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Policy uncertainty, inflation, and income inequality nexus: Does financial development matter?

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Abstract

Reducing income inequality is one of the goals under the Sustainable Development Goals. This study examines the intricate relationship between financial development, policy uncertainty, inflation, and income inequality. Panel data for African countries covering the period 2000-2022 were used in the analysis. The study used the economic policy uncertainty (EPU) index to examine its effects on income distribution. Previous studies indicated the possibility of asymmetric effects of inflation and EPU on income inequality. Hence, a dynamic non-linear Panel ARDL was employed to examine the asymmetric nature of the relationship between these variables. The study found that in the long run a symmetric EPU reduces income inequality for the countries in the study and this is confirmed by the asymmetric negative EPU that had a negative and significant impact on inequality. Income equality was found to deteriorate with an increase in inflation. Moreover, inequality was found to be more sensitive to negative changes in inflation relative to a positive change as inequality's elasticity to positive change was much lower as compared to negative changes. Under certain conditions and economic context, redistributive policies can alleviate inequality during a period of heightened EPU. By examining the theoretical frameworks and empirical evidence, the study highlights that for the countries in this study, policy uncertainty reduces inequality. Also, countries should continue with inflation targeting policies and if possible, aim for a lower rate relative to the previous period.

Keywords: inequality, policy uncertainty, inflation, financial development, autoregressive distributed lags, partial sums, structural breaks, asymmetric

JEL Codes: C22, C23, D80, O16.

1. Introduction

The global interconnectedness and heightened geopolitical risks have increased the economic policy uncertainty in most countries. Furthermore, with the advent of the Covid-19 pandemic there has been renewed interest in the role of economic policy to income distribution. Reducing income inequalities is a goal under the Sustainable Development Goals (Goal 10). Heightened economic policy uncertainty has rippling economic effects as it depresses economic activity through financial frictions (Karaman and Yıldırım-Karaman 2019; Albert and Gómez-Fernández 2023). Globally, the levels of income inequality are increasing and the emerging markets and developing economies (EMDE) have a triple challenge in inequality, economic policy uncertainty and underdeveloped financial markets among others (Bloom 2014; Smales 2020). The relationship between economic policy uncertainty and income inequality is complex. The effects of economic policy uncertainty (EPU) on income inequality in EMDE have not been empirically quantified. There is limited literature on the role of EPU, inflation and financial development on income inequality.

The recent COVID-19 pandemic has steered interests on examining the links between EPU and income distribution since income inequality had been amplified during the pandemic (International Monetary Fund (IMF), 2021; Farooq, Chisti, Rasheed and Rahman 2023). Unpredictable economic environment can be detrimental to low-income earners with a possibility of widening the income inequality gap (Farooq et al. 2023). Financial development and inflation can mitigate the within countries inequality gap, but it is not clear if economic policy uncertainties mitigate or exacerbate income inequality due to limited literature on the effect of economic policy uncertainty on income inequality. Increase or decrease in financial constraints during a period of heightened economic policy uncertainty may explain the role of financial development (Ma and Hao 2022). Shabir et al. (2022) opined that the effects of economic policy uncertainty tend to be higher in countries with constrained financial markets.

The financial markets of most EMDE are underdeveloped with financial constraints for businesses and individuals (Shabir et al. 2022). JPMorgan Chase (2024) emphasized that access to financial markets plays a critical role in shaping the financial well-being of families and individuals looking to accumulate wealth. Over time, financial assets have consistently delivered strong returns, though this growth often requires navigating periods of market volatility. The financial markets are essential for allocating scarce resources and fluctuations in the EPU can affect the allocative efficiency of the financial sector. Although there is literature on the determinants of income inequality such as economic growth, financial inclusion, institutional quality, monetary policy among others, the link between income inequality and economic policy uncertainty is understudied. Financial markets in most emerging and developing markets are very thin with

limited access and use of formal financial services by the low-income earners. Additionally, these countries also have very high inequality levels as measured by the Gini coefficient.

Risks emanating from policy instability in these economies are also higher than they are for developed markets mainly because of the undiversified economies (see Bloom 2014). Most emerging markets rely mainly on commodities which are prone to volatile global prices. Furthermore, emerging markets and developing economies have higher political risks (such as conflicts, wars, etc.) and natural disasters, with inadequate fiscal and monetary stabilization policies. It is therefore the objective of this study to examine the relationship between inequality, economic policy uncertainty, inflation and financial development. The relationship between income inequality and economic policy uncertainty (EPU) is complex and there is little empirical research on the economic policy uncertainty-inequality nexus. Effective policy interventions aimed at reducing inequality require a comprehensive understanding of the complex interactions between economic policies, market dynamics, and social factors. This study contributes to the empirical debates as most emerging and developing markets have very thin financial markets (low financial development), high income inequality, and economic policy uncertainties, compounded with spiralling inflationary pressures. Kim and Lin (2023) opined that increasing financial development attenuates the effects of inflation hence the study also examines the relationship between inflation and income inequality. High and unpredictable inflation disrupts information flows and hampers the financial sector's ability to allocate resources efficiently (Kim and Lin 2023). Understanding the relationship between inflation and income inequality is crucial for policymakers, as it helps guide decisions on how distributional concerns can be factored into price stabilization policies.

Given that the aim of this study is to investigate the effects of economic policy uncertainty, inflation and financial development on income inequality, it is hypothesised that:

H1: EPU has a significant effect on income inequality and the relationship is asymmetric

H2: inflation has a significant effect on income inequality and the relationship is asymmetric

H3: Financial development has a significant effect on income inequality

This study is organised as follows: The theoretical and empirical literature of the article is discussed in Section 2. Data description and model specification are discussed under the methodology in Section 3. The results on the inequality-economic policy uncertainty relationship, further analysing the moderating role of financial development are presented in section 4 whilst Section 5 concludes the study and provides a summary of policy implications.

2. Literature Review

The relationship between income inequality and economic policy uncertainty is complex and there is no single theory that explains this relationship. In the political economy theory, during periods of higher economic policy uncertainty, governments can intervene to reduce the social risks by increasing welfare spending to balance out inequality risks (Stack 1980; Al-Thaqeb and Algharabali 2019). Policy uncertainty shapes the economic outcomes of most economies as most economies with higher uncertainty experience sluggish economic growth, emigration and rising unemployment among others (Baker and Bloom 2013). Furthermore, during periods of higher uncertainty households can postpone investment and consumption decisions with implications for income distribution (Bernanke 1983; Pástor and Veronesi 2012). The theory of endogenous financial policy which is similar to the theory of endogenous growth suggests that financial regulations and policies evolve as part of the internal dynamics of the economy, responding to economic conditions rather than being static or externally determined (Aghion, Howitt and Mayer-Foulkes 2005; Bahmani-Oskooee and Hasanzade 2022). The framework opines that financial policies adapt based on economic growth, financial sector innovations and institutional changes (Greenwood and Jovanovic 1990). The theory argues that policies are shaped by factors like market demand, risk-taking, and technological advancement (Acemoglu and Zilibotti 1997).

Economic policy uncertainty can have a crucial impact on income inequality through the creation of unpredictable business environment that affect low-income earners. Under different economic contexts,the role of policy uncertainty to income distribution is unpredictable (Bahmani-Oskooee and Hasanzade 2022). Baker, Bloom and Davies (2016) argued that increased EPU affects investments, production and employment resulting in the slower growth of income for low-income earners thereby widening the inequality gap. However, the effect of EPU on income inequality is not clearly determined theoretically. Other studies argue that EPU only has an effect on income inequality if the uncertainty shocks affect the gross domestic product and interest rates (Albert and Gómez-Fernández 2023). In the same study Albert and Gómez-Fernández (2023) found that an increase in EPU increased inequality in Spain whilst reducing the income inequality gap in Germany and France. Ma and Hao (2022) further argued that financially developed markets can smooth consumption, market demand and increase economic growth which is essential for reduced income inequalities. Economic policy uncertainty affects the lending dynamics of the financial sector which will further affect economic and financial decisions such as investments, employment, and consumer spending decisions (Baker et al. 2016; Al-Thaqeb and Algharabali 2019; Shabir et al., 2022). Some of these decisions can have long-term, life-changing consequences.

In a period of heightened economic policy uncertainty, the financial markets play a role in ameliorating the severe socio-economic effect of economic policy uncertainty (Magwedere and Marozva 2021). However, this depends on the depth of the financial sector as underdeveloped financial markets may fail to absorb the effects of economic policy uncertainty increasing income inequality (Zhang and Razzaq 2022). Previous studies suggest that a well-functioning financial system, supported by efficient intermediation, reduced information asymmetry, strong institutions, and innovation can mitigate uncertainty, foster investment, and spur economic growth (Magwedere and Marozva 2022). Brueckner and Vespignani (2017) argued that the level of education of the populace and its ability to anticipate the economic effects of global events determines the correlation between income inequality and EPU. In other arguments the size of the economy affects the relationship between EPU and income inequalities (Obiakor et al. 2022). Furthermore, developed financial markets can smooth consumption and market demand (Ma and Hao 2022). Periods of high economic uncertainty affects the stock markets as stock prices during this period are very volatile (Marozva and Magwedere 2021) Economic policy uncertainty may lead to decreased investment and economic activity, disproportionately impacting lower-income individuals who rely on stable employment and wages (Ma and Hao 2022; Shabir et al. 2022). Additionally, uncertain economic conditions may incentivize firms to prioritize cost-cutting measures, such as reducing wages or employment benefits, further widening income disparities.

The impact of economic policy uncertainty on poor and wealthy households is heterogeneous; hence policy uncertainty can be an important determinant of income inequality (Theophilopoulou 2022). In other arguments it is postulated that household and business response to economic policy uncertainty depends on the dynamics of the labour market and the form of employment that is, between informal and formal markets (Ma and Hao 2022). That is the structural context of the economy can determine the relationship between the variables. There are mixed findings in the literature on the relationship between income inequality and inflation. Kim and Lin (2023) concluded that inflation increases income inequality whilst Law and Soon (2020) argued that the impact of inflation on income inequality is ambiguous as it is reliant on other variables.

There is no conclusive evidence on the income distribution effect of EPU and there is a gap in the literature on how EPU affects income inequality in emerging markets and developing economies, let alone the role of inflation and financial development in this relationship. This has remained a fertile research topic as there is little empirical evidence on the topic. Improvements in data availability in a panel data setting, more so for emerging markets and developing economies have made the data on the proxies of economic uncertainty available. Hence, this study seeks to contribute to knowledge on the relationship between economic policy uncertainty and income distribution. Additionally, previous researchers have focused on economic growth, access

to finance, institutional quality, among the determinants of income inequality. Most previous studies have used the volatility of income as a measure of uncertainty (see Checchi and García-Peñalosa 2004). This study is a diversion from this measure of uncertainty as the recently developed economic policy uncertainty index was used to examine the relationship between income inequality and EPU.

The methodology of the study is discussed in section 3 below.

3. Methodology

This section explains the data used and describes the methodology employed for this study.

3.1 Data

Panel data spanning from the year 2000 to 2022 is used to examine the relationship between income inequality and economic policy uncertainty. The period of the study and the countries included in the study was determined by data availability for all the countries included.

Table 1: summary of the variables, definition and the data sources

Variable	Definition /Measurement	Source	Expected Sign
Inequality (INEQ)	Uneven distribution of income across the entire households. The measure of inequality is derived from the Lorenz curve. (Gini Coefficient)	SWIID	
Economic Policy Uncertainty (EPU)	Risk associated with undefined future government policies and regulatory frameworks	https://www.policyuncertainty.com	+
Financial development (FD)	Private credit by % of GDP	WDI	+
Real Gross Domestic Product (RGDP)	GDP (constant 2015 US$)	WDI	–
Unemployment (UNEM)	The total number of the unemployed labour force as a percentage of the total labour force.	WDI	+
Inflation (CPI)	Changes in prices of goods and services that households consumes (Consumer Price Index)	WDI	+/–

Notes: Standardized World Income Inequality Database (SWIID); World Development Indicators (WDI)

3.2 Empirical Methods

The study seeks to test for the long-run cointegrating relationships between inequality and explanatory variables applying the panel autoregressive distributed lags (ARDL) bounds testing approach by Pesaran, Shin and Smith (2001) and the Non-Linear autoregressive distributed lags (NARDL) models without and with structural breaks (see for example Adekoya, Ogunnusi and Oliyide 2021). The panel ARDL and panel NARDL are preferred relative to the traditional ARDL and NARDL which are best suited for longitudinal studies (Pesaran *et al*. 2001). Furthermore, both models are argued to have an ability to cope with endogenous bias (Magwedere and Marozva, 2024; Biyase and Chisadza, 2023). The Wald tests revealed that asymmetries matter, thus the focus is on the asymmetric models. There is also an indication in previous studies that the relationship between income inequality and economic policy uncertainty can be asymmetric hence the preferred use of asymmetric models to examine the relationship (see Bahmani-Oskooee and Motavallizadeh-Ardakani 2018). Primarily, the pros of the linear ARDL are in its ability to simultaneously generate both long-run and short-run estimates and it can be consistently used for variables at different levels of integration as long as they are not of higher order I (2) (Pesaran *et al*. 1999). When ARDL is run concurrently with Error Correction Term (ECT) it provides the long-run equilibrating estimate (ECT) which is the rate at which variables move together in the long-run, after a disruption by one-time shock in the short-run and adjust the output for the possible problem of endogeneity). To have a robust and reliable estimate, the test of endogeneity was conducted using the NPARDL based on the equations 8 and 9. Each independent variable was regressed on its own lag value and variables in the model to obtain their residual. Then, we later ran all the variables were then run with their lag values along with residuals. Since there are two independent variables involved (inequality and economic policy uncertainty, the inverse of the F-stat was used to determine if endogeneity exists or not. Where the F-value is not statistically significant, there is no endogeneity problem (see Gujarati and Porter, 2009; Seddighi, 2012). In addition, the ARDL is also appropriate for as the ARDL estimators also outperform other alternative estimators (such as cointegration methods) in that they have a greater statistical power in small samples (Panopoulou and Pittis, 2004; Narayan 2004). Given that economic policy uncertainty and inflation may respond differently to positive or negative shocks, the NARDL adds to the advantages of ARDL as it accounts for the direction of the shock.

Primarily the Pooled Mean Group (PMG) is employed as Pesaran *et al*. (1999) argue that this model is efficient and unbiased in a situation where either N or T is small, in this case T is small, therefore a short panel. The PMG estimator allows for country heterogeneity in error

variances, the short-run coefficients, together with the intercepts, and the speed of adjustment to the long-run equilibrium values with a proposal of the homogenous long-run slope coefficients across countries (N) (Loayza and Ranciere 2006). Employing the PMG model, the Panel ARDL/ NARDL and ECT were run concurrently to determine the speed of adjustment in situations of disequilibrium (see for example Pesaran et al. 1999; Pedroni 1999 2004; Apergis and Payne 2010). The model estimated has the form of an ARDL (*p, q, q, ..., q*).

$$\boldsymbol{INEQ_{it}} = \sum_{j=1}^{p} \delta_{ij} INEQ_{i,t-j} + \sum_{j=0}^{q} \beta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \tag{1}$$

where $INEQ_{it}$ is the GINI coefficient representing the level of inequality and $X_{i,t-1}$ is the vector of the explanatory variables for country i and μ_i is the country-specific fixed effect, j is the studied country with *p* and *q* as the lag length (Pesaran et al. 1999). Equations 2-3 are the proposed model specifications of the panel ARDL system of equations that are specific to this study. Thus, the reparametrized and customized ARDL (*p, q, q, ...q*) and error correction model is specified in equation 2 and equation 3 as follows:

$$\begin{aligned}\Delta INEQ_{it} = {} & \varnothing_i \left(INEQ_{i,t\text{-}1} - \boldsymbol{\gamma_{1i}} EPU_{i,t} - \boldsymbol{\gamma_{2i}} INF_{i,t} + \boldsymbol{\gamma_{3i}} RGDP_{i,t} + \boldsymbol{\gamma_{4i}} FD_{i,t} + \boldsymbol{\gamma_{5i}} UNEM_{i,t} \right) + \\ & \sum_{j=1}^{p\text{-}1} \delta_{ij} \Delta INEQ_{i,t\text{-}j} + \sum_{j=0}^{q\text{-}1} \beta_{1i} \Delta EPU_{i,t\text{-}j} + \sum_{j=0}^{q\text{-}1} \beta_{2i} \Delta INF_{i,t\text{-}j} + \sum_{j=1}^{q\text{-}1} \beta_{3i} \Delta RGDP_{i,t\text{-}j} + \sum_{j=0}^{q\text{-}1} \beta_{4i} \Delta FD_{i,t\text{-}j} + \\ & + \sum_{j=0}^{q\text{-}1} \beta_{5i} \Delta UNEM_{i,t\text{-}j} + \mu_i + \varepsilon_{it}\end{aligned} \tag{2}$$

Equation (2) was specified to explicitly include the error correction in equation 3:

$$\begin{aligned}\Delta INEQ_{it} = {} & \sum_{j=1}^{p-1} \delta_{ij} \Delta INEQ_{i,t-j} + \sum_{j=0}^{q-1} \beta_{1i} \Delta EPU_{i,t\text{-}j+} \sum_{j=0}^{q-1} \beta_{2i} \Delta INF_{i,t-j} + \sum_{j=1}^{q-1} \beta_{3i} \Delta RGDP_{i,t-j} + \\ & + \sum_{j=0}^{q-1} \beta_{4i} \Delta FD_{i,t-j} + \sum_{j=0}^{q-1} \beta_{5i} \Delta UNEM_{i,t-j} + \boldsymbol{\alpha_1 ECT_{it-1}} + \mu_i + \varepsilon_{it}\end{aligned} \tag{3}$$

After an analysis of the panel ARDL estimations, the nonlinearity of the model is introduced by including the partial sums variables following Shin et al. (2014). The NARDL model without structural breaks is put into perspective as the main independent variables, which are economic policy uncertainty and inflation are decomposed into positive and negative partial sums in equations 4 through 7 as follows:

$$EPU_t^+ = \sum_{j=1}^{t} \Delta EPU_j^+ = \sum_{j=1}^{t} max(\Delta EPU_j, 0) \tag{4}$$

$$EPU_t^- = \sum_{j=1}^{t} \Delta EPU_j^- = \sum_{j=1}^{t} min(\Delta EPU_j, 0) \tag{5}$$

$$INF_t^+ = \sum_{j=1}^{t} \Delta INF_j^+ = \sum_{j=1}^{t} max(\Delta INF_j, 0) \tag{6}$$

$$INF_t^- = \sum_{j=1}^{t} \Delta INF_j^- = \sum_{j=1}^{t} max(\Delta INF_j, 0) \tag{7}$$

Where $\boldsymbol{EPU_j^+}$ and $\boldsymbol{INF_j^+}$ are positive partial sums, while $\boldsymbol{EPU_j^-}$ and $\boldsymbol{INF_j^-}$ are negative partial sums. The partial sums for EPU were tested in separate equations from those of INF. The real GDP was logged and in the models GDP regressions were run in its log form. The resultant NARDL (*p, q, q, ...q*) and error correction model are specified in equation (8) and (9) as follows:

$$\begin{aligned}\Delta INEQ_{it} = \varnothing_i (INEQ_{i,\,t-1} - \gamma_{1i} EPU_{it+} - \gamma_{2i} INF_{it}^+ - \gamma_{3i} INF_{it}^- - \gamma_{4i} RGDP_{i,t} - \gamma_{5i} FD_{i,t} - \\ - \gamma_{6i} UNEM_{i,t}) - \sum_{j=1}^{p-1} \delta_{ij} \Delta INEQ_{i,t-j} + \sum_{j=0}^{q-1} \beta_{1ij}^+ \Delta EPU_{it} + \sum_{j=0}^{q-1} \left(\beta_{2ij}^+ \Delta INF_{t-j}^+ + \beta_{3ij}^- \Delta INF_{t-j}^- \right) \\ \sum_{j=1}^{q-1} \beta_{4i} \Delta RGDP_{i,t-j} + \sum_{j=0}^{q-1} \beta_{5i} \Delta FD_{i,t-j} + \sum_{j=0}^{q-1} \beta_{6i} \Delta UNEM_{i,t-j} + \mu_i + \varepsilon_{it}\end{aligned} \tag{8}$$

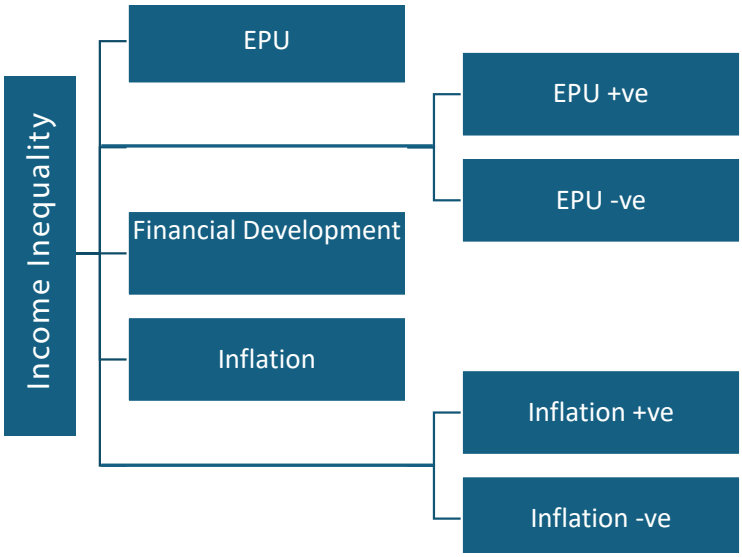
$$\begin{aligned}\Delta INEQ_{it} = \varnothing_i \left(INEQ_{i,t-1} - \gamma_{1i} INF_{it+} - \gamma_{2i} EPU_{it}^+ - \gamma_{3i} EPU_{it}^- - \gamma_{4i} RGDP_{i,t} - \gamma_{5i} FD_{i,t} - \right. \\ \left. - \gamma_{6i} UNEM_{i,t} \right) + \sum_{j=1}^{p-1} \delta_{ij} \Delta INEQ_{i,t-j} + \sum_{j=0}^{q-1} \beta_{1ij}^+ \Delta INF_{it} + \sum_{j=0}^{q-1} \left(\beta_{2ij}^+ \Delta EPU_{t-j}^+ + \beta_{3ij}^- \Delta EPU_{t-j}^- \right) \cdot \\ + \sum_{j=1}^{q-1} \beta_{4i} \Delta RGDP_{i,t-j} + \sum_{j=0}^{q-1} \beta_{5i} \Delta FD_{i,t-j} + \sum_{j=0}^{q-1} \beta_{6i} \Delta UNEM_{i,t-j} + \mu_i + \varepsilon_{it}\end{aligned} \tag{9}$$

Given that the data used runs from 2000 to 2022, a period that included some structural breaks the NARDL model is adjusted to incorporate break dummies to account for the structural changes over the period of analysis and the equations are presented in the appendix. Where INEQ represents inequality, as measured by the GINI coefficient. EPU represents economic policy uncertainty, INF represents inflation, γ represents the long-run coefficients of the independent variables, δ and β are the short-run coefficients, μ_i captures he country specific effects, ε_{it} is the error term, $\varnothing$ is the speed of adjustment to the long-run equilibrium**,** i and t representing the country and time period respectively. Equations (10) and equation (11) in the appendix capture the breaks by the inclusion of $\sum_{k=0}^{y} \boldsymbol{d_k SB_{kt}}$ where $\boldsymbol{B_{kt}}$ represent the dummy variable with $\boldsymbol{SB_{kt}} = 1$ for $\boldsymbol{t > T_B}$, else $\boldsymbol{SB_{kt}} = 0$. Where t represents the time period, and $\boldsymbol{T_B}$ represent

the structural break dates, $k = 1, 2, 3\ldots, k$, and $\boldsymbol{d_k}$ is the coefficient of the dummy variable. The break dates were endogenously determined using STATA. The identification of structural break dates enabled the determination of long-run and short-run estimates for the inequality, economic policy uncertainty and inflation dynamics in the presence of structural breaks. Also, the results from equation 10 and 11 were compared with the results from equation (8) through (9) to examine if accounting for breaks in the regression is essential. The equations that account for structural breaks are presented in the appendix.

The optimal lag order (p, q) is determined using the Akaike Information Criterion (AIC) and the Bayesian information criterion (BIC)/Schwarz Bayesian Criterion (SBC) in Stata. The optimal lag length is presented by the smallest values of the two criteria. The lagged variables and the differences variables of the ARDL respectively test for the long-run and the short-run relationships of the variables, which will in theory, find the cointegrating relationships between the variables. Before the final models were run all, pre-test diagnostics were conducted , variables were stationary at level and first difference. Refer to Table 8 in the appendix. The analysis is based on the conceptual framework outlined in Figure 1

Figure 1: Conceptual Framework



Source: Authors' own design

The conceptual framework is designed in the manner that the effects of EPU and inflation on income inequality are tested initially as symmetric and then as asymmetric.

4. Estimation results

The dynamic panel data models were used to investigate the nexus between inequality, economic policy uncertainty, and inflation. The advantages of dynamic panel data over aggregate time series data, include the likelihood that underlying microeconomic dynamics may be concealed by aggregation biases. Additionally panel data offers to investigate heterogeneity in adjustment dynamics between different countries (Abonazel, 2016; Bahmani-Oskooee,Hasanzade 2022). Bond (2002) argues that even in situations where the coefficients of lagged dependent variables are not of interest, allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other parameters. Since dynamic models are associated with endogeneity problems, the optimum lag length criteria and the Hausman test were employed to address the problem. The Schwarz Information Criterion (SIC) and Bayesian information criterion (BIC) were used for optimal lag selection as it had the lowest value, and the selected model was (1,1,1,1,1,1). Hausman test was used to select the best model, and the PMG was selected as the best model for this study. Given that the Pooled Mean Group (PMG) is efficient and unbiased in a short panel (N > T) it was the preferred estimation technique to run the PNARDL and ECM models on the panel data for the study and the interpretation will therefore focus on the PMG output. Cointegration is determined from the statistical significance of the error correction term in these models. Table 2 provides the PNARDL and ECM model outputs, from which our long and short-run relationships and causation analysis between dependent variable INEQ and independent variables EPU and INF are done. The positive and negative changes of the EPU are put into perspective. For brevity, the descriptive statistics and correlation statistics are presented in Table 9 and Table 10 in the appendix.

Table 2: PNARD Results on Economic Policy Uncertainty, Inflation and Inequality nexus: Model with EPU decomposed in positive and negative and with a structural dummy (where SB is the structural break)

	PMG	
Variables	***D.INEQ***	**Probability value (*p*–value)**
LONG–RUN		
SB	1.723*** (0.532)	0.001
INF (CPI)	0.000000350 (0.0000407)	0.993
FD	–0.0331786** (0.0110803)	0.003
EPU_pos	3.440 (2.497)	0.168
EPU_neg	–7.460** (2.702)	0.006
LRGDP	–8.697*** (1.450)	0.000
UNEM	–0.183* (0.0735)	0.013
ECT	–0.255*** (0.0328)	0.000
SHORT–RUN		
D.SB	–0.335* (0.133)	0.011
D.INF(CPI)	0.00977 (0.00963)	0.310
D.FD	–0.0314 (0.0338)	0.352
D.EPU_pos	–2.669 (2.077)	0.199
D.EPU_neg	2.961 (1.629)	0.069
D.RLGDP	6.490 (3.933)	0.099
D.UNEM	0.0364 (0.102)	0.721
_cons	34.29*** (4.520)	0.000
N	782	

*p< 0.05; **p<0.01; ***p<0.001 denotes the levels of significance. Δ is the difference operator, standard error in parentheses

Source: Authors own Computations using Stata 18

The analysis indicated that structural breaks had a minor impact on the magnitude of the coefficients; however, they did not alter the nature or significance of the relationships observed (See Table 4 and Table 5 in the appendix). The regression results show that the error correction term (ECT) for all outputs as presented in Table 4 exhibit coefficients ranging from –0.0769 to –0.4113, indicating a speed of adjustment that varies from a minimum of 7.69% to a maximum of 41.13% annually towards equilibrium. Specifically, it will require approximately 3.92 years (1/0.255) for changes in the regressors to fully impact the long-run inequality, about 13 years (1/0.0769) for their effects on long-run CPI, and approximately 2.43 years (1/0.4113) for long-run RGDP. Furthermore, it will take around 5.52 years (1/0.181) for changes in the regressors to fully influence a long-run financial market development, and about 4.88 years (1/0.205) for these changes to affect long-run unemployment, thereby restoring the deviation to its equilibrium state.

Both positive and negative economic policy uncertainty changes did not exert any significant influence on inequality in the short run. Foerster (2014) argued that slight changes to economic policy uncertainty (positive or negative) have little or no significant effect on economic fundamentals. In this analysis, a positive or negative change in policy uncertainty if viewed separately did not have any significant effect on income inequality in the short run. However, in the long run a negative change in economic policy uncertainty is negatively related to income inequality. The findings suggest an existence of asymmetric effects of policy uncertainty in the long-run, a decrease in policy uncertainty increases income inequality confirming the finding of Bahmani-Oskooee and Hasanzade (2022) for some of the states in the USA.

As per expectations, unemployment had a negative and significant coefficient of –0.183, implying that a unit increase in unemployment results in an 18.3% decrease in inequality in the long-run. This implies that the labour market dynamics plays a role in income distribution dynamics. The results differed with the finding by Haini et al. (2023), who argue that higher unemployment weakens the bargaining power of workers, particularly those with low skills widening the inequality gap. The financial market development had a negative and significant cointegrating coefficient of -0.0332. This is in line with theoretical predictions that as financial markets develop, the marginalised are economically included resulting in a reduction in inequality.

Table 3 presents the outputs of the ARDL and ECM models, which focus on analysing the long- and short-run relationships between inequality and the independent variables. The results are particularly from the effects of both positive and negative changes in inflation.

Table 3: PNARD Results on Economic Policy Uncertainty, Inflation and Inequality nexus: Model with INF decomposed in positive and negative and with a structural dummy

	Pooled Mean Group	
Variables	**D.INEQ**	**Probability value (*p*–value)**
LONG-RUN		
EPU	–3.894* (1.713)	0.023
FD	–0.0341** (0.0113)	0.003
DB	1.138* (0.483)	0.019
CPI_pos	–0.000507 (0.000304)	0.096
CPI_neg	0.0796*** (0.0147)	0.000
LRGDP	–1.562 (0.854)	0.067
UNEM	0.169*** (0.0510)	0.001
ECT	**–0.290*** **(0.0381)**	**0.000**
SHORT-RUN		
D.EPU	0.796 (0.823)	0.334
D.FD	–0.0427 (0.0325)	0.189
D.DB	–0.260 (0.139)	0.062
D.CPI_pos	0.0129 (0.0103)	0.210
D.CPI_neg	0.153 (0.214)	0.476
D.LRGDP	4.516 (3.805)	0.235
D.UNEM	–0.00620 (0.113)	0.956
_cons	17.65*** (2.381)	0.000
N	782	

**p*< 0.05; **p<0.01; ***p<0.001 denotes the levels of significance. Δ is the difference operator, *standard error* in parentheses

Source: Authors' compilation from Stata outputs

The analysis indicates that structural breaks have a modest effect on the magnitude of the coefficients, while not altering the nature or significance of the relationships observed (See Table 4 in the appendix). The error correction term (ECT) presented in Table 5 shows coefficients ranging from –0.0157 to –0.546, reflecting an adjustment range of 1.57% to 54.6% toward equilibrium annually. Specifically, it will take approximately 3.45 years (1/0.290) for the independent variables to fully impact long-run inequality, 9.52 years (1/0.105) for their complete effect on unemployment in the long-run, 63.69 years (1/0.0157) for their full influence on RGDP, 3.8 years (1/0.263) for their total impact on the financial market development in the long-run, and 1.83 years (1/0.546) for their comprehensive effect on the economic policy uncertainty in the long-run, thereby restoring deviations to equilibrium.

In the short run, inflation had no statistically significant relationship with inequality. However, in the long-run CPI_neg statistically influenced income inequality as a unit change in CPI_neg increased inequality by 7.96%. Therefore, inequality is more sensitive to the decrease in inflation as the gap between the marginalised population and the affluent continues to widen. Despite the complexity of the distributional effects of inflation this also signifies the challenges that the marginalised face in the debt markets. If there is a decrease in inflation, real interest rates and debt burdens are likely to increase potentially exacerbating financial instability (International Monetary Fund, 2023). However, inequality elasticity to positive or negative changes in inflation are much lower in the short run as the results show insignificant results to a positive or a negative change in inflation. Increase in inflation increases the gap between the rich and the poor not as much as the decrease as increase in inflation affects both sides negatively. The positive and significant relationship between inflation and inequality is consistent with some scholar's findings, for example, Magwedere and Marozva (2022) and Glawe and Wagner (2024). These findings seem to support the asset price theories that suggest that higher inflation results in higher inequality. In these theories, higher asset prices widen income inequality as when return on capital outpaces wage growth, thereby increasing the income inequality gap (Tobin 1969; Greenwood and Scharfstein 2013; Piketty 2014). Theoretically, inflation and inequality are intrinsically connected due to their sensitivity to unemployment. This evidence clearly reinforces the observations that wealthier individuals own assets that tend to increase with inflation, while due to wage stagnation, wages for lower wage earners remain stagnant during increase in inflation, resulting in decrease in real wages. Also, the increase in inflation was found to disproportionately affect low-income earners and retirees (Krasnopjorovs 2022).

Assuming that EPU is symmetric, the results show that economic policy uncertainty reduces inequality in the long run, although no significant relationship could be confirmed in the short run. A positive change in the economic policy in the uncertainty index leads

to a decrease in inequality (GINI Coefficient) in the long-run. The a priori expectations of the study on the relationship between income inequality and economic policy uncertainty were positive where inequality increases with increase in economic policy uncertainty (see Theophilopoulou 2022). The finding of this study are results are in line with Bahmani-Oskooee and Hasanzade (2022) whose findings argued that in 20 US states decreased policy uncertainty increased income inequality. The findings of this study could best be summarised by arguing that the volatility of policy uncertainty affects the economic decisions with possible repercussions to socio-economic effects such as income distribution. The implications of changes in economic policy uncertainty on households are not homogeneous. For this study the EPU in the short run had no effect on income inequality. However, the long run relationship is negative and significant, that is in the long run there is an inverse relationship between economic policy uncertainty and income inequality.

This can be explained by the fact that economic policy uncertainty can be a tax to investment reducing capital for the wealthy, which can reduce inequality gap during uncertain periods (Bahmani-Oskooee and Hasanzade 2022). Alternatively, during uncertain times, markets often experience volatility, which can disproportionately impact high-income individuals with large amounts of financial wealth (Glawe and Wagner, 2024) A sudden drop in asset values due to increased uncertainty could narrow the income gap as the wealthy see reductions in capital gains, thereby reducing income inequalities. Furthermore, low-income households do not have significant exposures to the financial markets, higher EPU can act as a corrective measure through leveling income disparities by reducing the returns to financial capital. Periods of low economic policy uncertainty can increase risk-taking behavior by high income earners and they can invest more and accumulate more wealth and income thereby worsening income inequality. Theoretically, fiscal and social policies that protect the poor during uncertain times can explain the inverse relationship between EPU and income inequality. Although it was not in the scope of this study to examine policy responses, in times of heightened policy uncertainty governments can intervene through social transfers to support lower-income individuals and this can reduce the income distribution gap (Albert and Gómez-Fernández 2023). Stiglitz (2012) argued that uncertainty can lead to political responses that aim at reducing income redistribution responses. The argument postulated was that uncertainty can trigger institutional reforms and redistributive measures to reduce disparities a scenario which is explained by political economy theory (North 1990; Stiglitz 2012; Campomanes, 2024). In some context political pressure can force governments to introduce policies that reduce income inequalities by introducing social safety nets or redistributive policies aimed at protecting lower-income groups during uncertain periods.

In line with expectations, unemployment had a positive and significant coefficient of 0.169 implying that a unit increase in unemployment resulted in a 16.9% increase in inequality and vice versa in the long-run. In other words, as more people are employed, inequality decreases. During a period of high uncertainty business confidence is eroded ultimately resulting in slowing employment and poor economic prospects and this phenomenon increases income inequality (Haini et al. 2023).

The same results were found by Aghion (2024), who argues that in the absence of government interventions with social policies, unemployment worsens income inequality. Also, financial market development had a negative and significant cointegrating coefficient of -0.0341. This is in line with the theoretical prediction that as financial markets develop, the marginalised are economically included resulting in the reduction of inequality.

5. Conclusions and recommendations

The aim of the study was to examine the effect of economic policy uncertainty, inflation and financial market development on income inequality (Gini). Since the literature seems to suggest that EPU index and inflation effects on economic factors are asymmetric, the panel nonlinear ARDL was also estimated through the introduction of partial sums of economic policy uncertainty and inflation. Although the study did not find a short run relationship between income inequality and EPU, in the long run decreased economic policy uncertainty worsens income inequality for the countries in this study. Although reducing economic policy uncertainty can benefit other macro-economic sectors. The concern with asymmetric properties is that they make economic outcomes more complex as EPU's effects are less predictable and may depend on other factors or markets' location. This confirms the findings of this study that there might be other factors determining the relationship between income inequality and EPU as the results were different from the a priori expectations of the study. Also, the study confirmed the asymmetric nature of the effects of inflation on inequality. In the long-run inequality was found to worsen with the increase in inflation. On the other hand, financial market development was found to reduce inequality. The limitation of the study is that the sample of the study is region specific such that the finding may not be easily generalized for other regions. However, the studies that were done for states in the US confirmed the presence of asymmetric effects on the relationship between economic policy uncertainty and inequality.

Therefore, countries are recommended to put in place policies that promote the development of the financial sector while curbing inflation and ensuring stability of economic policies. The EPU and inflation show asymmetric effects, which significantly affect income inequality

and require reforms in the financial sector and monetary policy. It is recommended that countries should focus on enhancing access to financial services for low-income groups as the financial sector develops since it can potentially reduce income inequalities. The study recommends reforms such as expanding digital financial inclusion to the previously underserved segments of the population as digital financial services lower transaction costs of saving, borrowing, and investing further reducing inequality gap. Effective policies to reduce inequality in the face of Economic Policy Uncertainty and inflation require financial sector development such as enhancing financial inclusion and policies that stabilize inflation. The study contributed to the literature by including other determinants of income inequality such as economic policy uncertainty that are seldom studied in previous studies. The study recommends the inclusion of fiscal policy in future studies on determining the effect of fiscal surplus/deficit on the role of economic policy uncertainty in income distribution. The relationship between income inequality, EPU, inflation and financial development is dynamic and complex; policy makers should therefore focus more on leveraging uncertainty, inflation and financial development to promote income equity.

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Appendix

$$\Delta INEQ_{it} = \emptyset_i\Big(INEQ_{i,\,t-1} - \boldsymbol{\gamma_{1i}} EPU_{it+} - \boldsymbol{\gamma_{2i}} \boldsymbol{INF_{it}^{+}} - \boldsymbol{\gamma_{3i}} \boldsymbol{INF_{it}^{-}} - \boldsymbol{\gamma_{4i}} RGDP_{i,t} - \boldsymbol{\gamma_{5i}} FD_{i,t} - \boldsymbol{\gamma_{6i}} UNEM_{i,t}\Big) + \sum_{j=1}^{p-1} \delta_{ij} \Delta INEQ_{i,\,t-j} + \sum_{j=0}^{q-1} \boldsymbol{\beta_{1ij}^{+}} \Delta EPU_{it} + \sum_{j=0}^{q-1} \Big(\boldsymbol{\beta_{2ij}^{+}} \Delta \boldsymbol{INF_{t-j}^{+}} + \boldsymbol{\beta_{3ij}^{-}} \Delta \boldsymbol{INF_{t-j}^{-}}\Big) + \sum_{j=1}^{q-1} \beta_{4i} \Delta RGDP_{i,\,t-j} + \sum_{j=0}^{q-1} \beta_{5i} \Delta FD_{i,t-j} + \sum_{j=0}^{q-1} \beta_{6i} \Delta UNEM_{i,t-j} + \sum_{k=0}^{y} \boldsymbol{d_k} SB_{kt} + \mu_i + \varepsilon_{it} \quad (10)$$

$$\Delta INEQ_{it} = \emptyset_i\Big(INEQ_{i,\,t-1} - \boldsymbol{\gamma_{1i}} INF_{it+} - \boldsymbol{\gamma_{2i}} \boldsymbol{EPU_{it}^{+}} - \boldsymbol{\gamma_{3i}} \boldsymbol{EPU_{it}^{-}} - \boldsymbol{\gamma_{4i}} RGDP_{i,t} - \boldsymbol{\gamma_{5i}} FD_{i,t} - \boldsymbol{\gamma_{6i}} UNEM_{i,t}\Big) + \sum_{j=1}^{p-1} \delta_{ij} \Delta INEQ_{i,\,t-j} + \sum_{j=0}^{q-1} \boldsymbol{\beta_{1ij}^{+}} \Delta INF_{it} + \sum_{j=0}^{q-1} \Big(\boldsymbol{\beta_{2ij}^{+}} \Delta \boldsymbol{EPU_{t-j}^{+}} + \boldsymbol{\beta_{3ij}^{-}} \Delta \boldsymbol{EPU_{t-j}^{-}}\Big) + \sum_{j=1}^{q-1} \beta_{4i} \Delta RGDP_{i,\,t-j} + \sum_{j=0}^{q-1} \beta_{5i} \Delta FD_{i,t-j} + \sum_{j=0}^{q-1} \beta_{6i} \Delta UNEM_{i,t-j} \sum_{k=0}^{y} \boldsymbol{d_k} SB_{kt} + \mu_i + \varepsilon_{it} \quad (11)$$

Table 4: PNARD Results on Economic Policy Uncertainty, Inflation and Inequality nexus: Model with EPU decomposed and a structural dummy

	PMG	PMG	PMG	PMG	PMG
Variables	***D.INEQ***	***D.UNEM***	***D.LRGDP***	***D.FD***	***D.CPI***
Long–run					
DB	1.723**	0.976**	1.06745e+10	3.106	8.978
	(0.532)	(0.309)	(7136485.2)	(2.279)	(7.570)
CPI	0.000000350	–0.0000844	6144100.3**	–0.000774	
	(0.0000407)	(0.0000431)	(2236485.2)	(0.000837)	
FD	–0.0332**	–0.0856***	–214150475.4		–2.427***
	(0.0111)	(0.00818)	(181608272.6)		(0.439)
EPU_pos	3.440	5.156***	1.34376e+11	–82.74***	105.7**
	(2.497)	(1.228)	(553911.2)	(16.38)	(35.26)
EPU_neg	–7.460**	1.992	–1.54234e+11	–29.93*	129.2**
	(2.702)	(1.410)	(11935476.2)	(13.67)	(46.50)
LRGDP	–8.697***	1.183*		49.65***	184.5***
	(1.450)	(0.590)		(9.022)	(33.34)
UNEM	–0.183*		1.99651e+10***	–2.053***	0.308
	(0.0735)		(2.94187e+09)	(0.456)	(1.245)
INEQ		0.183***	199907292.3	0.757*	3.281*
		(0.0345)	(1.80435e+09)	(0.355)	(1.410)
ECT	–0.255***	–0.205***	–0.4113***	–0.181***	–0.0769*
	(0.0328)	(0.0350)	(0.02539)	(0.0470)	(0.0316)
Short–run					
D.DB	–0.335*	–0.344**	–0.00676**	–0.846	–497.9
	(0.133)	(0.112)	(0.00227)	(0.547)	(502.8)
D.CPI	0.00977	–0.00859	–0.000255	–0.0451	
	(0.00963)	(0.00923)	(0.000302)	(0.130)	
D.FD	–0.0314	0.0165	–0.000766		48.73
	(0.0338)	(0.0124)	(0.00145)		(49.53)
D.EPU_pos	–2.669	–0.282	0.0415	11.19	–2034.2
	(2.077)	(1.128)	(0.0478)	(12.61)	(2062.6)
D.EPU_neg	2.961	–0.348	–0.0821	–46.75*	4499.1
	(1.629)	(1.300)	(0.0472)	(19.87)	(4220.9)
D.LRGDP	6.490	–19.34***		–141.1*	–3797.2
	(3.933)	(4.149)		(71.55)	(3999.3)
D.UNEM	0.0364		–0.0151***	0.373	–163.8
	(0.102)		(0.00310)	(0.908)	(194.2)
D.INEQ		–0.00862	–0.000349	0.286	82.97
		(0.0475)	(0.00114)	(0.393)	(78.71)
_cons	34.29***	–1.477***	0.0471***	–88.59***	333.4*
	(4.520)	(0.396)	(0.00868)	(23.52)	(140.2)
N	782	782	782	782	782
R^2					

*P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance. Δ is the difference operator, *standard error* in parentheses

Source: Authors' compilation from Stata outputs

Table 5: PNARD Results on Economic Policy Uncertainty, Inflation and Inequality nexus: Model with EPU decomposed and *without a* structural dummy

	PMG	PMG	PMG	PMG	PMG
Variables	***D.INEQ***	***D.UNEM***	***D.LRGDP***	***D.FD***	***D.CPI***
Long–Run					
CPI	−0.0000114 (0.0000322)	0.00254** (0.000835)	1378.5 (7264.5)	−0.00178 (0.00117)	
FD	−0.0419*** (0.0123)	−0.00753 (0.00392)	100443 (4836659)		−2.515*** (0.455)
EPU_pos	4.451* (2.182)	2.279** (0.846)	407035 (84747366)	−26.64* (10.83)	111.6** (38.15)
EPU_neg	−7.046** (2.314)	1.890 (0.965)	−326001 (29058367)	−22.82* (9.842)	136.5** (51.99)
LRGDP	−9.866*** (1.404)	−0.257 (0.473)		14.02* (5.449)	189.3*** (34.71)
UNEM	−0.352*** (0.0761)		345840 (4874673)	−1.713*** (0.343)	0.256 (1.336)
INEQ		0.0800*** (0.0233)	−518119 (21119994)	−0.265 (0.238)	2.766 (1.461)
ECT	−0.286*** (0.0371)	−0.238*** (0.0385)	0.00509** (0.00166)	−0.240*** (0.0434)	0.0798** (0.0294)
Short–run					
D.CPI	0.0101 (0.00967)	−0.00716 (0.00808)	−0.000270 (0.000313)	−0.0343 (0.119)	
D.FD	−0.0160 (0.0346)	0.00331 (0.0105)	−0.000565 (0.00156)		50.17 (50.84)
D.EPU_pos	−3.762 (2.032)	0.645 (0.824)	0.0473 (0.0490)	4.412 (12.21)	1413.9 (1394.1)
D.EPU_neg	3.506* (1.527)	−0.779 (1.099)	−0.0771 (0.0491)	−39.25* (19.74)	2767.3 (2495.0)
D.LRGDP	8.082* (3.869)	−16.88*** (4.142)		−140.8* (70.22)	−755.2 (988.2)
D.UNEM	0.137 (0.105)		−0.0150*** (0.00321)	−0.275 (0.981)	−73.17 (105.7)
D.INEQ		0.00287 (0.0456)	−0.000314 (0.000967)	0.397 (0.363)	52.68 (48.59)
_cons	41.84*** (5.468)	1.847*** (0.408)	0.0277*** (0.00384)	−19.96*** (4.499)	216.2*** (48.58)
N	782	782	782	782	782

**P*< 0.05; ***P*<0.01; ****P*<0.001 denotes the levels of significance. Δ is the difference operator, *standard error* in parentheses

Source: Authors' compilation from Stata outputs

Table 6: PNARD Results on Economic Policy Uncertainty, Inflation and Inequality nexus: Model with CPI decomposed and a structural dummy

	PMG	PMG	PMG	PMG	PMG
Variables	***D.INEQ***	***D.UNEM***	***D.LRGDP***	***D.FD***	***D.EPU***
Long–Run					
EPU	−3.894* (1.713)	−0.625 (2.659)	−1.630** (0.548)	−0.0239** (0.00885)	
FD	−0.0341** (0.0113)	0.149*** (0.0344)	0.0150*** (0.00260)		0.00202*** (0.000321)
SB	1.138* (0.483)	−1.466* (0.704)	−0.184* (0.0786)	0.00373*** (0.000808)	−0.0529*** (0.0123)
CPI_pos	−0.000507 (0.000304)	−0.00170*** (0.000501)	−0.000240** (0.0000890)	0.0000149*** (0.00000449)	0.00000757 (0.0000182)
CPI_neg	0.0796*** (0.0147)	−0.0247 (0.0181)	−0.00541 (0.00505)	−0.338*** (0.0748)	−0.00207 (0.00108)
LRGDP	−1.562 (0.854)	−1.798 (1.387)		−0.00671* (0.00292)	0.0277 (0.0227)
UNEM	0.169*** (0.0510)		−0.118*** (0.0262)	0.000733* (0.000300)	−0.00591** (0.00216)
INEQ		0.537*** (0.144)	0.0566*** (0.0159)	−0.000960*** (0.000125)	0.00302* (0.00152)
ECT	−0.290*** (0.0381)	−0.105*** (0.0301)	−0.0157** (0.00598)	−0.263*** (0.0418)	−0.546*** (0.0493)
Short–Run					
D.EPU	0.796 (0.823)	0.0907 (0.441)	0.00386 (0.0153)	−26.67* (10.97)	
D.FD	−0.0427 (0.0325)	−0.0179 (0.0133)	−0.000866 (0.00169)		−0.0000513 (0.00164)
D.SB	−0.260 (0.139)	−0.0788 (0.0660)	−0.00459* (0.00209)	−0.309 (0.517)	0.00658 (0.00475)
D.CPI_pos	0.0129 (0.0103)	−0.0106 (0.00793)	−0.000373 (0.000207)	0.0467 (0.0873)	−0.000980 (0.000680)
D.CPI_neg	0.153 (0.214)	−0.0113 (0.0383)	−0.00523 (0.00270)	−0.0717 (0.425)	0.0000414 (0.00393)
D.LRGDP	4.516 (3.805)	−18.17*** (4.128)		−130.7 (71.09)	−0.527* (0.209)
D.UNEM	−0.00620 (0.113)		−0.0140*** (0.00259)	−0.710 (1.053)	0.0148** (0.00544)
D.INEQ		−0.0191 (0.0376)	−0.00127 (0.00106)	0.167 (0.326)	0.00133 (0.00242)
_cons	17.65*** (2.381)	0.487** (0.169)	0.153** (0.0486)	8.331*** (2.341)	−0.175*** (0.0182)
N	782	782	782	782	782

*$P<$ 0.05; **$P<$0.01; ***$P<$0.001 denotes the levels of significance. Δ is the difference operator, *Standard error* in parentheses

Source: Authors' compilation from Stata outputs

Table 7: PNARD Results on Economic Policy Uncertainty, Inflation and Inequality nexus: Model with CPI decomposed and *without a* structural dummy.

	PMG	PMG	PMG	PMG	PMG
Variables	***D.INEQ***	***D.UNEM***	***D.LRGDP***	***D.FD***	***D.EPU***
Long–Run					
EPU	−6.359***	1.915	−1.510**	−0.0431***	
	(1.740)	(1.015)	(0.553)	(0.0110)	
FD	−0.0229*	0.0528***	0.0159***		0.00178***
	(0.0104)	(0.0113)	(0.00282)		(0.000349)
CPI_pos	−0.000545*	0.000825	−0.000260**	0.0000116	0.00000716
	(0.000269)	(0.000490)	(0.000101)	(0.00000712)	(0.0000156)
CPI_neg	0.0710**	0.0144	−0.00283	−0.337***	−0.000649
	(0.0228)	(0.0109)	(0.00475)	(0.0725)	(0.00123)
LRGDP	−2.599**	1.055*		−0.00531	0.0578*
	(0.890)	(0.452)		(0.00460)	(0.0234)
UNEM	0.133***		−0.115***	0.000961*	−0.00366
	(0.0403)		(0.0266)	(0.000453)	(0.00206)
INEQ		0.137***	0.0466**	−0.00103***	0.00132
		(0.0329)	(0.0156)	(0.000198)	(0.00153)
ECT	−0.297***	−0.190***	−0.0166**	−0.275***	−0.560***
	(0.0391)	(0.0390)	(0.00585)	(0.0422)	(0.0464)
Short–Run					
D.EPU	0.742	−0.0371	0.00150	−24.90*	
	(0.873)	(0.586)	(0.0161)	(10.70)	
D.FD	−0.0390	−0.00549	−0.000881		0.000116
	(0.0330)	(0.00975)	(0.00163)		(0.00158)
D.CPI_pos	0.0135	−0.0118	−0.000418*	0.0518	−0.000952
	(0.0102)	(0.00837)	(0.000211)	(0.0871)	(0.000594)
D.CPI_neg	0.142	−0.0233	−0.00500	0.00951	0.00226
	(0.231)	(0.0446)	(0.00269)	(0.435)	(0.00404)
D.LRGDP	5.477	−16.03***		−132.1	−0.488*
	(3.612)	(4.273)		(70.04)	(0.217)
D.UNEM	0.0496		−0.0137***	−0.925	0.0128*
	(0.109)		(0.00254)	(1.016)	(0.00515)
D.INEQ		−0.00670	−0.00105	0.186	0.00144
		(0.0396)	(0.000916)	(0.303)	(0.00212)
_cons	21.23***	−1.608**	0.166***	8.478***	−0.317***
	(2.877)	(0.497)	(0.0502)	(2.293)	(0.0280)
N	782	782	782	782	782
R^2					

*P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance. Δ is the difference operator, *standard error* in parentheses

Source: Authors' compilation from Stata outputs

Table 8: Unit root Tests

Variable	None	Intercept & Trend	Intercept	Decision
Panel Unit root test using the LLC				
INEQ	**–21.1383*** **	**–11.9069*** **	**–14.5823*** **	**I(1)**
CPI	–11.608***	–13.167***	–7.02009***	I(1)
EPU	–28.2345***	–17.168***	–20.7252***	I(1)
FD	–22.7638***	–21.862***	–20.889***	I(1)
RGDP	–2.7821***	–7.159***	–6.036***	I(0)
UNEM	–18.5162***	–12.246***	–14.328***	I(1)
Panel unit root tests using IPS				
INEQ	–	**–11.9700*** **	**–14.6678*** **	**I(1)**
CPI	–	–4.524***	–3.49952***	I(1)
EPU	–	–16.5451***	–19.8721***	I(1)
FD	–	–13.9429***	–15.4396***	I(1)
RGDP	–	–7.381***	–6.397***	I(0)
UNEM	–	–12.0246***	–6.42348***	I(1)
Panel unit root testing using ADF – Fisher Chi-square				
INEQ	**498.033*** **	**261.580*** **	**333.857*** **	**I(1)**
CPI	90.651**	366.764***	373.683***	I(1)
EPU	671.647***	354.056***	458.508***	I(1)
FD	481.099***	305.255***	354.454***	I(1)
RGDP	123.748***	173.761***	160.994***	I(0)
UNEM	466.677***	265.904***	165.218***	I(1)
Panel unit root testing using PP - Fisher Chi-square				
INEQ	**727.102*** **	**938.087*** **	**609.289*** **	**I(1)**
CPI	153.367***	158.451***	181.904***	I(1)
EPU	922.712***	1307.70***	916.376***	I(1)
FD	667.697***	859.918***	835.320***	I(1)
RGDP	208.761***	800.278***	334.332***	I(0)
UNEM	519.151***	546.386***	174.590***	I(1)

***; **; * indicates that the null hypothesis of unit root tests is rejected at 1%, 5% and 10%, respectively.

Source: Authors compilation from Stata outputs

Table 9: Correlations matrix

Variables	*INEQ*	*EPU*	*CPI*	*UNEM*	*RGDP*	*FD*
INEQ	1					
EPU	0,1220***	1				
CPI	0,0421	0,0480	1			
UNEM	0,6447***	0,0892**	0,0868***	1		
RGDP	0,0599*	−0,2369***	−0,0052**	−0,2218***	1	
FD	0,2321***	0,0801**	−0,0132***	0,4312***	−0,2522***	1

***; **; * indicates 1%, 5% and 10%, in that order.

Source: Authors' compilation from Stata outputs

Table 10: Descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Obser
INEQ	45.47	43.35	66.19	33.62	7.03	1.01	3.67	154.06	816.00
EPU	0.07	0.05	0.42	0.00	0.05	1.77	8.49	1,449.75	816.00
CPI	232.49	106.22	38,796.56	2.91	1,551.16	20.78	486.71	8,013,845.73	816.00
FD	21.08	14.63	127.22	0.00	18.82	1.85	7.24	1,079.52	816.00
RGDP' Millions	508,371.70	14,013.51	550,647.68	705.15	96,013.92	3.07	12.16	4,137.09	816.00
UNEM	7.46	4.87	28.84	0.32	6.28	1.09	3.10	162.59	816.00

Source: Authors' compilation from Stata outputs