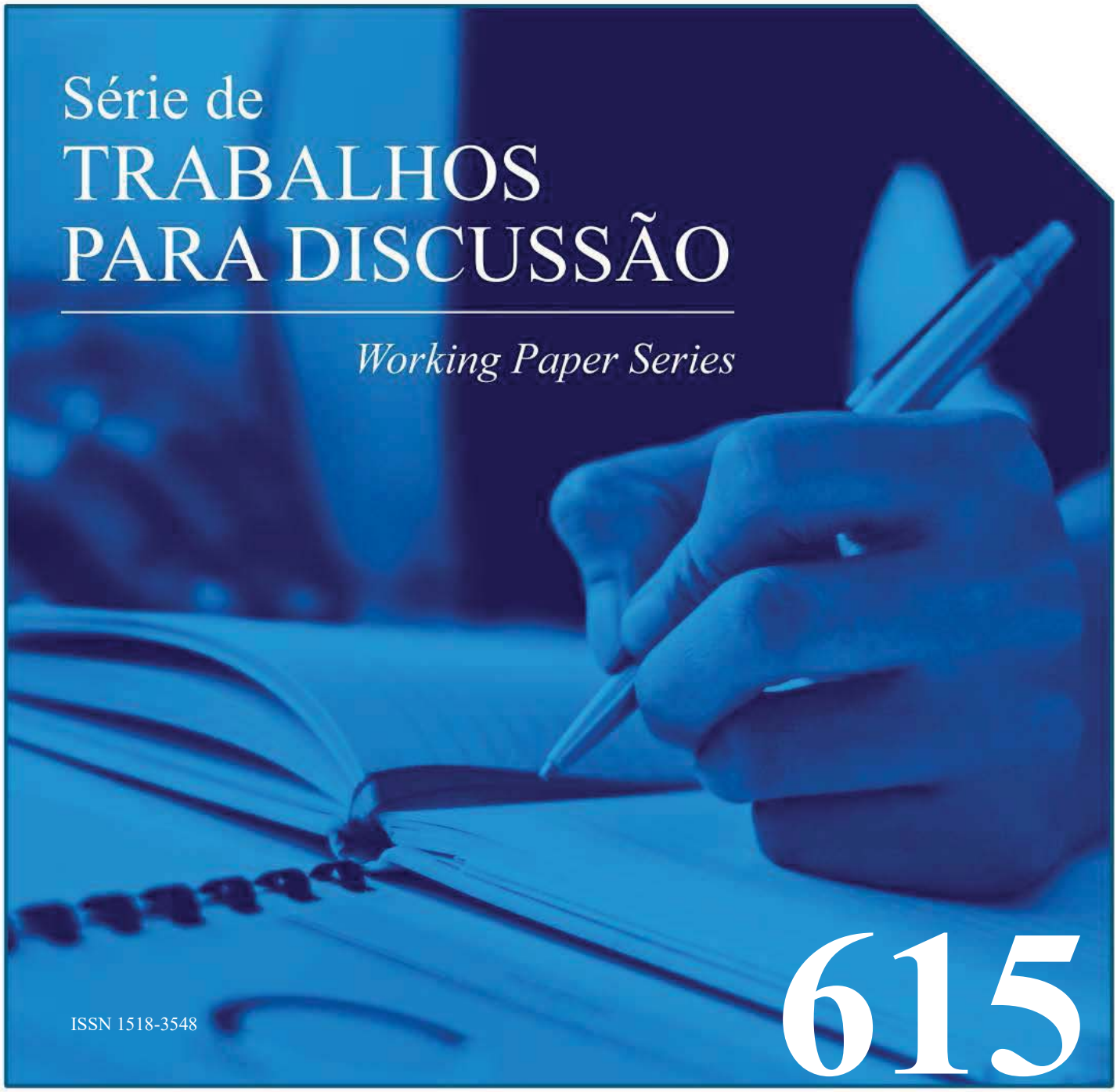


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# How Does Central Bank Independence Influence the Relationship Between Inflation, Income Inequality and Poverty?

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## Non-Technical Summary

This article is particularly relevant to policymakers and economists interested in the intersection of monetary and social policy, as it contributes to ongoing discussions about the role of central banks in promoting economic and social stability. The research underscores the importance of central banks' ability to formulate and execute monetary policy without political interference, highlighting their critical role in promoting macroeconomic stability and social equity. The study significantly contributes to the literature on central bank design and its influence on public policy aimed at improving income distribution and reducing poverty, making it valuable for policymakers and economists.

The article explores the nuanced role of central bank independence in mitigating the adverse effects of inflation on income inequality and poverty. The novelty of this work lies in its detailed examination of the indirect effects of central bank independence on income distribution and poverty alleviation through enhanced price stability. By employing the most comprehensive *de jure* central bank independence index available in the literature, the study provides an in-depth analysis of how varying degrees of central bank independence impact different income deciles and poverty measures.

Utilizing a comprehensive dataset from 46 countries spanning from 1980 to 2022, the study employs a robust methodological approach, including panel data analysis and the System Generalized Method of Moments (Sys-GMM), to address endogeneity issues. The findings reveal income inequality and poverty are driven by structural factors unrelated to central bank independence. The relationship between central bank independence and income inequality or poverty is indirect, stemming from the improved price stability fostered by an independent central bank. Specifically, while inflation exacerbates income inequality and poverty, central bank independence can effectively offset these adverse effects. In response to a 10% inflation shock, central bank independence reduced the negative impacts on income inequality from 0.13% to 0.42%. In the case of poverty, it reduced from 0.34% to 0.72%.

Furthermore, central bank independence disproportionately benefits low-income households, thereby improving overall income distribution. In response to a 10% inflation shock, central bank independence counteracts the negative effects on the income share of the bottom 80%, with more pronounced effects observed at higher levels of independence. The findings also reveal income inequality and poverty exhibit long-term persistence, exacerbating disparities in income distribution and poverty levels. Structural factors, such as GDP per capita, help mitigate income inequality, while overall GDP growth and increased government expenditure are effective in alleviating poverty. Conversely, trade openness tends to increase both income inequality and poverty. Additionally, the relationship between unemployment and income inequality is observed to be weakly negative.

In brief, this article provides evidence that greater central bank capacity to implement and formulate monetary policy without political pressure and interference (independence) is vital for mitigating the negative effects of inflation on income inequality and poverty, thereby promoting social and economic equity. Therefore, this study offers valuable insights into how central bank autonomy can protect vulnerable populations from the adverse effects of inflation.

## Sumário Não Técnico

Este artigo é particularmente relevante para formuladores de políticas e economistas interessados na interseção entre política monetária e política social, pois contribui para discussões em andamento sobre o papel dos bancos centrais na promoção da estabilidade econômica e social. A pesquisa destaca a importância da capacidade dos bancos centrais de formular e executar políticas monetárias sem interferência política, sublinhando seu papel crítico na promoção da estabilidade macroeconômica e da equidade social. O estudo contribui significativamente para a literatura sobre o desenho dos bancos centrais e sua influência nas políticas públicas voltadas para a melhoria da distribuição de renda e a redução da pobreza, tornando-se valioso para formuladores de políticas e economistas.

O artigo explora o papel diferenciado da independência do banco central na mitigação dos efeitos adversos da inflação sobre a desigualdade de renda e a pobreza. A novidade deste trabalho reside em seu exame detalhado dos efeitos indiretos da independência do banco central na distribuição de renda e na redução da pobreza por meio do fortalecimento da estabilidade de preços. Ao empregar o índice de independência do banco central *de jure* mais abrangente disponível na literatura, o estudo fornece uma análise aprofundada de como diferentes graus de independência do banco central impactam diferentes decis de renda e medidas de pobreza.

Utilizando um conjunto de dados abrangente de 46 países no período de 1980 a 2022, o estudo emprega uma abordagem metodológica robusta, incluindo análise de dados em painel e o Método Generalizado de Momentos Sistêmico (Sys-GMM), para abordar questões de endogeneidade. Os resultados revelam que a desigualdade de renda e a pobreza são impulsionadas por fatores estruturais não relacionados à independência do banco central. A relação entre independência do banco central e desigualdade de renda ou pobreza é indireta, decorrente do fortalecimento da estabilidade de preços promovida por um banco central independente. Especificamente, enquanto a inflação exacerba a desigualdade de renda e a pobreza, a independência do banco central pode efetivamente compensar esses efeitos adversos. Em resposta a um choque inflacionário de 10%, a independência do banco central reduziu os impactos negativos na desigualdade de renda, considerando diferentes medidas, entre 0,13% e 0,42%. No caso de indicadores de pobreza, a redução ficou entre 0,34% e 0,72%.

Além disso, a independência do banco central beneficia desproporcionalmente as famílias de baixa renda, melhorando, assim, a distribuição geral de renda. Em resposta a um choque inflacionário de 10%, a independência do banco central neutraliza os efeitos negativos na parcela de renda dos 80% mais pobres, com efeitos mais pronunciados observados em níveis mais altos de independência. Os resultados também revelam que a desigualdade de renda e a pobreza apresentam persistência a longo prazo, exacerbando as disparidades na distribuição de renda e nos níveis de pobreza. Fatores estruturais, como o PIB per capita, ajudam a mitigar a desigualdade de renda, enquanto o crescimento do PIB e o aumento dos gastos governamentais são eficazes na redução da pobreza. Em contrapartida, a abertura comercial tende a aumentar tanto a desigualdade de renda quanto a pobreza. Além disso, a relação entre desemprego e desigualdade de renda é observada como levemente negativa.

Em resumo, este artigo fornece evidências de que uma maior capacidade do banco central para implementar e formular políticas monetárias sem pressão e interferência política (independência) é vital para mitigar os efeitos negativos da inflação sobre a desigualdade de renda e a pobreza, promovendo assim a equidade social e econômica. Portanto, este estudo oferece percepções valiosas sobre como a autonomia do banco central pode proteger as populações vulneráveis dos efeitos adversos da inflação.

# How Does Central Bank Independence Influence the Relationship Between Inflation, Income Inequality and Poverty?

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## Abstract

This study employs panel data analysis for 46 countries from 1980 to 2022 to investigate the impact of inflation on income inequality and poverty, highlighting the mitigating role of central bank independence. Using a comprehensive index of *de jure* central bank independence, the study assesses its influence on five measures of income inequality, four measures of poverty, and income deciles. The findings suggest structural factors are the main drivers of income inequality and poverty, rather than central bank independence. However, while inflation worsens these issues, central bank independence can counteract the adverse effects of inflation. Moreover, the evidence indicates greater central bank independence disproportionately benefits low-income households at the expense of high-income households, with these redistributive effects being more pronounced at higher levels of independence. In conclusion, central bank independence is pivotal in alleviating the negative impacts of inflationary shocks on income inequality and poverty, thereby promoting social and economic justice.

**Keywords:** central bank independence; monetary policy; income inequality; poverty; inflation.

**JEL classification:** E58, E52, D63, I32, E31

*The views and opinions offered in this article do not necessarily reflect those of the Central Bank of Brazil. Any remaining errors are the sole responsibility of the author.*

## 1. Introduction

Macroeconomic stability, facilitated by the central bank's capacity to formulate and execute monetary policy without political interference or pressure and safeguarded by robust legal and administrative frameworks, is crucial for mitigating the adverse effects of inflationary shocks on income inequality and poverty. Inflation erodes the value of money and deteriorates the purchasing power of economic agents, disproportionately impacting the poorest and most vulnerable households. In this context, the increased autonomy granted to central banks to make monetary policy decisions without direct political influence leads to more effective inflation management, fostering a more predictable and stable economic environment that benefits society as a whole, particularly low-income households. In other words, greater institutional and operational autonomy for the central bank, enabled by robust legal and administrative frameworks, to formulate and execute monetary policy without government interference is essential for achieving macroeconomic stability and mitigating the adverse effects of inflationary shocks on income inequality and poverty, promoting social and economic justice.

This study investigates the impact of inflation on income inequality and poverty, focusing on how the central bank's ability in defining and implementing effective anti-inflationary monetary policies, without political interference (i.e., increased independence), influences this relationship. The analysis incorporates data on the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services (inflation), the institutional design of the central bank (using the *de jure* central bank independence index proposed by Romelli, 2022, 2024), how income is distributed among the population (income inequality measures), and the proportion of the population lacking sufficient resources to meet basic needs (poverty measures) within a panel data model. Furthermore, the model considers other macroeconomic variables that may affect income inequality and poverty. The study utilizes data from a comprehensive sample of 46 countries spanning the period from 1980 to 2022. These data are sourced from the Poverty and Inequality Platform (PIP), and the World Development Indicators (WDI) available in the World Bank database, as well as the International Financial Statistics (IFS) available from the International Monetary Fund.

The findings of this study indicate that the central bank's ability to define and implement effective monetary policies, independent of political pressures and interference, is crucial in mitigating the adverse effects of inflation on income inequality and poverty, thereby enhancing income distribution. The evidence indicates that structural factors, rather than central bank independence, primarily drive income inequality and poverty. The relationship between central bank independence and income inequality or poverty is indirect, stemming from the improved

price stability fostered by an independent central bank. Specifically, while inflation exacerbates income inequality and poverty, central bank independence can effectively counteract these adverse effects. Moreover, depending on the degree of independence of the central bank, it can more than offset the negative impacts of inflation, thereby reducing income inequality and poverty, and promoting social and economic justice. Furthermore, the evidence reveals central bank independence benefits lower-income households more than higher-income households, thereby improving income distribution across different income deciles. These positive distributional effects are even more pronounced with greater degrees of central bank independence. Additionally, the findings indicate income inequality and poverty exhibit long-term persistence, worsening disparities in income distribution and poverty levels. Structural factors, such as GDP per capita, contribute to mitigating income inequality, while GDP growth and increased government expenditure effectively alleviate poverty. Conversely, trade openness tends to exacerbate both income inequality and poverty. The relationship between unemployment and income inequality is negative, albeit with limited statistical significance.

Inflation has profound implications for the economy, particularly concerning income inequality and poverty. The literature indicates inflation generally exacerbates income inequality and poverty because it impacts real income differently across various socioeconomic groups, distorts price signals, and leads to a misallocation of resources, disproportionately affecting the poor who have less capacity to absorb these shocks (Bénabou, 1996; Romer and Romer, 1998; Akerlof et al., 2000; Easterly and Fischer, 2001; Albanesi, 2007; Berisha, et al., 2023; Glawe and Wagner, 2024). This occurs due to the relative vulnerability of low-income households to inflation, as they allocate a significant share of their income to essential goods and services, such as food, which may experience sharper price increases. Inflation reduces the real value of wages, fixed incomes, and savings, as well as government social transfers, eroding the purchasing power of low-income households. This erosion of purchasing power leads to an increasing disparity in financial resources between the rich and the poor, thereby increasing income inequality and poverty (Mulligan and Sala-i-Martin, 2000; Erosa and Ventura, 2002; Albanesi, 2007).

It is widely accepted in the literature that central bank independence is crucial for controlling inflation because it allows monetary policy to be conducted without interference and political pressures that might prioritize short-term economic gains over long-term price stability. When governments have control over monetary instruments, there is a tendency to use monetary policy to boost employment and production, especially during election periods, which can result in inflation. Kydland and Prescott (1977) highlighted this problem, suggesting

delegating monetary policy to independent central banks can protect against these political pressures. Rogoff (1985) reinforces this idea, arguing that an independent central banker, focused on stabilizing inflation, can implement more reliable and consistent policies, avoiding the time inconsistency of government policies.

Empirical evidence shows central bank independence is associated with lower inflation rates (Cukierman et al., 1992; Alesina and Summers, 1993; Jácome and Vázquez, 2008; Arnone and Romelli, 2013; Bodea and Hicks, 2015; Lim, 2020; Garriga and Rodriguez, 2020, 2023; Anwar, 2023; Jácome and Pienknagura, 2024). However, the effectiveness of this relationship is not uniform across countries. The relationship between central bank independence and inflation depends on the degree of institutional maturity of the respective country (Arnone et al., 2009). For example, formal independence may not always translate into real operational independence in countries where political interference remains widespread. Arnone and Romelli (2013) provide evidence that legislative reforms altering the degree of central bank independence have a strong impact on inflation dynamics. Similarly, Hansen (2021) finds legislative reforms granting legal and administrative independence to the central bank can significantly enhance its ability to control inflation.

Central bank independence significantly influences income inequality and poverty by safeguarding real wages, stabilizing inflation expectations, promoting economic growth, reinforcing democratic institutions, and enhancing transparency. In high-inflation economies, wages often fail to keep pace with rising prices, diminishing purchasing power, particularly for low-income households. Blanchard and Giavazzi (2003) argue that autonomous and effective monetary policies can maintain low and stable inflation, thereby preserving real wages and fostering a more equitable income distribution. When a central bank is perceived as independent and dedicated to price stability, economic agents are likely to form more accurate expectations regarding future inflation, thus avoiding the pitfalls of inflationary expectations that disproportionately affect vulnerable families (Kydland and Prescott, 1977). Rogoff (1985) asserts that the credibility of monetary policies formulated by an independent central bank can lead to lower interest rates and increased private investment, thereby stimulating economic growth. This growth, in turn, can create employment and opportunities essential for poverty alleviation (Adrian et al., 2024). Furthermore, Taylor (1993) suggests that central bank independence, by bolstering democratic institutions and fostering a more transparent environment, aids in the formulation of public policies aimed at reducing income inequality and poverty. Consequently, central bank independence emerges as a crucial instrument not only for inflation control but also for advancing social and economic justice.

Few studies have analyzed the impact of central bank independence on income inequality and poverty. Chang (2022) explored whether central banks should address inequality and concluded that incorporating this concern into their mandate could enhance welfare. Aklin et al. (2021) attribute the rise in income inequality since the 1980s to central bank independence, facilitated by economic deregulation and changes in social and labor policies. Rabhi and Parsons (2024) emphasize that central bank independence has a dual effect: it preserves the purchasing power of the vulnerable by reducing inflation but weakens fiscal policy, thereby increasing inequality. However, they do not explore how these policies interact. Sturm et al. (2024) found no robust relationship between central bank independence and income inequality or poverty. Rabhi (2024) demonstrates central bank independence can help control inflation in developing countries, contributing to poverty reduction.

This study contributes to the literature on the institutional design of central banks and its impact on the behavior of public policymakers, particularly those aimed at improving income distribution and reducing poverty. It first examines whether income inequality and poverty are driven by central bank independence or by structural factors unrelated to it. Second, it explores the potential link between central bank independence and income inequality or poverty through the lens of enhanced price stability. Third, the study employs the most comprehensive *de jure* central bank independence index available to analyze the effects of central bank independence on five measures of income inequality, four measures of poverty, and income deciles. Lastly, the dataset encompasses a broader range of countries than those analyzed by Rabhi (2024) and Rabhi and Parsons (2024) and covers a more extended period than the studies by Aklin et al. (2021), Rabhi (2024), Rabhi and Pearsons (2024), and Sturm et al. (2024). In brief, these enhancements allow for a more detailed analysis of the influence of central bank independence on inflation and its consequences for income inequality and poverty.

The remainder of this paper is structured as follows: Section 2 delineates the key variables of interest, including the central bank independence index, inflation, and measures of income inequality and poverty, and provides a preliminary empirical analysis of their relationship. Section 3 outlines the empirical specification and the estimation strategy employed. Section 4 presents empirical findings from a panel data analysis on the influence of central bank independence on the nexus between inflation, income inequality, and poverty, accompanied by a robustness check. The last section offers the conclusions.

## 2. Central Bank Independence Index, Inflation and Measures of Income Inequality and Poverty: A First Glance

Indices of central bank independence have been formulated to measure the extent of autonomy from political influence. Among the most prominent is the CWN index, developed by Cukierman et al. (1992), which evaluates central bank independence based on legal frameworks. This includes the procedures for appointing and dismissing central bank governors, the authority to formulate monetary policy, and the mandate to prioritize price stability. Another significant index is the GMT index, developed by Grilli et al. (1991), which distinguishes between political and economic independence. It assesses factors such as the central bank's ability to resist political pressure (economic independence) and its control over monetary policy instruments (political independence).[1]

Recent advancements in the measurement of central bank independence include the CBIE index, developed by Romelli (2022, 2024). Building on the CWN and GMT indices, the CBIE innovates by incorporating best practices in financial independence and reporting and disclosure. The financial independence criterion addresses conditions for capitalization and recapitalization of central bank capital, the authority responsible for determining and approving the central bank budget, and profit allocation requirements. The reporting and disclosure criterion includes legal provisions for regular reporting, fulfillment of policy goals, and whether the publication of financial statements is certified by an independent auditor. Consequently, the CBIE is the most comprehensive *de jure* central bank independence index in the literature[2], covering 155 countries from 1923 to 2023 and detailing 42 central bank institutional design criteria across six dimensions: 1) Governor and central bank board, 2) Monetary policy and conflict resolution, 3) Objectives, 4) Limitations on lending to the government, 5) Financial independence, and 6) Reporting and disclosure.

This study employs the *de jure* central bank independence index developed by Romelli (2022, 2024) to capture central bank institutional design. The codification strategy for this index closely follows Cukierman et al. (1992), with points assigned to the answers to the 42 questions constructing the CBIE index ranging from 0 (no independence) to 1 (full independence). Scores for each of the six dimensions are obtained by assigning equal weights to each question within a dimension. The overall index is then computed as the average of the scores across these six

[1] For an in-depth analysis of the CWN and GMT indices, refer to Eijffinger and de Haan (1996) and de Haan and Eijffinger (2019).

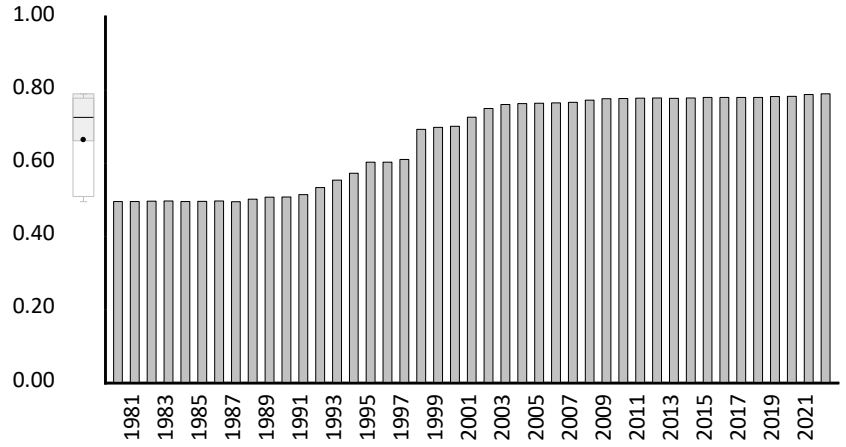
[2] Examples of prior research employing the *de jure* central bank independence index include studies by Cukierman et al. (2002), Polillo and Guillén (2005), Crowe and Meade (2008), Jacome and Vazquez (2008), Acemoglu et al. (2008), Arnone et al. (2009), Dincer and Eichengreen (2014), and Bodea and Hicks (2015).

dimensions, ensuring equal weight for all dimensions in determining the level of independence. The resulting index is normalized over the interval [0,1].

Figure 1 illustrates the average CBIE index for a sample of 46 countries from 1980 to 2022. The data reveal a progressive increase in the CBIE index over this period, signifying enhanced capacity of central banks to formulate and implement monetary policy autonomously, without political interference. The average CBIE index for the initial five years of the sample was 0.50, rising to 0.79 in the most recent five-year period.

**Figure 1**

*Annual Average Central Bank Independence Index – 1980 to 2022*



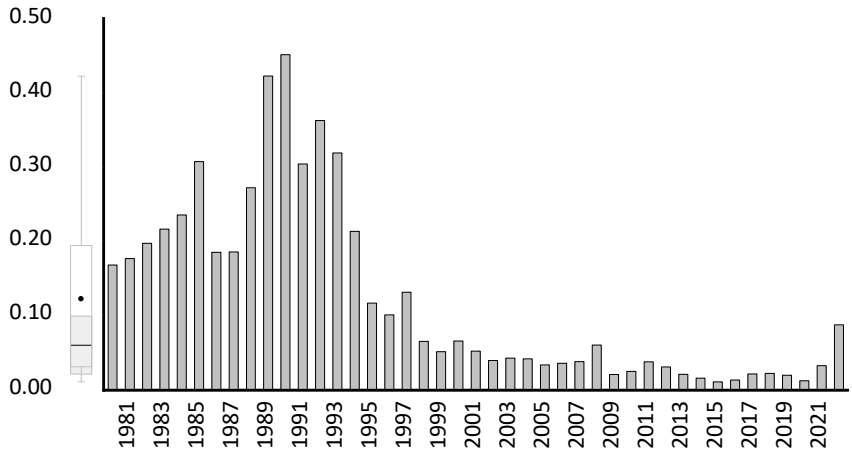

**Note:** The bars correspond to the cross-country average of 46 countries over time.

This study employs the Consumer Price Index (CPI) as a proxy for inflation, measuring the annual variation in the cost of a basket of goods and services. Outliers, especially in the 1980s and early 1990s, can skew the results. To address this, Cukierman et al. (1992) suggest calculating inflation as the change in the CPI divided by 1 plus the change in the CPI. Dincer and Eichengreen (2014) propose using the natural logarithm of 1 plus the change in the CPI. This study adopts the methodology proposed by Dincer and Eichengreen (2014).

Figure 2 illustrates the average inflation proxy for the 46 countries analyzed from 1980 to 2022. The 1980s are characterized by very high, increasing, and volatile average inflation rates. During the 1990s, although average inflation rates remained elevated and volatile, the onset of a deflationary trend is evident. This disinflationary trend persisted from the early 2000s until the 2008 financial crisis, with average inflation rates lower and less volatile than in previous decades. In the 2010s, inflation stabilized at lower levels compared to previous decades. However, in 2020, the average inflation rate began to rise rapidly and significantly.

**Figure 2**

*Annual Average Inflation – 1980 to 2022*




**Note:** The bars correspond to the cross-country average of 46 countries over time.

To analyze income distribution across the populations of 46 countries, this study employs five distinct measures of income inequality: (i) the Gini Index, (ii) Mean Log Deviation, (iii) Palma Ratio, (iv) Polarization Index, and (v) the top 20 to bottom 20 Ratio. The Gini Index (Gini), a prevalent metric for assessing income inequality, quantifies the deviation of income distribution among individuals or households from perfect equality. This index ranges from 0 (indicating perfect equality) to 1 (indicating maximum inequality) and is derived from the Lorenz curve, which plots the cumulative share of income against the cumulative share of the population. While the Gini is particularly sensitive to variations in the lower segment of the income distribution, it is less effective in capturing extreme inequality. Atkinson (1970) underscores the Gini simplicity and ease of interpretation as key strengths. Nevertheless, it has notable limitations, including its sensitivity to changes across different segments of the income distribution and its inadequacy in reflecting the depth of poverty (Cerra, 2021).

The Mean Log Deviation (MLD), also referred to as Theil *L*, is an indicator that assesses the overall well-being of a population by considering income alongside other developmental factors. It is computed as the average of the logarithm of the ratio of the general mean income to individual incomes. Anand and Segal (2008) emphasize that the MLD's multidimensional approach facilitates a more holistic analysis of living conditions. However, its calculation and interpretation complexity can be a drawback when compared to more straightforward measures like the Gini. The Polarization Index (Polarization) quantifies the degree of income-based social class separation, capturing the extent of division into distinct groups with substantial income disparities. Esteban and Ray (1994) contend that this index is valuable for identifying social

tensions in economically disparate societies, though it may be more challenging to interpret than traditional indices such as Gini.

The Palma Index (Palma) evaluates income inequality by comparing the income share of the richest 10% to that of the poorest 40%. A higher Palma signifies greater inequality; for instance, a ratio below 1 indicates that the poorest 40% possess a larger share of income than the richest 10%, whereas a ratio of 1 denotes equal shares for both groups. The Palma's strength lies in its simplicity and direct depiction of inequality. However, it does not account for the middle of the income distribution and may overlook significant changes within the middle class. Similarly, the top 20 to bottom 20 ratio (20:20 Ratio) assesses inequality by comparing the income of the richest quintile to that of the poorest quintile. Its advantages include simplicity and clarity, but like the Palma, it fails to provide insights into the middle of the income distribution and may miss critical aspects of inequality affecting the middle class.

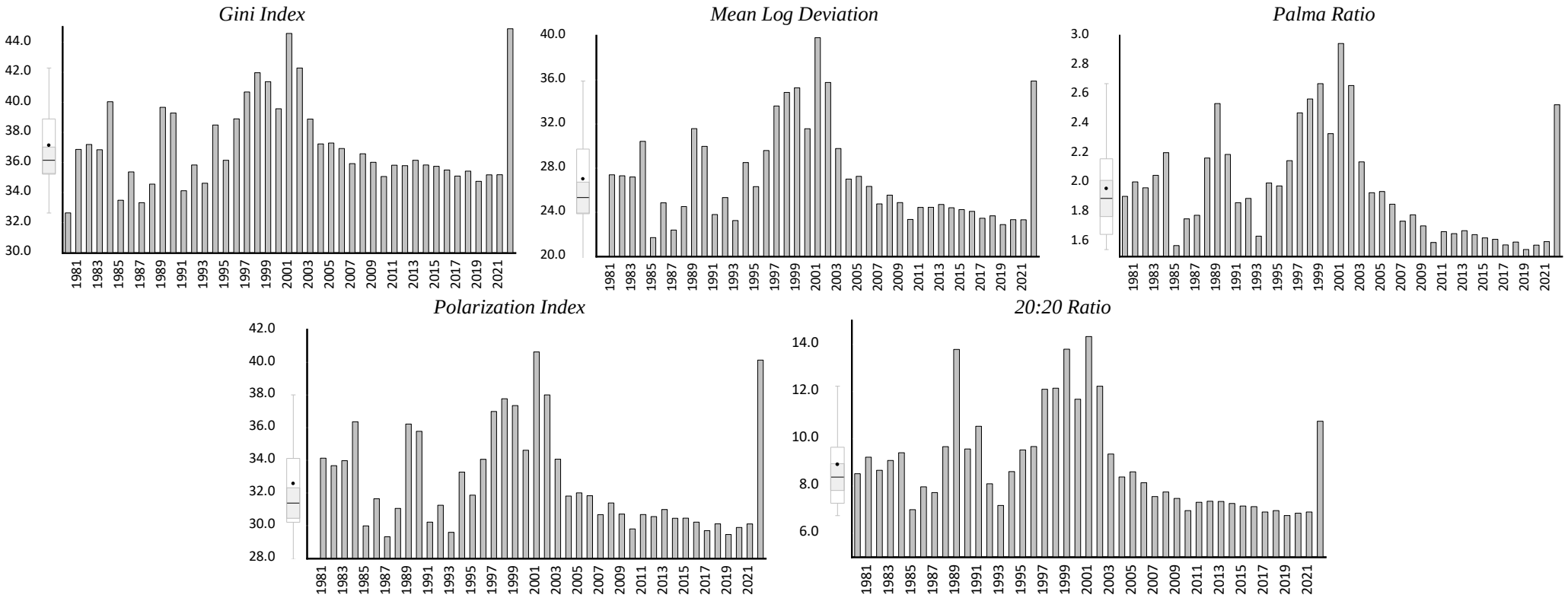
In summary, it is noteworthy that both Gini and MLD encompass the entire income distribution, with the MLD offering additional insights due to its decomposability. The Palma Ratio and the 20:20 Ratio, on the other hand, concentrate on specific segments of the income distribution, making them effective for highlighting disparities at the extremes but less informative regarding middle-income groups. The Polarization provides a unique perspective by quantifying the extent of social division, which is crucial for understanding social tensions.

Figure 3 shows the average income inequality measures for all sampled countries from 1980 to 2022. The measures exhibit a similar pattern, characterized by heightened volatility and an upward trajectory during the 1980s and 1990s, followed by reduced volatility and a downward trend from 2000 onwards, with significant growth in 2022.

The proportion of the population in the sample of 46 countries that lack sufficient resources to meet basic needs is assessed using four distinct measures: i) Poverty Headcount Ratio, ii) Poverty Gap, iii) Poverty Gap Squared, and iv) Watts Index. The Poverty Headcount Ratio quantifies the percentage of the population living below a specified poverty threshold, set at US$2.15 per day in this study. This measure is calculated by dividing the number of individuals with incomes below this threshold by the total population. As noted by Ravallion (1998), its primary advantage lies in its simplicity and ease of interpretation. However, it does not account for the depth or severity of poverty, treating all individuals below the poverty line equally, regardless of how far their income falls short of the threshold.

**Figure 3**

*Measures of income inequality – 1980 to 2022*




**Note:** The bars correspond to the cross-country average of 46 countries over time

The Poverty Gap measures the depth of poverty by calculating the average shortfall of the incomes of the poor relative to the poverty line, expressed as a proportion of the poverty line. According to Foster et al. (1984), this measure provides a more nuanced understanding of poverty by indicating the total amount of income required to bring all poor individuals up to the poverty line. While it highlights the depth of poverty, it does not differentiate between the very poor and those slightly below the poverty line. Building on the Poverty Gap, the Poverty Gap Squared gives greater weight to the income shortfalls of those further below the poverty line. This measure is calculated by squaring the poverty gap, thereby emphasizing the severity of poverty among the poorest individuals. Foster et al. (1984) suggest this measure is valuable for analyzing poverty severity as it incorporates inequality among the poor. However, its complexity can make it less intuitive compared to simpler measures.

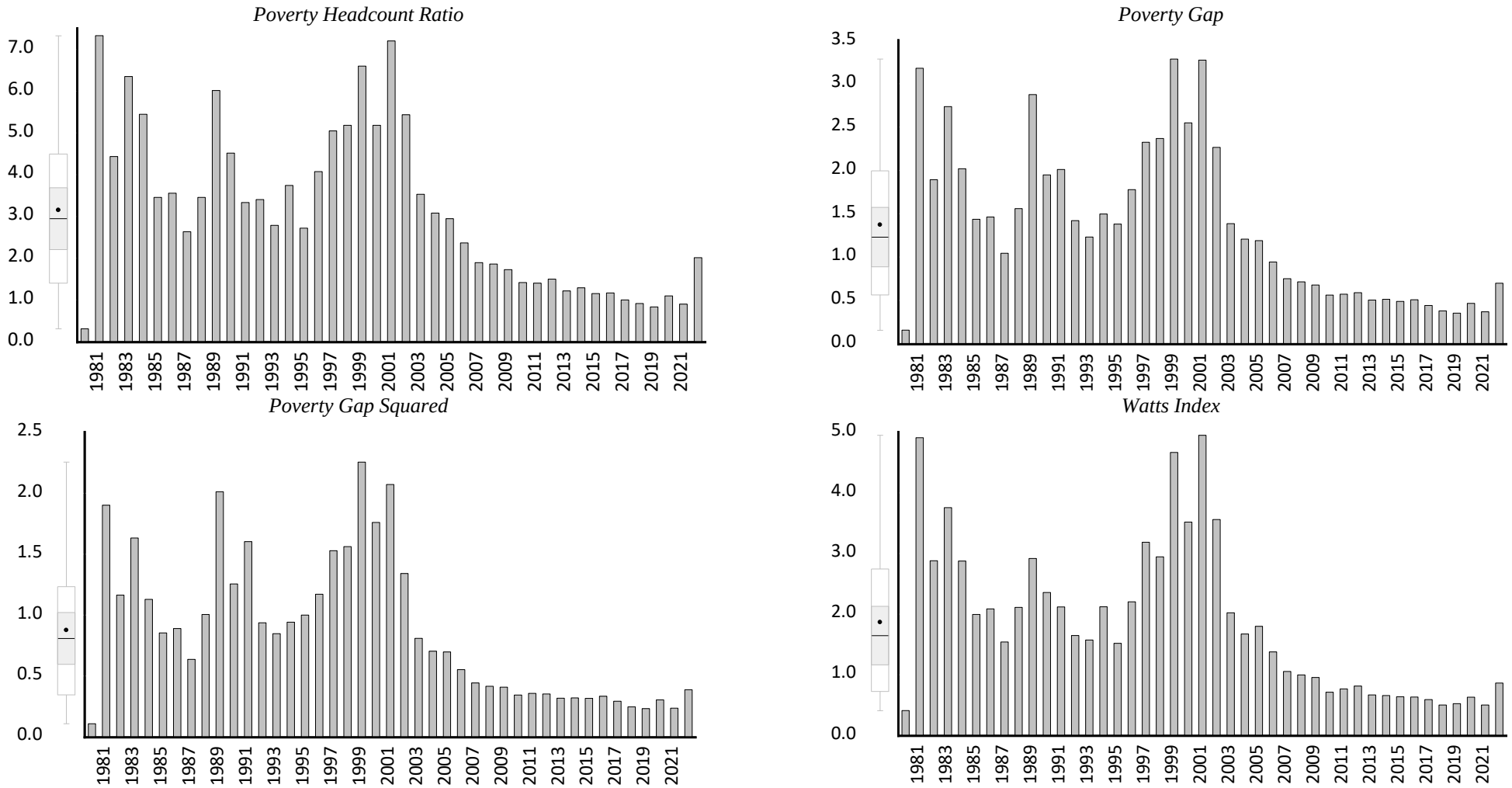
The Watts Index evaluates both the depth and incidence of poverty by considering the logarithm of the ratio of the incomes of the poor to the poverty line. This approach penalizes poverty more severely as incomes fall further below the poverty line. According to Watts (1968), the index's sensitivity to income distribution among the poor allows it to capture changes in poverty severity more effectively than the Poverty Headcount Ratio or Poverty Gap. Nonetheless, its complexity may limit its accessibility for policymakers and the general public.

In summary, while the Poverty Headcount Ratio is the simplest and most intuitive measure, it lacks depth. The Poverty Gap and Poverty Gap Squared offer more detailed insights into poverty severity, with the latter emphasizing the poorest individuals. The Watts Index provides the most comprehensive view by considering income distribution among the poor, though its complexity can be a drawback.

Figure 4 illustrates the average poverty measures for the sampled countries over time. Like the income inequality measures, the poverty measures exhibit a comparable pattern. During the 1980s and 1990s, the average poverty measures were higher than in subsequent decades. From 2000 onwards, a sharp decline in poverty measures is observed.

**Figure 4**

*Measures of poverty – 1980 to 2022*




**Note:** The bars correspond to the cross-country average of 46 countries over time.

Finally, this section examines the relationship between the central bank independence index, inflation, and measures of income inequality and poverty. Figures 5 and 6 illustrate the data on income inequality, poverty, inflation, and central bank independence, averaged across countries from 1980 to 2022. Figure 5 indicates inflation is positively correlated with all poverty measures and most income inequality measures, with Gini and MLD showing a weak negative correlation with inflation. Figure 6 reveals a strong negative correlation between all poverty measures and the central bank independence. For income inequality measures, Palma, Polarization, and the 20:20 Ratio exhibit a negative correlation with the central bank independence, while Gini and MLD show a weak positive correlation. Overall, this analysis indicates a positive correlation between measures of income inequality and poverty with inflation, and a negative correlation between these measures and the central bank independence.

## 3. Data and Methodology

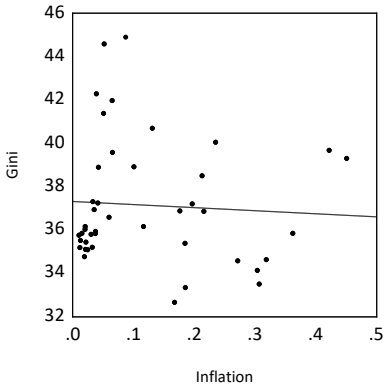
Comparative macroeconomic analyses across countries over extended periods often encounter the challenge of missing data, given that macroeconomic statistics typically derive from diverse countries or regions with varying periods of data availability. This issue of missing data can significantly influence the results of panel estimations, leading to biased estimates, diminished statistical power, and increased uncertainty in the findings. Missing variables can distort the true relationships between variables by either omitting relevant information or introducing noise.

To address the problem of missing data, this study includes only those countries that have at least one-third of the data available for all variables over the analyzed period. Additionally, to maximize sample size and incorporate more information to identify the underlying relationships between variables, this study employs an unbalanced panel. Thus, the research utilizes an annual dataset consisting of an unbalanced panel of 46 countries spanning from 1980 to 2022.[3] The sample is predominantly composed of high-income and upper-middle-income countries in the Americas and Europe.

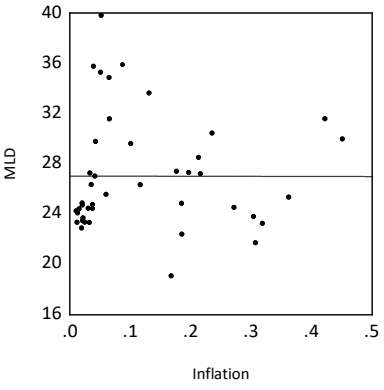
[3] Table A.1 (appendix) shows the countries included in the sample.

**Figure 5**

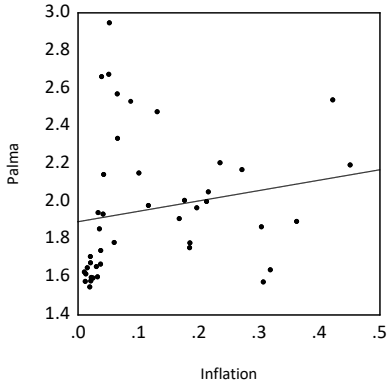
*Correlation between measures of income inequality and poverty with inflation*



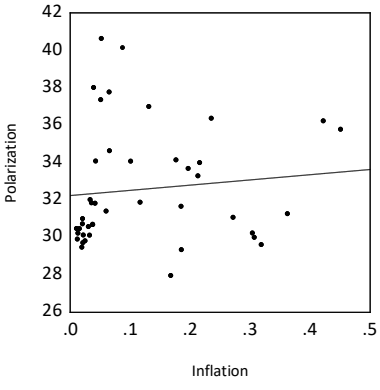

*Correl.: -0.061*



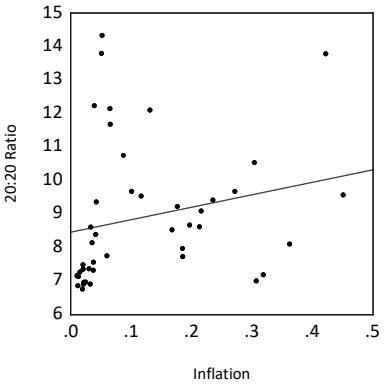

*Correl.: -0.002*



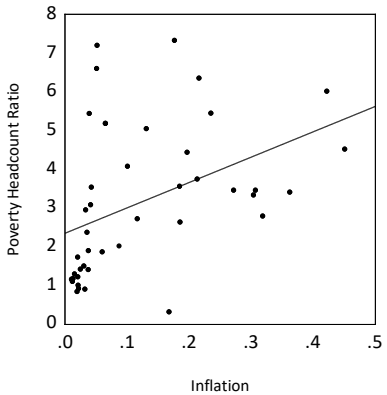

*Correl.: +0.185*



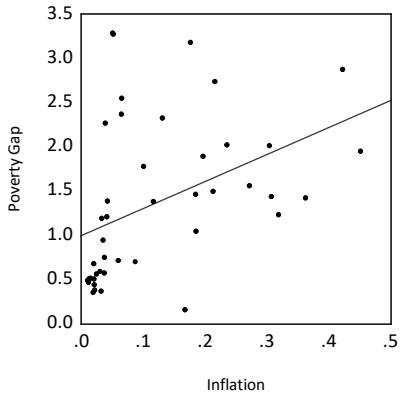

*Correl.: +0.109*



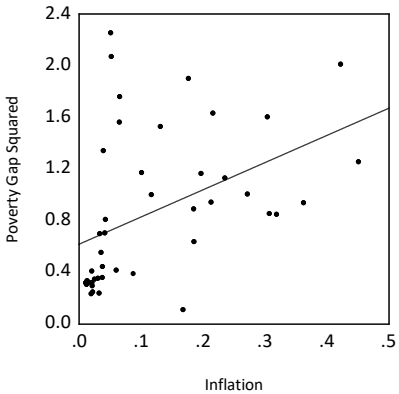

*Correl.: +0.219*



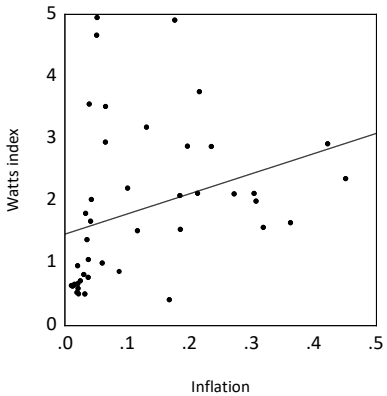

*Correl.: +0.416*




*Correl.: +0.418*



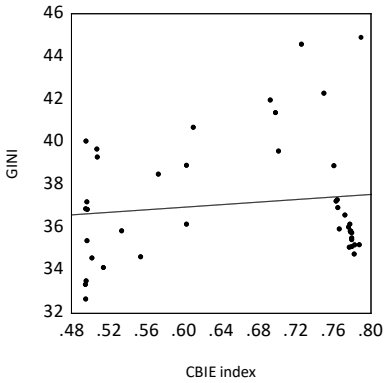

*Correl.: +0.436*



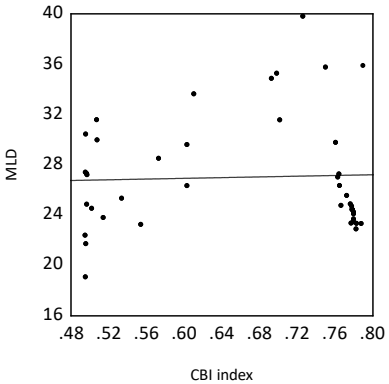

*Correl.: +0.315*

**Figure 6**

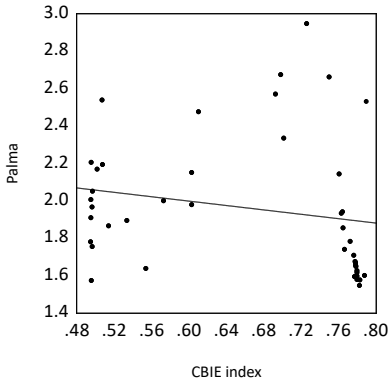
*Correlation between measures of income inequality and poverty with central bank independence*



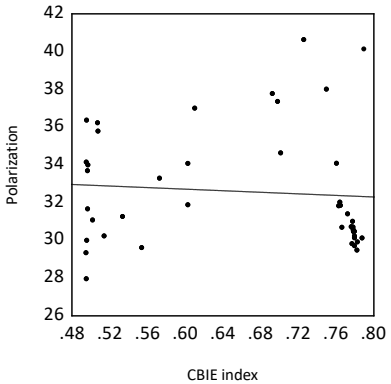

*Correl.: +0.128*



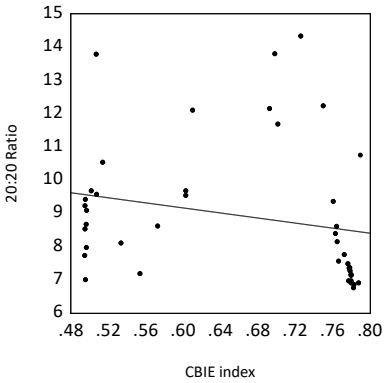

*Correl.: +0.039*



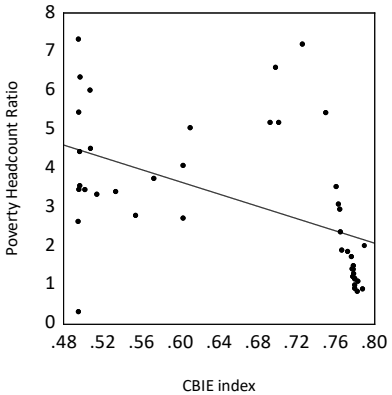

*Correl.: -0.198*



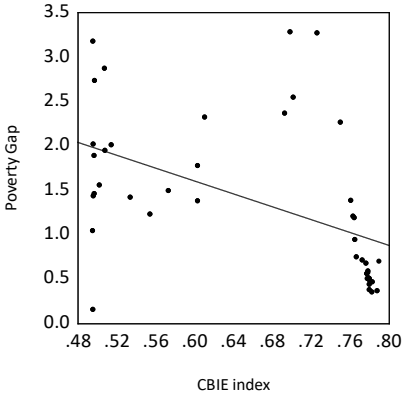

*Correl.: -0.082*



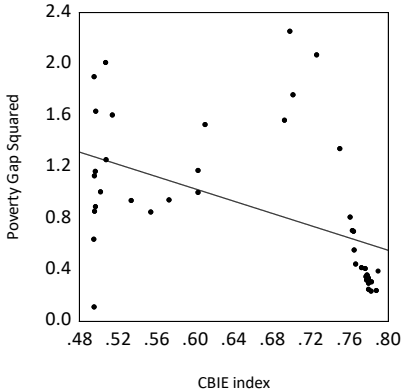

*Correl.: -0.226*



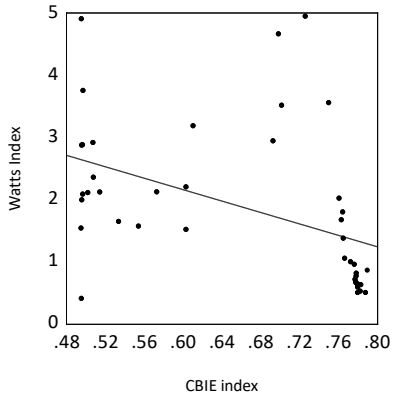

*Correl.: -0.505*




*Correl.: -0.499*




*Correl.: -0.497*




*Correl.: -0.450*

This research aims at examining the potential impact of inflation and central bank independence on income inequality and poverty. Consequently, the baseline model is specified as follows:

**(1)** $$Y_{n_j,i,t} = \beta_1 CBIE_{i,t-1} \times INF_{i,t-1} + \beta_2 CBIE_{i,t-1} + \beta_3 INF_{i,t-1} + \beta_4 Y_{n_j,i,t-1} + \beta_5 X_{n,i,t-1} + \varepsilon_{i,t}$$

where, $\varepsilon_{i,t} = \theta_i + \omega_{i,t}$, $\theta_i$ denotes the unobserved time-invariant country-specific fixed effects and $\omega_{i,t}$ is an i.i.d. random term with $E(\omega_{i,t}) = 0$ and $Var(\omega_{i,t}) = \sigma^2$.

The dependent variable $Y_{n_j,i,t}$ denotes the measures of income inequality ($n = 1$) or poverty ($n = 2$) for country $i$ in year $t$. The subscript $j$ specifies the measure within these categories. Specifically, when $n = 1$, $j$ takes values 1 through 5, corresponding to the Gini Index, Mean Log Deviation (MLD), Palma Ratio, Polarization Index, and the 20:20 Ratio, respectively. Conversely, when $n = 2$, $j$ takes values 1 through 4, representing the Poverty Headcount Ratio, Poverty Gap, Poverty Gap Squared, and Watts Index, respectively.

The *de jure* central bank independence index is denoted by *CBIE* and the proxy for the inflation rate is denoted by *INF*. This study aims at estimating the coefficients $\beta_2$ and $\beta_3$ to quantify the respective impacts of central bank independence and inflation on income inequality and poverty. Specifically, the coefficient $\beta_1$ of the interaction term *CBIE* × *INF* is intended to assess the potential moderating effect of central bank independence on the adverse consequences of inflation shocks on income inequality and poverty.

It is notable that the central bank independence index in the aforementioned equation makes the coefficient of inflation dependent on the degree of central bank independence. When central bank independence is high (*CBIE* close to 1), the impact of inflation on income inequality and poverty is expected to be mitigated. In this context, the coefficient of the interaction term is hypothesized to be negative.

In relation to the vector of control variables ($X_n$) within the model, this study incorporates the key variables identified in the literature as determinants of income inequality and poverty. For ($n = 1$), the control variables in vector ($X_1$) that elucidate income inequality include gross domestic product per capita, trade openness, and the unemployment rate. Conversely, for ($n = 2$), the control variables in vector ($X_2$) that account for poverty are gross domestic product, trade openness, and government consumption.[4]

[4] Details on descriptions of the variables, sources of data, and descriptive statistics are reported in Table A.2 (appendix).

Gross domestic product per capita (*GDP per capita*) is a crucial determinant of income inequality, as higher *GDP per capita* tends to improve income distribution within countries. Empirical studies by Barro (2000) and Dollar and Kraay (2002) support this, showing increases in *GDP per capita* are associated with better income distribution. Additionally, trade openness (*TRADE*) has a mixed impact on income inequality. While some studies, such as Dorn et al. (2022), suggest trade openness benefits the very poor, other research presents varied results (Wood, 1995; Feenstra and Hanson, 1996; Cragg and Epelbaum, 1996; Meschi and Vivarelli, 2009; Jaumotte et al., 2013; Roser and Cuaresma, 2016). The unemployment rate (*UNEMP*) is another critical factor, generally linked to higher income inequality, although some studies indicate ambiguous effects (Blinder and Esaki, 1978; Jantti, 1994; Mocan, 1999; Castañeda et al., 1998; Cysne and Turchick, 2012).

When examining poverty, gross domestic product (*GDP*) growth emerges as a significant control variable. There is robust empirical evidence demonstrating a strong relationship between GDP growth and poverty reduction (Ravallion, 2001; Kraay, 2006; Cerra et al., 2021). This suggests economic growth is a powerful tool for alleviating poverty. Trade openness (*TRADE*) also plays a crucial role in reducing poverty, as it is often associated with faster economic growth (Winters et al., 2004; Dollar and Kraay, 2004). By facilitating economic expansion, trade openness can help lift people out of poverty, making it an essential variable to consider in poverty studies. Government consumption (*GOV*) is another crucial control variable for poverty alleviation, with its effectiveness depending on resource allocation. Targeted transfers and subsidies can directly increase the disposable income of poor households, reducing poverty, and indirectly improve health and education outcomes (Castro-Leal et al., 1999; Cox et al., 2004; Davoodi et al., 2010).[5]

Macroeconomic panel data studies often encounter issues of heteroscedasticity and serial correlation, making the fixed effects model a suitable choice (Reed and Ye, 2011). This study adopts an ordinary least squares (OLS) model that includes country and time fixed effects to capture unique time-invariant characteristics within each country and any global shocks or trends that affect all countries simultaneously. However, OLS methods assume the error term is uncorrelated with the estimators, potentially leading to inconsistent estimates (Wooldridge, 2002). Additionally, to estimate parsimonious models examining the effects of central bank

[5] Studies show varied impacts: Mosley et al. (2004) and Kwon and Kim (2014) found significant negative effects of pro-poor and health expenditures on poverty, respectively, while Wagle (2012) noted the impact varies by sample and specification. Anderson et al. (2018) found no clear evidence of higher government spending reducing poverty in low- and middle-income countries, but Elshahawany and Elazhary (2024) emphasized its essential role in poverty alleviation through multiple channels.

independence and inflation on income inequality and poverty, this study utilizes a dynamic panel model, incorporating the lagged dependent variable as an explanatory variable.[6] Despite its advantages, the inclusion of the lagged dependent variable introduces dynamic panel bias and inconsistency in the least squares estimators (Baltagi, 2005).

This study uses instrumental variables within the frameworks of the System Generalized Method of Moments (Sys-GMM) to identify causal relationships between these variables and address the problem of endogeneity, which occurs when explanatory variables are correlated with the error term, leading to biased estimates.[7] As proposed by Arellano and Bover (1995) and Blundell and Bond (1998), Sys-GMM integrates moment conditions from difference and level regression equations using sequentially exogenous instrumental variables. By employing lagged values of the variables as instruments, as suggested by Johnston (1984)[8], this method effectively deals with missing data, lagged dependent variables, unobserved fixed effects, and potential reverse causality. Moreover, Sys-GMM accounts for heteroscedasticity and autocorrelation both across and within countries. This rigorous approach allows for consistent and efficient estimation, thereby isolating the true causal effect of the variables, distinguishing it from mere correlations. Through this framework, it is possible to better understand the dynamic relationships between variables in panel data analysis, capturing time-varying effects and ensuring robust causal inferences.

The Sys-GMM framework is well-suited for datasets with a small number of time periods (*t*) and a large number of individuals (*i*). However, in small samples or when the number of instruments is excessive, there is a risk of over-fitting the instrumented variables, resulting in biased estimates (Roodman, 2009). Although our sample size is sufficient, to avoid the use of an excessive number of instruments, the ratio of instruments to cross-sections is maintained below 1 in each regression (de Mendonça and Barcelos, 2015). This strategy mitigates the risk of over-fitting and ensures the consistency of the two-step Sys-GMM estimator. Furthermore, as recommended by Arellano (2003), the validity of the instruments is evaluated using the test of over-identifying restrictions (*J-test*). Additionally, tests for first-order (*AR1*) and second-order (*AR2*) serial correlation are performed.

[6] It is possible to estimate parsimonious models because lagged income inequality and lagged poverty carry a large part of their own explanation within themselves.

[7] To address endogeneity, Arellano and Bond (1991) advocate for the use of first-difference dynamic panel data, employing lagged values of endogenous variables as instruments. However, this approach can introduce bias and produce inaccurate estimates when lagged variables are utilized at the level (Arellano and Bover, 1995; Staiger and Stock, 1997).

[8] This study employs the dependent and independent variables themselves as instrumental variables, lagged by *t – 2* or earlier, both in levels and in first differences.

## 4. Empirical Results

This section presents empirical evidence on the relationship between inflation, central bank independence, income inequality, and poverty. To achieve this, the section is divided into three subsections. The first subsection details the results of OLS and Sys-GMM estimations across various models to assess the impact of central bank independence on inflation, income inequality, and poverty. The second subsection examines the influence of central bank independence on income deciles using OLS and Sys-GMM methods. The final subsection conducts a robustness analysis using four alternative indices of central bank independence: the CWN index (Cukierman et al., 1992), the GMT index (Grilli et al., 1991), the CWNE index (Jacome and Vazquez, 2008), and the CBI index (Bodea and Hicks, 2015), to re-estimate the baseline model using the Sys-GMM method.

### 4.1. Estimates of Central Bank Independence and Inflation on Income Inequality and Poverty

Tables 1 and 2 display the empirical findings for income inequality and poverty measures, respectively. The dependent variables of the estimated models are specified in the table columns. Generally, regardless of the income inequality or poverty measures considered or the estimation method used (OLS or Sys-GMM), the signs and significance of the *INF*, *CBIE*, and *CBIE* x *INF* coefficients align with theoretical expectations that central bank independence mitigates the adverse effects of inflation on income inequality and poverty. Additionally, all regressions estimated by Sys-GMM validate the null hypothesis in the Sargan tests (*J* statistic), confirming the validity of the overidentification restrictions. Moreover, both serial autocorrelation tests (*AR(1)* and *AR(2)*) reject the hypothesis of the presence of serial autocorrelation. Finally, all OLS regressions exhibit high adjusted $R^2$ statistics, indicating the variables included in the models are pertinent in explaining the behavior of income inequality and poverty.

The statistical significance and signs of the coefficients for the variable *INF* underscore its relevance in explaining income inequality and poverty. The positive and significant coefficient of *INF* across all models aligns with the perspective that inflation exacerbates income inequality and poverty (see Romer and Romer, 1998; Easterly and Fischer, 2001; Albanesi, 2007; Glawe and Wagner, 2024). Conversely, the variable *CBIE* does not exhibit statistical significance in any model, irrespective of the estimation method or the measure of income inequality and poverty employed. This finding supports the hypothesis that income inequality and poverty are primarily driven by structural factors not directly related to central bank

independence. Moreover, the absence of a direct effect of central bank independence on income inequality and poverty aligns with the findings of Sturm et al. (2024).

The statistical significance of the *CBIE* x *INF* interaction term across all models and measures of income inequality and poverty corroborates the hypothesis that the relationship between central bank independence and income inequality or poverty is indirect, stemming from the enhanced price stability fostered by an independent central bank. The magnitude of the negative coefficient of the interaction term suggests the effect of central bank independence can more than counterbalance the positive coefficient of *INF*. Notably, the coefficients of *CBIE* x *INF* exceed those of *INF* in all models, indicating central bank independence effectively mitigates the impacts of inflation on income inequality and poverty.

To ascertain whether the coefficients of *INF*, along with the interaction term between central bank independence and inflation (*CBIE* x *INF*), significantly reduce income inequality and poverty, the Wald test is performed. Given that the estimated coefficients for *INF* are positive ($\beta_3 > 0$, as per equation 1) and for *CBIE* x *INF* are negative ($\beta_1 < 0$, as per equation 1), the null hypothesis to be rejected to confirm the relevance of central bank independence in mitigating income inequality and poverty is $H_0$: $\beta_1 + \beta_3 = 0$. In summary, these tests allow us to determine whether the aforementioned coefficients are jointly significant.

The results of the Wald tests presented in Tables 1 and 2 indicate the sums of the coefficients $\beta_1 + \beta_3$ are negative across all measures of income inequality and poverty, regardless of the estimation method used. Additionally, the Wald tests confirm the coefficients of *INF* and *CBIE* x *INF* are jointly significant in all models estimated using Sys-GMM. These findings provide further support for the hypothesis that central bank independence plays a crucial role in reducing income inequality and poverty.

To validate these findings, this study examines the marginal effect on the sample mean of income inequality and poverty measures resulting from a 10% increase in *INF* relative to its sample mean. Specifically, using Equation 1 as a foundation, the partial derivative $dY/\,dINF = \beta_1 CBIE + \beta_3$ is evaluated. The overall impact of the inflation shock on income inequality and poverty measures is contingent upon the estimated values of $\beta_1$ and $\beta_3$, as well as the degree of central bank independence (*CBIE*).

**Table 1**

*Estimates of the Inflation with Central Bank Independence on Income Inequality (1980-2022)*

| | Sys-GMM | | | | | OLS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Gini Index** | **MLD** | **Palma Ratio** | **Polarization Index** | **20:20 Ratio** | **Gini Index** | **MLD** | **Palma Ratio** | **Polarization Index** | **20:20 Ratio** |
| $CBIE_{t-1} \times INF_{t-1}$ | -10.487*** | -23.203*** | -0.922** | -15.879** | -6.907* | -4.760** | -13.207*** | -1.010*** | -10.054*** | -6.741*** |
| | (2.802) | (4.594) | (0.397) | (6.541) | (3.495) | (2.224) | (4.004) | (0.374) | (2.399) | (2.545) |
| $CBIE_{t-1}$ | 0.778 | 1.425 | -0.003 | 0.984 | 0.455 | 0.395 | 0.935 | 0.143 | 0.398 | 0.626 |
| | (0.778) | (1.108) | (0.101) | (1.183) | (0.504) | (0.847) | (1.539) | (0.148) | (0.895) | (1.010) |
| $INF_{t-1}$ | 3.012*** | 6.665*** | 0.265** | 4.948*** | 2.309*** | 2.656*** | 6.297*** | 0.671*** | 4.388*** | 3.516*** |
| | (0.701) | (1.032) | (0.123) | (1.414) | (0.766) | (0.681) | (1.225) | (0.117) | (0.746) | (0.790) |
| $INEQ_{t-1}$ | 0.829*** | 0.852*** | 0.805*** | 0.840*** | 0.830*** | 0.753*** | 0.771*** | 0.760*** | 0.796*** | 0.728*** |
| | (0.033) | (0.031) | (0.039) | (0.029) | (0.028) | (0.022) | (0.021) | (0.022) | (0.020) | (0.021) |
| *GDP per capita*$_{t-1}$ | -1.164** | -2.088** | -0.146* | -1.638*** | -0.989*** | -2.481*** | -4.335*** | -0.294*** | -2.347*** | -1.839*** |
| | (0.514) | (0.827) | (0.077) | (0.604) | (0.318) | (0.576) | (1.060) | (0.100) | (0.608) | (0.670) |
| $TRADE_{t-1}$ | 0.004** | 0.007** | 0.001** | 0.005** | 0.003*** | 0.005* | 0.010* | 0.001 | 0.005* | 0.005 |
| | (0.002) | (0.003) | (0.0002) | (0.002) | (0.001) | (0.003) | (0.005) | (0.0005) | (0.003) | (0.003) |
| $UNEMP_{t-1}$ | -0.017 | -0.053** | -0.003 | -0.020 | -0.030*** | -0.037** | -0.084** | -0.003 | -0.033* | -0.025 |
| | (0.014) | (0.025) | (0.003) | (0.015) | (0.008) | (0.018) | (0.034) | (0.003) | (0.020) | (0.022) |
| ***Wald Test ($H_0$: $\beta_1 + \beta_3 = 0$)*** | | | | | | | | | | |
| *Coef. (Stand. error)* | -7.47 (2.13) | -16.54 (3.66) | -0.66 (0.29) | -10.93 (5.16) | -4.60 (2.75) | -2.10 (1.66) | -6.91 (2.98) | -0.34 (0.28) | -5.67 (1.77) | -3.23 (1.89) |
| *F-statistic [p-value]* | 12.35 [0.00] | 20.44 [0.00] | 5.27 [0.02] | 4.49 [0.03] | 2.79 [0.09] | 1.61 [0.20] | 5.36 [0.02] | 1.49 [0.22] | 10.23 [0.00] | 2.90 [0.09] |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *Adjusted* $R^2$ | | | | | | 0.98 | 0.98 | 0.97 | 0.98 | 0.94 |
| *F-statistic [p-value]* | | | | | | 594.8 [0.00] | 435.8 [0.00] | 299.2 [0.00] | 679.6 [0.00] | 161.3 [0.00] |
| *N. inst./N. cross sec.* | 0.39 | 0.35 | 0.33 | 0.37 | 0.35 | | | | | |
| *J statistic [p-value]* | 14.96 [0.18] | 12.08 [0.21] | 8.19 [0.41] | 8.85 [0.55] | 11.68 [0.23] | | | | | |
| *AR(1) [p-value]* | -0.57 [0.00] | -0.58 [0.00] | -0.52 [0.00] | -0.64 [0.00] | -0.58 [0.00] | | | | | |
| *AR(2) [p-value]* | -0.05 [0.24] | -0.03 [0.48] | -0.07 [0.10] | 0.04 [0.37] | 0.01 [0.74] | | | | | |

**Note:** *INEQ* represents the measures of income inequality labeled in the columns. OLS - Ordinary Least Squares with country- and time fixed. Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to five periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022.

**Table 2**

*Estimates of the Inflation with Central Bank Independence on Poverty (1980-2022)*

| | Sys-GMM | | | | OLS | | | |
|---|---|---|---|---|---|---|---|---|
| | **Poverty Headcount Ratio** | **Poverty Gap** | **Poverty Gap Squared** | **Watts Index** | **Poverty Headcount Ratio** | **Poverty Gap** | **Poverty Gap Squared** | **Watts Index** |
| $CBIE_{t-1} \times INF_{t-1}$ | -5.223*** | -2.491*** | -1.398** | -4.641** | -4.013** | -1.706* | -1.310* | -4.123** |
| | (1.651) | (0.892) | (0.550) | (1.832) | (1.948) | (0.968) | (0.699) | (1.701) |
| $CBIE_{t-1}$ | 1.060 | -0.747 | -0.480 | -0.586 | 0.952 | 0.370 | 0.215 | 0.589 |
| | (0.752) | (0.522) | (0.392) | (0.784) | (0.736) | (0.366) | (0.265) | (0.647) |
| $INF_{t-1}$ | 2.567*** | 1.295*** | 0.616*** | 2.314*** | 2.067*** | 0.948*** | 0.643*** | 2.159*** |
| | (0.446) | (0.239) | (0.152) | (0.520) | (0.640) | (0.314) | (0.224) | (0.544) |
| $POV_{t-1}$ | 0.893*** | 0.800*** | 0.806*** | 0.852*** | 0.838*** | 0.816*** | 0.796*** | 0.749*** |
| | (0.009) | (0.009) | (0.026) | (0.022) | (0.021) | (0.020) | (0.019) | (0.022) |
| $GDP_{t-1}$ | -0.228* | -0.261*** | -0.162*** | -0.298* | -1.148*** | -0.487** | -0.320** | -1.148*** |
| | (0.117) | (0.078) | (0.056) | (0.167) | (0.401) | (0.193) | (0.135) | (0.329) |
| $TRADE_{t-1}$ | -0.001 | 0.003*** | 0.002** | 0.004** | -0.0001 | 0.0005 | 0.001 | -0.0004 |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.003) | (0.001) | (0.001) | (0.002) |
| $GOV_{t-1}$ | -0.331** | -0.277*** | -0.217** | -0.241 | -0.289 | -0.118 | -0.032 | -0.377 |
| | (0.151) | (0.101) | (0.095) | (0.211) | (0.437) | (0.213) | (0.154) | (0.380) |
| ***Wald Test (H0: β1 + β3 = 0)*** | | | | | | | | |
| *Coef. (Stand. error)* | -2.66 (1.21) | -1.20 (0.66) | -0.78 (0.41) | -2.33 (1.32) | -1.95 (1.43) | -0.76 (0.71) | -0.67 (0.51) | -1.96 (1.25) |
| *F-statistic [p-value]* | 4.82 [0.03] | 3.29 [0.07] | 3.67 [0.06] | 3.11 [0.08] | 1.86 [0.17] | 1.14 [0.29] | 1.68 [0.19] | 2.45 [0.12] |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *Adjusted $R^2$* | | | | | 0.94 | 0.92 | 0.90 | 0.88 |
| *F-statistic [p-value]* | | | | | 165.7 (0.00) | 122.0 (0.00) | 91.98 (0.00) | 78.14 (0.00) |
| *N. inst./N. cross sec.* | 0.52 | 0.52 | 0.52 | 0.52 | | | | |
| *J statistic [p-value]* | 16.48 [0.49] | 23.31 [0.14] | 22.19 [0.18] | 18.60 [0.35] | | | | |
| *AR(1) [p-value]* | -0.50 [0.00] | -0.55 [0.00] | -0.59 [0.00] | -0.47 [0.00] | | | | |
| *AR(2) [p-value]* | -0.04 [0.30] | 0.06 [0.11] | 0.01 [0.75] | 0.04 [0.25] | | | | |

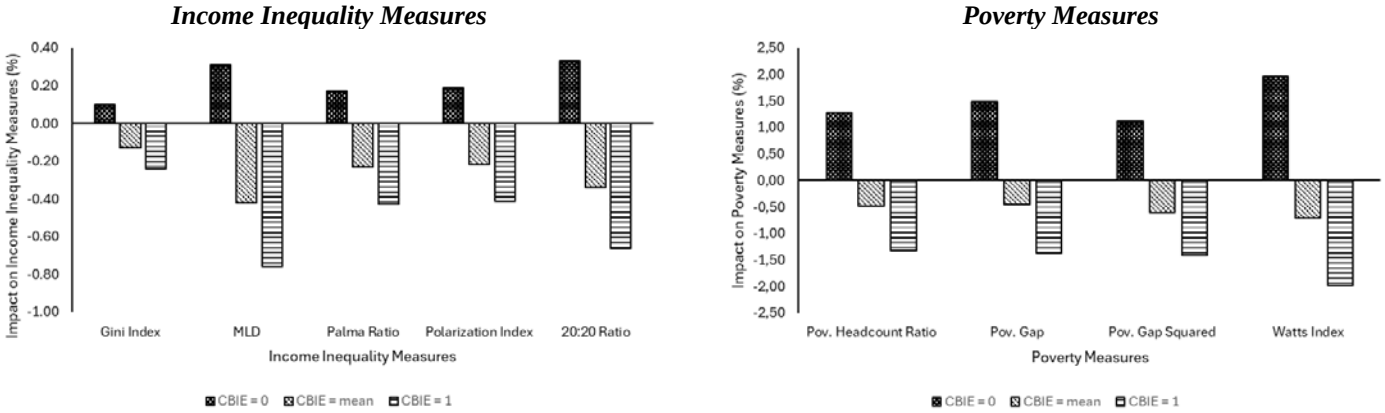
**Note:** *POV* represents the measures of poverty labeled in the columns. OLS - Ordinary Least Squares with country- and time fixed. Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to five periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022

Figure 7 presents the marginal effect on the sample mean of the income inequality and poverty measures resulting from the shock on INF. This considers the sample means of *INF*, *CBIE*, and the income inequality and poverty measures (*Y*), along with the coefficients estimated via Sys-GMM for *INF* ($\beta_3$) and *CBIE* x *INF* ($\beta_1$). When central bank independence (*CBIE*) is zero, an inflationary shock increases income inequality by 0.10% to 0.33% and poverty by 1.12% to 1.97%. However, these adverse effects are fully mitigated when *CBIE* reaches or exceeds 0.4 for income inequality and 0.6 for poverty measures. At the sample mean value of *CBIE*, considering all measures, a 10% increase in INF results in an average reduction in income inequality from 0.13% to 0.42% and in poverty from 0.34% to 0.72%. The positive impact of central bank independence on reducing income inequality and poverty is even more pronounced when *CBIE* is at its maximum (*CBIE* = 1). These findings reinforce the relevance of central bank independence in mitigating the negative effects of inflation on income inequality and poverty, thereby promoting social and economic justice.

Finally, the positive and significant coefficients for all dependent variables lagged by one period (*INEQ* and *POV*) show income inequality and poverty have long-term persistence. This persistence exacerbates both income inequality and poverty over time. In turn, the estimated coefficients for the control variables *GDP per capita*, *TRADE*, and *UNEMP* related to income inequality exhibit statistical significance across most models. Consistent with the findings of Barro (2000) and Dollar and Kraay (2002), higher GDP per capita is associated with improved income distribution. The results for *TRADE* align with Roser and Cuaresma (2016), indicating trade openness tends to exacerbate income inequality. Furthermore, the negative coefficients for *UNEMP*, significant in several models, suggest unemployment may contribute to reducing income inequality, corroborating the studies by Castañeda et al. (1998) and Cysne and Turchick (2012). Conversely, regarding the control variables related to poverty – *GDP*, *TRADE*, and *GOV* – the estimated coefficients are consistent with theoretical expectations. The findings affirm the robust relationship between GDP growth and poverty reduction, as highlighted by Kraay (2006). Additionally, the results reveal that *TRADE* increases income inequality and poverty, consistent with the analyses of Meschi and Vivarelli (2009) and Roser and Cuaresma (2016). Lastly, the coefficients for *GOV* support the conclusions of Cox et al. (2004), demonstrating government consumption plays a role in alleviating poverty.

**Figure 7**

*Impact of an inflation shock on income inequality and poverty measures across varying degrees of central bank independence*




## 4.2. Estimates of Central Bank Independence and Inflation on Income Deciles

The evidence presented in the previous subsection suggests central bank independence plays a crucial role in mitigating the impact of inflation on income inequality and poverty. This subsection assesses whether the beneficial outcomes of central bank independence on income inequality remain when considering the income deciles. Consequently, we use the following equation:

**(2)** $$D_{a,i,t} = \beta_1 CBIE_{i,t-1} \times INF_{i,t-1} + \beta_2 CBIE_{i,t-1} + \beta_3 INF_{i,t-1} + \beta_4 D_{a,i,t-1} + \beta_5 X_{1,i,t-1} + \varepsilon_{i,t}$$

where, as in Equation 1, $\varepsilon_{i,t} = \theta_i + \omega_{i,t}$, with $\theta_i$ denoting the unobserved time-invariant country-specific fixed effects and $\omega_{i,t}$ being an i.i.d. random term with $E(\omega_{i,t}) = 0$ and $Var(\omega_{i,t}) = \sigma^2$. *INF* and *CBIE* are proxies for the inflation rate and the *de jure* central bank independence index, respectively, as previously defined. $X_n$, with $n = 1$, represents the vector of control variables that determine income inequality: gross domestic product per capita, trade openness, and the unemployment rate. The dependent variable $D_a$ denotes the income share as a percentage of total income, divided by decile, for country *i* in year *t*. The subscript *a* specifies the income decile, ranging from the poorest segment of the population ($a = 1$ represents the income share of the poorest 10% of the population) to the richest segment of the population ($a = 10$ represents the income share of the richest 10% of the population).

Table 3 presents the results of the effects of central bank independence and inflation on income deciles. The dependent variables of the estimated models are specified in the columns of the tables and represent the income shares ranging from the lowest income decile (*D01*) to

the highest income decile (*D10*). Overall, the signs and significance of the *INF*, *CBIE* and *CBIE* x *INF* coefficients align with previous findings that central bank independence can mitigate the adverse effects of inflation on income inequality. Additionally, the OLS models exhibit high adjusted $R^2$ statistics, indicating the relevance of the variables included in the model to explain the behavior of income deciles. Furthermore, the Sargan test (*J* statistic) of the Sys-GMM models confirms the validity of the overidentification restrictions, and the hypothesis of the presence of serial autocorrelation in the models is rejected by the serial autocorrelation tests (*AR(1)* and *AR(2)*).

The negative and significant coefficients of *INF* for the lowest income deciles (*D01* to *D08*) and positive and significant coefficients for the highest income deciles (*D09* and *D10*) indicate inflation reduces the income share of the poorest population and increases the income share of the richest population, contributing to the increase in income inequality. This result is consistent with the findings of Erosa and Ventura (2002) and Albanesi (2007). These studies show inflation erodes purchasing power and reduces the value of the real wage of the poorest population, while the richest portion of the population can benefit from inflation since they have diversified assets that can act as a hedge against inflation, allowing them to preserve and even increase their wealth. In turn, the results for the *CBIE* confirm the findings of the previous subsection that central bank independence does not directly affect income inequality. Although it presents negative signs for the lower-income segments of the population and positive signs for the higher-income segments, the estimated coefficients for the *CBIE* do not exhibit statistical significance.

The significant positive coefficients of *CBIE* x *INF* for the lowest income deciles (*D01* to *D08*) and negative and significant coefficients for the highest income deciles (*D09* and *D10*), regardless of the estimation method, indicate that the indirect effect of greater central bank independence, through greater price stability, improves income distribution. The magnitude of the negative coefficient of the interaction term exceeds the magnitude of *INF* in all models for lower income deciles (*D01* to *D08*), suggesting the effect of central bank independence can mitigate the adverse effects of inflation on the share of income held by the poorest. On the other hand, the magnitude of the positive coefficient of *CBIE* x *INF* exceeds the magnitude of the estimated coefficients for inflation in the models for higher income deciles. These results suggest that as the central bank gains more independence and control over monetary policy, this can lead to a more equitable distribution of income.

## Table 3

*Estimates of the Inflation with Central Bank Independence on Income Deciles (1980-2022)*

| | Sys-GMM | | | | | | | | | | OLS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **D01** | **D02** | **D03** | **D04** | **D05** | **D06** | **D07** | **D08** | **D09** | **D10** | **D01** | **D02** | **D03** | **D04** | **D05** | **D06** | **D07** | **D08** | **D09** | **D10** |
| $CBIE_{t-1} \times INF_{t-1}$ | 1.108*** | 1.195* | 1.248* | 0.930** | 1.718*** | 1.739*** | 1.639*** | 1.351*** | -7.083* | -11.99*** | 0.227 | 0.481* | 0.570** | 0.832*** | 0.921*** | 0.862*** | 0.655** | -0.094 | -1.796*** | -4.577** |
| | (0.366) | (0.664) | (0.641) | (0.393) | (0.614) | (0.397) | (0.326) | (0.375) | (3.547) | (2.029) | (0.289) | (0.274) | (0.273) | (0.279) | (0.287) | (0.301) | (0.316) | (0.342) | (0.448) | (2.049) |
| $CBIE_{t-1}$ | -0.350 | -0.165 | -0.026 | -0.006 | 0.070 | -0.039 | 0.052 | 0.009 | 0.311 | 0.695 | -0.117 | -0.044 | -0.035 | -0.030 | -0.004 | 0.003 | -0.010 | 0.012 | 0.126 | 0.409 |
| | (0.234) | (0.142) | (0.114) | (0.112) | (0.120) | (0.112) | (0.117) | (0.125) | (0.431) | (0.632) | (0.111) | (0.103) | (0.103) | (0.106) | (0.110) | (0.116) | (0.123) | (0.133) | (0.166) | (0.791) |
| $INF_{t-1}$ | -0.368*** | -0.323** | -0.349** | -0.319*** | -0.463*** | -0.471*** | -0.423*** | -0.305*** | 2.360** | 3.074*** | -0.149* | -0.239*** | -0.279*** | -0.379*** | -0.432*** | -0.464*** | -0.448*** | -0.231** | 0.438*** | 2.749*** |
| | (0.112) | (0.149) | (0.145) | (0.089) | (0.137) | (0.099) | (0.078) | (0.080) | (1.136) | (0.494) | (0.088) | (0.084) | (0.083) | (0.085) | (0.088) | (0.092) | (0.096) | (0.102) | (0.135) | (0.624) |
| $DECILES_{t-1}$ | 0.722*** | 0.834*** | 0.839*** | 0.821*** | 0.806*** | 0.818*** | 0.786*** | 0.732*** | 0.280*** | 0.817*** | 0.699*** | 0.745*** | 0.761*** | 0.759*** | 0.750*** | 0.710*** | 0.648*** | 0.541*** | 0.463*** | 0.704*** |
| | (0.065) | (0.031) | (0.030) | (0.033) | (0.038) | (0.049) | (0.049) | (0.056) | (0.073) | (0.039) | (0.024) | (0.023) | (0.022) | (0.022) | (0.022) | (0.023) | (0.025) | (0.028) | (0.030) | (0.024) |
| *GDP per capita*$_{t-1}$ | 0.152* | 0.195*** | 0.142** | 0.117* | 0.143* | 0.201** | 0.163* | 0.147* | -0.263* | -1.247** | 0.270*** | 0.328*** | 0.296*** | 0.301*** | 0.295*** | 0.271*** | 0.287*** | 0.292*** | -0.053 | -2.360*** |
| | (0.079) | (0.064) | (0.058) | (0.070) | (0.080) | (0.089) | (0.094) | (0.086) | (0.148) | (0.518) | (0.073) | (0.070) | (0.070) | (0.071) | (0.073) | (0.077) | (0.081) | (0.086) | (0.105) | (0.534) |
| $TRADE_{t-1}$ | 0.0002 | -0.001* | -0.001* | -0.001** | -0.001** | -0.0004* | -0.0005* | -0.0003 | 0.002* | 0.004** | -0.001** | -0.001* | -0.001** | -0.001* | -0.001* | -0.001 | -0.001 | 0.0003 | 0.001* | 0.005* |
| | (0.001) | (0.0003) | (0.0003) | (0.0002) | (0.0002) | (0.0002) | (0.0003) | (0.0003) | (0.001) | (0.001) | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.001) | (0.003) |
| $UNEMP_{t-1}$ | -0.008* | 0.004* | 0.003* | 0.001 | 0.003 | 0.003 | 0.006** | 0.008** | 0.014** | -0.029** | 0.001 | 0.004* | 0.005** | 0.005** | 0.004* | 0.003 | 0.004* | 0.007** | 0.009** | -0.036** |
| | (0.005) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) | (0.006) | (0.014) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) | (0.003) | (0.004) | (0.017) |
| ***Wald Test ($H_0$: $\beta_1 + \beta_3 = 0$)*** | | | | | | | | | | | | | | | | | | | | |
| *Coef. (Stand. error)* | 0.74(0.27) | 0.87(0.52) | 0.90(0.50) | 0.61(0.31) | 1.25(0.48) | 1.27(0.31) | 1.21(0.25) | 1.05(0.30) | -4.72(2.44) | -8.92(1.55) | 0.08(0.21) | 0.24(0.20) | 0.29(0.20) | 0.45(0.21) | 0.49(0.21) | 0.40(0.22) | 0.21(0.24) | -0.32(0.26) | -1.36(0.34) | -1.83(1.53) |
| *F-statistic [p-value]* | 7.19[0.01] | 2.84[0.09] | 3.26[0.07] | 3.97[0.05] | 6.86[0.01] | 17.63[0.00] | 23.13[0.00] | 12.42[0.00] | 3.75[0.05] | 33.04[0.00] | 0.13[0.72] | 1.40[0.24] | 2.07[0.15] | 4.77[0.03] | 5.21[0.02] | 3.14[0.08] | 0.76[0.38] | 1.60[0.21] | 16.53[0.00] | 1.42[0.23] |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *Adjusted* $R^2$ | | | | | | | | | | | 0.97 | 0.98 | 0.98 | 0.98 | 0.98 | 0.97 | 0.95 | 0.88 | 0.92 | 0.97 |
| *F-statistic [p-value]* | | | | | | | | | | | 387.9[0.00] | 655.1[0.00] | 694.7[0.00] | 625.6[0.00] | 513.4[0.00] | 367.7[0.00] | 213.1[0.00] | 75.5[0.00] | 123.5[0.00] | 385.5[0.00] |
| *N. inst./N. cross sec.* | 0.26 | 0.28 | 0.30 | 0.39 | 0.37 | 0.28 | 0.35 | 0.39 | 0.28 | 0.39 | | | | | | | | | | |
| *J statistic [p-value]* | 2.15[0.83] | 4.52[0.61] | 8.14[0.32] | 12.51[0.33] | 12.16[0.27] | 5.54[0.48] | 7.76[0.56] | 10.51[0.48] | 5.60[0.47] | 13.01[0.29] | | | | | | | | | | |
| *AR(1) [p-value]* | -0.57[0.00] | -0.58[0.00] | -0.61[0.00] | -0.58[0.00] | -0.56[0.00] | -0.56[0.00] | -0.52[0.00] | -0.53[0.00] | -0.48[0.00] | -0.53[0.00] | | | | | | | | | | |
| *AR(2) [p-value]* | 0.06[0.15] | -0.04[0.33] | 0.01[0.81] | -0.01[0.78] | -0.02[0.65] | 0.04[0.34] | -0.01[0.94] | -0.01[0.92] | 0.01[0.70] | -0.04[0.27] | | | | | | | | | | |

**Note:** *DECILES* represents the income deciles labeled in the columns. OLS - Ordinary Least Squares with country- and time fixed. Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to five periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022.

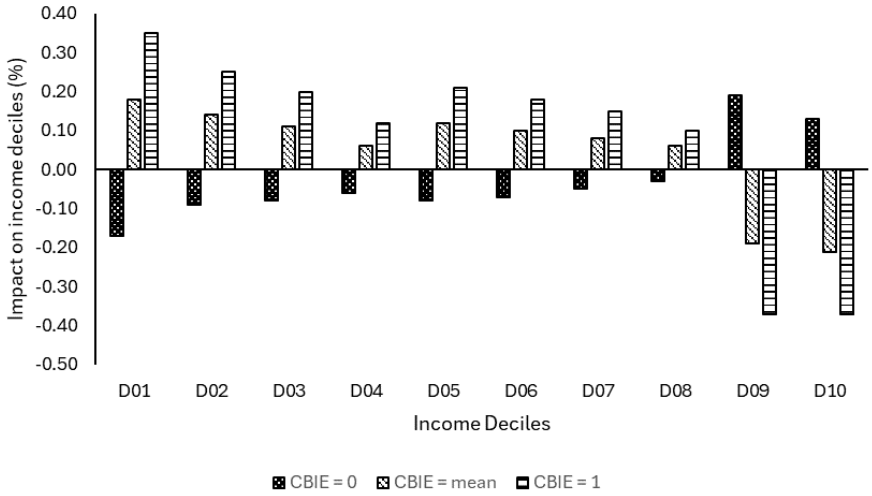
To validate these findings, we perform the Wald test to verify whether the coefficients of *INF*, together with *CBIE* x *INF*, are jointly significant. Given Equation 2 as an example, the null hypothesis to be rejected to confirm the relevance of central bank independence for a more equitable distribution of income is $H_0: \beta_1 + \beta_3 = 0$. The Wald test results presented in Table 3 show that, regardless of the estimation method used, the sums of the coefficients $\beta_1 + \beta_3$ are positive for the lowest income deciles and negative for the highest income deciles. Furthermore, the coefficients of *INF* and *CBIE* x *INF* are jointly significant in all models estimated using Sys-GMM. These results reinforce previous findings showing a more independent central bank benefits lower-income households to the detriment of higher-income households, possibly contributing to an improvement in income distribution in general.

Additionally, Figure 8 examines the marginal effect on the sample mean of the income deciles resulting from a 10% increase in *INF* relative to its sample mean. The partial derivative $dD/\,dINF = \beta_1 CBIE + \beta_3$ is calculated using the sample means of *INF*, *CBIE*, and the income deciles (*D*), along with the coefficients estimated via Sys-GMM for *INF* ($\beta_3$) and *CBIE* x *INF* ($\beta_1$). When central bank independence (*CBIE*) is zero, the inflationary shock exacerbates income inequality, decreasing the income share of the lowest deciles and increasing the income share of the highest deciles. The adverse effects of inflation on the lowest income deciles are fully mitigated when the degree of central bank independence is at least 0.4 for the poorest 10% of the population and at least 0.3 for the following income deciles (*D02* to *D07*). Given the sample mean value of *CBIE* at 0.68, it is observed that central bank independence more than offsets the adverse effects of inflation on the lowest income deciles (*D01* to *D08*), increasing the income share of the poorest 80% of the population and reducing the income share held by the richest 20%. The positive distributional effects of central bank independence on income deciles are even more pronounced when the degree of independence is total (*CBIE = 1*). Therefore, the evidence of the effects of central bank independence on income deciles underscores the benefits of central bank independence in promoting social and economic equity.

Regarding the control variables, all exhibit signs consistent with those expected in the literature and show statistical significance in most models. The estimated coefficients for *GDP per capita* confirm its relevance for improved income distribution (see Barro, 2000 and Dollar and Kraay, 2002), while the estimated coefficients for *TRADE* reinforce its adverse effects on income distribution (see Roser and Cuaresma, 2016). Finally, the results suggest unemployment penalizes both the poorest 10% and the richest 10%, favoring the deciles in the middle of the income distribution.

**Figure 8**

*Impact of an inflation shock on income deciles across varying degrees of central bank independence*




## 4.3. Robustness Analysis

The evidence presented in the previous subsections indicates central bank independence plays a crucial role in mitigating the negative impact of inflation on income inequality and poverty. In order to verify the robustness of these beneficial effects, this subsection re-estimate all previously estimated models using the Sys-GMM method with four alternative indices of central bank independence: the *CWN index* (Cukierman et al., 1992), the *GMT index* (Grilli et al., 1991), the *CWNE index* (Jacome and Vazquez, 2008), and the *CBI index* (Bodea and Hicks, 2015).

Tables A.3 and A.4 display the results for income inequality and poverty measures, respectively, while Tables A.5 and A.6 present the results for income deciles. The dependent variables of the estimated models are specified in the columns, and the alternative indices of central bank independence are labeled at the top. Consistent with the findings in the previous subsections, all models exhibit no overidentification or autocorrelation issues (see *J-statistic*, *AR(1)*, and *AR(2)*). Additionally, the signs of the control variable coefficients align with theoretical expectations and are consistent with the results from the previous subsections.

The estimation results presented in Tables A.3 and A.4 support the hypothesis that central bank independence can mitigate the negative effects of inflation on income inequality and poverty. Regardless of the specific index of central bank independence or the measures of income inequality and poverty employed, the interaction term between central bank independence and inflation (*CBIA* × *INF*) is consistently negative and statistically significant across all models. Moreover, in most cases, the magnitude of these coefficients exceeds that of the positive and significant coefficients associated with inflation alone (*INF*), reinforcing the

interpretation that central bank independence effectively counteracts the detrimental impact of inflation on income distribution and poverty levels. Additionally, the statistically insignificant coefficients for central bank independence (*CBIA*) suggest income inequality and poverty are primarily influenced by structural factors, rather than being directly attributable to central bank independence.

The empirical evidence presented in Tables A.5 and A.6 supports the positive role of central bank independence in promoting social and economic equity. Regardless of the specific central bank independence index used, the negative and significant coefficients of the interaction term between inflation and central bank independence (*CBIA* x *INF*) for the lowest income deciles (*D01* to *D08*) and the positive and significant coefficients for the highest income deciles (*D09* and *D10*) corroborate prior findings. These findings suggest that greater central bank independence, coupled with enhanced control over monetary policy, contributes to improved price stability and a more equitable income distribution. Furthermore, as noted in the previous subsection, the magnitude of the estimated coefficients for *CBIA* x *INF* generally exceeds that of *INF* across all models, indicating central bank independence plays a significant role in redistributing income from higher to lower income groups.

## 5. Conclusion

Through a panel data analysis for 46 countries from 1980 to 2022, this study examined the effect of inflation on income inequality and poverty, and how central bank independence influences this relationship. Central bank independence was measured by the ability to formulate and execute monetary policy without political interference, safeguarded by robust legal and administrative frameworks. This study used the comprehensive de jure central bank independence index developed by Romelli (2022, 2024) to assess its effect on five measures of income inequality, four measures of poverty, and income deciles.

The findings underscore the importance of central banks' ability to conduct effective anti-inflationary monetary policies without political interference in mitigating the adverse effects of inflation on income inequality and poverty. The evidence indicated income inequality and poverty are driven by structural factors unrelated to central bank independence. The relationship between central bank independence and income inequality or poverty is indirect, stemming from the improved price stability fostered by an independent central bank. Specifically, while inflation exacerbates income inequality and poverty, central bank independence can effectively offset these adverse effects. In response to a 10% inflation shock, central bank independence mitigated the negative impacts on inequality and poverty, reducing

them from 0.13% to 0.42% and from 0.34% to 0.72%, respectively.

Furthermore, central bank independence disproportionately benefits low-income households, thereby improving overall income distribution. In response to a 10% inflation shock, central bank independence counteracts the negative effects on the income share of the bottom 80%, with more pronounced effects observed at higher levels of independence. The findings also revealed income inequality and poverty exhibit long-term persistence, exacerbating disparities in income distribution and poverty levels. Structural factors, such as GDP per capita, help mitigate income inequality, while overall GDP growth and increased government expenditure are effective in alleviating poverty. Conversely, trade openness tends to increase both income inequality and poverty. Additionally, the relationship between unemployment and income inequality is observed to be weakly negative.

It is crucial to acknowledge that income inequality and poverty can be influenced by factors beyond inflation, which were not accounted for in this study. Additionally, the literature on the impacts of inflation on income inequality and poverty is complex, and the use of multiple measures of income inequality and poverty, while comprehensive, can complicate the interpretation of findings for policymakers. Nonetheless, this study provides evidence that greater central bank capacity to implement and formulate monetary policy without political pressure and interference (independence) is vital for mitigating the negative effects of inflation on income inequality and poverty. In brief, the primary finding of this analysis indicates central bank independence is essential for alleviating the adverse effects of inflation on income inequality and poverty, thereby promoting social and economic equity.

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**Table A.1**

*Sample Countries*

| Country Name | Code | Country Name | Code | Country Name | Code | Country Name | Code | Country Name | Code |
|---|---|---|---|---|---|---|---|---|---|
| Austria | AUT | Cyprus | CYP | Greece | GRC | Malta | MLT | Romania | ROU |
| Belgium | BEL | Czech Republic | CZE | Hungary | HUN | Mexico | MEX | Slovakia | SVK |
| Bolivia | BOL | Denmark | DNK | Iceland | ISL | Netherlands | NLD | Slovenia | SVN |
| Brazil | BRA | Dominican Republic | DOM | Ireland | IRL | Norway | NOR | Spain | ESP |
| Bulgaria | BGR | Ecuador | ECU | Italy | ITA | Panama | PAN | Sweden | SWE |
| Canada | CAN | Estonia | EST | Latvia | LVA | Paraguay | PRY | Switzerland | CHE |
| Chile | CHL | Finland | FIN | Lithuania | LTU | Peru | PER | United Kingdom | GBR |
| Colombia | COL | France | FRA | Luxembourg | LUX | Poland | POL | United States of America | USA |
| Costa Rica | CRI | Germany | DEU | Malaysia | MYS | Portugal | PRT | Uruguay | URY |
| Croatia | HRV | | | | | | | | |

**Table A.2**

*Description of the variables, sources of data, and descriptive statistics*

| Variable | Description | Data source | Mean | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|---|---|
| *20:20 Ratio* | The top 20 to bottom 20 ratio is the share of the richest quintile to the poorest quintile. | Devised by authors - PIP (WB) | 8.34 | 6.41 | 2.75 | 72.92 |
| *CBI* | Central Bank Independence Index developed by Bodea and Hicks (2015). The index ranges from 0 (absence of independence) to 1 (complete independence). | Bodea and Hicks (2015) | 0.56 | 0.21 | 0.16 | 0.95 |
| *CBIE* | Central Bank Independence Index developed by Romelli (2022, 2024). The index ranges from 0 (absence of independence) to 1 (complete independence). | Romelli (2022, 2024). | 0.68 | 0.19 | 0.10 | 0.93 |
| *CWN* | Central Bank Independence Index developed by Cukierman et al. (1992). The index ranges from 0 (absence of independence) to 1 (complete independence). | Romelli (2022, 2024). | 0.68 | 0.25 | 0.09 | 0.95 |
| *CWNE* | Central Bank Independence Index developed by Jacome and Vazquez (2008). The index ranges from 0 (absence of independence) to 1 (complete independence). | Romelli (2022, 2024). | 0.67 | 0.23 | 0.03 | 0.97 |
| *D01* | Percentage share of income held by the lowest/1st decile (%). | PIP (WB) | 2.54 | 0.99 | 0.02 | 5.12 |
| *D02* | Percentage share of income held by second/2nd decile (%). | PIP (WB) | 4.19 | 1.20 | 0.82 | 6.58 |
| *D03* | Percentage share of income held by third/3rd decile (%). | PIP (WB) | 5.29 | 1.23 | 2.03 | 7.46 |
| *D04* | Percentage share of income held by 4th decile (%). | PIP (WB) | 6.30 | 1.21 | 2.87 | 8.23 |
| *D05* | Percentage share of income held by 5th decile (%). | PIP (WB) | 7.34 | 1.14 | 3.82 | 9.10 |
| *D06* | Percentage share of income held by 6th decile (%). | PIP (WB) | 8.53 | 1.02 | 5.10 | 10.05 |
| *D07* | Percentage share of income held by 7th decile (%). | PIP (WB) | 9.98 | 0.83 | 6.92 | 11.49 |
| *D08* | Percentage share of income held by 8th decile (%). | PIP (WB) | 11.97 | 0.55 | 9.91 | 13.49 |
| *D09* | Percentage share of income held by 9th decile (%). | PIP (WB) | 15.26 | 0.84 | 13.01 | 18.11 |
| *D10* | Percentage share of income held by highest/10th decile (%). | PIP (WB) | 28.61 | 7.16 | 18.29 | 51.15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| *GDP* | Natural logarithm of gross domestic product (in US Dollars at constant 2015 prices). | WDI (WB) | 25.74 | 1.74 | 21.61 | 30.69 |
| *GDP per capita* | Natural logarithm of gross domestic product (in US Dollars at constant 2015 prices) divided by midyear population. | WDI (WB) | 9.67 | 0.94 | 7.38 | 11.63 |
| *Gini Index* | The Gini index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. The index ranges from 0 (perfect equality) to 100 (perfect inequality). | PIP (WB) | 36.70 | 9.45 | 20.19 | 63.30 |
| *GMT* | Central Bank Independence Index developed by Grilli et al. (1991). The index ranges from 0 (absence of independence) to 1 (complete independence). | Romelli (2022, 2024). | 0.66 | 0.24 | 0.06 | 1.00 |
| *GOV* | Government consumption is the natural logarithm of general government final consumption expenditure (% of GDP). | WDI (WB) | 2.82 | 0.31 | 1.07 | 3.41 |
| *INF* | Domestic inflation rate. Such as Dincer and Eichengreen (2014), inflation is equal to the natural logarithm of 1 plus the change in consumer price index available from IFS (IMF). | Devised by authors - IFS (IMF) | 0.12 | 0.33 | -0.05 | 4.77 |
| *MLD* | The Mean Log Deviation is an index of inequality, given by the mean across the population of the log of the overall mean divided by individual income. | PIP (WB) | 26.14 | 14.64 | 6.90 | 86.53 |
| *Palma Ratio* | The Palma Ratio is a measure of income inequality that compares the share of income received by the richest 10% of a population to the share received by the poorest 40%. A higher Palma ratio indicates greater inequality. | Devised by authors - PIP (WB) | 1.85 | 1.18 | 0.69 | 7.57 |
| *Polarization Index* | Polarization index measures the extent to which the distribution of welfare is "spread out" and bi-modal. A higher Polarization index indicates greater inequality. | PIP (WB) | 31.76 | 10.54 | 15.09 | 69.50 |
| *Poverty Gap* | Poverty gap (2017 PPP, $2.15) is the mean shortfall in income from the poverty line a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence. | PIP (WB) | 1.04 | 2.08 | 0.00 | 15.58 |
| *Poverty Gap Squared* | Poverty gap squared (2017 PPP, $2.15) reflects the depth of poverty as well as its incidence and severity. | PIP (WB) | 0.66 | 1.38 | 0.00 | 13.20 |
| *Poverty Headcount Ratio* | Poverty rate is the percentage of the population living in households with per capita income below the poverty line of US$2.15 at international prices (2017 PPP). | PIP (WB) | 2.42 | 4.65 | 0.00 | 30.58 |
| *TRADE* | Trade openness refers to the sum of imports and exports in relation to GDP. | Devised by authors - WDI (WB) | 88.45 | 54.66 | 14.39 | 393.14 |
| *UNEMP* | Unemployment (% of total labor force). Unemployment refers to the share of the labor force that is without work but available for and seeking employment. | WDI (WB) | 7.72 | 4.17 | 0.20 | 27.69 |
| *Watts Index* | Watts index (2017 PPP, $2.15) is the mean across the population of the proportionate poverty gaps, as measured by the log of the ratio of the poverty line to income, where the mean is formed over the whole population, counting the nonpoor as having a zero poverty gap. | PIP (WB) | 1.41 | 2.95 | 0.00 | 30.90 |

**Note:** PIP (WB) - Poverty and Inequality Platform from the World Bank. WDI (WB) - World Development Indicators from the World Bank. IFS (IMF) - International Financial Statistics from the International Monetary Fund.

## Table A.3

*Estimates of the Inflation with Central Bank Independence on Income Inequality (1980-2022) - Robustness Analysis*

| | ***CWN Index (Cukierman et al., 1992)*** | | | | | ***GMT Index (Grilli et al., 1991)*** | | | | | ***CWNE Index (Jacome and Vazquez, 2008)*** | | | | | ***CBI Index (Bodea and Hicks, 2015)*** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Gini Index** | **MLD** | **Palma Ratio** | **Polari-zation Index** | **20:20 Ratio** | **Gini Index** | **MLD** | **Palma Ratio** | **Polari-zation Index** | **20:20 Ratio** | **Gini Index** | **MLD** | **Palma Ratio** | **Polari-zation Index** | **20:20 Ratio** | **Gini Index** | **MLD** | **Palma Ratio** | **Polari-zation Index** | **20:20 Ratio** |
| $CBIA_{t-1} \times INF_{t-1}$ | -7.526* | -11.97*** | -0.487** | -11.67*** | -10.664** | -8.756*** | -23.72*** | -1.099*** | -12.59*** | -9.813*** | -8.469*** | -18.43*** | -1.068*** | -11.46** | -11.92** | -15.78*** | -14.67* | -2.107** | -13.77* | -11.77** |
| | (4.359) | (2.557) | (0.209) | (3.118) | (4.696) | (2.285) | (4.942) | (0.340) | (4.611) | (2.690) | (2.093) | (2.766) | (0.323) | (5.358) | (4.807) | (5.315) | (7.972) | (0.897) | (7.446) | (5.738) |
| $CBIA_{t-1}$ | 2.049 | 1.488 | -0.089 | 1.883 | 0.976 | 1.028 | 1.099 | 0.053 | 0.520 | 0.406 | 1.254 | 1.682 | 0.037 | 1.179 | 0.689 | -0.648 | 0.326 | 0.209 | 7.631 | 8.945 |
| | (1.567) | (1.156) | (0.126) | (1.300) | (1.528) | (0.647) | (1.130) | (0.098) | (0.947) | (0.582) | (0.807) | (1.033) | (0.111) | (1.221) | (0.981) | (0.520) | (0.884) | (0.134) | (5.417) | (6.100) |
| $INF_{t-1}$ | 4.306** | 7.159*** | 0.262** | 6.898*** | 5.400** | 5.010*** | 13.135*** | 0.616*** | 7.529*** | 6.244*** | 4.112*** | 8.968*** | 0.533*** | 5.966*** | 5.295*** | 4.640*** | 4.979** | 0.706*** | 5.326*** | 2.968* |
| | (2.075) | (1.303) | (0.128) | (1.398) | (2.223) | (1.219) | (2.449) | (0.211) | (2.151) | (1.186) | (0.921) | (1.285) | (0.185) | (2.085) | (1.934) | (1.262) | (1.843) | (0.238) | (1.827) | (1.730) |
| $INEQ_{t-1}$ | 0.813*** | 0.819*** | 0.821*** | 0.823*** | 0.866*** | 0.794*** | 0.788*** | 0.802*** | 0.833*** | 0.727*** | 0.816*** | 0.837*** | 0.806*** | 0.842*** | 0.867*** | 0.872*** | 0.844*** | 0.794*** | 0.817*** | 0.648*** |
| | (0.033) | (0.029) | (0.029) | (0.027) | (0.028) | (0.036) | (0.032) | (0.036) | (0.028) | (0.030) | (0.034) | (0.030) | (0.035) | (0.031) | (0.028) | (0.027) | (0.040) | (0.048) | (0.041) | (0.081) |
| $GDP\ per\ capita_{t-1}$ | -1.021** | -1.349** | -0.074* | -0.918* | -0.699** | -1.076** | -1.749* | -0.110* | -0.959** | -1.019*** | -0.977* | -1.406* | -0.105* | -1.241** | -0.738** | -1.393** | -2.423** | -0.325** | -2.292** | -4.693 |
| | (0.468) | (0.638) | (0.042) | (0.479) | (0.296) | (0.476) | (0.890) | (0.055) | (0.417) | (0.372) | (0.501) | (0.703) | (0.059) | (0.527) | (0.306) | (0.577) | (0.954) | (0.136) | (0.905) | (3.761) |
| $TRADE_{t-1}$ | 0.002 | 0.006 | 0.001** | 0.002 | 0.0004 | 0.004** | 0.014** | 0.0005** | 0.005* | 0.006** | 0.002 | 0.004 | 0.001* | 0.004 | 0.001 | 0.016*** | 0.018* | 0.001 | 0.022*** | 0.004 |
| | (0.004) | (0.004) | (0.0003) | (0.004) | (0.003) | (0.002) | (0.005) | (0.0002) | (0.003) | (0.003) | (0.002) | (0.003) | (0.0003) | (0.004) | (0.002) | (0.005) | (0.009) | (0.001) | (0.008) | (0.014) |
| $UNEMP_{t-1}$ | -0.003 | -0.020 | -0.001 | 0.013 | -0.018** | -0.005 | -0.023 | -0.002 | 0.013 | -0.026** | -0.003 | -0.023 | -0.002 | 0.002 | -0.022** | 0.006 | -0.017 | -0.007* | 0.017 | -0.066 |
| | (0.015) | (0.022) | (0.002) | (0.015) | (0.009) | (0.015) | (0.028) | (0.002) | (0.012) | (0.011) | (0.015) | (0.023) | (0.002) | (0.013) | (0.009) | (0.021) | (0.031) | (0.004) | (0.029) | (0.058) |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *N. inst./N. cross sec.* | 0.30 | 0.33 | 0.30 | 0.37 | 0.28 | 0.33 | 0.30 | 0.35 | 0.37 | 0.30 | 0.39 | 0.39 | 0.35 | 0.33 | 0.30 | 0.41 | 0.39 | 0.37 | 0.35 | 0.24 |
| *J statistic* | 9.19 | 9.36 | 3.89 | 7.42 | 6.38 | 11.21 | 11.10 | 6.58 | 12.15 | 11.50 | 13.62 | 12.82 | 6.63 | 4.36 | 8.39 | 14.05 | 10.09 | 9.99 | 4.51 | 1.56 |
| *[p-value]* | [0.24] | [0.31] | [0.79] | [0.68] | [0.38] | [0.19] | [0.13] | [0.68] | [0.27] | [0.12] | [0.25] | [0.30] | [0.67] | [0.82] | [0.30] | [0.30] | [0.52] | [0.44] | [0.87] | [0.82] |
| *AR(1)* | -0.54 | -0.55 | -0.52 | -0.65 | -0.59 | -0.56 | -0.54 | -0.52 | -0.65 | -0.56 | -0.56 | -0.59 | -0.52 | -0.65 | -0.59 | -0.52 | -0.51 | -0.43 | -0.54 | -0.30 |
| *[p-value]* | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| *AR(2)* | -0.05 | -0.04 | -0.07 | 0.07 | 0.03 | -0.05 | -0.05 | -0.07 | 0.07 | 0.06 | -0.05 | -0.02 | -0.07 | 0.07 | 0.02 | -0.07 | -0.07 | -0.08 | 0.05 | -0.11 |
| *[p-value]* | [0.23] | [0.35] | [0.12] | [0.13] | [0.52] | [0.27] | [0.23] | [0.11] | [0.17] | [0.17] | [0.27] | [0.58] | [0.10] | [0.18] | [0.59] | [0.24] | [0.26] | [0.13] | [0.44] | [0.07] |

**Note:** *CBIA* denotes the alternative central bank independence indices labeled at the top of the table. *INEQ* represents the measures of income inequality labeled in the columns. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to seven periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022. For models using the CBI index (Bodea and Hicks, 2015), the sample includes 43 countries from 1980 to 2020, excluding Ecuador, Luxembourg, and Malta.

## Table A.4

*Estimates of the Inflation with Central Bank Independence on Poverty (1980-2022) - Robustness Analysis*

| | *CWN Index (Cukierman et al., 1992)* | | | | *GMT Index (Grilli et al., 1991)* | | | | *CWNE Index (Jacome and Vazquez, 2008)* | | | | *CBI Index (Bodea and Hicks, 2015)* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Poverty Headcount Ratio** | **Poverty Gap** | **Poverty Gap Squared** | **Watts Index** | **Poverty Headcount Ratio** | **Poverty Gap** | **Poverty Gap Squared** | **Watts Index** | **Poverty Headcount Ratio** | **Poverty Gap** | **Poverty Gap Squared** | **Watts Index** | **Poverty Headcount Ratio** | **Poverty Gap** | **Poverty Gap Squared** | **Watts Index** |
| $CBIA_{t-1} \times INF_{t-1}$ | -5.437*** | -4.214*** | -1.324*** | -2.761** | -4.287** | -5.393*** | -2.352*** | -2.543* | -5.745*** | -6.048*** | -1.610*** | -2.385* | -8.590*** | -2.434*** | -1.745*** | -14.935*** |
| | (1.180) | (1.124) | (0.344) | (1.202) | (1.665) | (0.896) | (0.566) | (1.317) | (0.917) | (0.850) | (0.469) | (1.328) | (1.021) | (0.561) | (0.280) | (5.055) |
| $CBIA_{t-1}$ | 1.428 | 0.520 | -0.114 | -0.302 | 1.168 | 0.318 | 0.045 | 0.054 | 0.904 | 0.904 | -0.407 | -0.136 | 0.242 | 0.218 | 0.679 | 0.210 |
| | (0.931) | (0.952) | (0.278) | (0.625) | (0.776) | (0.541) | (0.301) | (0.608) | (0.672) | (0.587) | (0.346) | (0.794) | (0.472) | (0.188) | (0.692) | (0.537) |
| $INF_{t-1}$ | 4.189*** | 3.083*** | 1.018*** | 2.555*** | 3.489*** | 3.698*** | 1.573*** | 2.347*** | 3.894*** | 3.661*** | 1.052*** | 2.146*** | 3.661*** | 1.146*** | 0.687*** | 2.981** |
| | (0.673) | (0.632) | (0.198) | (0.710) | (0.911) | (0.469) | (0.317) | (0.749) | (0.443) | (0.394) | (0.240) | (0.663) | (0.256) | (0.141) | (0.082) | (1.328) |
| $POV_{t-1}$ | 0.884*** | 0.812*** | 0.783*** | 0.833*** | 0.867*** | 0.789*** | 0.781*** | 0.846*** | 0.885*** | 0.809*** | 0.792*** | 0.848*** | 0.879*** | 0.891*** | 0.901*** | 1.255*** |
| | (0.007) | (0.012) | (0.031) | (0.020) | (0.008) | (0.014) | (0.029) | (0.014) | (0.007) | (0.017) | (0.026) | (0.025) | (0.008) | (0.009) | (0.008) | (0.065) |
| $GDP_{t-1}$ | -0.237** | -0.172* | -0.114* | -0.530*** | -0.319** | -0.330** | -0.132* | -0.341** | -0.215* | -0.248* | -0.138** | -0.347* | -0.286*** | -0.079** | -0.069*** | 0.721** |
| | (0.116) | (0.097) | (0.062) | (0.178) | (0.127) | (0.127) | (0.075) | (0.158) | (0.109) | (0.127) | (0.058) | (0.208) | (0.077) | (0.035) | (0.021) | (0.272) |
| $TRADE_{t-1}$ | -0.002 | -0.0001 | 0.001 | 0.005*** | -0.001 | 0.001 | 0.001 | 0.003* | -0.001 | -0.002 | 0.002** | 0.004** | -0.006*** | -0.004*** | -0.002 | -0.029*** |
| | (0.002) | (0.002) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) | (0.001) | (0.001) | (0.004) |
| $GOV_{t-1}$ | -0.348** | -0.458** | -0.231*** | -0.301 | -0.478** | -0.361* | -0.198** | -0.409** | -0.313** | -0.341* | -0.160* | -0.252 | -0.586*** | -0.361*** | -0.179** | -2.545*** |
| | (0.150) | (0.210) | (0.081) | (0.211) | (0.214) | (0.197) | (0.083) | (0.186) | (0.151) | (0.176) | (0.097) | (0.228) | (0.191) | (0.103) | (0.078) | (0.390) |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *N. inst./N. cross sec.* | 0.52 | 0.50 | 0.50 | 0.48 | 0.54 | 0.48 | 0.48 | 0.46 | 0.52 | 0.52 | 0.52 | 0.50 | 0.52 | 0.52 | 0.52 | 0.48 |
| *J statistic* | 16.70 | 19.73 | 21.61 | 14.40 | 21.49 | 20.59 | 21.25 | 14.17 | 18.02 | 21.48 | 21.48 | 17.08 | 17.09 | 16.58 | 14.13 | 16.13 |
| *[p-value]* | [0.47] | [0.23] | [0.16] | [0.49] | [0.25] | [0.15] | [0.13] | [0.44] | [0.39] | [0.20] | [0.20] | [0.38] | [0.45] | [0.48] | [0.66] | [0.37] |
| *AR(1)* | -0.50 | -0.52 | -0.59 | -0.47 | -0.49 | -0.51 | -0.59 | -0.47 | -0.50 | -0.52 | -0.60 | -0.47 | -0.36 | -0.43 | -0.50 | -0.46 |
| *[p-value]* | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| *AR(2)* | -0.04 | 0.01 | 0.02 | 0.04 | -0.04 | 0.002 | 0.01 | 0.04 | -0.04 | 0.007 | 0.02 | 0.04 | -0.09 | -0.04 | 0.03 | 0.08 |
| *[p-value]* | [0.34] | [0.84] | [0.68] | [0.21] | [0.32] | [0.95] | [0.73] | [0.21] | [0.33] | [0.87] | [0.69] | [0.21] | [0.18] | [0.54] | [0.71] | [0.18] |

**Note:** *CBIA* denotes the alternative central bank independence indices labeled at the top of the table. *POV* represents the measures of poverty labeled in the columns. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to seven periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022. For models using the CBI index (Bodea and Hicks, 2015), the sample includes 43 countries from 1980 to 2020, excluding Ecuador, Luxembourg, and Malta.

## Table A.5

*Estimates of the Inflation with Central Bank Independence on Income Deciles (1980-2022) - Robustness Analysis*

| | ***CWN Index (Cukierman et al., 1992)*** | | | | | | | | | | ***GMT Index (Grilli et al., 1991)*** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **D01** | **D02** | **D03** | **D04** | **D05** | **D06** | **D07** | **D08** | **D09** | **D10** | **D01** | **D02** | **D03** | **D04** | **D05** | **D06** | **D07** | **D08** | **D09** | **D10** |
| $CBIA_{t-1} \times INF_{t-1}$ | 0.588*** | 1.152** | 0.525* | 0.708*** | 0.763*** | 0.813*** | 0.846*** | 0.805*** | -1.696** | -6.438*** | 0.837*** | 0.963* | 0.993*** | 0.825** | 1.100*** | 1.335*** | 1.026*** | 1.292*** | -1.570* | -9.834*** |
| | (0.210) | (0.486) | (0.290) | (0.150) | (0.120) | (0.270) | (0.144) | (0.177) | (0.776) | (1.090) | (0.266) | (0.492) | (0.351) | (0.325) | (0.338) | (0.243) | (0.239) | (0.205) | (0.913) | (1.430) |
| $CBIA_{t-1}$ | -0.252 | -0.209 | -0.136 | -0.041 | 0.018 | 0.090 | -0.106 | -0.080 | 0.560 | 0.938 | -0.272 | -0.151 | -0.118 | 0.092 | 0.016 | 0.027 | 0.124 | -0.082 | 0.413 | 0.600 |
| | (0.175) | (0.149) | (0.131) | (0.084) | (0.111) | (0.191) | (0.130) | (0.140) | (0.410) | (0.676) | (0.169) | (0.107) | (0.085) | (0.112) | (0.105) | (0.075) | (0.115) | (0.104) | (0.276) | (0.452) |
| $INF_{t-1}$ | -0.378*** | -0.600** | -0.315** | -0.456*** | -0.473*** | -0.410*** | -0.463*** | -0.367*** | 1.270*** | 3.443*** | -0.509*** | -0.523** | -0.564*** | -0.490*** | -0.623*** | -0.750*** | -0.516*** | -0.617*** | 1.124** | 5.178*** |
| | (0.133) | (0.236) | (0.140) | (0.080) | (0.070) | (0.137) | (0.080) | (0.094) | (0.467) | (0.545) | (0.161) | (0.237) | (0.172) | (0.163) | (0.154) | (0.131) | (0.121) | (0.102) | (0.525) | (0.698) |
| $DECILES_{t-1}$ | 0.719*** | 0.833*** | 0.861*** | 0.833*** | 0.812*** | 0.834*** | 0.745*** | 0.727*** | 0.337*** | 0.803*** | 0.705*** | 0.817*** | 0.824*** | 0.842*** | 0.777*** | 0.838*** | 0.804*** | 0.726*** | 0.299*** | 0.796*** |
| | (0.060) | (0.032) | (0.027) | (0.029) | (0.033) | (0.028) | (0.050) | (0.053) | (0.041) | (0.037) | (0.064) | (0.041) | (0.030) | (0.035) | (0.036) | (0.046) | (0.035) | (0.056) | (0.043) | (0.032) |
| *GDP per capita*$_{t-1}$ | 0.139* | 0.154*** | 0.123*** | 0.097* | 0.120* | 0.125** | 0.161* | 0.140* | -0.093 | -0.871** | 0.130* | 0.130** | 0.134** | 0.097* | 0.121 | 0.131* | 0.124* | 0.145* | -0.001 | -0.731* |
| | (0.073) | (0.050) | (0.044) | (0.055) | (0.064) | (0.062) | (0.092) | (0.071) | (0.092) | (0.398) | (0.074) | (0.052) | (0.054) | (0.057) | (0.080) | (0.069) | (0.069) | (0.073) | (0.094) | (0.425) |
| $TRADE_{t-1}$ | -0.0004 | -0.001 | -0.0003 | -0.001** | -0.001*** | -0.0004 | -0.0002 | 0.0002 | -0.001 | 0.003* | -0.0003 | -0.001* | -0.001** | -0.001*** | -0.001** | -0.0003 | -0.001* | 0.0001 | -0.0002 | 0.002* |
| | (0.001) | (0.001) | (0.0004) | (0.0002) | (0.0003) | (0.0005) | (0.0004) | (0.0005) | (0.001) | (0.002) | (0.001) | (0.0004) | (0.0003) | (0.0002) | (0.0003) | (0.0002) | (0.0004) | (0.0004) | (0.001) | (0.001) |
| $UNEMP_{t-1}$ | -0.008* | 0.004* | 0.002 | -0.001 | -0.0003 | -0.001 | 0.004 | 0.006** | 0.017*** | -0.003 | -0.008* | 0.002 | 0.001 | -0.001 | 0.0003 | 0.001 | 0.003 | 0.007** | 0.016*** | -0.010 |
| | (0.004) | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) | (0.003) | (0.004) | (0.013) | (0.005) | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) | (0.002) | (0.003) | (0.004) | (0.013) |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *N. inst./N. cross sec.* | 0.28 | 0.24 | 0.33 | 0.46 | 0.48 | 0.28 | 0.33 | 0.41 | 0.39 | 0.37 | 0.28 | 0.28 | 0.35 | 0.37 | 0.33 | 0.35 | 0.33 | 0.41 | 0.39 | 0.39 |
| *J statistic* | 4.04 | 5.94 | 8.47 | 16.52 | 18.31 | 3.17 | 6.10 | 7.67 | 12.47 | 9.80 | 4.03 | 6.82 | 14.60 | 14.42 | 10.00 | 9.89 | 6.63 | 9.82 | 10.51 | 11.81 |
| *[p-value]* | [0.67] | [0.20] | [0.39] | [0.28] | [0.25] | [0.79] | [0.64] | [0.81] | [0.33] | [0.46] | [0.67] | [0.34] | [0.10] | [0.15] | [0.26] | [0.36] | [0.58] | [0.63] | [0.48] | [0.38] |
| *AR(1)* | -0.58 | -0.54 | -0.57 | -0.59 | -0.57 | -0.54 | -0.52 | -0.52 | -0.51 | -0.53 | -0.57 | -0.54 | -0.61 | -0.58 | -0.56 | -0.57 | -0.51 | -0.52 | -0.49 | -0.53 |
| *[p-value]* | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| *AR(2)* | 0.07 | -0.02 | -0.01 | -0.01 | -0.02 | 0.04 | -0.01 | -0.01 | 0.02 | -0.04 | 0.07 | -0.03 | 0.01 | -0.01 | -0.01 | 0.04 | 0.003 | -0.01 | 0.01 | -0.05 |
| *[p-value]* | [0.10] | [0.61] | [0.86] | [0.77] | [0.70] | [0.31] | [0.85] | [0.81] | [0.57] | [0.26] | [0.12] | [0.54] | [0.73] | [0.81] | [0.74] | [0.40] | [0.93] | [0.78] | [0.83] | [0.26] |

**Note:** *CBIA* denotes the alternative central bank independence indices labeled at the top of the table. *DECILES* represents the income deciles labeled in the columns. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to seven periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022.

## Table A.6

*Estimates of the Inflation with Central Bank Independence on Income Deciles (1980-2022) - Robustness Analysis*

| | ***CWNE Index (Jacome and Vazquez, 2008)*** | | | | | | | | | | ***CBI Index (Bodea and Hicks, 2015)*** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **D01** | **D02** | **D03** | **D04** | **D05** | **D06** | **D07** | **D08** | **D09** | **D10** | **D01** | **D02** | **D03** | **D04** | **D05** | **D06** | **D07** | **D08** | **D09** | **D10** |
| $CBIA_{t-1} \times INF_{t-1}$ | 0.766*** | 1.494* | 0.798** | 0.655** | 1.400*** | 1.174*** | 1.318*** | 0.759*** | -1.423* | -6.045*** | 3.171** | 0.794* | 6.835*** | 8.089*** | 3.096** | 4.485*** | 3.411** | 3.401** | -4.040** | -20.11*** |
| | (0.243) | (0.876) | (0.327) | (0.305) | (0.429) | (0.229) | (0.165) | (0.266) | (0.805) | (1.559) | (1.323) | (0.467) | (2.018) | (2.060) | (1.139) | (1.454) | (1.292) | (1.509) | (1.982) | (3.262) |
| $CBIA_{t-1}$ | -0.308 | -1.116 | -0.142 | 0.036 | -0.098 | -0.062 | -0.014 | 0.133 | 0.398 | 0.395 | -0.164 | 0.054 | -0.061 | -0.089 | 0.035 | -0.015 | -0.105 | -0.184 | -0.241 | 0.248 |
| | (0.194) | (1.003) | (0.107) | (0.154) | (0.131) | (0.104) | (0.107) | (0.173) | (0.267) | (0.780) | (0.144) | (0.060) | (0.157) | (0.150) | (0.083) | (0.096) | (0.107) | (0.163) | (0.151) | (0.487) |
| $INF_{t-1}$ | -0.412*** | -0.738* | -0.403*** | -0.359** | -0.706*** | -0.554*** | -0.586*** | -0.309*** | 0.977** | 2.885*** | -0.820** | -0.250* | -1.809*** | -2.144*** | -0.901*** | -1.258*** | -0.976*** | -0.917** | 1.289** | 5.495*** |
| | (0.134) | (0.435) | (0.139) | (0.134) | (0.181) | (0.106) | (0.077) | (0.107) | (0.424) | (0.661) | (0.337) | (0.128) | (0.521) | (0.545) | (0.291) | (0.359) | (0.324) | (0.379) | (0.524) | (0.800) |
| $DECILES_{t-1}$ | 0.716*** | 0.750*** | 0.835*** | 0.843*** | 0.768*** | 0.818*** | 0.777*** | 0.721*** | 0.326*** | 0.814*** | 0.705*** | 0.894*** | 0.865*** | 0.889*** | 0.858*** | 0.864*** | 0.768*** | 0.720*** | 0.223*** | 0.875*** |
| | (0.065) | (0.088) | (0.033) | (0.034) | (0.045) | (0.048) | (0.048) | (0.054) | (0.044) | (0.036) | (0.081) | (0.038) | (0.046) | (0.044) | (0.039) | (0.040) | (0.047) | (0.063) | (0.043) | (0.034) |
| *GDP per capita*$_{t-1}$ | 0.168** | 0.380* | 0.130** | 0.107* | 0.154* | 0.147* | 0.158* | 0.084 | -0.078 | -0.827* | 0.292*** | 0.240*** | 0.329*** | 0.371*** | 0.142* | 0.209* | 0.251** | 0.292*** | -0.172 | -1.202** |
| | (0.076) | (0.230) | (0.058) | (0.061) | (0.093) | (0.083) | (0.086) | (0.073) | (0.091) | (0.473) | (0.093) | (0.065) | (0.097) | (0.091) | (0.081) | (0.120) | (0.110) | (0.097) | (0.120) | (0.587) |
| $TRADE_{t-1}$ | -0.0002 | 0.001 | -0.0003 | -0.001* | -0.001* | -0.0002 | -0.001* | -0.001 | -0.0002 | 0.003* | 0.0002 | -0.002 | -0.002 | -0.004** | -0.003*** | -0.002* | -0.001 | -0.001 | 0.001 | 0.006 |
| | (0.001) | (0.002) | (0.0003) | (0.0004) | (0.0003) | (0.0002) | (0.0003) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | (0.002) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.006) |
| $UNEMP_{t-1}$ | -0.008* | 0.005* | 0.002 | -0.0002 | 0.001 | 0.0003 | 0.004 | 0.006** | 0.014*** | -0.005 | 0.004 | 0.002 | 0.004 | 0.004 | -0.004 | -0.0005 | 0.005 | 0.010*** | 0.005 | 0.0001 |
| | (0.004) | (0.003) | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) | (0.003) | (0.004) | (0.014) | (0.004) | (0.003) | (0.004) | (0.005) | (0.004) | (0.006) | (0.004) | (0.003) | (0.010) | (0.020) |
| *Countries* | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| *N. inst./N. cross sec.* | 0.26 | 0.24 | 0.30 | 0.35 | 0.37 | 0.28 | 0.35 | 0.33 | 0.37 | 0.33 | 0.26 | 0.35 | 0.26 | 0.26 | 0.35 | 0.30 | 0.35 | 0.37 | 0.28 | 0.37 |
| *J statistic* | 4.24 | 5.64 | 7.37 | 13.61 | 13.70 | 3.90 | 6.36 | 4.76 | 9.28 | 6.73 | 1.82 | 7.22 | 3.07 | 1.81 | 8.27 | 8.47 | 10.14 | 6.50 | 1.87 | 10.15 |
| *[p-value]* | [0.51] | [0.23] | [0.39] | [0.14] | [0.19] | [0.69] | [0.70] | [0.78] | [0.50] | [0.56] | [0.87] | [0.61] | [0.69] | [0.87] | [0.51] | [0.29] | [0.34] | [0.77] | [0.93] | [0.43] |
| *AR(1)* | -0.57 | -0.55 | -0.61 | -0.58 | -0.57 | -0.56 | -0.52 | -0.53 | -0.50 | -0.54 | -0.50 | -0.47 | -0.47 | -0.47 | -0.54 | -0.58 | -0.54 | -0.48 | -0.41 | -0.51 |
| *[p-value]* | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| *AR(2)* | 0.07 | -0.06 | 0.01 | -0.01 | -0.02 | 0.04 | -0.006 | -0.007 | 0.01 | -0.04 | -0.02 | -0.09 | -0.09 | -0.08 | -0.01 | 0.07 | 0.02 | -0.03 | -0.10 | -0.04 |
| *[p-value]* | [0.12] | [0.21] | [0.73] | [0.83] | [0.67] | [0.33] | [0.88] | [0.86] | [0.77] | [0.32] | [0.67] | [0.12] | [0.12] | [0.13] | [0.85] | [0.19] | [0.74] | [0.49] | [0.05] | [0.48] |

**Note:** *CBIA* denotes the alternative central bank independence indices labeled at the top of the table. *DECILES* represents the income deciles labeled in the columns. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. The instrumental variables are the model variables themselves, in level or in first difference, lagged from two to seven periods. Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Standard errors in parentheses and p-value in square brackets. Tests for *AR(1)* and *AR(2)* check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is an unbalanced panel of 46 countries from 1980 to 2022. For models using the CBI index (Bodea and Hicks, 2015), the sample includes 43 countries from 1980 to 2020, excluding Ecuador, Luxembourg, and Malta.