 1960 to 2022 and applying a Vector Error Correction (VEC) model, the research highlights both the short-term and long-term impacts of sectoral shocks on inflation. These findings contribute valuable insights into the mechanisms through which different economic sectors influence inflationary outcomes, offering both economic implications and policy recommendations for managing inflation in a complex and interconnected economy.

6.1. Economic and Sectoral Implications

The analysis reveals that shocks to net lending from the financial sector lead to a reduction in inflation, particularly in the early stages following the shock. This is consistent with the traditional monetary transmission mechanism, whereby higher lending rates lead to tighter monetary conditions, reduced credit availability, and a consequent decrease in aggregate demand. The financial sector's pivotal role in inflation control is evident, as it serves as a conduit through which central bank policies impact the broader economy. However, the broader implication of this finding is the risk of potential economic slowdowns. As borrowing costs rise, businesses may curtail investment, and consumers may reduce spending, thereby slowing down economic growth. This finding suggests that while financial sector-driven policies can effectively manage inflation, they may also induce contractionary effects in the real economy. Policymakers need to consider these trade-offs carefully, particularly in periods of economic fragility or when growth stimulation is required.

In contrast, shocks to net lending from the household sector exhibit a different inflationary trajectory. Initially, inflation rises as household borrowing increases,

reflecting heightened consumer demand driven by easier credit conditions or increased confidence in spending. This aligns with demand-pull inflation theory, where increased demand pressures drive prices upward. However, the subsequent decline in inflation, particularly after the third quarter, signals a reversion of these pressures. This deflationary phase could be attributed to adjustments in household spending, as consumers face higher debt servicing costs or uncertainties in income, leading to reduced expenditure. The cyclical nature of household borrowing highlights its sensitivity to broader economic conditions and the feedback loop between credit expansion and inflation. This sector's inflationary impact underscores the importance of monitoring consumer credit trends and household debt levels, as excessive credit growth could create short-term inflationary pressures, followed by medium-term deflationary risks.

The government sector presents a more complex dynamic. Shocks to the government's net lending rate initially led to a reduction in inflation, reflecting the deflationary effects of reduced government borrowing or spending. However, this is followed by a period of sustained inflationary pressure, indicating that fiscal shocks have multi-phased effects. The initial deflationary phase could be linked to reduced public sector demand, while the subsequent inflationary rise suggests that fiscal stimuli or increased public borrowing reintroduces inflationary pressures into the economy. This delayed inflationary response implies that fiscal policy has a long-term impact on inflation, which may not be immediately apparent in the short run. The results suggest that fiscal interventions must be timed and calibrated to avoid inflationary overshooting. In the context of South Africa, where fiscal imbalances and debt sustainability concerns are prevalent, these findings emphasize the need for careful fiscal management to prevent runaway inflation, especially during periods of increased government borrowing.

6.2. Policy Implications and Recommendations

The study's findings underscore the need for a delicate balance between monetary and fiscal policies to ensure price stability while promoting economic growth. Financial sector policies, particularly those affecting lending rates, can effectively curb inflation, but they come with the risk of slowing economic activity. Central banks and monetary authorities must weigh the timing and magnitude of interest rate hikes or lending rate adjustments to prevent economic stagnation while controlling inflation. Moreover, policymakers should recognize that overly aggressive tightening could stifle investment and employment, leading to protracted periods of low growth. On the fiscal side, the government's role in influencing inflation through net lending is more nuanced. Policymakers should be aware of the time-lagged effects of fiscal policy on inflation, especially when fiscal consolidation or expansion is employed as a tool for economic stabilization. Fiscal authorities need to coordinate with monetary

policymakers to ensure that their respective policies are complementary rather than contradictory. For instance, while a central bank may be tightening monetary conditions to control inflation, an expansive fiscal policy could undermine these efforts by reintroducing inflationary pressures, as seen in the government sector findings.

The impact of household sector lending on inflation suggests that consumer credit and spending are key determinants of short-term inflationary dynamics. Policymakers should focus on developing macroprudential tools to manage household borrowing and prevent excessive credit growth that could fuel inflation. Tools such as limits on loan-to-value (LTV) ratios, stricter lending standards, and debt-to-income (DTI) thresholds can help mitigate the risks associated with household borrowing booms. Additionally, targeted policies aimed at promoting financial literacy and prudent borrowing among consumers could help stabilize inflation by moderating demand-driven price pressures. In this context, policymakers must remain vigilant about changes in consumer confidence, disposable income, and credit conditions, which could quickly shift inflationary dynamics. The cyclical nature of household borrowing observed in the study also highlights the need for counter-cyclical policies that can dampen the inflationary effects during periods of economic overheating. The delayed inflationary response to government net lending shocks suggests that fiscal policy can have a prolonged effect on inflation, which necessitates timely and well-coordinated interventions. Policymakers should consider the multi-phase nature of fiscal shocks when designing fiscal interventions. For example, expansionary fiscal policies intended to boost growth should be accompanied by measures to manage inflationary spillovers in the medium term. This could involve staggered fiscal stimulus packages or phased borrowing strategies to minimize inflationary overshooting.

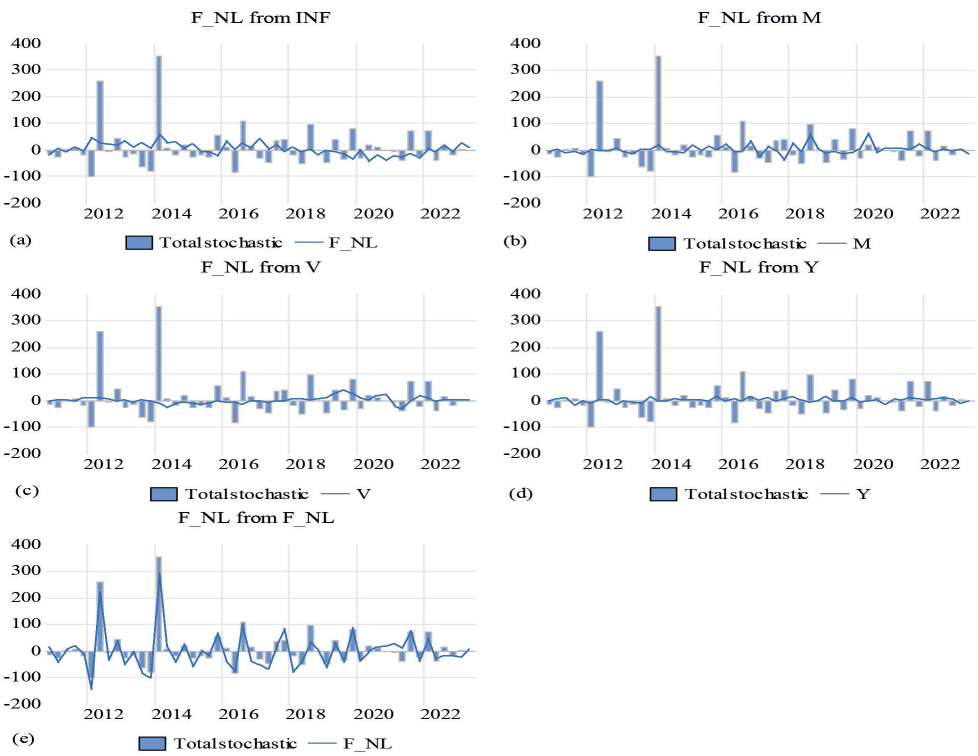
Moreover, the results highlight the importance of adopting a counter-cyclical fiscal policy stance. During periods of high inflation, reducing government borrowing or spending can help dampen inflationary pressures, while during deflationary periods, targeted fiscal expansion can support demand without triggering inflationary spirals. Flexibility in fiscal policy design and execution is critical, particularly in economies like South Africa, where inflationary pressures may be driven by both domestic and global factors. South Africa's open economy means that domestic inflation is not solely driven by internal factors but is also influenced by global economic conditions such as commodity price fluctuations, exchange rate volatility, and international capital flows. Policymakers must remain adaptive, considering how external shocks might amplify or mitigate the inflationary effects of domestic net lending rate changes. This is particularly relevant given South Africa's dependence on commodity exports, where global price shifts can have direct inflationary impacts. A proactive approach to managing these external risks through strategies such as building fiscal buffers, hedging against commodity price volatility, and maintaining foreign exchange reserves could help stabilize inflationary expectations.

In conclusion, this study advances the understanding of sectoral lending shocks on inflation in South Africa. Policymakers should adopt a flexible and coordinated

approach that accounts for the timing, sectoral differences, and global economic influences on inflation. By doing so, they can effectively manage inflationary pressures while promoting sustainable economic growth. Further research into macroprudential policy effectiveness, global influences, and sector-specific inflation dynamics will be critical in refining inflation control strategies in South Africa and other emerging economies.

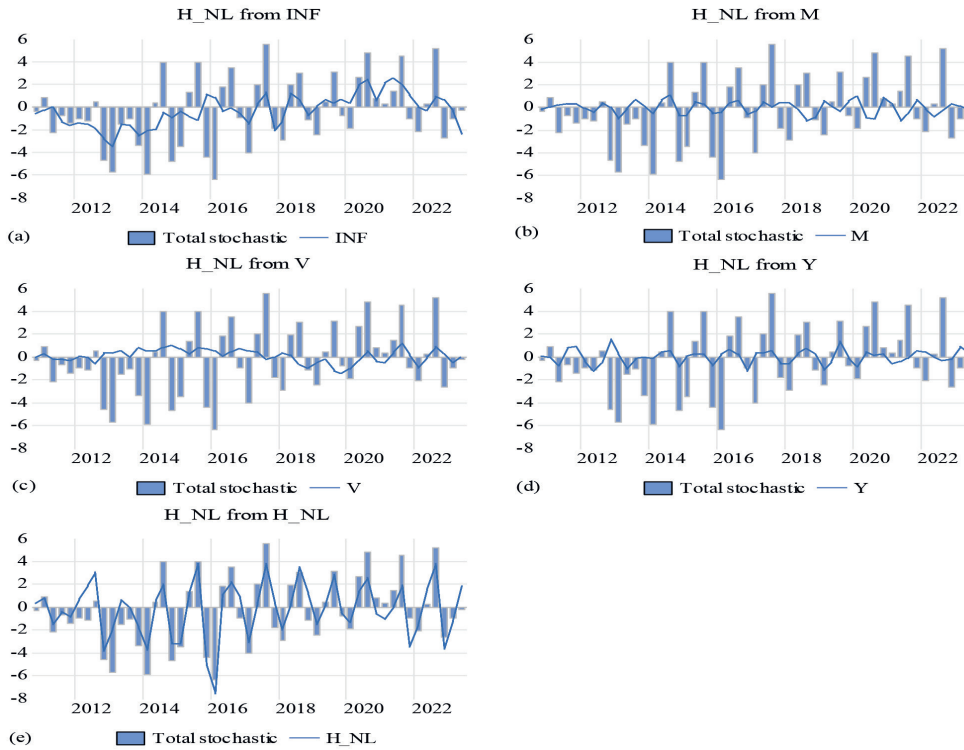
Annexure

Figure A.1. Historical Decomposition using Cholesky (d.f. adjusted) Weights for *F_NL*



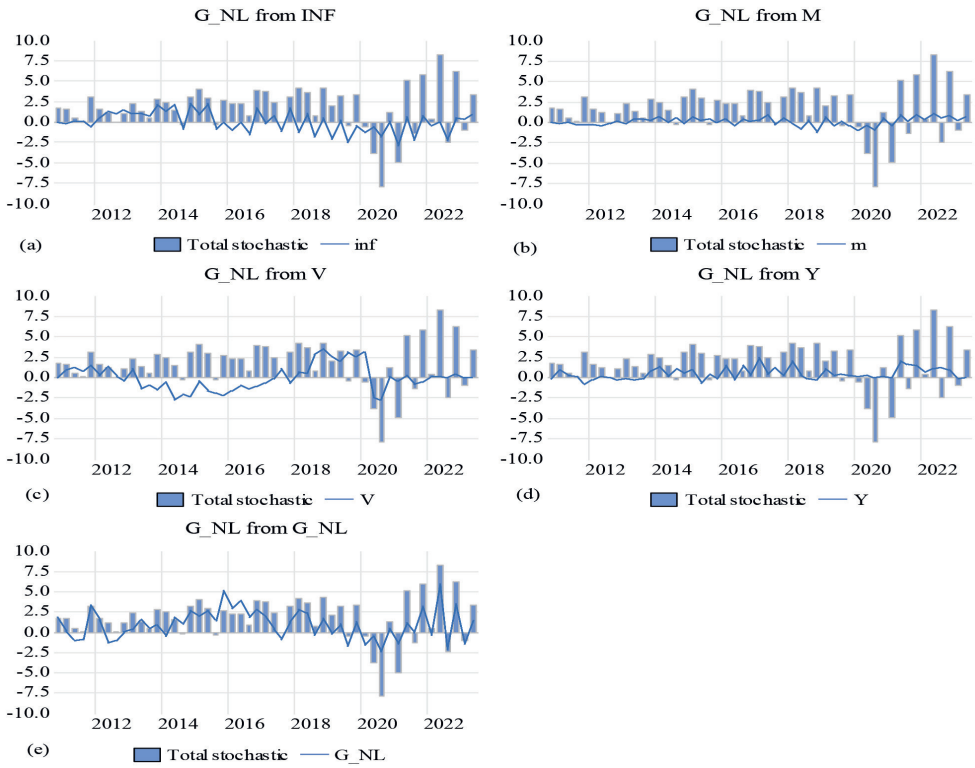
Source: The figure is the author's computation

Figure A.2. Historical Decomposition using Cholesky (d.f. adjusted) Weights for *F_NL*



Source: The figure is the author's computation

Figure A.3. Historical Decomposition using Cholesky (d.f. adjusted) Weights for G_NL



Source: The figure is the author's computation

Author contributions

I am the sole author who conceived, designed, analyzed, and interpreted the data. I drafted the study and revised it critically for intellectual content.

Disclosure of interest

There are no conflicts of interest or content of the study or the author.

Declaration of funding

No funds were provided.

Data availability

The data used in this study can be provided upon request.

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