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To What Extent Does Central Bank Independence Alleviate Poverty in Developing Countries?

Abstract: This paper investigates the nexus between poverty and central bank independence in developing countries. The study examines data from up to 35 developing countries from 2000 to 2018. Using the GMM dynamic panel data method, the study finds that de jure central bank independence is more robust than de facto in reducing inflation. However, the effect of de facto central bank independence is significant in reducing poverty, while de jure central bank independence is not. The paper concludes that central bank independence may play a role in managing inflation in developing countries with high inflation and could relatively contribute to poverty reduction in these countries.

Keywords: Central Bank Independence, Monetary Policy, Inflation, Poverty, Developing countries.

JEL Classification: E52, E58, E42, O11, P64, C33.

Introduction

Poverty is undoubtedly one of the most pressing issues faced by developing countries. It has been suggested that inflation increases the cost of living, which arguably affects the poor more severely than the rich (Easterly & Fischer, 2001). One key aspect is that the affluent, who possess greater financial resources and knowledge, are more likely to have access to sophisticated financial instruments that provide protection against inflation (Dyner, Skinner & Zeldes, 2004). On the contrary, the poor typically have smaller portfolios and limited investment

options. Consequently, a larger proportion of their assets may be held in cash or cash equivalents, which are highly susceptible to the eroding effects of inflation over time. As a result, the poor may experience a reduction in their purchasing power and struggle to maintain the same standard of living during periods of inflation.

Additionally, the income sources of the poor are often more reliant on state-determined programs that may not be fully indexed to inflation. These programs may include social assistance, minimum wage jobs, or other forms of income support. Consequently, the poor may face challenges in keeping up with rising prices, as their income fails to grow at the same pace as inflation. This disparity further exacerbates the financial burden on the poor during inflationary periods. However, while the evidence of a positive relationship between inflation and poverty on a macroscopic scale is mixed, the links are more firmly established at the household level (Easterly & Fischer, 2001).

Against this backdrop, central bank independence (CBI) has become a benchmark for appropriate monetary policy and is considered a modern economic policy tool for managing economies. While central bank independence has been adopted in practice by advanced countries, it is still in the process of implementation in developing countries. Theoretical models have shown that central bank independence is efficient in curbing inflationary pressures and solving the inconsistency problem (Kydland & Prescott, 1977; Rogoff, 1985). It is widely recognized that countries with more central bank independence tend to experience lower average inflation (Alesina & Summers, 1993a; Cukierman, Web & Neyapti, 1992; Garriga & Rodriguez, 2020), whereas those with central banks subject to direct political influence often face higher rates of inflation. The underlying reason for this relationship is relatively straightforward. When the institution responsible for conducting monetary policy operates free from political pressure, it can focus exclusively on achieving objectives such as price stability. The detachment from political influence empowers central banks to base their decisions on economic indicators and expert analysis, free from the constraints of short-sighted political factors. As a result, they can adopt a long-term perspective and implement measures aimed at controlling inflation effectively.

In recent years, there has been a growing acknowledgment among politicians from various ideological backgrounds about the significance of central bank independence. This recognition has prompted several developing countries to grant greater independence to their central banks, separating them from the direct influence of the executive and legislative branches of government. By establishing a clear mandate focused on price stability, central banks can better align

their actions with the long-term interests of the economy. This action toward granting autonomy to central banks reflects an understanding that political interference in monetary policy decisions can undermine the effectiveness of controlling inflation and maintaining a stable economic environment. Overall, the trend toward increased independence for central banks in developing countries and the prioritization of price stability as their primary goal signifies a broader recognition of the importance of monetary policy in fostering economic stability.

Considering the aforementioned, this paper examines the interaction between poverty and central bank independence, specifically focusing on the context of developing countries. Therefore, it is crucial to first reassess the relationship between central bank independence and price stability in developing countries over the last two decades before studying the implications of this dynamic on poverty alleviation.

The current study employs two types of central bank independence: De facto and De jure (Haoudi & Touati, 2023). De jure CBI involves evaluating the extent to which a central bank is free from political influence. De facto CBI focuses on the frequency of changes in central bank governors, also known as turnover rates. Empirically, we test these hypotheses using a panel dataset covering up to 35 developing countries from 2000 to 2018. The findings of this study provide moderate support for the hypothesis that independent central banks in developing countries may help to mitigate the impact of inflation on poverty.

The rest of the paper is structured as follows. In the next section, we review the related literature, providing a comprehensive examination. Following that, the third and fourth sections are dedicated to the data employed in this study, outlining the methodology, and presenting the results regarding the nexus between central bank independence and inflation, along with its interaction with poverty. Lastly, we conclude with insights and overall conclusions in the final section.

1. Literature review

1.1. Effects of CBI on inflation

When governments possess the authority to exercise discretion over monetary instruments, they hold the power to place alternative policy objectives above the preservation of price stability over the course of their governance. Politicians might find themselves enticed to employ monetary policy as a means to generate advancements in employment and output for electoral gains, thereby causing

inflation. This problem was raised by Kydland and Prescott (1977), leading to the idea of delegating monetary policy to independent central banks to protect central bankers from political pressures (Rogoff, 1985).

Numerous studies have examined the impact of central bank independence on inflation, focusing on developed and developing countries. Banaian, Laney & Willett (1986), and Cukierman et al., (1992) among others, find a negative relationship between central bank independence and inflation in developed countries, indicating that higher independence is associated with lower inflation rates. Alesina & Summers (1993a) support this finding and demonstrate that countries with independent central banks not only achieve superior inflation outcomes but also perform well in terms of real economic activity. However, the relationship between central bank independence and inflation in developing countries is less straightforward. Studies such as Cukierman et al. (1992) find no general negative relationship between legal central bank independence and inflation in developing countries. Certain correlations have been identified in various specific contexts. For instance, evidence suggests a negative relationship between central bank independence and inflation in Latin American countries, where high inflation has historically been a significant issue (Jácome & Vázquez, 2008). Similarly, in developing democracies, a negative relationship has been observed, indicating that central bank independence may play a crucial role in controlling inflation (Bodea & Hicks, 2015). Additionally, this negative relationship is consistent across various estimation methods (Anwar, 2023). While certain research has discovered a negative association between central bank independence and price stability, other studies, such as the one conducted by Alesina and Summers (1993a), present alternative perspectives finding no statistically significant impact. Others, including those by Arnone and Romelli (2013), have presented ambiguous findings regarding the relationship between central bank independence and inflation. Recently, Baumann, Schomaker & Rossi (2021) challenged the hypothesis that sustained that CBI inherently leads to lower inflation. Similarly, Rossi (2022) argues that price stability is not solely a consequence of inflation targeting by an independent central bank but may also be influenced by broader factors such as globalization and financialization. The relationship between CBI and inflation is complex, and some theoretical studies suggest it may depend on social and political factors that differ between developed and developing economies (Petrevski, Bogoev & Sergi, 2012). These differences significantly limit the applicability of standard CBI literature across different economic contexts. However, since the financial crisis of 2008, research on central bank independence has shifted its focus to the impacts of central banks on income distribution (Aklin, Kern & Negre, 2021; Khan & Khan, 2023; Rabhi & Parsons, 2024; Fawaz & Rahnamamoghadam, 2024).

Despite mixed results and the heated debate, sweeping reforms have been enacted worldwide to enhance the autonomy of central banks. These reforms have been instrumental in empowering central banks with the authority to determine policy objectives and utilize appropriate tools. At the same time, they have imposed limitations on the extent to which central banks can finance governments, all in a bid to maintain control over money supply and keep inflation in check.

1.2. Effects of inflation on poverty

The relationship between poverty and inflation is multidimensional, with various factors influencing their interaction. One crucial aspect to consider is that individuals living in poverty allocate a significant portion of their income towards essential goods and services, such as food. Therefore, when there is an increase in food prices, it directly impacts the purchasing power of the poor, leading to a decrease in their ability to afford other non-essential goods. Another factor that affects the relationship between poverty and inflation is the disparity in financial resources between the poor and the wealthy. Affluent individuals often have the means to diversify their investments during periods of high inflation, such as investing in gold or other interest-bearing assets. However, those living in poverty face limited resources and lack the financial capacity to engage in such investments. Consequently, they are more vulnerable to the negative effects of inflation (Mulligan & Sala-i-Martin, 2000; Erosa & Ventura, 2002).

Additionally, it is important to recognize that certain benefits provided to alleviate poverty, such as unemployment benefits, indexed wages, or inflation-proof benefits such as health insurance are not indexed to inflation in many cases (Bulíř, 2001). This means that as prices rise due to inflation, the purchasing power of these benefits diminishes. Consequently, the poor face a double burden, as their already limited financial support does not adequately adjust to compensate for the rising costs of living. This exacerbates the challenges faced by individuals in poverty and intensifies the impact of inflation on their well-being.

A plethora of scholarly works have extensively analysed the repercussions associated with inflation. Easterly and Fischer (2001) using a survey on 38 countries found evidence that supports the view that inflation makes the poor worse off. Cardoso (1992) concentrates on the impact of inflation tax on individuals already living below the poverty line in Latin America. The author posits that these individuals are minimally affected due to their negligible cash holdings. However, Cardoso does find a negative association between higher inflation and real wages in a panel of seven Latin American countries. Another noteworthy piece of

evidence is provided by (Rezende, 1998) who highlights the steady increase in Brazil's Gini coefficient during the inflation-ridden 1980s, followed by a decline during the successful inflation stabilization period of 1994-1996.

In a comprehensive study spanning across different states and time periods in India, Datt and Ravallion (2002) establish a positive correlation between elevated inflation rates and increased poverty rates. Their findings indicate that regions experiencing higher inflation tend to exhibit higher poverty rates. Romer and Romer (1997) put forth the proposition that the impact of inflation on incomes of the impoverished may vary when considering cyclical and long-term perspectives. In the short term, an unforeseen surge in inflation is associated with a decline in unemployment, which can potentially have relatively advantageous consequences for the less privileged. Nevertheless, it is crucial to recognize that inflation alone cannot consistently alleviate unemployment in a sustainable manner, which may ultimately undermine its impact on impoverished communities. Even when considering the cyclical nature of economic fluctuations, Romer and Romer's research reveals that the influence of unemployment on income distribution was more conspicuous in earlier periods, in contrast to the 1990s.

Although numerous studies have scrutinized the connection between inflation and poverty, as well as inflation and central bank independence, a notable gap remains in the research landscape. Specifically, there is currently a dearth of studies dedicated to exploring the role of CBI in shaping the relationship between inflation and poverty.

2. Data and methodology

This section presents a study that examines the relationship between central bank independence (CBI), inflation, and their impact on poverty in a sample of 35 developing countries from 2000 to 2018. The study adopts a dynamic panel data approach, which enables the examination of both time series and cross-sectional variations in the data. By incorporating lagged variables, the analysis captures the intertemporal dynamics of inflation and its determinants. This approach allows for a more comprehensive understanding of the relationship between CBI and inflation over an extended period, while controlling for other relevant factors that influence inflation outcomes. Furthermore, the study goes beyond analysing the direct relationship between CBI and inflation by considering the interaction between CBI and inflation in their impact on poverty.

To measure CBI, two different indicators are utilized: De jure CBI and De facto CBI. De jure CBI is obtained from the Romelli CBI dataset (Romelli, 2022), which provides an index of legal CBI based on the work of Cukierman et al. (1992). This index is constructed using 16 legal indicators related to the tenure of central bank governors, policy formulation, limitations on lending to the government, and the central bank's focus on price stability. A higher value on the index indicates greater central bank independence.

In addition to De jure CBI, De facto CBI is captured by considering the irregular turnover of central bankers. This measure, based on the work of de Haan & Sturm (2017), takes into account the frequency at which central bank governors are replaced. Higher turnover rates suggest lower De facto CBI, indicating a higher degree of political influence on monetary policy.

Inflation, on the other hand, is a critical macroeconomic variable that affects economic stability and individuals' well-being, particularly in developing countries. High inflation rates can erode purchasing power, reduce real incomes, and exacerbate poverty levels. Understanding the factors that influence inflation dynamics is essential for designing effective monetary policies and promoting economic development.

The analysis explores the interaction effects of CBI and inflation on poverty, considering other factors such as GDP per capita, unemployment, and trade openness. Data on inflation are sourced from the World Bank (World Bank, 2019), which provides comprehensive and reliable information on inflation rates for a wide range of countries. The inflation variable serves as the main dependent variable in the analysis, representing the rate of change in the general price level over time.

To assess the impact of the interaction between CBI and inflation on poverty, poverty data is obtained from the World Bank. The poverty measure utilized in this study is the Poverty headcount ratio at \$5.50 a day (2011 PPP) representing the average shortfall in consumption or income from the poverty line. Poverty data is collected at the country level and covers the time span from 2000 to 2018. Additional control variables are included in the analysis to account for other factors that may influence inflation and poverty outcomes. These variables include GDP per capita, unemployment rates, and trade openness. GDP per capita serves as a proxy for the overall economic development of the countries in the sample. Unemployment rates capture the labour market conditions, while trade openness reflects the extent of a country's integration into international trade.

The empirical analysis utilizes various econometric techniques, to estimate the relationships between CBI, inflation, and poverty. We used Arellano-Bond dynamic panel-data estimation which is a statistical technique used to estimate the parameters of dynamic panel data models. It is based on the generalized method of moments (GMM) and is commonly used to account for endogeneity, serial correlation, and other issues that arise in the analysis of panel data (Arellano and Bond, 1991). We also run the GMM robust standard errors for robustness check which is another estimation technique used to account for issues such as heteroscedasticity, serial correlation, and clustering in the data. It is a method for estimating standard errors that is robust to violations of the assumptions underlying ordinary least squares (OLS) regression (Hansen, 1982).

2.1. Model 1: Effects of CBI on inflation

To answer the first research question, we adopt the following macroeconomic model to examine the determinants of inflation, incorporating various factors that are believed to influence inflation dynamics. The equation takes the form:

$$\begin{aligned} Inflation_{it} = & b_0 + b_1 Inflation_{it-1} + b_2 CBI_{it} + b_3 Money\ supply_{it} + b_4 Unemployment_{it} \\ & + b_5 Interest\ rate_{it} + b_6 GDP\ per\ capita_{it} + \varepsilon_{it} \end{aligned}$$

$Inflation_{it}$ is the dependent variable, representing the inflation rate at time "t." It is influenced by several independent variables, as outlined in the equation. The lagged inflation $Inflation_{it-1}$ captures the impact of past inflation on current inflation. It suggests that inflation at time "t-1" can have a persistent influence on inflation at time "t" This implies that past inflation affects the current rate of inflation, indicating the presence of inflationary or deflationary trends (Blanchard & Galí, 2010; Sargent et al., 1975). CBI_{it} reflects the impact of the Central Bank Independence on inflation. Central bank independence refers to the degree of autonomy that a central bank has in making monetary policy decisions. A higher level of independence may enable the central bank to focus on price stability and effectively manage inflation. $Money\ supply_{it}$ is considered as a determinant of price stability. An increase in the money supply can potentially lead to higher inflation (Bernanke & Gertler, 1995; Friedman, 1982; Friedman, 1963; Mishkin, 2007; Friedman, 1970). When there is more money in circulation, it can increase aggregate demand, contributing to upward pressure on prices. $Unemployment_{it}$ can explain inflation. As per the Phillips curve concept, there exists an inverse connection between inflation and unemployment in the short term. When the level of unemployment is low, it can result in an elevation of wage pressures, consequently driving up inflation. $Interest\ rate_{it}$ plays a role in influencing infla-

tion. Changes in interest rates can affect borrowing costs, investment decisions, and aggregate demand. Higher interest rates can dampen economic activity, potentially leading to lower inflation (Galí, 2015; Svensson, 2005; Taylor, 1993). $GDP\ per\ capita_{it}$ represents the level of economic development. Higher GDP per capita indicates increased consumer spending, productivity levels, and economic activity. These factors can contribute to inflationary pressures. The error term (ε_{it}) captures factors or influences on inflation not accounted for by the included variables. This term represents the discrepancy between the predicted inflation value and the actual inflation observed in the data.

2.2. Model 2: Effects of CBI on Poverty

To answer the second research question on the impact of the interaction between CBI and inflation on poverty, the following model was adopted to examine the determinants of poverty.

$$\begin{aligned} Poverty_{it} = & b_0 + b_1 Poverty_{it-1} + b_2 Inflation_{it} + b_3 CBI_{it} \\ & + b_4 GDP\ per\ capita_{it} + b_5 Trade\ openness_{it} + b_6 CBI * Inflation_{it} \\ & + b_7 Unemployment_{it} + \varepsilon_{it} \end{aligned}$$

$Poverty_{it}$: This is the dependent variable and represents the poverty rate at time "t." It is the variable that the model seeks to explain or predict. $Poverty_{it-1}$ explains the impact of past poverty on current poverty. It captures the idea that poverty at time "t-1" can have a persistent influence on poverty at time "t." This suggests that past poverty levels affect the current poverty rate, indicating the presence of persistent poverty conditions.

Changes in $Inflation_{it}$ can affect the purchasing power of individuals and households, which in turn can influence poverty levels. Higher inflation rates may erode the value of income and contribute to increased poverty.

Higher $GDP\ per\ capita_{it}$ indicates a higher level of economic development, which can be associated with lower poverty rates. Economic growth and higher incomes can lead to improved living standards and reduced poverty (Dollar & Kraay, 2002, 2004; Fosu, 2017).

$Trade\ openness_{it}$ refers to the degree of international trade and economic integration. Greater trade openness can provide opportunities for economic growth, job creation, and poverty reduction through increased export competitiveness and access to global markets (Rodrik & Kennedy, 2018; Topalova, 2010).

Central bank independence interaction with inflation ($CBI * Inflation_{it}$) captures the role of central bank independence in shaping the relationship between inflation and poverty. A more independent central bank may be better equipped to maintain price stability, which can have implications for poverty levels.

High levels of $Unemployment_{it}$ can contribute to poverty by limiting income opportunities and reducing household welfare. The relationship between unemployment and poverty is complex and can vary depending on other economic and social factors (Balanche, 2017; Saunders, 2002). The error term ε_{it} represents factors or influences on poverty that are not accounted for by the included variables. It represents the discrepancy between the predicted poverty rate and the actual poverty rate observed in the data.

In the following sections, we will discuss empirical results of the study, focusing on the relationships between CBI, inflation, and poverty, while considering the unique characteristics of the sample of developing countries over the period of 2000 to 2018.

3. Results and Discussion

3.1. Descriptive Statistics

Table 1 reports statistics for different variables across a sample of 664 observations. It begins with the variable "Poverty (5.5 \$)," which represents the poverty rate in percentage terms. The mean poverty rate is 31.85923%, indicating a substantial portion of the population living below the specified poverty line. The standard deviation of 24.21108 suggests considerable variability in poverty rates across the sample. Next, "GDP per capita" provides insights into the economic well-being of the population. With a mean value of 7073.609 dollars, this indicates the average economic output per person. The significant standard deviation of 5786.818 reflects substantial disparities in income levels within the sample.

The variable "Inflation" measures the average rate of price increase. The mean inflation rate of 6.687297% implies a moderate inflationary environment. However, the high standard deviation of 10.47746 indicates considerable fluctuations in price levels, potentially impacting economic stability. The highest inflation rate in the sample was registered in Belarus in 2000, hitting 168% inflation rate with a low De jure CBI score of 0.295. The "Broad money" variable, observed in 475 instances, captures the total money supply within an economy. The mean value of 17.35754 suggests a moderate level of liquidity. However, the negative minimum

and the wide range between the minimum and maximum values (-20.01024 to 219.2678) indicate potential issues with monetary stability.

The "Real Interest Rate" variable, also observed in 475 instances, represents the cost of borrowing. With a mean value of 8.781811%, it provides insights into the overall cost of capital. The substantial standard deviation of 11.66123 implies fluctuations in borrowing costs, which may impact investment and economic growth. The "CBI De jure" and "CBI De facto" variables pertain to the central bank's independence, as measured by legal provisions and actual autonomy, respectively. The mean values of .6777267 and 1.203101 suggest varying levels of central bank independence within the sample, possibly impacting monetary policy effectiveness.

The highest CBI De facto with 7 irregular turnovers was registered in Argentina, combined with a high inflation rate hitting 34.8% during the studied period. The "Unemployment" variable indicates the percentage of unemployed individuals. With a mean of 7.885726%, it suggests a relatively low unemployment rate. However, the standard deviation of 5.60967 implies variations in employment levels across the observed instances. Lastly, "Trade openness" measures the degree of international trade integration. The mean value of 80.81385 suggests a significant level of trade openness. The substantial standard deviation of 36.01612 implies variations in trade engagement, potentially impacting economic performance. The statistical measures presented offer valuable insights for further academic analysis, allowing for a more comprehensive understanding of the relationships and dynamics at play in the examined context.

Table 1: Descriptive Statistics

| Variables | No. Obs | Mean | Std. Dev | Min | Max |
|------------------|---------|----------|----------|-----------|----------|
| Poverty (5.9 \$) | 664 | 31.85923 | 24.21108 | .2389852 | 95.1749 |
| GDP per capita | 664 | 7073.609 | 5786.818 | 279.6196 | 35397.36 |
| Inflation | 664 | 6.687297 | 10.47746 | -2.096998 | 168.6202 |
| Broad money | 475 | 17.35754 | 18.14805 | -20.01024 | 219.2678 |
| Interest rate | 475 | 8.781811 | 11.66123 | -41.22955 | 93.91508 |
| CBI De jure | 664 | .6777267 | .1795699 | .142 | .912 |
| CBI De facto | 645 | 1.203101 | 1.483027 | 0 | 7 |
| Unemployment | 664 | 7.885726 | 5.60967 | .25 | 37.25 |
| Trade openness | 664 | 80.81385 | 36.01612 | 21.85226 | 168.3946 |

Source: Author's calculations

Based on the pairwise correlations from table 2, there does not seem to be any significant multicollinearity issue among the variables. The correlations are generally weak or close to zero, indicating that the variables are not highly linearly related to each other.

Table 2: Pairwise Correlations

| Variables | GDP per capita | CBI De jure | CBI De facto | Money supply | Inflation | Unemployment | Interest rate | Trade openness |
|----------------|----------------|-------------|--------------|--------------|-----------|--------------|---------------|----------------|
| GDP per capita | 1.000 | | | | | | | |
| CBI De jure | 0.082 | 1.000 | | | | | | |
| CBI De facto | 0.128 | 0.016 | 1.000 | | | | | |
| Broad money | -0.236 | -0.166 | -0.185 | 1.000 | | | | |
| Inflation | -0.179 | -0.164 | -0.091 | 0.673 | 1.000 | | | |
| Unemployment | -0.132 | 0.202 | -0.320 | 0.113 | 0.090 | 1.000 | | |
| Interest rate | -0.164 | -0.008 | -0.025 | -0.175 | -0.166 | 0.073 | 1.000 | |
| Trade openness | 0.151 | -0.110 | -0.286 | 0.081 | 0.008 | -0.419 | 0.296 | 1.000 |

Source: Author's calculations

3.2. Results on the nexus between Central Bank Independence and Inflation

Table 3 provides estimations for two different models: the De jure central bank independence (CBI) model and the De facto model. Columns 1 and 2 present the findings for the De jure CBI model, using the GMM Arellano-Bond dynamic panel-data estimation and the GMM robust standard errors for robustness check. On the other hand, columns 3 and 4 present the estimations for the De facto model using the same estimators. The De jure CBI model reveals a negative coefficient, indicating that higher central bank independence is associated with lower inflation. However, the statistical significance varies across the estimators, yet remains positive and significant. In contrast, the De facto CBI model shows a positive coefficient at 10% level, suggesting that weaker central bank independence, characterized by irregular turnover of central bank governors, is associated with higher inflation. These outcomes suggest that an independent central bank can relatively mitigate inflationary pressures. Previous studies by Cukierman et al. (1992), Garriga and Rodriguez (2020), Bodea and Hicks (2015), and Loungani and Sheets (1997) support the consensus that CBI is negatively associated with inflation, particularly in developing countries. These findings confirm the arguments presented by Barro and Gordon (1983), Kydland and Prescott (1977), Banaian et al. (1986), and Alesina and Summers (1993a). Furthermore, the negative

coefficient estimate for De jure central bank independence aligns with prior research conducted by Cukierman et al. (1992) and Alesina and Summers (1993b). The controlled variables in the analysis indicate that lagged inflation has a positive and statistically significant effect on current inflation in both the De jure CBI and De facto CBI models. Even after applying robustness checks using VCE Robust standard errors, the positive and significant relationship between lagged inflation and current inflation persists. The result aligns with previous research. For example, Ball & Sheridan (2013) found evidence of inflation persistence in the United States, suggesting that past inflation rates affect current inflation levels. This highlights the importance of considering inflation dynamics over time when formulating inflation management policies. Interest rate has a negative coefficient, suggesting that higher interest rates are associated with lower inflation. The negative coefficient estimates for interest rates and their potential to mitigate inflationary pressures is supported by economic theory. Higher interest rates, through tightening monetary policy, can reduce aggregate demand and help control inflation. Empirical studies by Taylor (1993) and Romer & Romer (1997) provide evidence of the effectiveness of interest rate policies in curbing inflation.

Money supply also has a positive and statistically significant impact suggesting that an expansion in the money supply contributes to higher inflation rates in developing countries. The positive and statistically significant coefficient estimate for money supply and its direct impact on inflation align with the widely accepted belief in monetary economics. The quantity theory of money suggests that changes in the money supply can lead to changes in the price level. Empirical studies by Mishkin (1992) and Blinder (1998) provide evidence supporting the relationship between money supply and inflation. Unemployment does not exhibit a consistent pattern in its relationship with inflation across the models, as indicated by mixed coefficients and non-significance in some cases. The relationship between unemployment and inflation is indeed subject to various factors, as indicated by mixed coefficients and non-significance in some cases. The Phillips curve framework suggests a trade-off between inflation and unemployment, but this relationship can be influenced by labour market dynamics, wage-setting mechanisms, and supply-side considerations. (Blanchard & Katz, 1999; Ball & Sheridan, 2013)

The Wald chi-square tests indicate overall model fit and the joint significance of the variables. The results show statistical significance at the 1% level, indicating that the models as a whole explain a significant portion of the variation in inflation. The Sargan's test examines the validity of the overidentifying restrictions in the GMM framework. The results do not provide sufficient evidence to reject the

validity of these restrictions. In summary, the results suggest that lagged inflation, real interest rates, money supply, and central bank independence (both De jure and De facto) are important factors influencing inflation.

Table 3: Effects of CBI on Inflation

| Variables | (1) | (2) | (3) | (4) |
|---------------------|--------------------|-------------------|--------------------|-------------------|
| | GMM | VCE | GMM | VCE |
| Lag of Inflation | .4611*** .0343 | .4450*** .0616 | .4466*** .0351 | .4627*** .0509 |
| GDP per capita | 12.001* 6.095 | 13.056 12.089 | 4.004 8.692 | 12.31* 6.500 |
| Money supply | .1653*** .0218 | .1692** .0552 | .1700*** .0224 | .1718** .0556 |
| De jure CBI | -16.96*** 6.494 | -20.49** 9.189 | | |
| De facto CBI | | | .5907* .3378 | 1.228* .6460 |
| Unemployment | .1887 .1414 | .1959 .1739 | -.5593 .3803 | .2464 .1734 |
| Interest rate | -.2865*** .0397 | -.2903** .1374 | -.2275*** .0420 | -.1939 .1219 |
| Constant | 21.34*** 6.797 | 24.41** 9.683 | .2114 1.801 | -3.984 2.976 |
| Wald chi2 | 340.49*** | 248.46*** | 335.69*** | 1155.17*** |
| No. Of observations | 400 | 400 | 400 | 400 |
| No. Of countries | 25 | 25 | 25 | 25 |
| Sargan's test | 328.90 | | 317.79 | |
| Prob > z | 0.2573 | | 0.2043 | |
| Arellano-Bond AR(2) | | -1.68 | | -1.54 |
| Prob > chi2 | | 0.10 | | 0.1215 |

Absolute value of z statistics in parentheses.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%

Source: Author's calculations

3.3. Results on the nexus between Central Bank Independence and Poverty

Table 4 presents the results of two models (CBI De jure and CBI De facto) that investigate the relationship between various factors and poverty using the headline account 5.5\$ because it's covering poverty headline account 3.2\$ and 1.9\$.

The presence of De jure CBI and its interaction with inflation do not have consistent significant effects. The second model, CBI De facto, yields relative significant results, showing a weak positive relationship with poverty. Based on our findings, low rate of irregular turnover among central bank governors, which is indicative of high central bank independence, can relatively mitigate poverty by keeping inflation rates low. The crucial factor influencing the connection between poverty and inflation is not the type of independence explicitly stated in a central bank's charter, but rather the practical choices made by a country.

Inflation has a positive effect in the CBI De facto model, suggesting that higher inflation rates may contribute to higher poverty levels. The relationship between inflation and poverty is more complex and context dependent. While moderate inflation may stimulate economic growth, high inflation can erode the purchasing power of low-income households, potentially leading to higher poverty rates (World Bank, 2019). Lag of poverty shows positive effect suggesting that lagged poverty levels can influence current poverty rates, as persistent poverty tends to have long-lasting effects on individuals and communities (Smeeding, 2016).

Moreover, GDP per capita is often considered a proxy for economic development, and higher levels of economic prosperity are generally associated with lower poverty rates (Datt & Ravallion, 2002). Conversely, unemployment exhibits a positive effect in both models, indicating that higher unemployment rates are linked to increased poverty levels.

Joblessness can limit individuals' access to income and resources, thereby increasing their vulnerability to poverty (Jenkins, 2021). Trade openness demonstrates a negative impact on poverty but only significant in the first model, implying that more open trade policies are associated with lower poverty rates. However, Trade openness can influence poverty rates by affecting job opportunities, income distribution, and access to markets (Winters, Mcculloch & Mckay, 2015).

Table 4: Effects of CBI on Poverty

| Variables | (1) CBI De jure | (2) CBI De facto |
|--------------------------|---------------------|-----------------------|
| | Poverty | Poverty |
| Lag of poverty | .8477*** (.0330) | .8307*** (.0597) |
| GDP per capita | -.0003** (.0001) | -.00027** (.00013) |
| Unemployment | .2128** (.1032) | .2544*** (.0946) |
| Trade Openness | -.0360* (.0195) | -.0326 (.0241) |
| Inflation | .0743 (.0896) | .0761* (.0413) |
| De facto CBI | | -.6325 (.4373) |
| De facto CBI x Inflation | | .0231* (.0135) |
| De jure CBI | -1.605 (4.085) | |
| De jure CBI x Inflation | .0504 (.1801) | |
| Constant | 7.478** (3.739) | 6.715 (4.367) |
| Wald chi2 | 3234.84*** | 4192.39*** |
| No. Of observations | 594 | 577 |
| No. Of countries | 35 | 34 |
| Arellano-Bond AR(2) | -.7688 | -.3010 |
| Prob > chi2 | .4420 | .7634 |

Absolute value of z statistics in parentheses.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%

Source: Author's calculations

4. Conclusion

Based on the results, it can be concluded that central bank independence could play a role in managing inflation in developing countries, thereby relatively contributing to poverty alleviation. Specifically, the findings suggest that *de facto* central bank independence, indicated by a low rate of irregular turnover among central bank governors, can help mitigate poverty by maintaining low inflation rates. Consequently, this underscores the role of central banks as development agents in economies. Furthermore, the findings highlight the difference in outcomes between *de jure* and *de facto* independence. However, it is crucial to note that different results could be obtained depending on whether *de jure* or *de facto* measures of central bank independence are used. While *de jure* independence refers to the formal legal frameworks in place, *de facto* independence reflects the practical autonomy and actions of the central bank. This distinction can lead to varying outcomes in studies assessing the impact of central bank independence on inflation and poverty.

Interestingly, central bank independence in developing countries might offer advantages over their counterparts in advanced economies, particularly in countries suffering from high inflation rates. However, the different political contexts and regimes in these countries should be carefully considered before implementing or advocating for greater independence, as the type of exchange rate regime could also play a crucial role in limiting inflation. Moreover, achieving central bank independence (CBI) in practice is not always straightforward. Developing countries with weak institutions and governance structures may struggle to establish independent central banks. It is important to remember that while CBI can play a relative role alleviating poverty in developing countries, it is not the only component. Fiscal policies are more important in addressing this issue.

Appendix: Sample of the study

| Countries included in the study | | |
|---------------------------------|-----------------|-------------|
| Argentina | Ecuador | Pakistan |
| Belarus | Georgia | Panama |
| Bolivia | China | Paraguay |
| Brazil | Hungary | Peru |
| Bulgaria | Indonesia | Philippines |
| Chile | Kazakhstan | Poland |
| China | Kyrgyzstan | Romania |
| Colombia | Latvia | Russia |
| Costa Rica | Lithuania | Thailand |
| Cyprus | Mexico | Turkey |
| Czech Republic | Moldova | Ukraine |
| Dominican Republic | North Macedonia | |

References

1. Aklin, M., Kern, A., & Negre, M. (2021). Does central bank independence increase inequality?.
2. Alesina, A., & Summers, L. H. (1993a). Central Bank Independence and Macro Performance.pdf. *Journal of Money, Credit and Banking*, 25(2).
3. Alesina, A. & Summers, L. H. (1993b). Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence. In Source: *Journal of Money, Credit and Banking* (Vol. 25, Issue 2).
4. Anwar, C. J. (2023). Heterogeneity Effect of Central Bank Independence on Inflation in Developing Countries. *Global Journal of Emerging Market Economies*, 15(1). <https://doi.org/10.1177/09749101221082049>
5. Arellano, M. & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58.
6. Arnone, M. & Romelli, D. (2013). Dynamic central bank independence indices and inflation rate: A new empirical exploration. *Journal of Financial Stability*, 9(3). <https://doi.org/10.1016/j.jfs.2013.03.002>
7. Bagheri, F. M. & Habibi, N. (1998). Political institutions and Central Bank independence: A cross-country analysis. *Public Choice*, 96(1–2). <https://doi.org/10.1023/a:1005055317499>
8. Balanche, F. (2017). Unemployment and Poverty. In *Atlas of the Near East*. https://doi.org/10.1163/9789004345188_043
9. Ball, L., & Sheridan, N. (2013). Does Inflation Targeting Matter? In *The Inflation-Targeting Debate*. <https://doi.org/10.7208/chicago/9780226044736.003.0007>
10. Banaian, K., Laney, L. O. & Willett, T. D. (1986). Central Bank Independence: An International Comparison. In *Central Bankers, Bureaucratic Incentives, and Monetary Policy*. https://doi.org/10.1007/978-94-009-4432-9_11
11. Barro, R. J. & Gordon, D. B. (1983). Rules, discretion and reputation in a model of monetary policy. *Journal of Monetary Economics*, 12(1), 101–121. [https://doi.org/10.1016/0304-3932\(83\)90051-X](https://doi.org/10.1016/0304-3932(83)90051-X)
12. Baumann, P. F., Schomaker, M. & Rossi, E. (2021). Estimating the effect of central bank independence on inflation using longitudinal targeted maximum likelihood estimation. *Journal of Causal Inference*, 9(1), 109-146.
13. Bernanke, B. S. & Gertler, M. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, 9(4). <https://doi.org/10.1257/jep.9.4.27>

14. Blanchard, O. & Galí, J. (2010). Labor markets and monetary policy: A new keynesian model with unemployment. *American Economic Journal: Macroeconomics*, 2(2). <https://doi.org/10.1257/mac.2.2.1>
15. Blanchard, O. & Katz, L. F. (1999). Wage dynamics: Reconciling theory and evidence. *American Economic Review*, 89(2). <https://doi.org/10.1257/aer.89.2.69>
16. Blinder, A. S. (1998). "Central Banking in Theory and Practice." In The Lionel Robbins lectures.
17. Bodea C., & Hicks, R. (2015). International finance and central bank independence: Institutional diffusion and the flow and cost of capital. *Journal of Politics*, 77(1). <https://doi.org/10.1086/678987>
18. Bulir, A. (2001). Income inequality: Does inflation matter? *IMF Staff Papers*, 48(1). <https://doi.org/10.5089/9781451928549.001>
19. Cardosa, E. (1992). NBER working papers series inflation and poverty.
20. Crowe, C. & Meade, E. E. (2007). The evolution of central bank governance around the world. *Journal of Economic Perspectives*, 21(4). <https://doi.org/10.1257/jep.21.4.69>
21. Cukierman, A., Web, S. B. & Neyapti, B. (1992). Measuring the independence of central banks and its effect on policy outcomes. *World Bank Economic Review*, 6(3), 353–398. <https://doi.org/10.1093/wber/6.3.353>
22. Datt, G., & Ravallion, M. (2002). Is India's economic growth leaving the poor behind? In *Journal of Economic Perspectives* (Vol. 16, Issue 3). <https://doi.org/10.1257/089533002760278730>
23. de Haan, J., & Sturm, J. E. (2017). Finance and income inequality: A review and new evidence. *European Journal of Political Economy*, 50. <https://doi.org/10.1016/j.ejpoleco.2017.04.007>
24. Dollar, D., & Kraay, A. (2002). Growth is good for the poor. *Journal of Economic Growth*, 7(3). <https://doi.org/10.1023/A:1020139631000>
25. Dollar, D., & Kraay, A. (2004). Trade, growth, and poverty. *Economic Journal*, 114(493). <https://doi.org/10.1111/j.0013-0133.2004.00186.x>
26. Dynan, K. E., Skinner, J., & Zeldes, S. P. (2004). Do the rich save more? *Journal of Political Economy*, 112(2). <https://doi.org/10.1086/381475>
27. Easterly, W., & Fischer, S. (2001). Inflation and the Poor. In *Source: Journal of Money, Credit and Banking* (Vol. 33, Issue 2).
28. Eijffinger, S. C. W., & De Haan, J. (1996). THE POLITICAL ECONOMY OF CENTRAL-BANK INDEPENDENCE. In *Special Papers In International Economics* (Issue 19).
29. Erosa, A., & Ventura, G. (2002). On inflation as a regressive consumption tax. *Journal of Monetary Economics*, 49(4). [https://doi.org/10.1016/S0304-3932\(02\)00115-0](https://doi.org/10.1016/S0304-3932(02)00115-0)

30. Fawaz, F., & Rahnamamoghadam, M. (2024). A Refinement of the Relationship Between Central Bank Independence, Inflation, and Income Inequality in Developing Countries. *Journal of Central Banking Theory and Practice*, 13(1), 117-131.
31. Fosu, A. K. (2017). Growth, inequality, and poverty reduction in developing countries: Recent global evidence. *Research in Economics*, 71(2). <https://doi.org/10.1016/j.rie.2016.05.005>
32. Friedman, M. (1963). *Inflation: Causes and consequences*. Asia Publishing House.
33. Friedman, M. (1970). A Theoretical Framework for Monetary Analysis. *Journal of Political Economy*, 78(6). <https://doi.org/10.1086/259720>
34. Friedman, M. (1982). Monetary Policy: Theory and Practice. *Journal of Money, Credit and Banking*, 14(1). <https://doi.org/10.2307/1991496>
35. Galí, J. (2015). Monetary policy, inflation, and the business cycle: An introduction to the new Keynesian framework and its applications: Second edition. In *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and its Applications: Second edition*.
36. Garriga, A. C., & Rodriguez, C. M. (2020). More effective than we thought: Central bank independence and inflation in developing countries. *Economic Modelling*, 85, 87–105. <https://doi.org/10.1016/j.econmod.2019.05.009>
37. Gyeke-Dako, A., Agbloyor, E. K., Agoba, A. M., Turkson, F., & Abbey, E. (2022). Central Bank Independence, Inflation, and Poverty in Africa. *Journal of Emerging Market Finance*, 21(2), 211–236. <https://doi.org/10.1177/09726527221078434>
38. Hansen, L. P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica*, 50(4). <https://doi.org/10.2307/1912775>
39. Haoudi, A., & Touati, A. B. (2023). Central Bank Independence: The Case of North African Central Banks. *Journal of Central Banking Theory and Practice*, 12(3), 61-85.
40. Jácome, L. I., & Vázquez, F. (2008). Is there any link between legal central bank independence and inflation? Evidence from Latin America and the Caribbean. *European Journal of Political Economy*, 24(4). <https://doi.org/10.1016/j.ejpoleco.2008.07.003>
41. Jenkins, S. P. (2021). The Income Distribution in the UK: A Picture of Advantage and Disadvantage. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2564968>
42. Khan, Z., & Khan, M. A. (2023). The Effect of Monetary Policy on Income Inequality: Empirical Evidence from Asian and African Developing Economies. *Journal of Central Banking Theory and Practice*, 12(3), 133-158.

43. Klomp, J., & de Haan, J. (2010). Central bank independence and inflation revisited. *Public Choice*, 144(3). <https://doi.org/10.1007/s11127-010-9672-z>
44. Kydland, F. E., & Prescott, E. C. (1977). Rules Rather than Discretion: The Inconsistency of Optimal Plans. *Journal of Political Economy*, 85(3). <https://doi.org/10.1086/260580>
45. Loungani, P., & Sheets, N. (1997). Central Bank Independence, Inflation, and Growth in Transition Economies. In Source: *Journal of Money, Credit and Banking* (Vol. 29, Issue 3). URL: <http://www.jstor.org/stable/2953701>
46. Mishkin, F. S. (1992). Is the Fisher effect for real?. A reexamination of the relationship between inflation and interest rates. *Journal of Monetary Economics*, 30(2). [https://doi.org/10.1016/0304-3932\(92\)90060-F](https://doi.org/10.1016/0304-3932(92)90060-F)
47. Mishkin, F. S. (2007). The economics of money, banking, and financial markets. In Policy.
48. Mulligan, C. B., & Sala-i-Martin, X. (2000). Extensive margins and the demand for money at low interest rates. *Journal of Political Economy*, 108(5). <https://doi.org/10.1086/317676>
49. Neyapti, B. (2001). Central bank independence and economic performance in eastern Europe. *Economic Systems*, 25(4). [https://doi.org/10.1016/S0939-3625\(01\)00033-4](https://doi.org/10.1016/S0939-3625(01)00033-4)
50. Nurbayev, D. (2018). The rule of law, central bank independence and price stability. In *Journal of Institutional Economics* (Vol. 14, Issue 4). <https://doi.org/10.1017/S1744137417000261>
51. Petrevski, G., Bogoev, J., & Sergi, B. S. (2012). The link between central bank independence and inflation in Central and Eastern Europe: are the results sensitive to endogeneity issue omitted dynamics and subjectivity bias?. *Journal of Post Keynesian Economics*, 34(4), 611-652.
52. Rabhi, A., & Parsons, B. (2024). How is Central Bank Independence Shaping Income Inequality in Developing Countries?. *International Advances in Economic Research*, 1-18.
53. Rabhi, A. (2020) Taux De Change Et Croissance Economique Au Maroc : Evidence Empirique. *Finance et Finance Internationale* Vol. 1, No 18 (2020)
54. Rabhi, A. (2019). Déterminants du choix optimal d'un régime de change dans les pays en voie de développement. *Critique Economique* , n° 38-39, 111-124.
55. Rezende, F. (1998). The Brazilian economy: Recent developments and future prospects. In *International Affairs* (Vol. 74, Issue 3). <https://doi.org/10.1111/1468-2346.00034>

56. Rodrik, D., & Kennedy, J. F. (2018). New Technologies, Global Value Chains, and Developing Economies. SSRN.
57. Rogoff, K. (1985). The optimal degree of commitment to an intermediate monetary target. *Quarterly Journal of Economics*, 100(4). <https://doi.org/10.2307/1885679>
58. Romelli, D. (2022). The political economy of reforms in central bank design: Evidence from a new dataset. *Economic Policy*, 37(112), 641–688. <https://doi.org/10.1093/epolic/eiac011>
59. Romer, C. & Romer, D. (1997). Reducing inflation : motivation and strategy. University of Chicago Press.
60. Rossi, S. (2022) "Central Bank Independence from Banks Rather Than Governments." In *The Future of Central Banking*, 360-372. Edward Elgar Publishing.
61. Sargent, T. J., Wallace, N., Barro, R., Friedman, M., Kareken, J., & Lucas, R. E. (1975). "Rational" Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule This content downloaded from 128. *Journal of Political Economy*, 83(2).
62. Saunders, P. (2002). The direct and indirect effects of unemployment on poverty and inequality. In SPRC Discussion paper No. 118 (Issue 118).
63. Smeeding, T. M. (2016). Multiple barriers to economic opportunity for the "truly" disadvantaged and vulnerable. *RSF*, 2(2). <https://doi.org/10.7758/rsf.2016.2.2.04>
64. Svensson, L. E. O. (2005). Inflation Targeting in an Open Economy: Strict or Flexible Inflation Targeting? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.321784>
65. Taylor, J. B. (1993). Discretion versus policy rules in practice. Carnegie-Rochester Confer. Series on Public Policy, 39(C). [https://doi.org/10.1016/0167-2231\(93\)90009-L](https://doi.org/10.1016/0167-2231(93)90009-L)
66. Topalova, P. (2010). Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India. *American Economic Journal: Applied Economics*, 2(4). <https://doi.org/10.1257/app.2.4.1>
67. Winters, L. A., Mcculloch, N. & Mckay, A. (2015). Trade Liberalization and Poverty: The Evidence So Far. https://doi.org/10.1142/9789814571272_0014
68. World Bank. (2019). World Development Indicators. Available at: <https://databank.worldbank.org/source/world-development-indicators> Last accessed June-2023.
69. World Bank. (2019). Inflation in Emerging and Developing Economies Evolution, Drivers, and Policies. <https://documents1.worldbank.org/curated/en/749181542305098752/pdf/Inflation-in-Emerging-and-Developing-Economies-Evolution-Drivers-and-Policies.pdf>