Original Research Article

Sectoral Effects of Monetary Policy in CEMAC

Abstract

In this paper, we investigate the asymmetric impact of monetary policy on the sectoral allocation of bank credit within the Economic and Monetary Community of Central African States (CEMAC). Employing a Bayesian Structural Vector Autoregression (BSVAR) framework, we examine how adjustments in interest rates and liquidity injections influence sectoral credit allocation, thereby shaping economic activity across nine key sectors. Our findings reveal significant sectoral heterogeneity in monetary transmission: the manufacturing sector emerges as the most responsive to liquidity interventions, underscoring its high reliance on bank credit, while agriculture exhibits moderate sensitivity and services remain comparatively less affected. By capturing both the immediate and cumulative impacts of monetary shocks, the analysis highlights that liquidity injections exert more pronounced effects than interest rate changes across all sectors, yet their magnitude and duration differ substantially. Moreover, these results hold even when controlling for macroeconomic factors such as oil prices, exchange rates, and inflation levels.From a policy standpoint, the demonstrated sectoral asymmetries call into question the efficacy of uniform monetary policy measures across a region characterized by diverse economic structures. Our evidence suggests that policymakers at the Bank of Central African States (BEAC) may benefit from tailoring interventions to sector-specific characteristics to optimize growth outcomes. Furthermore, the differential responsiveness to various policy tools indicates that liquidity-based measures can be particularly potent in catalyzing activity in capital-intensive sectors. These insights offer crucial guidance for designing and implementing more targeted and balanced monetary policies to foster inclusive development in the CEMAC region.

Keywords: Monetary Policy; Sectoral output; CEMAC; Bayesian VAR; Credit; Africa; Market neutrality
JEL classification: E52; E32; E40, E58

1 Introduction

Understanding how monetary policy transmits to the real sector is crucial for macroeconomic analysis. As Bernanke and Gertler (1995) note, policy actions significantly affect real variables like output and employment by influencing aggregate demand. Often, these effects are gauged using aggregate indicators such as GDP or inflation, potentially obscuring important sector-level variations. Focusing on macro-level outcomes can overlook how particular industries respond differently to interest rate changes or to credit availability constraints.

The assumption of a uniform impact of monetary policy across all sectors may thus be misleading. Kashyap and Stein (2000) highlight how credit market imperfections can generate heterogeneous sectoral responses, especially regarding access to loans and borrowing costs. Industries with high capital intensity, for example, may be more vulnerable to shifts in interest rates than sectors relying more on labor. These asymmetries underscore the need for a disaggregated analysis that captures how monetary policy truly operates across different areas of the economy.

This issue is particularly relevant in the Economic and Monetary Community of Central African States (CEMAC), which comprises Cameroon, the Central African Republic, Congo, Gabon, Equatorial Guinea, and Chad. CEMAC uses a fixed exchange rate regime pegged to the Euro (XAF), presenting unique policy transmission challenges. Most member nations depend heavily on oil exports—except the Central African Republic—and oil revenues represent about 27.7% of the region's GDP. Fluctuating global oil prices add complexity to how monetary policy ripples through diverse industries. Devarajan and Shetty (2010) emphasizes that resource-rich nations often confront distortions that dampen policy effectiveness.

Moreover, CEMAC's manufacturing sector remains small, averaging only 10% of GDP from 2010 to 2020. This figure ranges from 2.7% in Equatorial Guinea to 14.5% in Cameroon. Rodrik (2016) associates underdeveloped manufacturing with constraints on how effectively policy spurs industrial growth. Sectoral responses to policy can vary widely: while agriculture, extractive industries, and services may have one pattern, manufacturing might show another, shaped by higher reliance on capital.

These divergences are critical both academically and practically. If monetary policy disproportionately benefits certain industries, it may inadvertently shift growth patterns and create imbalances. This selective boost or dampening of sectors can arise from differences in how banks allocate credit or how firms handle borrowing costs. Claessens and Kose (2018) argue that financial intermediaries' behavior is key to explaining why certain industries expand faster after a policy change. Sector-specific responses can also drive broader structural shifts, reinforcing or hindering industrial development. Rodrik (2013) shows that long-term credit allocation can mold the evolution of an economy, highlighting the importance of understanding these sector-level processes.

CEMAC provides a compelling case to examine these channels. The combination of a shared currency, heavy reliance on oil exports, and varied economic structures raises questions about the ability of monetary policy to nurture balanced growth. Mishra and Montiel (2012) find that underdeveloped financial markets and informality often reduce the potency of interest rate adjustments in low-income countries. In CEMAC, excess liquidity in banks further complicates transmission (Saxegaard, 2006; Kamgna and Ndambedia, 2008; Bikai and Kenkouo, 2019), whereas direct liquidity injections may be more potent than rate changes (Bikai and Essiane, 2017). Yet most studies rely on aggregate outcomes (e.g., GDP, inflation) rather than sector-level data, obscuring whether individual industries receive uneven benefits or burdens.

A growing body of research underscores the importance of probing heterogeneous responses across sectors. Studies on developed economies (Ganley and Salmon, 1997; Raddatz and Rigobon, 2003) show that capital-intensive manufacturing can be more sensitive to monetary policy.

Developing-country analyses (Alam and Waheed, 2006; Sengupta, 2014) similarly highlight diverging patterns between resource-based and non-resource-based sectors. For CEMAC, relatively few studies dissect how liquidity injections or interest rate moves affect agriculture, industry, or services. This gap merits attention, given the region's pressing need for industrialization and diversification.

The finance-industrial development nexus is another key dimension. Levine (2005) discusses how better-developed financial systems amplify monetary policy impacts on growth. In early stages of development, banks are pivotal (Gerschenkron, 1962; Lin and Xu, 2012). Deeper financial markets correlate with higher growth (King and Levine, 1993; Ang, 2008), and targeted credit allocation can boost manufacturing expansion (Lee, 2019). Some arguments even favor central-bank strategies that promote sustainable sectors (Schoenmaker, 2019; Volz, 2017), although these ideas challenge the conventional view of a neutral monetary stance.

In this paper, we contribute in three ways. First, we focus on how key monetary policy tools in CEMAC influence sectoral bank credit, rather than aggregate output alone. Second, we do so in a developing-country monetary union context seldom studied, offering insights into policy transmission under structural constraints. Third, we employ a Bayesian approach that integrates prior evidence and expert judgment, enhancing the robustness of our findings.

We show that monetary policy shocks produce different effects across sectors: industries reliant on capital (e.g., manufacturing) display higher sensitivity to central bank liquidity injections, while agriculture shows moderate responsiveness, and services the least. Further, post-reform data indicate increased policy efficacy in sectors like agriculture and construction, although extractive activities and transport see limited or declining effects. Significant disparities also emerge across member states. Cameroon experiences broadly positive impacts, but other countries (e.g., Congo, Gabon) show weaker sectoral reactions, highlighting the importance of local context.

These patterns confirm that monetary policy influences much more than aggregate demand. By acknowledging the diversity in sectoral needs and structures, policy interventions can be better targeted, potentially mitigating structural imbalances. The rest of this essay proceeds as follows: Section 2 discusses sectoral effects in monetary policy research; Section 3 presents our Bayesian SVAR framework; Section 4 reports the empirical findings; Section 5 interprets results in light of broader debates; and Section 6 concludes..

2 Literature review

This section examines key theoretical and empirical perspectives on the sectoral effects of monetary policy and the concept of market neutrality. In Section 2.1, we focus on how the neutrality of money relates to monetary policy's potential sectoral asymmetries. Section 2.2 then reviews empirical findings on these sectoral impacts across advanced and developing economies.

2.1 Sectoral effect of monetary policy and the market neutrality hypothesis

2.1.1 Neutrality of Money and Monetary Policy

The neutrality of money holds that changes in the money supply affect only nominal variables—prices and wages—without altering real economic variables such as output and employment. Rooted in Hume's essays (Hume, 1752), it assumes no "money illusion," so proportional changes in the money

supply do not shift real behavior (Patinkin, 1965). Under this view, long-run equilibrium hinges on price adjustments that leave real factors unaffected (Archibald and Lipsey, 1958).

However, classic discussions also acknowledge that money can be non-neutral in the short run. Hume (1752) and Keynes (1923) point to price stickiness and distribution effects, while Fisher (1913) highlights how nominal interest rates may lag behind inflation, affecting investment decisions. Superneutrality extends neutrality by arguing that changing the growth rate of the money supply likewise exerts no long-term real effect, although many models challenge this assumption by showing that varying inflation rates may induce real changes (Tobin, 1965; Sidrauski, 1967).

Turning to monetary policy, Friedman (1968) contends that in the long run, changes in money supply only affect nominal indicators, albeit short-run real effects may emerge. He emphasizes a stable monetary framework where variations in the money supply have purely transitory influences on output and employment. Yet modern experiences suggest that rigidities and expectations can create short-run divergences from neutrality (Lucas, 1972; Barro, 1976).

Market neutrality extends monetary neutrality by arguing that central banks should not advantage specific sectors or instruments, thus preserving an “even playing field” (van ’t Klooster and Fontan, 2019). This principle posits that open-market operations or asset purchases should not distort relative prices among sectors. In practice, however, critics underscore that any intervention in certain markets can unintentionally alter resource allocation (Schnabel, 2021).

2.1.2 Theoretical Controversies on Market Neutrality of Monetary Policy

While classical theory advocates that money supply changes are primarily nominal, numerous works illustrate scenarios where monetary actions have nontrivial real effects. Fisher (1930) posits superneutrality when foresight is perfect, but Tobin (1965) and Sidrauski (1967) show that inflation can shift savings from money to capital, influencing growth rates. Lucas (1996) acknowledges long-run neutrality but notes that frictions—sticky prices, imperfect information—create short-run trade-offs.

Empirical findings complicate the picture further. Lucas (1975), Barro (1978), and others find that unanticipated money supply changes affect real output, while anticipated ones may also matter under certain frictions (Mishkin, 1982, 1983). Bank-created inside money adds another dimension: Hartley and Walsh (1986) argue that monetary policy can affect investment through liquidity channels if banks alter lending due to endogenous money creation.

Moreover, Blinder (1982) highlights how inventories and sticky prices cause firms to respond more acutely to demand shocks, implying that monetary changes can produce uneven sectoral adjustments. Monetarist traditions (Friedman, 1968) assume a primary focus on price stability, but real-world market imperfections challenge “pure” neutrality (Benigno and Nisticò, 2020). Sectoral biases arise when central banks purchase specific assets, as van ’t Klooster and Fontan (2019) shows with ECB and SNB interventions in corporate bond markets. Sectoral interconnections can exacerbate these effects (Singh and Beetsma, 2018; Cardinale and Scazzieri, 2016).

Similarly, Braun (2020) identifies the ECB’s infrastructural power over financial markets through repo operations. Such influence can steer liquidity toward certain market segments, challenging the neutrality ideal. Wang (2019) further observes that changes in fiat money quantities alter bank lending dynamics, potentially reshaping real allocations.

Overall, while neutrality remains foundational in monetary theory, abundant evidence and theoretical developments highlight complexities, especially when frictions, banking structures, or targeted interventions are present. These realities undermine the assumption of uniform market outcomes when central banks engage in policy operations.

2.1.3 An emerging necessity to go Beyond the neutrality debate?

A newer strand of literature urges shifting focus from market neutrality to market efficiency in response to structural weaknesses and sustainability challenges. Schnabel (2021) argues that strict neutrality can be suboptimal in distorted markets, calling for central banks to address inefficiencies through targeted interventions. Lepers (2017) show that FOMC members' ideological biases can produce sectorally asymmetric policies, further questioning neutrality's practicality.

Climate-related financial risks are a prime example. Braun (2020) and Dafe and Volz (2021) illustrate how including environmental considerations in monetary frameworks may conflict with the neutrality principle but ensures financial stability in the face of climate shocks. Campiglio *and al.* (2018) and Sachs *and al.* (2019) argue that green finance and sustainability-linked lending might be necessary to correct market failures, suggesting a more active role for central banks in shaping credit flows. Historically, Epstein (2005) and Gregory and Sailors (1976) show that major central banks have supported strategic sectors, raising questions about whether strict neutrality was ever truly practiced.

These perspectives indicate a growing acceptance that market neutrality, while theoretically elegant, might be insufficient given real-world distortions and new policy objectives like transitioning to a low-carbon economy. By acknowledging that policy interventions can have consequential sectoral effects, central banks could more transparently weigh distributional outcomes against macro-stability goals. Consequently, the debate increasingly centers on how to incorporate sustainability, financial stability, and developmental goals without undermining core objectives.

In summary, monetary policy's real effects and its sectoral consequences cannot be dismissed as mere short-run anomalies. The shift toward proactive measures—such as green lending—reflects recognition that central banks may need to guide resources toward strategic ends, effectively transcending neutrality to address climate or developmental imperatives. This broadens our understanding of monetary policy's asymmetric sectoral impacts.

2.2 Sectoral effects of monetary policy: what does the empirical literature say?

Empirical research generally confirms that monetary policy has uneven impacts across industries, driven by factors like capital intensity, leverage, and sector-specific financial frictions. Advanced economies have garnered extensive attention, but emerging and developing markets offer additional insights into how structural conditions shape policy transmission.

2.2.1 Sectoral effects of monetary policy in advanced economies

Studies on advanced economies reveal that capital-intensive or highly leveraged sectors, such as durable manufacturing, respond more acutely to policy shocks (Peersman and Smets, 2005; Dedola and Lippi, 2005). Small firms and regions with greater financial constraints also exhibit amplified reactions (Kandrac, 2012; Arnold and Vrugt, 2004). The literature often employs SVAR frameworks (Ganley and Salmon, 1997), difference-in-differences (Rodnyansky and Darmouni, 2018), or event studies (Anderson *and al.*, 2017) to identify shocks and measure responses.

Unconventional policies like QE further alter this dynamic. Rodnyansky and Darmouni (2018) show that banks holding mortgage-backed securities substantially adjust lending after QE rounds, while Berisha (2020) notes that high-leverage industries see pronounced effects. Over time, advanced economy research has shifted to real-time market reactions and unconventional

measures, underscoring the complexity of monetary transmission (Farès *and al.*, 2001; Berisha, 2020).

Despite progress, questions remain about the long-term sectoral impacts of QE and forward guidance, spillovers across borders, and how emerging industries like tech or green energy might react. Policymakers increasingly recognize that accounting for sectoral heterogeneity can improve macro-stability and guide strategic interventions (Rodnyansky and Darmouni, 2018; Kandrac, 2012).

2.2.2 Sectoral effects of monetary policy in developing and emerging economies

In emerging and developing countries, similar themes emerge but are often intensified by underdeveloped financial markets and heightened structural constraints (Mishra and Montiel, 2012). Empirical work by Alam and Waheed (2006), Nampewo *and al.* (2013), and Sengupta (2014) shows that manufacturing and capital-intensive industries tend to be especially sensitive, reflecting both credit constraints and interest rate exposures. Methodologically, studies frequently use VAR models to capture dynamic relationships among key macro variables (Pellényi, 2012; Sankaran *and al.*, 2020; Prabu *and al.*, 2020).

One prominent trend is the importance of liquidity channels in settings where conventional interest rate mechanisms are weak (Nampewo *and al.*, 2013). Researchers note that direct liquidity injections sometimes exert stronger effects than policy rate shifts, particularly when excess reserves prevail (Dickinson and Liu, 2007). Recent work explores unconventional policy moves in emerging markets and how sectoral variations in leverage or informality shape outcomes (Sengupta, 2014).

Over time, the literature on developing economies has expanded from focusing on rate channels and credit constraints to examining environmental concerns and industrial policy (Dikau and Ryan-Collins, 2017). Increasingly, scholars argue for targeted interventions to bolster sectors crucial for growth or sustainability, mirroring the debate on green finance in advanced markets (Campiglio *and al.*, 2018). However, data limitations remain a challenge, and further research is needed to isolate how institutional factors—like regulatory frameworks or governance quality—modulate sectoral responses.

In sum, while advanced economies and emerging markets differ in financial maturity, both exhibit uneven sectoral responses to monetary policy. Understanding these asymmetries is key for informed policymaking. Tailored interventions, whether via liquidity operations or credit-enhancing measures, can help mitigate vulnerabilities and capitalize on high-responsiveness sectors. This perspective underlies the rationale for a more nuanced approach to monetary policy that accommodates sector-specific characteristics, a theme increasingly relevant in the face of evolving economic and sustainability challenges.

3 Methodology

Studying the sectoral effects of monetary policy in CEMAC is challenging because historical, high-frequency data disaggregated by sector are scarce. Most countries in the region lack detailed quarterly national accounts, and even where production indices exist (e.g., Chad), coverage often excludes primary or tertiary sectors. Consequently, modeling how BEAC's policy actions affect each sector faces data limitations.

Nonetheless, harmonized bank-level datasets on credit to different industries allow us to assess

whether monetary policy instruments produce heterogeneous sectoral impacts. Our central question is whether changes in key policy tools lead to divergent responses in private-sector lending.

Two main hurdles arise. First, not all variations in central bank instruments qualify as genuine monetary policy shocks; identifying exogenous policy movements is crucial for drawing valid conclusions. Second, capturing cross-industry asymmetries requires robust estimation techniques and appropriate controls.

Following Arnold and Vrugt (2004) and Dedola and Lippi (2005), we adopt a two-step approach. We first measure monetary policy's influence on credit distribution across branches, then examine asymmetries and control variables in a cross-sectional setup.

3.1 First step: Compute the effects of monetary policy on sectoral credit allocation

We employ a Structural Vector Autoregressive (SVAR) approach, with exogenous variables included (SVAR-X), as informed by Ganley and Salmon (1997), Arnold and Vrugt (2004), Dedola and Lippi (2005), Alam and Waheed (2006), Nampewo *and al.* (2013), and Sengupta (2014). SVAR models capture dynamic interactions among macroeconomic variables, permitting analysis of policy impacts over time. They also handle indirect feedback loops, vital in contexts where credit conditions may evolve gradually or exhibit interdependence. Integrating exogenous factors responds to the specificities of CEMAC, where issues like oil-price shifts or exchange-rate constraints may condition monetary transmission.

Section 3.1.1 details the SVAR-X specifications, while Section 3.1.3 discusses robustness checks. Including these checks helps validate that our identification of exogenous monetary shocks remains sound, ensuring reliable inferences about how changes in the key policy instruments propagate across distinct economic branches.

3.1.1 General specifications

A VAR(p) model regresses each variable on its own lags and those of others:

$$y_t = c + \sum_{i=1}^{p} \Phi_i \, y_{t-i} + \varepsilon_t, \tag{3.1}$$

where y_t is a $k \times 1$ vector of endogenous variables, c a $k \times 1$ constant, Φ_i are $k \times k$ coefficient matrices, and ε_t is a serially uncorrelated error vector. In stacked form:

$$Y_t = B(L)\, Y_{t-1} + \varepsilon_t, \quad \text{with} \quad B(L) = \sum_{i=1}^{p} B_i \, L^i, \tag{3.2}$$

and ε_t is i.i.d.

VAR models are used to study how shocks (e.g., monetary policy innovations) affect inflation, output, and rates (see Sims, 1980; Bernanke and Mihov, 1998; Christiano, 2012). To directly interpret shocks, additional structure is imposed, yielding the Structural VAR (SVAR) model (Amisano and

Giannini, 2012; Hamilton, 2020):

$$Y_t = A_0 + \sum_{i=1}^{p} A_i \, Y_{t-i} + \epsilon_t. \tag{3.3}$$

Here, one transforms the reduced-form VAR via

$$\varepsilon_t = Y_t - B(L)Y_{t-1},$$

premultiplies by A, and replaces $B(L)$ with AC, with C identified from data, yielding the structural relations (Binning, 2013).

Many sectoral studies (Dedola and Lippi, 2005; Alam and Waheed, 2006; Nampewo *and al.*, 2013; Sengupta, 2014) use a recursive scheme for shock identification, though it can be sensitive to ordering. We therefore adopt an SVAR with exogenous variables (SVAR-X):

$$Y_{i,j,k,t} = A(L) \, Y_{i,j,k,t-1} + C \, X_t + \epsilon_{i,j,k,t}, \tag{3.4}$$

with a fixed three-month lag as in Arnold and Vrugt (2004).

3.1.2 Estimation strategy

Each SVAR-X in (3.4) is estimated using a Bayesian approach with Sims–Zha priors (Sims and Zha, 1998; Sheefeni, 2017) (see also Hamilton, 2020). Impulse response functions (IRFs) are computed and summarized by (i) the sectoral credit elasticity to a 1% policy change over two years, (ii) the maximum elasticity within 1–24 months, and (iii) the cumulative two-year impact (Dedola and Lippi, 2005).

3.1.3 Robustness checks

We test alternative identification schemes (e.g., sign restrictions) and split the sample into subperiods to verify that sectoral responses remain stable across specifications.

3.2 Second step: Cross-section analysis

3.2.1 Evaluate the asymmetry of the sectoral effects of monetary policy

We aggregate IRFs across CEMAC by weighting each sector's response by its economic share (Peersman and Smets, 2005; Ciccarelli and Rebucci, 2005). This quantifies how sectors differ in sensitivity to the same monetary shock.

3.2.2 Robustness checks

We further validate our results by:

- Examining country-specific effects to capture variations in economic structure (Saxegaard, 2006).

- Categorizing banks (public, private, foreign, local) to assess differences in monetary pass-through (Claessens and Kose, 2018).
- Including additional macroeconomic and bank-level controls to isolate genuine sectoral differences.

These tests confirm the robustness of our findings regarding asymmetric sectoral impacts of monetary policy in CEMAC.

3.3 Data

We use monthly country-level sectoral credit data from the *CERBER* platform of the Banking Supervisor (COBAC), covering January 2010 to December 2019. Because interest rates vary little monthly, we employ the ratio of central bank net liquidity injections to annual CEMAC GDP as our primary monetary policy indicator, capturing more responsive policy signals in the region. However, few high-frequency variables (e.g., growth or institutional indicators) exist, necessitating careful interpretation.

Table 1: *Descriptive Statistics of Country-Specific Macro Variables*

	Cameroon	Congo	Gabon	Equatorial Guinea	Central African Republic	Chad	Total
Legal system property rights	2.962381	3.57	2.850476	3.28619	-	2.966667	3.06982
Legal enforcement of contracts	4.195238	0.51	3.158095	3.01	-	5.044762	3.526718
Financial Openness	1.658095	1.658095	1.658095	1.658095	-	1.658095	1.658095
Credit market regulations	7.402381	7.47619	5.853333	5.724762	-	7.542857	6.726216
Human capital index	0.3911263	0.2916319	0.2944716	0.4165932	-	0.4556668	0.3796895
Human development index	0.4821667	0.3455667	0.3574	0.5062333	0.57215	0.6443667	0.486794
Political stability index	-1.954843	-0.8186586	-0.62542	0.1359521	-0.0200135	-1.438369	-0.9122671
Rule of law index	-1.549159	-1.103434	-1.196874	-0.5530606	-1.176079	-1.394746	-1.182361
Real GDP per capita	1.028308	-0.2049396	-0.4475225	-2.326057	-4.279986	-0.2807912	-0.8123304
Average real GDP growth	3.768473	1.008092	2.80014	0.4046896	-0.2586759	2.87238	2.103003
Firms using banks to finance investment	23.6	25.3	5.75	7.7	-	6.3	14.15541
Human capital index (WDI)	0.3911263	0.2916319	0.2944716	0.4165932	-	0.4556668	0.3796895
Credit to private sector	13.27909	11.39239	7.56879	11.99627	10.33108	12.3689	11.45841
Oil rent	3.412499	0	16.70669	33.59221	23.54576	21.9889	16.45982

Table 1 offers key macroeconomic indicators revealing major cross-country differences in institutional quality, human capital, and financial openness. Congo scores highest in property rights (3.57), while Cameroon leads in contract enforcement (4.195). Cameroon and Chad display stricter credit market regulations (7.402 and 7.543) compared to Gabon (5.853) and Equatorial Guinea (5.725).

Human Capital Index (HCI) peaks in Chad (0.456); Equatorial Guinea tops the HDI scale (0.506). Political stability is comparatively low in Cameroon and Chad. Differences in real GDP growth—positive for Cameroon and Chad but negative for Equatorial Guinea and the Central African Republic—underscore the region's uneven development trajectories. Congo (25.3) shows better access to banking for investment, contrasting with Equatorial Guinea (7.7) and Chad (6.3).

Furthermore, high oil rents in Gabon (16.707) and Equatorial Guinea (33.592) signal reliance on oil revenues and susceptibility to price swings. These wide variations in economic conditions, institutional frameworks, and resource dependence highlight the importance of context-specific monetary and regulatory policies that account for each country's structural realities.

Table 2: *Descriptive Statistics of Variables*

	Median	Std. Dev.	Count
Foreign bank			
Liquidity ratio	124.4932	106517	241
Banks' Dependence on the Central Bank's Refinancing Index	0.0032533	1025.41	241
Size of the balance sheet	191.0994	186.3139	241
Non-performing loan ratio	0.1067054	1.081039	241
Sectoral Non-performing loan ratio	7.945487	19.44448	241
Size of the branch in total credit	1.650373	9.846177	241
Return on Equity	26.755	100933.9	241
Public banks			
Liquidity ratio	90.202	84895.03	71
Banks' Dependence on the Central Bank's Refinancing Index	0.039318	804.0789	71
Size of the balance sheet	164.5648	111.8184	71
Non-performing loan ratio	0.1136741	2.038336	71
Sectoral Non-performing loan ratio	17.31661	15.24898	71
Size of the branch in total credit	1.328318	9.356969	71
Return on Equity	8.251667	83752.61	71
National private bank			
Liquidity ratio	115.4016	33044.56	63
Banks' Dependence on the Central Bank's Refinancing Index	0.016588	329.1858	63
Size of the balance sheet	654.9473	354.0409	63
Non-performing loan ratio	0.474986	2.077044	63
Sectoral Non-performing loan ratio	13.5497	17.9736	63
Size of the branch in total credit	3.314336	59.88511	63
Return on Equity	21.09458	29394.15	63
Total			
Liquidity ratio	115.4016	94209.94	375
Banks' Dependence on the Central Bank's Refinancing Index	0.0057107	905.251	375
Size of the balance sheet	204.7888	251.4898	375
Non-performing loan ratio	0.1365558	1.513748	375
Sectoral Non-performing loan ratio	10.91033	18.51876	375
Size of the branch in total credit	1.713096	26.28833	375
Return on Equity	23.6	89738.33	375

Table 2 reveals marked contrasts in liquidity and scale across Central African banks. Foreign banks show the highest median liquidity ratio (124.49) compared to public (90.20) and national private (115.40), indicating stronger liquidity management or broader access to liquid assets. While reliance on central bank refinancing appears low overall, high standard deviations suggest considerable variation.

National private banks exhibit the largest balance sheets (median 654.95), far exceeding foreign (191.10) and public (164.56). In terms of risk, foreign institutions have lower non-performing loan (NPL) ratios (median 0.1067), whereas national private banks exhibit more risk (0.4750). Public

banks report the highest sectoral NPLs, possibly due to sector-specific exposures or less rigorous risk management.

Branch size in total credit also differs significantly. National private banks hold a median of 3.31, surpassing foreign (1.65) and public (1.33) banks, suggesting broader market penetration or larger branch networks. Meanwhile, return on equity diverges widely: foreign banks lead (26.76), national private banks occupy a middle range (21.09), and public banks lag (8.25). These variations in liquidity, credit risk, operational scale, and profitability underscore the diverse ways in which monetary policy can shape credit allocation among different bank types in the region.

3.4 Estimation Strategy

We employ a Bayesian approach to estimate our models, leveraging prior knowledge on variable behavior alongside observed data (Hamilton, 2020). Unlike frequentist methods, which assume fixed parameters estimated purely from the sample, Bayesian VAR (BVAR) models treat parameters as distributions informed by both data likelihood and analyst priors. BVARs are especially useful in developing economies, where data constraints and potential measurement errors can undermine classical techniques. They also allow for time-varying parameters, capturing potential shifts in monetary transmission (Sims and Zha, 1998).

Our estimation proceeds in two steps:

1. **BSVAR modeling of policy shocks:** We first estimate a Bayesian Structural VAR (BSVAR) to identify how monetary policy innovations influence sectoral credit allocation.
2. **Bayesian regression of estimated shocks:** Next, we regress the BSVAR-derived shocks on sectoral variables to detect asymmetries. This highlights whether particular sectors exhibit systematically greater or lesser responses to monetary impulses.

This approach, integrating prior evidence and dynamic data patterns, enables a nuanced examination of policy impacts across diverse CEMAC sectors.

3.5 Robustness checks

To confirm the validity of our results, we conduct several robustness checks that address identification strategies, sample subdivisions, country-specific variations, bank-type differences, and relevant control variables. Specifically, we apply various identification schemes for the VAR models to mitigate the risk of relying on a single assumption (Dedola and Lippi, 2005), and we re-estimate the models over different subsamples to account for potential structural breaks or regime changes within CEMAC's policy environment. In light of regional heterogeneity, we also conduct country-level estimations to detect whether aggregated results obscure distinct transmission channels, enabling more targeted policy recommendations for each nation's economic and institutional context. Furthermore, we categorize banks by governance structure (public, private, foreign, local) to investigate how ownership and risk orientation may shape sectoral lending patterns (Claessens and Kose, 2018). Finally, we include both macroeconomic indicators (e.g., political stability, GDP growth) and bank-specific characteristics (e.g., profitability, refinancing dependency, non-performing loans) to ensure that our findings reflect genuine policy impacts rather than broader economic or institutional factors.

Table 3: *Structure of the estimated BSVAR-X models*

Models	M1	M2	M3	M4	M5	M6
Endogenous variables $(Y_{i,j,k,t})$						
Log of credit of bank j to sector k	2	2	3			
y-o-y growth of credit of bank j to sector k				2	2	3
Policy interest rate		1	1			
y-o-y policy interest rate variation					1	1
Net Liquidity injections / annual CEMAC GDP	1		2			
y-o-y growth of net liquidity injections on annual CEMAC GDP		1		2		
Log of CPI of country i	3	3	4			
y-o-y inflation in country i				3	3	4
Exogenous variables (X_t)						
Oil prices	*	*	*			
USD/EUR exchange rate	*	*	*			
y-o-y oil prices growth				*	*	*
y-o-y USD/EUR exchange rate				*	*	*

Note: The numbers indicate the position of each variable in the vector of endogenous variables used in the recursive BSVAR-X models. Source: Authors.

Input: Data on $Y_{i,j,k,t}$, for each model v and each robustness scheme w
Output: Monetary policy shock IRFs: maximum value, 2-year cumulative, and 2-year effects
for *each model v* **do**
  for *each robustness scheme w* **do**
    Setup VAR-X model using endogenous vector $Y^w_{i,j,k,t}$ and exogenous vector X^w_t;
    Estimate coefficients using Bayesian approach with Sims and Zha prior to obtain the BVAR-X model ;
    Impose the restriction on the BVAR-X coefficients to obtain the BSVAR-X model corresponding to the robustness scheme w;
    Compute the IRF of the monetary policy shock using the estimated BSVAR-X;
    Store the maximum value of the IRF, the 2-year cumulative sum of the IRF, and the 2-year impact of the monetary policy shock;
  end
end

Algorithm 1: Estimation of BSVAR-X and Computation of IRF

These robustness checks are designed to rigorously test the resilience of our findings under various scenarios and assumptions. By doing so, we can confidently interpret the results and offer sound policy recommendations based on a comprehensive and scrutinized set of analyses. This thorough approach ensures that the implications of our study are both reliable and applicable to the specific economic and financial contexts of the CEMAC region.

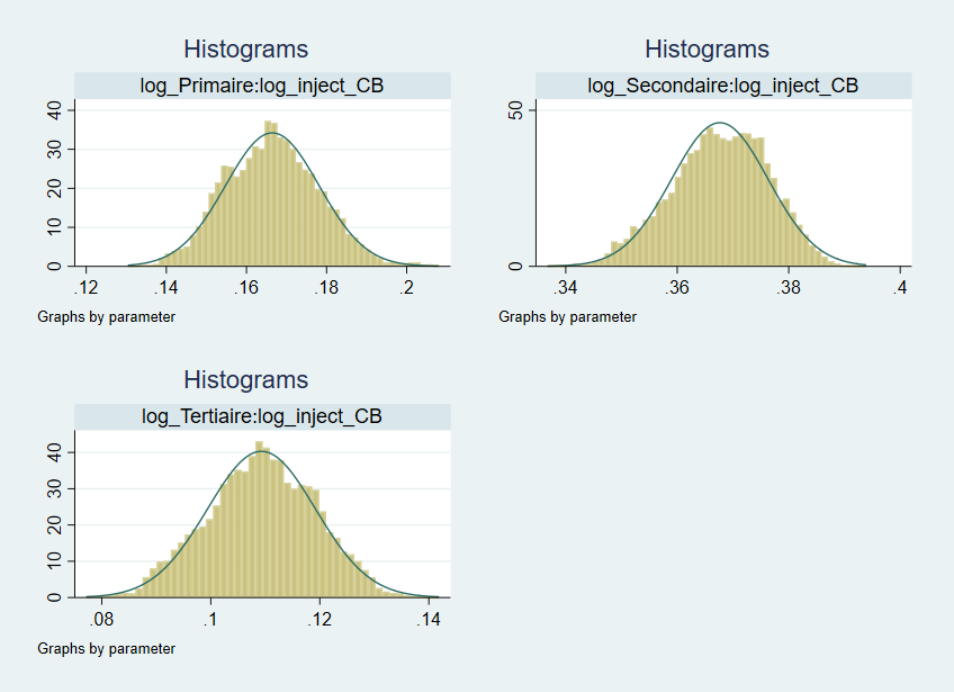
4 Results

4.1 Baseline results

4.1.1 Bayesian panel data analysis

We begin by examining sectoral impacts of liquidity injections via a Bayesian panel regression, focusing on the primary, secondary, and tertiary sectors in CEMAC. Figure 1 displays the posterior distributions of elasticity for each sector, highlighting how changes in liquidity influence output.

Figure 1: *Posterior Distributions of Elasticity for Primary, Secondary, and Tertiary Sectors*



The primary sector's mean elasticity is 0.16, reflecting moderate sensitivity to liquidity shifts. Such responsiveness likely stems from this sector's foundational role and relatively predictable demand. By contrast, the secondary (industrial) sector exhibits a higher mean elasticity of 0.36, suggesting it is notably capital-dependent and more reactive to monetary stimuli. Its tight posterior distribution underscores a consistent, robust response pattern. Meanwhile, the tertiary sector's mean elasticity of 0.12 implies lower sensitivity, consistent with services relying less on large capital injections.

Comparing elasticities reveals distinct asymmetries across sectors. The secondary sector's high elasticity points to greater leverage of liquidity-based policy measures in stimulating industrial growth. In contrast, the more modest responses of primary and tertiary sectors indicate a need for targeted interventions if policymakers wish to achieve commensurate effects there. Such differentiation underscores the importance of aligning policy tools with sector-specific structures.

Overall, these results highlight that uniform monetary actions produce uneven outcomes in CEMAC. Policymakers should account for sector-level variations to enhance stability and foster

balanced growth. The narrow confidence intervals around the posterior means indicate that these elasticities are estimated with relative precision, bolstering confidence in predicting how liquidity injections affect different areas of the economy. By capturing the nuanced responses of each sector, officials can better calibrate policy, particularly if industrial expansion or diversification is a strategic priority.

4.1.2 Bayesian VAR Analysis

We estimated six Bayesian VAR models (M1–M6) to compare how nine CEMAC sectors respond to monetary policy shocks before and after reforms, using both Choleski and sign/zero restrictions. The results confirm an asymmetrical effect of liquidity injections on credit, as some sectors—like Agriculture, Manufacturing, Utilities, Construction, Trade, and Community Services—experience stronger or more consistent gains, while Extractive Industries remain volatile and Financial/Real Estate shows mixed outcomes. Overall, monetary shocks still produce predominantly positive impacts, which reforms have amplified for most sectors, underscoring the need for sector-targeted policies to address these divergent credit responses.

Table 4: *Posterior Distributions of Maximum Cumulative Two-Year Effects of a Monetary Policy Shock by Sector (Model M1)*

Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Agriculture, livestock, hunting, forestry and fishing				
95% lower bound	-0.013	-0.012	-0.008	-0.011
median	0.025	0.012	0.020	0.029
95% upper bound	0.227	0.035	0.049	0.069
Extractive industries				
95% lower bound	-0.176	-0.009	-0.005	-0.032
median	0.014	0.015	0.023	0.007
95% upper bound	0.052	0.038	0.052	0.047
Manufacturing industries				
95% lower bound	-0.112	-0.014	-0.010	-0.030
median	0.007	0.010	0.019	0.009
95% upper bound	0.047	0.034	0.048	0.050
Production - distribution of electricity, gas, steam, water				
95% lower bound	-0.166	0.004	0.003	-0.015
median	0.029	0.027	0.031	0.025
95% upper bound	0.069	0.052	0.059	0.065
Construction and public works				
95% lower bound	0.016	0.020	0.031	0.032
median	0.058	0.043	0.058	0.071
95% upper bound	0.095	0.068	0.086	0.111
Wholesale and retail, restaurants and hotels				
95% lower bound	-0.117	0.038	0.045	0.003
median	0.077	0.062	0.073	0.041
95% upper bound	0.116	0.086	0.101	0.082

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Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Transport activities auxiliary to transport and telecommunications				
95% lower bound	0.036	0.026	0.040	-0.023
median	0.073	0.050	0.068	0.017
95% upper bound	0.129	0.073	0.097	0.056
Activities of financial institutions, real estate business, production of business				
95% lower bound	-0.128	-0.002	-0.006	-0.013
median	0.022	0.021	0.021	0.025
95% upper bound	0.061	0.044	0.050	0.065
Production of community, social and personal services				
95% lower bound	-0.070	0.020	0.004	0.006
median	0.054	0.042	0.033	0.045
95% upper bound	0.092	0.066	0.061	0.085

Table 5: *Posterior Distributions of Maximum Cumulative Two-Year Effects of a Monetary Policy Shock by Sector (Model M2)*

Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Agriculture, livestock, hunting, forestry and fishing				
95% lower bound	-0.041	0.009	0.005	-0.007
median	0.033	0.024	0.016	0.016
95% upper bound	0.058	0.041	0.026	0.039
Extractive industries				
95% lower bound	-0.073	-0.003	0.003	-0.019
median	0.013	0.014	0.014	0.003
95% upper bound	0.040	0.031	0.025	0.026
Manufacturing industries				
95% lower bound	-0.265	-0.024	-0.006	-0.018
median	0.005	0.005	0.004	0.006
95% upper bound	0.029	0.027	0.015	0.029
Production - distribution of electricity, gas, steam, water				
95% lower bound	-0.014	-0.009	-0.010	-0.015
median	0.013	0.009	0.001	0.009
95% upper bound	0.155	0.032	0.011	0.031
Construction and public works				
95% lower bound	-0.007	-0.008	-0.004	0.019
median	0.019	0.008	0.007	0.042
95% upper bound	0.143	0.026	0.017	0.064
Wholesale and retail, restaurants and hotels				
95% lower bound	-0.188	-0.003	-0.005	-0.010
median	0.017	0.017	0.006	0.012
95% upper bound	0.043	0.034	0.017	0.036

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Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Transport activities auxiliary to transport and telecommunications				
95% lower bound	-0.010	-0.005	-0.007	-0.014
median	0.016	0.011	0.003	0.008
95% upper bound	0.164	0.028	0.014	0.032
Activities of financial institutions, real estate business, production of business				
95% lower bound	-0.170	-0.007	-0.001	-0.010
median	0.016	0.014	0.010	0.013
95% upper bound	0.042	0.033	0.020	0.036
Production of community, social and personal services				
95% lower bound	0.022	0.023	-0.003	-0.002
median	0.047	0.042	0.007	0.021
95% upper bound	0.248	0.060	0.018	0.044

Table 6: *Posterior Distributions of Maximum Cumulative Two-Year Effects of a Monetary Policy Shock by Sector (Model M3)*

Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Agriculture, livestock, hunting, forestry and fishing				
95% lower bound	0.016	-0.002	-0.042	-0.005
median	0.039	0.013	0.015	0.016
95% upper bound	0.066	0.026	0.056	0.039
Extractive industries				
95% lower bound	-0.059	-0.047	-0.172	-0.019
median	0.012	0.007	0.011	0.003
95% upper bound	0.036	0.021	0.027	0.025
Manufacturing industries				
95% lower bound	-0.169	-0.138	-0.504	-0.017
median	0.004	0.005	0.001	0.006
95% upper bound	0.027	0.020	0.017	0.028
Production - distribution of electricity, gas, steam, water				
95% lower bound	-0.011	-0.011	-0.013	-0.013
median	0.013	0.004	0.003	0.009
95% upper bound	0.075	0.039	0.206	0.031
Construction and public works				
95% lower bound	-0.006	-0.007	-0.006	0.017
median	0.017	0.007	0.010	0.040
95% upper bound	0.044	0.066	0.222	0.063
Wholesale and retail, restaurants and hotels				
95% lower bound	-0.055	-0.039	-0.264	-0.009
median	0.019	0.005	0.004	0.012
95% upper bound	0.043	0.019	0.019	0.034

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Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Transport activities auxiliary to transport and telecommunications				
95% lower bound	-0.013	-0.009	-0.011	-0.013
median	0.011	0.007	0.006	0.009
95% upper bound	0.033	0.094	0.283	0.031
Activities of financial institutions, real estate business, production of business				
95% lower bound	-0.017	-0.049	-0.204	-0.010
median	0.017	0.005	0.007	0.013
95% upper bound	0.040	0.019	0.022	0.034
Production of community, social and personal services				
95% lower bound	0.025	0.013	-0.007	-0.002
median	0.047	0.027	0.008	0.020
95% upper bound	0.184	0.090	0.289	0.041

Table 7: *Posterior Distributions of Maximum Cumulative Two-Year Effects of a Monetary Policy Shock by Sector (Model M4)*

Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Agriculture, livestock, hunting, forestry and fishing				
95% lower bound	-0.081	0.046	0.000	-0.023
median	0.020	0.092	0.017	0.012
95% upper bound	0.050	0.139	0.035	0.154
Extractive industries				
95% lower bound	-0.078	-0.003	0.001	-0.115
median	0.020	0.045	0.019	-0.004
95% upper bound	0.051	0.091	0.038	0.036
Manufacturing industries				
95% lower bound	-0.050	-0.012	-0.011	-0.293
median	0.007	0.035	0.008	-0.003
95% upper bound	0.038	0.080	0.026	0.042
Production - distribution of electricity, gas, steam, water				
95% lower bound	-0.082	-0.001	-0.010	-0.019
median	0.010	0.045	0.008	0.017
95% upper bound	0.042	0.093	0.026	0.130
Construction and public works				
95% lower bound	-0.050	0.043	-0.004	0.017
median	0.033	0.088	0.014	0.056
95% upper bound	0.064	0.133	0.032	0.139
Wholesale and retail, restaurants and hotels				
95% lower bound	0.000	0.020	0.003	-0.134
median	0.039	0.068	0.022	0.003
95% upper bound	0.069	0.113	0.039	0.044

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Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Transport activities auxiliary to transport and telecommunications				
95% lower bound	0.027	0.051	0.010	-0.035
median	0.059	0.098	0.028	0.010
95% upper bound	0.206	0.144	0.046	0.389
Activities of financial institutions, real estate business, production of business				
95% lower bound	-0.150	-0.009	-0.011	-0.212
median	0.002	0.037	0.007	-0.001
95% upper bound	0.033	0.085	0.025	0.042
Production of community, social and personal services				
95% lower bound	-0.114	0.046	-0.014	-0.077
median	0.008	0.092	0.004	-0.001
95% upper bound	0.039	0.138	0.022	0.039

Table 8: *Posterior Distributions of Maximum Cumulative Two-Year Effects of a Monetary Policy Shock by Sector (Model M5)*

Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Agriculture, livestock, hunting, forestry and fishing				
95% lower bound	0.008	0.049	0.005	-0.011
median	0.028	0.111	0.032	0.006
95% upper bound	0.047	0.171	0.097	0.023
Extractive industries				
95% lower bound	0.003	0.007	-0.052	-0.010
median	0.023	0.069	0.016	0.007
95% upper bound	0.043	0.128	0.040	0.024
Manufacturing industries				
95% lower bound	-0.019	-0.010	-0.156	-0.014
median	0.003	0.052	0.000	0.004
95% upper bound	0.024	0.112	0.025	0.021
Production - distribution of electricity, gas, steam, water				
95% lower bound	-0.014	0.011	-0.012	-0.012
median	0.008	0.073	0.012	0.005
95% upper bound	0.030	0.134	0.060	0.023
Construction and public works				
95% lower bound	-0.002	0.073	-0.007	0.010
median	0.018	0.133	0.014	0.027
95% upper bound	0.039	0.194	0.038	0.044
Wholesale and retail, restaurants and hotels				
95% lower bound	0.014	0.121	-0.013	0.001
median	0.033	0.181	0.033	0.017
95% upper bound	0.053	0.243	0.056	0.034

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Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Transport activities auxiliary to transport and telecommunications				
95% lower bound	-0.008	0.088	-0.002	-0.016
median	0.011	0.150	0.023	0.002
95% upper bound	0.031	0.209	0.120	0.019
Activities of financial institutions, real estate business, production of business				
95% lower bound	-0.007	0.004	-0.058	-0.013
median	0.012	0.064	0.006	0.004
95% upper bound	0.031	0.123	0.029	0.021
Production of community, social and personal services				
95% lower bound	0.008	0.096	-0.007	0.003
median	0.029	0.157	0.016	0.021
95% upper bound	0.061	0.219	0.055	0.038

Table 9: *Posterior Distributions of Maximum Cumulative Two-Year Effects of a Monetary Policy Shock by Sector (Model M6)*

Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Agriculture, livestock, hunting, forestry and fishing				
95% lower bound	0.010	0.055	-0.062	-0.014
median	0.028	0.114	0.023	0.009
95% upper bound	0.047	0.173	0.047	0.080
Extractive industries				
95% lower bound	0.003	0.014	-0.002	-0.208
median	0.022	0.072	0.021	0.003
95% upper bound	0.040	0.131	0.094	0.026
Manufacturing industries				
95% lower bound	-0.012	-0.007	-0.281	-0.396
median	0.006	0.052	0.000	0.000
95% upper bound	0.025	0.111	0.023	0.024
Production - distribution of electricity, gas, steam, water				
95% lower bound	-0.014	0.014	-0.013	-0.013
median	0.004	0.071	0.011	0.009
95% upper bound	0.023	0.131	0.221	0.075
Construction and public works				
95% lower bound	-0.003	0.046	-0.020	-0.028
median	0.015	0.103	0.012	0.023
95% upper bound	0.033	0.162	0.044	0.046
Wholesale and retail, restaurants and hotels				
95% lower bound	0.016	0.122	-0.070	-0.112
median	0.034	0.180	0.033	0.012
95% upper bound	0.053	0.239	0.057	0.036

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Sector	Choleski BSVAR	Sign & Zero rest. BSVAR	Chol. Before reform	Chol. After reform
Transport activities auxiliary to transport and telecommunications				
95% lower bound	-0.007	0.065	-0.181	-0.019
median	0.011	0.126	0.014	0.005
95% upper bound	0.030	0.185	0.038	0.153
Activities of financial institutions, real estate business, production of business				
95% lower bound	-0.006	0.009	-0.189	-0.139
median	0.012	0.068	0.005	0.000
95% upper bound	0.031	0.126	0.030	0.024
Production of community, social and personal services				
95% lower bound	0.010	0.109	-0.170	-0.001
median	0.028	0.170	0.011	0.024
95% upper bound	0.047	0.224	0.037	0.207

4.2 Robustness checks

4.2.1 Alternative identification schemes

We compare two identification methods—Choleski BSVAR and Sign & Zero restrictions BSVAR—to test how monetary policy shocks affect each CEMAC sector, finding notable differences that can guide more nuanced policy choices. Under the Choleski approach, sectors like Agriculture often register moderate positive responses, while Extractive Industries can even show negative outcomes in certain periods. By contrast, Sign & Zero restrictions typically yield stronger or more consistently positive effects, revealing greater sectoral sensitivity and variation. In Manufacturing, for instance, Choleski indicates relatively modest gains, whereas Sign & Zero points to a more pronounced positive impact. Similar divergences emerge across sectors such as Electricity, Construction, Trade, Transport, Financial Services, and Community Services, highlighting the importance of considering both methods' insights. Overall, these discrepancies underscore the value of tailoring policy to each sector's unique characteristics and monitoring outcomes under different identification constraints to refine forecasts and interventions.

4.2.2 Impact of Monetary Policy Reforms on Sectoral Responses

Following reforms transitioning from monetary to interest rate targeting—and the development of money and treasury bond markets—many CEMAC sectors now show heightened sensitivity to monetary policy, reflecting improved liquidity and stronger financial intermediation. Agriculture, Manufacturing, Utilities, Construction, and Community Services generally respond more positively, thanks to easier credit and stable rates that foster investment. By contrast, Extractive Industries exhibit reduced sensitivity, likely overshadowed by global price shifts, and Transport's reaction is tempered by longer investment horizons. Financial Institutions and Real Estate remain relatively muted, possibly due to structural factors. Overall, reforms do not uniformly benefit all sectors, but continued policy enhancements, expanded credit access, and deeper financial markets can strengthen overall transmission.

4.2.3 Country differences

Table 11 reveals that Cameroon serves as a moderate baseline for central bank liquidity effects, with the Central African Republic showing stronger primary and secondary responses. Congo exhibits negative deviations across all sectors, Gabon features even larger negatives, and Equatorial Guinea remains mostly negative except for a small dip in primary. Chad's variations are minor, though its secondary sector surpasses Cameroon's baseline. Overall, the secondary sector benefits most, followed by tertiary, then primary—underscoring how distinct economic structures and institutional factors demand tailored policy interventions in each country.

Table 10: *Bayesian Regression Results: Country Effects on Sectoral Impacts of Monetary Policy in CEMAC*

	Primary Sector		**Secondary Sector**		**Tertiary Sector**	
Variable	Mean (Median)	Std. Dev.	Mean (Median)	Std. Dev.	Mean (Median)	Std. Dev.
Central bank liquidity injection (Cameroon)	0.1891 (0.1851) [0.1463, 0.2496]	0.0271	0.2642 (0.2641) [0.2499, 0.2807]	0.0079	0.2008 (0.2007) [0.1626, 0.2341]	0.0176
Country difference (Central African Republic)	0.1567 (0.1571) [0.0777, 0.2349]	0.0415	0.0747 (0.0754) [0.0266, 0.1147]	0.0214	0.0255 (0.0239) [-0.0250, 0.0798]	0.0264
Country difference (Congo)	-0.0553 (-0.0654) [-0.0766, -0.0263]	0.0124	-0.0093 (-0.0124) [-0.0435, 0.0254]	0.0248	-0.0464 (-0.0643) [-0.1340, -0.0076]	0.0361
Country difference (Gabon)	-0.2129 (-0.2096) [-0.2395, -0.1942]	0.0161	-0.2371 (-0.2361) [-0.2607, -0.2183]	0.0181	-0.0696 (-0.2059) [-0.1233, -0.0404]	0.0323
Country difference (Equatorial Guinea)	-0.0398 (-0.0406) [-0.0938, 0.0186]	0.0287	-0.2252 (-0.2255) [-0.3004, -0.1486]	0.0394	-0.1387 (-0.1386) [-0.2135, -0.0624]	0.0379
Country difference (Chad)	-0.0282 (-0.0176) [-0.1186, 0.0741]	0.0384	0.0059 (0.0072) [-0.3095, 0.0943]	0.0166	-0.0073 (-0.0093) [-0.0471, -0.0498]	0.0244
Constant	757.75 (756.68) [746.24, 774.13]	7.41	749.08 (748.52) [736.61, 762.24]	7.11	1059.92 (1059.55) [1059.55, 1060.35]	205.3
Paysx U0:sigma2	50627.37 (37488.38) [11592.21, 168101.2]	51648.2	101628.2 (75740.9) [27688.01, 330258.3]	104859.9	10888.23 (8067.72) [2721.23, 35738.38]	10688.02
e.log_Sector sigma2	1801.19 (1777.66) [1594.63, 2201.84]	145.27	1376.74 (1360.76) [1222.65, 1661.64]	105.73	1160.23 (1147.99) [1031.27, 1391.32]	86.39

Note: The values in parentheses are the medians, and the 95% credible intervals are provided below each mean value.

5 Discussion

Our findings confirm significant sectoral asymmetries in how monetary policy shapes credit allocation in CEMAC. Such disparities invite debate on whether to leave them unaddressed or adopt targeted strategies to manage them. Below, we explore three approaches: laissez-faire (Section 5.1), corrective measures (Section 5.2), and an active policy stance (Section 5.3).

5.1 Laissez-faire approach

One view is that sectoral asymmetries reflect a "natural" market outcome and need no intervention. This stance, in line with neoclassical notions of market neutrality, holds that central banks should not steer credit toward specific sectors (Greenfield and Yeager 1983; Chuku 2020; Mill 2020). A hands-off policy preserves autonomy and credibility, focusing the central bank on price stability rather than sectoral policy. Indeed, central bank independence has often proven essential for macroeconomic stability, as highlighted by Arnone et al. 2009, Cukierman 2006, Tullio and Ronci 1997, Kydland and Prescott (1977), and Rogoff (1985). Avoiding sectoral targeting may thus minimize political pressures (Di Pace and Görtz 2021; Cantelmo and Melina 2023).

Historically, the BEAC phased out directed credit policies after the 1980s–90s crises to ensure credit allocation remained market-based. However, our results (Section 4) show that, intentionally or not, monetary policy does create sectoral effects. Given the region's heterogeneous structures—varying development levels, financial depths, and institutional capacities (Anagnostou and Papadamou 2016; Jaccard 2024)—these unintended biases can exacerbate imbalances and inequalities.

Bernanke and Gertler (1995) note that differential access to credit fosters a financial accelerator, affecting specific industries more severely. Kreamer 2022 and Ida 2020 underscore how ignoring sectoral dynamics can undermine broader economic stability. Hence, even if the BEAC aims to remain neutral, the evidence suggests active consideration of sectoral outcomes is warranted. The next sections examine options for addressing these asymmetries.

5.2 Correct monetary policy eviction bias

Because monetary policy produces unintended sectoral imbalances, the central bank could adopt corrective measures to align ex-ante neutrality with ex-post outcomes. Drawing on public economics ideas like Pigovian taxes (Hindriks and Myles 2006; Salanié 2003), the BEAC might tailor credit or adjust rates in under-stimulated sectors—such as services or agriculture—to balance the distribution of monetary policy effects (Atkinson and Stiglitz 2015; Santoro et al. 2014).

However, operationalizing these corrections is difficult. Sectoral asymmetries vary widely across CEMAC countries, complicating efforts to fine-tune monetary actions for absolute ex-post neutrality. Moreover, BEAC's mandate does not explicitly define neutrality as a direct policy goal. Past analyses reveal that intended policy targets often diverge from actual outcomes (Bruha and Tonner 2018; Ottaviani and Wickelgren 2011). Neither official frameworks nor statutes prominently endorse market neutrality (Tol 2022; Grübler and Reiter 2021).

Still, actively mitigating distortions without aiming for full neutrality remains possible. Introducing specialized instruments or credit facilities for disproportionately affected areas can address major imbalances without compromising broader objectives. Studies show quantity-based measures sometimes exert more powerful effects than price-based approaches (Shi et al. 2018). Indeed,

transmission can be asymmetric, with policy shocks hitting certain sectors harder depending on local conditions (Ca' Zorzi et al. 2023). Accounting for this nonlinearity (Bui and Kiss 2020; Park 2019) may enhance policy effectiveness. In short, acknowledging sectoral asymmetries and adopting targeted fixes could help the BEAC achieve both equity and economic stability across CEMAC.

5.3 Adopt active monetary policy

Because monetary policy impacts sectors unevenly, the BEAC could move beyond presumed neutrality and actively direct credit toward those sectors best aligned with its objectives (Kreamer 2022; Dixon et al. 2023). Sectoral credit allocation strongly influences domestic supply, demand, inflation, and external balances (Jansen et al. 2013; Di Pace and Görtz 2021; Singh et al. 2022). Stimulating capital-intensive sectors may lower inflationary pressures by boosting productivity, while favoring industries with lower import dependencies can improve currency stability (Cong et al. 2019; Osigwe et al. 2017; Basnet and Upadhyaya 2015).

Though some view this as a break from monetary orthodoxy—recalling the abandonment of directed credit in the 1990s—contemporary scholarship increasingly supports proactive central-bank roles, including sectoral guidance (Li et al. 2021; Petrin and Sivadasan 2013). Climate policy offers a leading example: many experts argue central banks should support "green" sectors and discourage high-carbon industries (Boneva et al. 2022; Svartzman et al. 2021; Campiglio et al. 2018). Similarly, in a developing context like CEMAC, the BEAC could adopt instruments to enhance sectors essential for long-term resilience or foreign-exchange stability (Kranz, Bennani, and Neuenkirch 2024; Ma and Chang 2023; Migliorelli and Dessertine 2018).

Granted, an active stance may reduce the BEAC's apparent detachment from political economy, but central banks inevitably shape economic structures by setting interest rates and exchange policies (Arnone et al. 2009). In CEMAC, heated debates on key rates and FX rules underscore the bank's unavoidable role. Autonomy remains vital: the BEAC should coordinate policy with member states while safeguarding its core mandate. However, recent shocks—like COVID-19 and the Russo-Ukrainian crisis—reveal the dangers of lacking robust domestic sectors. Chronic deficits in key goods both strain foreign reserves and fuel inflationary pressures.

In sum, adopting a more active monetary policy could help the BEAC mitigate sectoral asymmetries and leverage its tools to promote durable, inclusive growth across the region. By aligning credit flows with strategic goals, the bank might better navigate supply vulnerabilities, stabilize prices, and foster a resilient economic foundation throughout CEMAC.

6 Conclusion

This essay examined how monetary policy influences sectoral credit allocation in Central Africa, finding that different sectors respond unevenly to policy actions. Manufacturing and services are most responsive, while primary sectors show lower elasticity. For instance, a 1% rise in liquidity prompts a 0.36% manufacturing output increase, compared to more modest gains in agriculture and tertiary activities. Such evidence underscores the need for a sector-focused policy lens to achieve balanced growth.

Overall, these results deepen our understanding of monetary transmission. High manufacturing sensitivity suggests that targeted measures—such as reducing borrowing costs or broadening credit access—could spur industrial expansion. Meanwhile, the comparatively weak responses of agriculture and services signal the necessity of more tailored incentives to boost these areas. Narrow

posterior distributions imply our estimates are reliable, offering policymakers confidence in designing interventions.

These findings also align with the broader research goal of understanding how monetary policy fosters economic development in Central Africa. By pinpointing the sectors most affected by policy shifts, we highlight potential leverage points for stimulating growth. Future recommendations and interventions can thus be more precisely aimed at specific industries, enhancing overall policy impact.

Notably, this approach carries several implications. Manufacturing's positive response suggests an opportunity to harness liquidity-driven growth. In contrast, agriculture or low-sensitivity services may demand specialized support to realize comparable benefits. Policymakers can incorporate these sectoral insights into broader frameworks, refining monetary tools to avoid unintended imbalances and to maximize effectiveness across the region.

Nonetheless, certain limitations remain. Data scarcity, especially regarding informal credit, restricts our analysis to the formal sector. Extending datasets to capture unregulated finance could yield a fuller picture of policy impacts. Additionally, country-level differences in institutional capacity and financial systems may shape policy effectiveness. Future studies should investigate these nuances, potentially enabling more accurate targeting of monetary interventions.

In sum, while demonstrating that monetary policy can significantly affect the sectoral distribution of credit, this essay underscores the importance of tailoring interventions. By addressing sector-specific needs—particularly given the varying degrees of sensitivity—policymakers in CEMAC can better support inclusive and sustainable economic growth.

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