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Essays on Monetary Policy, Inclusive Growth, and Sovereign Defaults

Economics

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Summary

This thesis contributes to the literature on monetary policy, income inequality, inclusive growth, and sovereign defaults, building on the research on sovereign default risk and more recent developments in the literature on the implications of monetary policy for inclusive growth and income inequality. This thesis, comprising four self-contained chapters, provides timely analyses of important topical issues facing the monetary policy front and the global economy.

The thesis starts with an evaluation of the monetary policy transmission and income inequality in Sub-Saharan Africa (SSA) countries. I find a procyclical response of income inequality to unanticipated monetary easing in the last two decades. Countercyclical monetary measures may have been efficient, but they have been dis-equalising as well. Taking cognisance of the explanations of the earnings heterogeneity channel, this evidence signals a high concentration of assets and resources, limited employment of labour and limited distributive capacity of the state in SSA countries. Economic outturns may have favoured chiefly, the top of the distribution—entrepreneurs and their profit margin. Three main channels distinguish the transmission of standard and non-standard monetary measures: the reaction in the stock market, the response of the exchange rate and the fiscal response. The evidence demonstrates that the fiscal reaction to monetary policy action is important to the overall transmission of monetary policy to macroeconomic aggregates. Instructively, I find that the inflation cost of countercyclical monetary measures is comparatively less severe for standard monetary measures than for non-standard monetary actions.

The second part evaluates how financial development affects the distributive channel of monetary policy. This chapter provides a unique view from Sub-Saharan Africa on the role of the financial structure in the transmission mechanism from monetary policy to income inequality. The findings show that monetary policy has a significant impact on income inequality and the financial system plays an important role by dampening the dis-equalising effects of monetary policy shocks. Both monetary policy and financial development directly exert redistributive effects. However, the financial system appears to wield the greatest impact and contribute more to the inequality dynamics. The policy-relevant conclusion is that the financial system is crucial for the monetary transmission mechanism and the effects of monetary policy actions. As the economy develops financially, it may require less movement in the policy position to achieve the desired policy outcome. The evidence shows that the strength of the monetary transmission is more dependent on financial development than the nature of the policy regime.

The third chapter evaluates the role of monetary policy towards inclusive growth. The evidence from a large sample of countries shows that in both the short and

long terms, low inflation and stable economic growth are associated with lower income inequality, improved well-being of the poor and greater inclusion. Both short-term and long-run effects are statistically significant and show that monetary policy that aims at low inflation and stable economic growth is most likely to improve permanently growth inclusiveness and the conditions of the poor. However, in advanced economies where inflation rates are considerably lower, disinflation hurts the poor and equity, ignites greater unemployment costs, and worsens growth inclusiveness. In any case, price and output stability is necessary for greater growth inclusiveness. Thus, the twin objectives of macroeconomic stability and inclusive growth offer no trade-offs.

Finally, I empirically analyse the impacts of debt reliefs during the period 1990–2019 on the sovereign debt crises of developing and emerging countries. The analysis shows that the debt reliefs provided thus far failed to ease the debt overhang problems of developing and emerging countries and reduced investment. Sovereign default crises in low and middle-income countries appear to be persistent and recurring. The current debt relief schemes may underscore the prospects of self-enforcing and self-fulfilling sovereign debt crises rather than eliminating the dilemma completely. Any debt relief mechanism should consider seriously the potential incentive effect that reinforces expectations of future debt-relief initiatives. Importantly, solving the sovereign debt problem requires a programme for sustained investment and economic growth, while not discounting the critical role of prudent debt management policies and institutions. Regarding the forms of debt reliefs, the analysis shows that debt forgiveness offers favourable prospects in terms of debt sustainability and economic outcomes than debt rescheduling. Perhaps, the sovereign debt crises, particularly in low-income countries, hinge on insolvency problems rather than transitory illiquidity issues.

Introduction, Overview, and Economic Background

In the last two decades, the crisis-plagued world has had to contend with deteriorating welfare - increasing inequality and high levels of unemployment while persisting poverty remains a pressing issue.

Rising job losses and the decline in income have translated into a sharp increase in global poverty and inequality. Worldwide, researchers at the World Bank estimated that there were over 200 million people who were out of work by 2013, while 600 million new jobs would be needed by 2028 just to keep employment constant. World Bank statistics show that in 2011, 1.2 billion people were living on less than $1.25 per day, equivalent to 24 percent of the world's population. Today, the gap between rich and poor is widening almost everywhere, and the Organisation for Economic Co-operation and Development (OECD) estimates that the current income gap is the widest in 30 years.

The COVID-19 pandemic has exacerbated and raised awareness of the prevalence of poverty and disparities between the rich and poor. The World Bank estimates that the pandemic has increased the global poverty rate from 7.8 to 9.1 percent as about 97 million more people are living on less than $1.90 a day, while 163 million more are living on less than $5.50 a day. World Bank's estimates show that between 2019 and 2021, the average income of the bottom 40 percent fell by 2.2 percent while households in the bottom 60 percent of the global income distribution have lost ground because of the pandemic. The number of poor people has increased across all regions, but Sub-Saharan Africa and Latin America and the Caribbean regions have been worse scourged.

Against the backdrop of the worsening welfare indicators, institutions, governments, donors, and NGOs are increasingly talking about 'inclusive growth'. The call is for the approach to growth to be inclusive and able to tackle unemployment, poverty, and inequality. These debates are happening alongside parallel discussions on debt sustainability and sovereign debt crises and the unrivalled applications of monetary mechanisms and tools all around the globe since the advent of the financial crises. Even though 'inclusive growth' indicators

remain outside central banks' mandates, major central bankers are increasingly discussing welfare issues, as recent advances in economic theory shed new light on the interplay of monetary policy and inequality.

This thesis provides a timely analysis of the implications of monetary actions for inclusive growth and the interplay of debt reliefs and the sovereign debt crises around the world. The thesis starts with an empirical examination of the distributional impact of both conventional and unconventional monetary actions for Sub-Saharan Africa (SSA) countries as little attention has been paid to the issue of inequality in SSA historically, from a political, policy and research perspective. In a subsequent chapter, I focused on whether financial development matters in the monetary transmission to income inequality as our understanding of the mediating role of the financial system on the redistributive channel of monetary policy is limited. The third part assesses the implications of monetary policy for inclusive growth as a key policy issue facing central banks today is policy toward inclusive growth and welfare. The chapter investigates whether the twin objectives of macroeconomic stability and growth inclusion offer any trade-off. The fourth part of the thesis provides a unique focus on the sovereign debt crises and includes an evaluation of the interplay of debt reliefs during the period 1990–2019 and the sovereign debt crises of developing and emerging countries.

Chapter 1

Monetary policy transmission and income inequality in Sub-Saharan Africa

1.1 Introduction

The international development debate has witnessed significant shifts with the emergence of the Sustainable Development Goals (SDGs) and this has heightened the attention to inequality. Increasing evidence of the ramifications of the surging inequality - that high inequality limits the younger generations' economic opportunities and mobility, decreases the "growth elasticity of poverty", harms sustainable economic growth and macroeconomic and financial stability, and endangers political and socio-economic stability (Dabla-Norris et al., 2015; Berg et al., 2018) – further explains why stakeholders in world development, including policymakers, are increasingly concerned about the role of distributive programmes and the distributional consequences of monetary and fiscal policies. There is a conventional view that redistribution is a side effect of changes in monetary policy since monetary actions have a disproportionate effect on households (Auclert, 2019). This paper is concerned with the propagation of monetary policy shocks to income inequality.

Kuznets (1955) identifies a country's level of development as a key explanation of the observed distribution of income in a country. According to the Kuznets hypothesis, as countries move through the development stages, they attain greater equality after swinging from the initial phases of relative equality to inequality (Galli and von der Hoeven, 2001). However, extant literature has shown that the prediction by the Kuznets hypothesis is a limited explanation of the variations in the income distribution in a country. Galli and von der Hoeven (2001) document that empirical studies have alluded to human capital or state employment, social transfers, government spending and tax as other policy and structural variables explaining the cross-country differences in income distribution. There are growing concerns about the implications of monetary policy for income inequality given the unrivalled application of monetary mechanisms and tools all around the globe

since the advent of the financial crisis[1], but empirical work on this issue in Africa is rather limited.

Monetary policies moderate economic activities and the gains from these changes are distributed disproportionately due to diverse individual idiosyncrasies. Monetary easing and a corresponding rise in inflation may widen the income differentials as the real values of fixed incomes are eroded. Notwithstanding, inflation surprises may benefit borrowers while savers are disadvantaged. Also, monetary expansion may expand aggregate output to generate employment and increase incomes to narrow the income gap. Finally, expansionary monetary actions may increase asset prices to benefit the top of the distribution who are chiefly holders of financial assets. Previous papers (for example, Coibion et al., 2017; Cloyne, Ferreira, and Surico, 2020) have shown significant links between monetary policy and income inequality. However, findings on the redistributive effects of monetary policy are rather disparate. Income inequality may be aggravated by expansionary monetary policy (Inui et al., 2017; Dolado et al., 2018). On the other hand, Guerello (2018) finds that expansionary monetary policy in the form of long-run interest rates is associated with decreasing income inequality for the Euro area. In the UK, Mumtaz and Theophilopoulou (2017) find that quantitative easing decreases inequality while economic inequality is worsened by contractionary monetary policy. In the US, Davtyan (2017) finds that restrictive monetary policy exerts downward pressure on income inequality while in Italy, Casiraghi et al. (2018) find that the total effect of the recent monetary policy measures on inequality is negligible. In another study, Furceri, Loungani and Zdzienicka (2018) report the asymmetric impact of monetary policy on income inequality[2]. The debate remains unresolved, and the stylised findings on the distributional effects of monetary policy may not be portable across countries and across jurisdictions.

During the financial crises, Draghi (2015) submits that central banks have become constrained in their ability to deploy conventional monetary policy tools

[1] See Colciago, Samarina and de Haan (2019) for review of the literature
[2] The upward effect of restrictive monetary policy on inequality exceeds the downward pressure exerted by expansionary monetary policy on inequality.

and have resorted to applying new instruments to achieve the same results. Draghi reiterates the concern that these new instruments may have different distributional consequences than conventional monetary policy. Against this background, this paper considers the impact of both conventional and unconventional monetary policy on inequality. Existing evidence suggests somewhat symmetric distributional effects of monetary actions - monetary expansion reduces income inequality (Samarina and Nguyen, 2019) while restrictive monetary policy heightens economic inequality (Areosa and Areosa, 2016). Besides, a section of the research on monetary policy transmission concludes that monetary contraction impacts the economy more than monetary expansion. Thus, this research examines whether the inequality effect of monetary policy is symmetric across expansionary and contractionary monetary actions.

Africa is a continent bedevilled by the developmental challenge of inequality – a challenge not entirely independent of policy choices. Africa is recorded as the second most unequal continent in the world, and home to seven of the most unequal countries (Seery, Okanda and Lawson, 2019). The United Nations World Population prospects show that the proportion of the world's population accounted for by Africa (particularly Sub-Saharan Africa) will increase significantly by 2050 while the fraction contributed by the rest of the world will decrease[3]. This implies that with the current trend of inequality in Africa, the evolution of global inequality will largely be driven by the level of economic inequality in Africa. Yet from a political, policy and research perspective, there has been little attention to the issue of inequality in SSA historically (Odusola *et al.*, 2017).

During the post-independence decades, income inequality in SSA was mainly driven by the distribution of assets, the structure of the economy, policies affecting redistribution and returns on assets. The high concentration of assets and resources, limited employment of labour and the limited distributive capacity of the state typify the structures of most SSA countries and sum up the drivers of inequality in these countries (Odusola *et al.*, 2017). Incidentally, these factors underscore the

[3] See United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019: Highlights (ST/ESA/SER.A/423).

potential channels for a distributive role of monetary policy in SSA. Monetary actions (expansive monetary policy) may improve growth, economic activities and asset prices to benefit those with controlling interests in assets and resources while also generating employment to benefit the masses. Expansive monetary actions may also improve the fiscal distributive capacity of the state and consequently, reduce income inequality[4]. This study connects with the research on monetary transmission in emerging and developing economies and evaluates the redistributive effects of monetary policy in SSA. Auclert (2019) emphasises that the aggregate effects of monetary policy are better appreciated with an understanding of its redistributive effects. The distributional impact of both conventional and unconventional monetary actions is empirically examined for Sub-Saharan African countries. The analysis involves the identification of monetary policy shock for Sub-Saharan African countries and the evaluation of the transmission channels of monetary actions.

I identify monetary policy shock in a sign restricted VAR à la Uhlig (2005) and investigate its propagation to income inequality via impulse response analysis. Consistent with conventional wisdom, I assume that monetary expansion should raise prices and real output on impact following a shock. Thus, the baseline specification proceeds with the aid of vector autoregressions in line with the workhorse framework on the effects of monetary policy. The main finding is that the heterogeneity in households' earnings, financial assets and liabilities is important in the distributional consequences of monetary policy. Monetary easing increases aggregate income and asset prices to chiefly advantage households with controlling interests in assets and resources but also decreases the interest incomes on financial assets. The empirical results decompose the inequality effect of a transitory change in monetary policy into the direct effects, alongside the contribution from macroeconomic and financial channels and the role of fiscal response. I find a procyclical response of income inequality to unexpected monetary easing in the last two decades with the Gini coefficient rising by about

[4] The fiscal response to monetary actions and the consequential effects on income inequality is a conspicuous feature in Heterogenous Agent New Keynesian models (for example Kaplan, Moll and Violante, 2018).

0.16 percentage points. Countercyclical monetary actions may have been efficient, but their distributional consequences have been dis-equalising. Consistent with the results in other jurisdictions, the overall effects of monetary policy on income inequality are quantitatively modest, compared to its evolution.

The evidence for my sample demonstrates that the transmission of conventional monetary policy shocks and unconventional monetary policy shocks are diverse. Stark differences are noticed in the reaction of the stock market, the response of the exchange rate, and the fiscal response. The equity index increases strongly in response to unforeseen, unconventional accommodative monetary action, but reacts moderately after unanticipated conventional monetary easing. The exchange rate depreciates after unexpected non-standard monetary expansion but appreciates in response to accommodative standard monetary policy shock. The variation in the reaction of the exchange rate may be largely attributable to the relative strength of the liquidity demand feature of monetary transmission. Fiscal transfers fall in response to expansionary conventional monetary policy shock but increase after innovations in non-standard accommodative monetary measures. The fiscal reactions may signal the haunting fiscal dominance of central bank actions and the generally low level of tax revenues that limits the distributive capacity of governments in SSA countries.

I find some evidence of persistence in the response of inequality to monetary policy shocks, corroborating the observation in the empirical literature. Albeit the findings show that the Gini coefficient displays a considerable degree of persistence. The results show that unconventional monetary measures appear to be more inflationary than standard monetary actions. This may imply that countercyclical monetary actions incur less inflation cost when exercised via standard measures than non-standard measures. This evidence may also suggest that inflation expectations are more anchored, and signals of policy intentions are better projected through standard monetary measures.

1.2 Related literature: Distributive Channels of Monetary Policies

Monetary actions typically produce three main changes which identify the distributive channels of monetary policy: monetary easing produces increases in real income, rises in inflation and reductions in real interest rates.

First, monetary actions affect economic activities and have implications for employment, profits, and real wages. Auclert (2019) identifies the earnings heterogeneity channel and clarifies that the heterogeneity in households' earnings positions individuals to benefit disproportionately from monetary actions and the consequential changes in wages and profits. Samarina and Nguyen (2019) consider the macroeconomic transmission channel of monetary policy and indicate that monetary easing lowers income inequality by raising labour earnings since the lower end of the income distribution depends on labour earning as their main source of income. In their study of Korea, Kang et al. (2013) find that GDP growth from monetary expansions decreases economic inequality. In the Euro area, Lenza and Slacalek (2018) find that QE exerts downward pressure on income inequality, mostly via the earnings heterogeneity channel and improved macroeconomic indicators which have seen a considerable reduction in the unemployment rate (benefiting the poorer part of the population) and wage increases for the employed.

Secondly, inflation surprises impact non-indexed nominal fixed incomes to affect income inequality. Inflation arising out of monetary easing erodes purchasing power to increase income inequality since the chunk of the income of the poor emanates from transfers and pensions. However, Auclert (2019) classifies the inflation effects as the Fisher channel and indicates that monetary actions necessitate the repayments of interest between savers and borrowers. Unexpected inflation hurts nominal creditors and benefits nominal debtors by revaluing nominal balance sheets. Thus, rises in inflation lessen income inequality since the top houses more net lenders than the bottom of the income distribution. Doepke and Schneider (2006) explore this transmission channel for the United States and conclude that inflation hurts uninsured income sources. Albanesi (2007) observes the high exposure of low-income households to inflation and demonstrates that a higher inflation rate is accompanied by greater income inequality. In an earlier study, Easterly and Fischer (2001) identify inflation as a top concern to the poor

than the rich. However, Kang et al. (2013) show that in the short-run, inflation decreases economic inequality in Korea. Galli and von der Hoeven (2001) conclude that the relationship between income inequality and inflation is nonmonotonic.

Lastly, monetary policies may impact asset prices to affect economic inequality. Auclert (2019) terms this transmission channel as the interest rate exposure channel while Samarina and Nguyen (2019) refer to it as the financial distributive channel. The hike in asset prices associated with monetary easing leads to increases in the wealth of rich households who usually own the bulk of financial assets as their earnings from capital gains and dividends rise while the wealth of poorer households may even shrink due to declining real wages, low interest on savings and possible unemployment. Increases in asset prices, resulting from the effects of quantitative easing, lead to high economic inequality in Japan (Saiki and Frost, 2014), the U.S. (Montecino and Epstein, 2015) and the U.K. (Mumtaz and Theophilopoulou, 2017). However, in the Euro area, Lenza and Slacalek (2018) report that the ECB's asset purchases have accounted for some reduction in the net wealth inequality although negligible. They explain that housing wealth is quite homogeneously distributed, and QE has equalising effects by positively affecting housing wealth which is a component of the net wealth. In their investigation of Korea, Kang et al. (2013) find no significant impact of real interest rate on inequality.

The distributional consequences of monetary policies have been established and different transmission channels of monetary actions have been explored in various domains. Certainly, the total net distributional effects of central bank activities cannot be determined a priori. This paper assesses the entirety of the distributional impacts of monetary transmission channels.

1.3 Data and Methodology

1.3.1 Data

Measuring inequality remains a daunting task in the research of the distributional consequences of monetary policy. The strategy is to proxy income inequality by the Gini coefficient, sourced from the Standardized World Income Inequality Database (SWIID 8.2). The SWIID standardises data from several sources (the Luxembourg Income Study, Eurostat, World Bank, the OECD Income Distribution Database and United Nations University's World Income Inequality Database) and consists of measures of market (pre-tax, pre-transfers) and net (post-tax, post-transfers) income inequality (Furceri, Loungani and Zdzienicka, 2018). According to De Haan and Sturm 2017, (cited in Samarina and Nguyen, 2019), the SWIID standardises income and allows for cross-country comparison and represents the most comprehensive database on inequality. Relative to inequality measures based on household surveys, the Gini has the advantage of representing the entire income distribution (Ruiz and Woloszko, cited in Samarina and Nguyen, 2019). As an alternative measure of inequality, I use the top income share (Top 10 percent) from the World Inequality Database (WID)[5].

The inequality data is complemented by macroeconomic, financial, and monetary policy data. Macroeconomic and financial data include real GDP, the unemployment rate, inflation based on the Consumer Price Index (CPI), the real effective exchange rate and stock market prices measured by the stock market indices. Finally, I include measures of the monetary policy stance. I employ monetary policy rates and broad money to capture conventional and unconventional monetary measures, respectively. Table A1.1, in the Appendix, presents the details on data construction and sources. The sample for the combined inequality, financial and macroeconomic data spans the period from 1990Q1 to

[5] See *WID.world* for details on methodology. A more comparable choice would have been the ratio of the top 10 with respect to the bottom 90. Unfortunately, the data on the various income percentiles for SSA countries are limited. The WID has data on 1% and 10% top income shares for the countries in the sample. Exploring the responses of top incomes helps to capture changes in the income distribution at the top end and to that end, the top 10 appears more appropriate.

2018Q4 and includes fifteen (15) Sub-Saharan African countries. The choice of the study period is informed by data availability and the considerations of monetary policy developments in SSA. The original sample included all countries in SSA (about 46 countries), but countries with insufficient data are excluded.

1.3.2 Methodology

Dealing with mixed frequency data

The data for this study is of a mixed frequency: while some macroeconomic, monetary and financial variables are quarterly series, the inequality measures and some other macroeconomic and monetary indicators are sampled annually. Econometric models in recent times have considered the information in unequal frequencies in the attempt to eschew loss of information stemming from aggregation to the lower frequency. The approach has largely been termed a mixed-frequency method (Ankargren and Jonéus, 2019). Multiple approaches have been professed[6]. Ankargren and Jonéus (2019) employ the method to cast the mixed-frequency model in a state-space form to essentially interpolate the latent values and this is the approach adopted in this paper.

First, I follow the notations of Samarina and Nguyen (2019) and define the country-level VAR process as follows:

$$Y_t = C + \sum_{j=1}^{p} A_j Y_{t-j} + \varepsilon_t, \qquad \varepsilon_t \sim \mathcal{N}(0, \boldsymbol{\Sigma}_\varepsilon) \tag{1}$$

where Y_t is a matrix of endogenous variables, $Y_t = [X_t, Z_t]$; X_t is a matrix of observed quarterly data while Z_t represents unobserved quarterly data. Z_t is a vector of annual observations treated as quarterly series with missing observations; its values are observed every fourth quarter of a year (t_q = 4, 8, 12, …, T_q), to which the annual value is assigned and values are missing in the remaining three quarters of a year (t_q = 1, 2, 3, 5, 6, 7, …, T_{q-1}). The model evolves as a VAR (1) process with all the variables included in log levels. This process is entirely

[6] see Foroni and Marcellino (2013) for a review

targeted at estimating missing values and not at identifying monetary policy shocks. The idea is to express a dynamic system in a state-space representation that essentially helps to interpolate missing observations.

A state-space representation of the VAR model specified in equation (1) is as follows:

$$\begin{bmatrix} X_t \\ Z_t \end{bmatrix} = \begin{bmatrix} C_x \\ C_z \end{bmatrix} + \begin{bmatrix} A_{xx} & A_{xz} \\ A_{zx} & A_{zz} \end{bmatrix} \begin{bmatrix} X_{t-1} \\ Z_{t-1} \end{bmatrix} + \begin{bmatrix} \mu_t \\ \upsilon_t \end{bmatrix} \quad (2)$$

The Kalman filter's smoothing algorithm provides formulas for backward prediction and thereby updating all earlier predictions based on the information from the total observed series. I run the Kalman filter for each country and interpolate the latent quarterly series of the annual variables.

Distributional consequences of monetary policy

Baseline model: PVAR

It is a conventional practice in the existing literature to employ impulse response analysis to investigate the effects of monetary policy. The effects of monetary policy shock are investigated through an impulse response analysis once the structural model has been identified and estimated. Lütkepohl, Krätzig and Phillips (2004) emphasise that relative to the structural parameters, the impulse response analysis produces more informative results. The econometric approach entails estimating a PVAR model for 15 SSA countries. The starting point of the analysis is a reduced form panel vector autoregressive (PVAR) model with a constant as a deterministic term specified as follows:

$$Y_{i,t} = C + \sum_{j=1}^{p} A_j Y_{i,t-j} + \varepsilon_{i,t}, \qquad \varepsilon_{i,t} \sim \mathcal{N}(0, \mathbf{\Sigma}_\varepsilon) \quad (3)$$

Here, *i* (= 1, ..., N) refers to the country, *t* (= 1, ..., T) refers to the time period and p is the lag length. Y is a vector of endogenous variables which include real GDP, inflation, monetary policy stance, unemployment, equity index, and income

inequality. A is a coefficient matrix and ε is the disturbance term with variance – covariance matrix **Σ.**

The key step in applying VAR methodology to the question of the impacts of monetary policy is identifying the innovations to monetary policy. Using the reduced form PVAR, I follow Uhlig (2005) and impose restrictions on the sign of structural impulse responses on impact in the impulse response analysis. Rather than appealing to certain informational orderings about the arrival of shocks, Uhlig's (2005) sign restricted VAR identifies structural shocks by relying on the guidance of economic theory on the sign of structural impulse responses on impact. In this paper, I am mainly interested in the impacts of monetary policy shocks on income inequality and find the sign restricted VAR appropriate.

As a complement to the existing literature, it is desirable to make the a priori theorizing explicit while at the same time leaving the question of interest open (Uhlig, 2005). In furtherance of this, I directly impose sign restrictions on the impulse responses of inflation and output on impact to identify the effects of monetary policy shocks on income inequality. More specifically, I assume that for a certain period subsequent to a shock, an expansionary monetary policy shock does not lead to decreases in output and inflation. These assumptions are tacitly employed in the VAR literature and enjoy popular support in the monetary policy literature (see Rubio-Ramírez, Waggoner and Zha, 2010; Mumtaz and Theophilopoulou, 2017; Samarina and Nguyen, 2019). The sign restricted PVAR consistent with Uhlig (2005) is based on Bayesian methods of inference and I proceed with the penalty function approach as the VAR impulse response algorithm. The lag length criteria select a smaller lag length (p = 2) and all the endogenous variables are included in levels[7]. Using 6 or 4 lags (p = 6 / p = 4) makes no difference to the results.

[7] Sims, Stock and Watson (1990) show that VAR models in levels produce consistent results and it is unnecessary in many cases to attempt to transform models to stationary form by cointegration operators or difference. Regardless of non-stationarity, the Bayesian approach delivers the same Gaussian shape since it is entirely based on the likelihood function. Thus, no special considerations for non-stationarity is needed with Bayesian inferences (Sims, Stock and Watson, 1990).

The analysis focuses on the net Gini coefficient. By using the net Gini coefficient, I seek to evaluate the overall response of income inequality to monetary policy shocks including indirect effects emanating from fiscal distributions.

1.4 Distributional consequences of conventional monetary policy

Following the theoretical findings of Kaplan, Moll and Violante (2018), I analyse the distributional consequences of monetary policy along two broad strands: partial equilibrium effects (direct effects) and general equilibrium effects (indirect effects).

The measure of standard monetary policy is the monetary policy rate. The data is available for three countries (Ghana, Gambia, and South Africa) and the analysis of the distributional consequences of monetary policy with respect to conventional policy involves these three countries.

1.4.1 Partial equilibrium (direct effects)

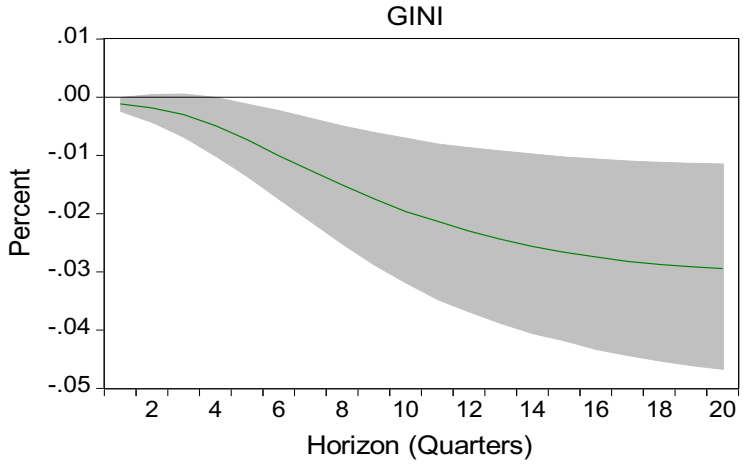
The heterogeneous effects of monetary actions on households' income in the partial equilibrium are manifested through the impact of the nominal and real interest rates on households' net financial positions and on households' intertemporal consumption choices. In the representative - agent models, the sensitivity of consumption to interest rate is due to the intertemporal substitution effect represented in the usual consumption Euler equation; thus, this elasticity is hypothesised to be negative. The consumer also experiences an income effect from changes in interest rates. Lower policy rates imply reduced interest income from interest-bearing assets. Since such assets are usually owned by high-income individuals, monetary policy induced income effect should reduce income inequality. Figure 1.1 shows the impulse response of the net Gini coefficient to a one standard deviation negative monetary policy shock.

In the partial equilibrium, a change in the policy rate has a significant effect on income inequality. A one standard deviation negative (conventional) monetary policy shock reduces the net Gini coefficient by about 0.04 percent. The inequality effects of shifts in monetary stance in the partial equilibrium appear to be driven by the income effects hypothesis reflecting lower interest income. Contrary to Inui,

Sudo and Yamada, (2017), this result suggests that households' net financial positions play a significant role in the distributional effects of monetary policy. The result may suggest that the strong intertemporal substitution effects associated with representative agent models might be debatable. Even if the effect occasioned by the intertemporal substitution is non-negligible, it appears its impact is diminished by an offsetting negative income effect.

Also, the partial equilibrium results may be explained by interest rate changes resulting from monetary policy actions, directly affecting interest payments to savers and that paid by borrowers. Thus, policy rate cuts imply reduced inequality since the conventional belief is that the bottom of the distribution are usually net borrowers while the savers are at the top of the income ladder. The finding of this paper supports the results of Doepke and Schneider (2006) and Auclert (2019) and may suggest that a decline in the policy rate induces wealth transfer between borrowers and lenders.

Figure 1. 1: Response to an expansionary monetary policy shock (partial equilibrium)

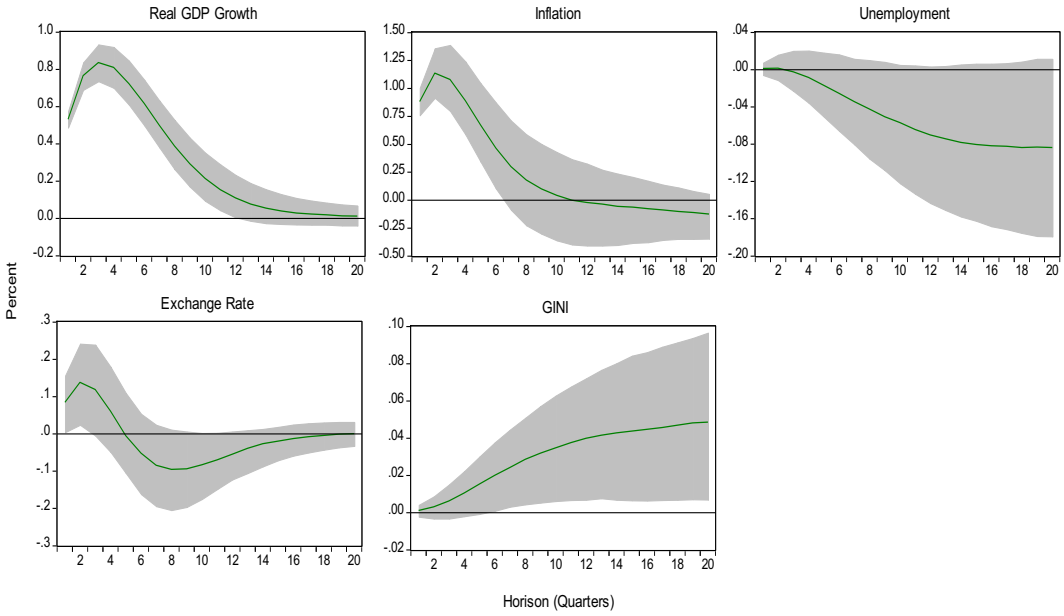


1.4.2 General equilibrium (indirect effects)

In the general equilibrium, indirect effects on inequality arise from shifts in aggregate demand (and potentially labour demand) and hence in prices, wages, employment, and income that originate from the monetary policy action. Heterogeneous consequences from the indirect effects, antecedent by the disparities in earning sources underscore the potential changes in inequality after a

monetary action in the general equilibrium. I evaluate the impact of an expansionary monetary policy shock on income inequality in the general equilibrium and the impulse responses are presented in Figure 1.2.

Figure 1. 2: Responses to an expansionary monetary policy shock (general equilibrium)



A one standard deviation negative shock to monetary policy decreases the policy rate by about 80 basis points. The sample shows that real GDP growth and inflation increased by 0.8 and 1.1 percent respectively at the peak after surprised shifts in conventional monetary policy. Real GDP growth displays a hump-shaped response, peaking after about one year and returning to steady-state levels after about three years – in line with the results of Christiano, Eichenbaum, and Evans (2005). Inflation peaks after about three quarters and return to pre-shock levels after about two and half years. Unemployment declines in response to the innovation in monetary policy, consistent with theory and empirical evidence. The response of the real effective exchange rate is however counterintuitive, depicting the exchange rate puzzle - a monetary policy shock that lowers interest rates appreciates, rather than depreciates a currency[8].

[8] Hnatkovska, Lahiri, and Vegh (2016) report the exchange rate puzzle for developing countries when the policy-controlled interest rate is moved and show that the supposed "fear of floating" syndrome among developing countries does not explain the 'puzzle'.

The findings are consistent with the evidence for Japan (Inui, Sudo and Yamada, 2017) and for the US and UK (Cloyne, Ferreira and Surico, 2020) and show that income inequality may be aggravated by expansionary monetary policy. In the wake of innovations in monetary policy, income inequality increases persistently, reaching an increase of about 0.04 percent in five (5) years after the shock. Impliedly, a 100 basis points monetary easing is estimated to increase the net Gini coefficient by 0.05 percentage points. This translates into a change in the Gini by -1.05 in original units. This is comparable to the 1.01 change in the Gini coefficient, reported by Samarina and Nguyen (2019), after 100 basis points reduction in the Euro area monetary policy interest rates. The persistent distributional effects of monetary policy may suggest generally declining interest rates over a long horizon. Significant persistent effects of monetary policy shock on inequality are also reported for the US (Coibion *et al.,* 2017) and for the UK (Mumtaz and Theophilopoulou, 2017).

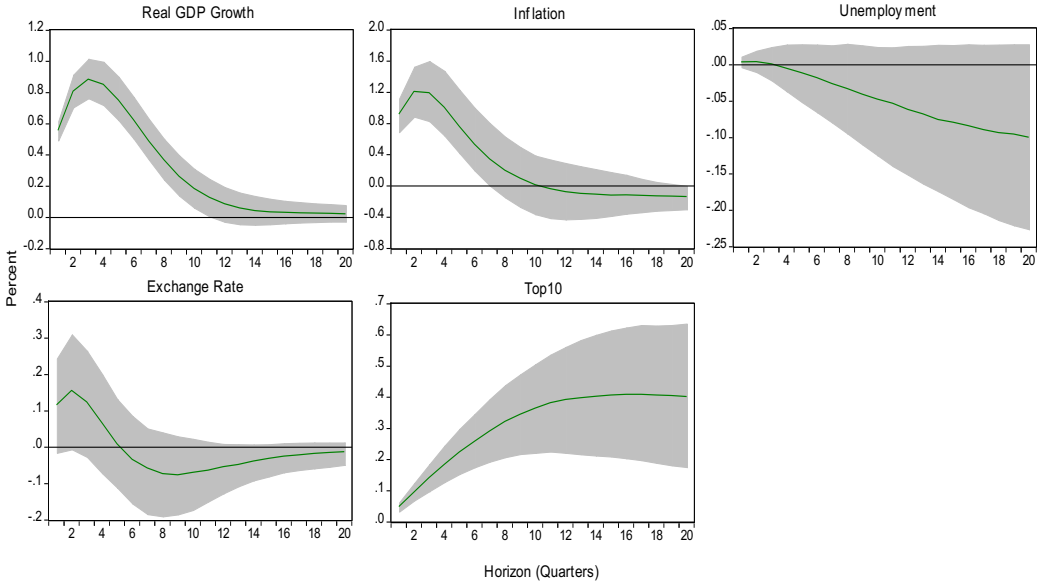
The results indicate that the impact of conventional, expansionary monetary policy shock on income inequalities is procyclical. Taking cognisance of the explanations of the earnings heterogeneity channel, this evidence supports the observation that SSA countries are characterised by a high concentration of assets and resources, limited employment of labour and the limited distributive capacity of the state. Even though the dis-equalising effects of conventional monetary policy are qualitatively and quantitatively significant, its economic magnitude seems moderate. The variance decompositions show that monetary policy shocks account for less than 5 percent of the variance of income inequality: 3.05 percent of the variance over two (2) years and 3.74 percent over five (5) years. Relative to other jurisdictions, Coibion *et al.* (2017) report that shocks to monetary policy in the US

The features of monetary transmission mechanisms drive the exchange rate response. The exchange rate response may suggest the indirect effects of output and fiscal channels of monetary transmission outweighing the direct effects of liquidity demand channel. The output channel reflects the expansionary effect of interest rates cuts on domestic activity and the fiscal channel reveals a lower fiscal burden of interest rates cuts. The lower fiscal burden may translate into stable macroeconomic environment and together with expansionary effects of the output channel attract interest in domestic economic activity. The liquidity demand channel after changes in monetary policy would alter the demand for domestic currency denominated liquid assets.

explain less than 5% of the total variance of earnings inequality and about 10-15% of the variance of income inequality.

Different measures of inequality: I test the validity of the results by first using an alternative measure of inequality, the top 10 income share. The results are not qualitatively different from the baseline results. The results of the impulse responses in the general equilibrium are presented in Figure 1.3. Expansionary standard monetary action increases inequality. A one standard deviation negative monetary policy shock increases the top 10 share of income by 0.4 percent at peak.

Figure 1. 3: Responses to expansionary monetary policy shock (Top10)



Estimates with annual observations: I also consider if the results are sensitive to the interpolation of quarterly values from the annual frequencies. I estimate the impulse responses using the annual observations. The impact of monetary policy shock on income inequality is not qualitatively different from the effects obtained from a quarterly model. In response to a one standard deviation negative monetary policy shock, the Gini coefficient rises by about 0.3 percent at the peak (Figure A1.1).

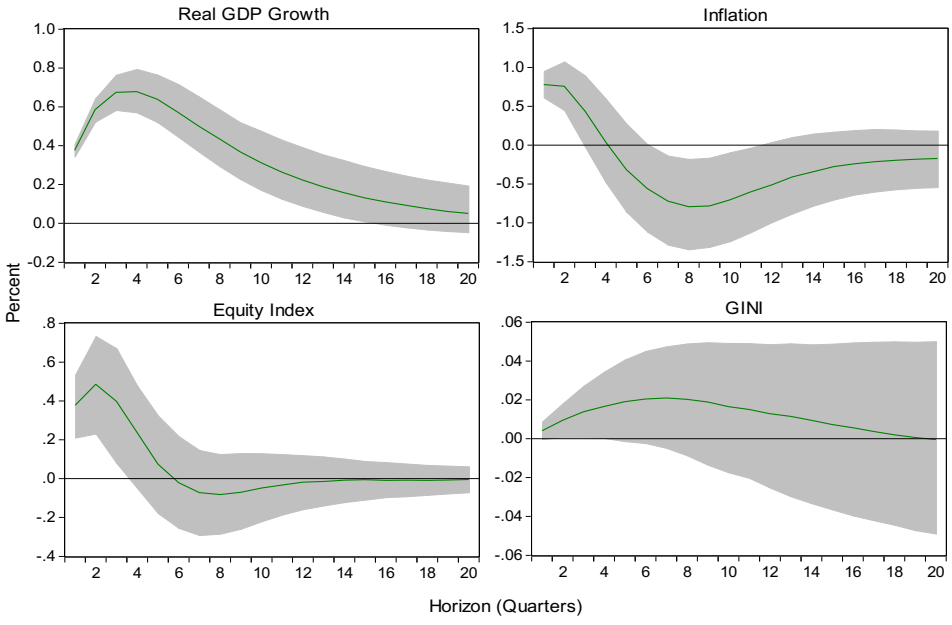
Alternative identification of monetary policy shocks: Finally, I verify if the results are also robust to monetary policy shocks identified by Cholesky decomposition. Cholesky decomposition imposes a recursive structure in the VAR to identify

structural shocks. I impose a recursive structure on the instantaneous relations between the variables as per the following ordering, ($y = real\ GDP,\ inflation,\ unemployment,\ monetary\ policy,\ exchange\ rate,\ inequalty$), consistent with the standard assumption in the literature. The effect of monetary policy shock on income inequality remains qualitatively unchanged from the baseline analysis – the Gini coefficient rises in response to a negative monetary policy shock (Figure A1.5).

1.4.3 The role of the financial / portfolio channel

I utilise data for Ghana and South Africa and evaluate the contribution of the financial / portfolio channel to the effects of monetary policy on income inequality. The results of the impulse responses are shown in Figure 1.4. The response of equity prices is consistent with the literature (for example, Calza, Monacelli, and Stracca, 2013) – decreases in short-term rates exert positive influences on stock prices. However, the distributional effects of policy rate cuts through their impacts on equity prices have been modest. Rising values of households' equity portfolios occasioned by policy rate cuts have not been translated into significant changes in income inequality.

Figure 1. 4: Responses to expansionary monetary policy shock (financial channel)



The evidence shows that the most significant effects on the dynamics of income inequality from conventional monetary policies operating through the financial/portfolio channel might have come through changes in interest income rather than equity returns. This result may suggest that conventional monetary policy has a stronger effect on inequality via short-term assets than with long-term assets. This finding is consistent with the observations of Calza, Monacelli, and Stracca (2013) and Auclert (2019). Conventional monetary easing generates fewer capital gains with shorter asset maturities and, given that capital gains accrue mostly to the top of the distribution, the aggregate distributional effect from equity prices is modest.

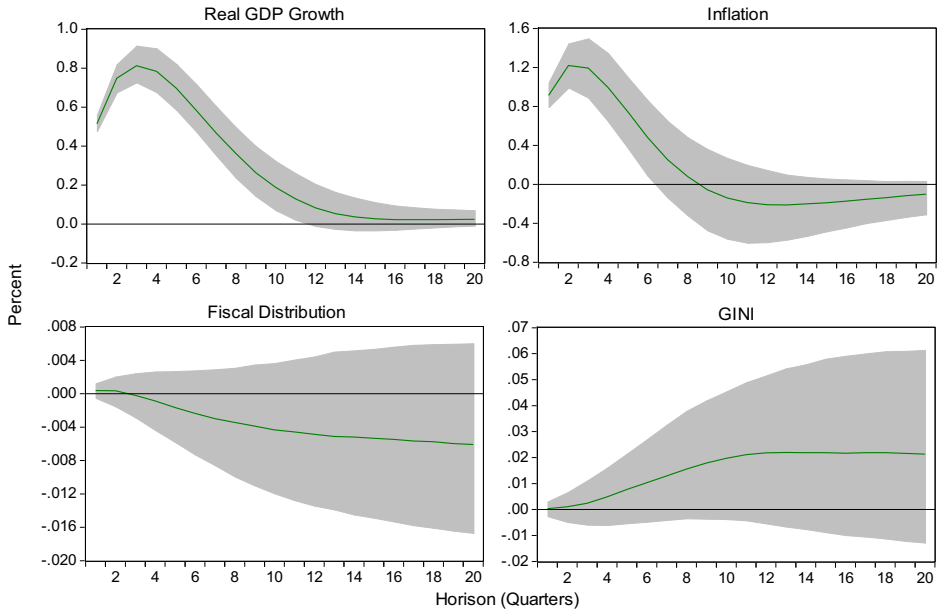
1.4.4 The role of the fiscal response to a monetary shock

Finally, pursuant to the heterogenous agent models, I estimate the contribution of fiscal reaction to the redistributive effects of monetary policy. Evaluating the indirect effects of monetary policy, including the fiscal reaction, is important for understanding the totality of monetary transmission.

In the general equilibrium, the distributional implications of monetary policy are also shaped by the fiscal response since government debt, public transfers and the amount of taxes are shaped by the changes in the future path of interest rates (Ampudia *et al.,* 2018). The distributional effects from the fiscal reaction explored in this study involve further fiscal space that is translated into improved transfer and social distributions. Following the literature on fiscal policy, I proxy fiscal transfers by the difference between the market Gini and the net Gini coefficients. If the distributional policies are progressive in nature, the bottom of the income distribution tends to be the biggest beneficiaries of pro-poor policies. Thus, improved fiscal distributions occasioned by monetary actions should decrease inequality. I present the results of the impulse responses to a one standard deviation expansionary monetary policy in Figure 1.5. The evidence supports the findings of Furceri, Loungani and Zdzienicka (2018) and shows the importance of fiscal response and redistribution policies to the propagation of monetary policy shocks to income dispersion.

Fiscal transfers decline after a conventional, accommodative monetary policy shock. This implies that cuts in monetary policy-controlled interest rates reduce the government's distributive capacity. Lower interest rates compel investors in search of yield to reshuffle their portfolio away from government debt; thus, limiting the government's fiscal ability, particularly in the presence of inadequate tax revenue. The fall in fiscal transfers coincides with increases in income inequality, as the bottom of the distribution is usually the greatest beneficiary of government transfers.

Figure 1. 5: Responses to expansionary monetary policy shock (fiscal response)



1.4.5 Type of monetary policy shocks

Are the distributional effects of monetary policy symmetric? Does the direction of monetary policy shock matter in its impact on inequality? Furceri, Loungani and Zdzienicka (2018) report asymmetry in the monetary policy transmission to inequality. A strand of the literature on monetary policy transmission (for example Matthes and Barnichon, 2015) contends that contractionary monetary policy impacts the economy more than an expansionary monetary policy action. I follow Furceri, Loungani and Zdzienicka (2018) and examine this hypothesis by estimating the following equation:

$$y_{i,t} = \alpha + \gamma_{+} D_{i,t} MP_{i,t} + \gamma_{-}\left(1 - D_{i,t}\right) MP_{i,t} + \pi X_{i,t} + \mu_i + \varepsilon_{i,t} \qquad (4)$$

where *D* is a dummy corresponding to one for positive monetary policy shocks and zero otherwise; *y* is income inequality; $MP_{i,t}$ represent exogenous monetary policy shocks; μ_i are unobserved country-specific characteristics and account for cross-country heterogeneities and $\varepsilon_{i,t}$ is the idiosyncratic term and represents the remaining disturbances. *X* represents a set of controls including lagged income inequality and monetary policy shocks.

Table 1. 1: Effect of monetary policy shocks on income inequality

Positive versus negative monetary policy shock	
Gini (t-1)	0.9962*** (3270.25)
Positive monetary policy shock (t)	-0.0038*** (-4.56)
Negative monetary policy shock (t)	0.0022** (2.52)
Test of difference	18.93***
Positive monetary policy shock (t-1)	-0.0038*** (-4.42)
Negative monetary policy shock (t-1)	0.0009 (1.05)
Test of difference	11.09***
Obs	315
N	3
Prob (Wald)	0.000

Note: z-statistics in parentheses, *** and ** denote significance at 1% and 5% respectively. Controls included but not reported. The model in equation (4) is estimated using the dynamic panel system GMM technique.

The evidence (Table 1.1) indicates asymmetry in the inequality effects of monetary policy. The distributional consequence of monetary action depends on the direction of monetary policy shock. Increases in monetary policy-controlled interest rates impact the income gap more than decreases in the policy rate. Income inequality shows a considerable degree of persistence as indicated by the statistically significant positive AR(1) term.

1.4.6 Country heterogeneity

The panel estimates are average responses across the countries. I engage in a single country analysis of the impulse responses to surprises in conventional monetary policy to explore country heterogeneities.

Income dispersion reacts to monetary shocks for all the countries with a degree of heterogeneity, qualitatively and quantitatively. Inequality increases in South Africa and Ghana after a negative monetary policy shock. The Gambia on the other experiences a decline in the income gap after an expansionary monetary policy shock. Coincidentally, Gambia has recorded a downward trend in the Gini coefficient while the Gini coefficient assumes an increasing trend in both South Africa and Ghana. This may suggest the importance of monetary policy in explaining income dispersion in these countries. There is also an obvious heterogeneity across the countries in the reactions in the labour markets after a shock to the policy rate. The unemployment rates drop in Ghana and Gambia but rise in South Africa.

1.5 The inequality effects of unconventional monetary policy

Ampudia *et al.* (2018) emphasise that the aggregate and distributional effects of unconventional monetary actions are less well understood in comparison to standard monetary policy. While the channels of transmission should remain unchanged, their relative strength may vary. Following Saiki and Frost (2014), I proxy unconventional policy using growth in the monetary aggregates. The empirical analysis is implemented for 15 countries.

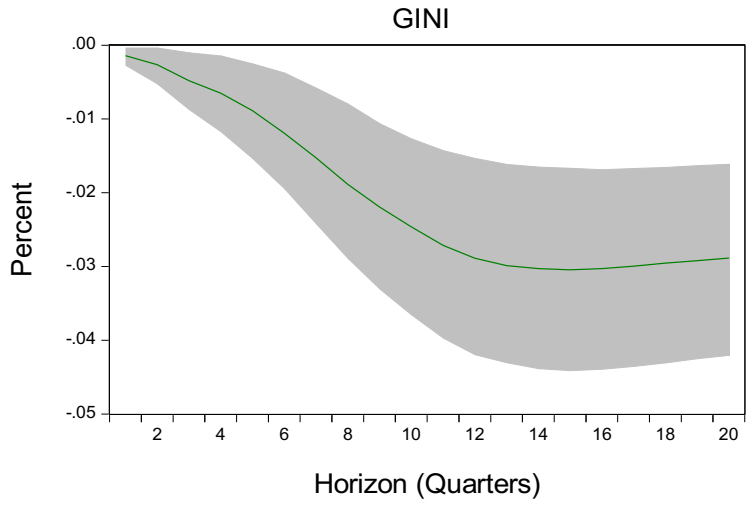
1.5.1 Partial equilibrium (direct effects)

Contrary to the observations of Ampudia *et al.* (2018), I find significant decreases in the Gini coefficient in the partial equilibrium (Figure 1.6). The evidence suggests a decrease in interest income arising from the negative income effects[9]. The result is consistent with Galbraith et al. (2007) who find for the US, a

[9] Positive monetary policy shock that increases the money growth would decrease the interest rate (Christiano, Eichenbaum and Evans, 2005).

direct relationship between monetary policy and earnings inequality in manufacturing.

Figure 1. 6: Response to expansionary unconventional monetary policy shock (partial equilibrium)



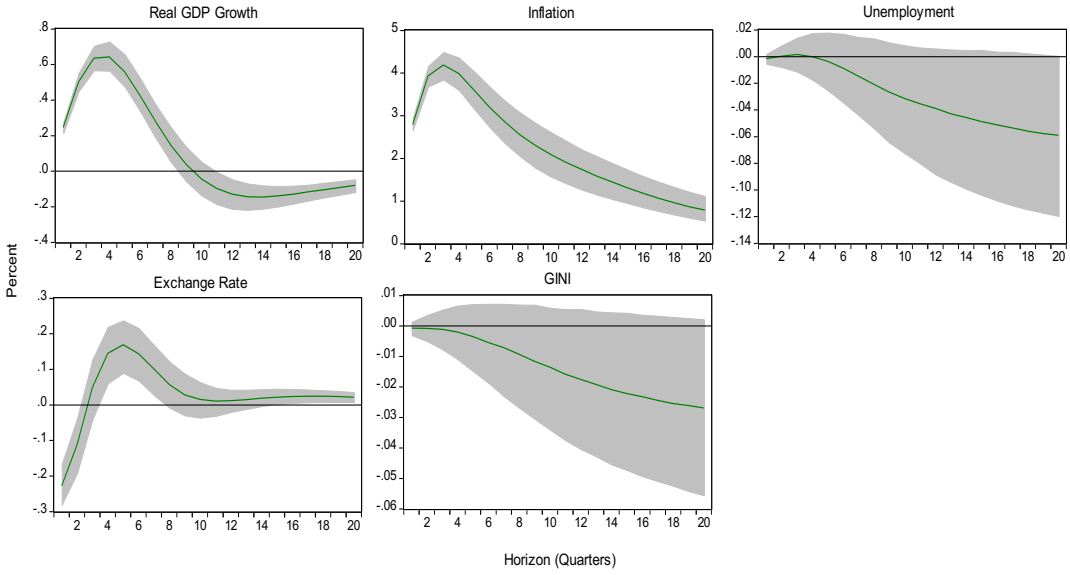
1.5.2 General equilibrium (indirect effects)

The general equilibrium results are shown in Figure 1.7. Compared to the responses to surprises in conventional monetary policy, real GDP growth reacts less while inflation increases more after accommodative unconventional monetary policy. The disparity in the responses of real GDP and inflation in the sample most likely is not occasioned by the differences in the sample size. The evidence may suggest that a conventional policy has the most counter-cyclical effect. The inflation cost of output is relatively lower for conventional monetary action in comparison to unconventional monetary policy. Changes in the monetary aggregate appear highly inflationary and may signal lingering fiscal dominance in SSA countries. In sharp contrast to innovations in conventional monetary policy, the exchange rate depreciates in response to surprises in unconventional monetary policy. The depreciating currency may also account for the relatively high inflation associated with unconventional monetary measures. The response of the real effective exchange rate indicates the dominance of the liquidity demand feature of monetary transmission. The decrease in interest rates, antecedent by monetary policy action ignites lower demand for domestic-currency-denominated assets,

thus depreciating the local currency. Unemployment declines expectedly, in the wake of shocks to unconventional monetary policy stance. These results are in line with Friedman's (1968) claims that an exogenous increase in the money supply leads to growth in output and employment, which lasts two to five years.

The results of the impulse responses also show that expansionary monetary policy shock leads to a persistent decrease in income inequality. The evidence for my sample shows that income inequality responds countercyclically to unconventional, accommodative monetary policy shock. This is consistent with the evidence for the US (Montecino, and Epstein, 2015), the UK (Mumtaz and Theophilopoulou, 2017), for the Euro area (Lenza and Slacalek, 2018).

Figure 1. 7: Responses to an expansionary unconventional monetary policy shock (general equilibrium)



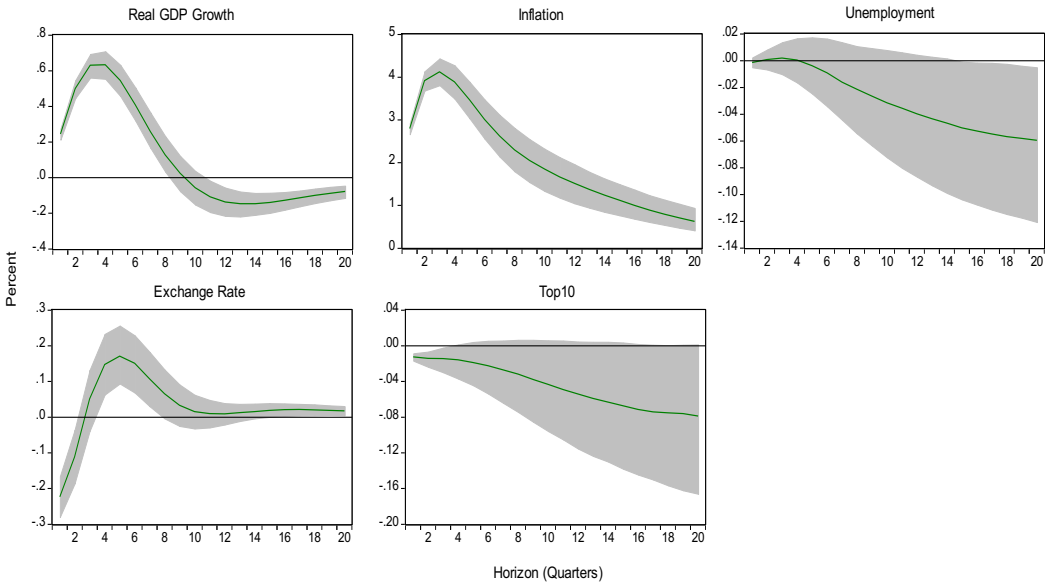
Different measures of inequality: The results are robust to alternative measures of income inequality (Figure 1.8). The top 10 share of income declines in response to innovations in unconventional monetary policy stance.

Estimates with annual observations: I implement the PVAR using annual series and the results are comparable to the findings obtained using the quarterly frequencies (Figure A1.2).

Alternative identification of monetary policy shocks: I verify if the results are also robust to monetary policy shocks identified by Cholesky decomposition. The results are qualitatively unchanged from the baseline analysis – the Gini coefficient falls in response to a positive monetary policy shock (Figure A1.6).

Alternative measures of non-standard monetary policy: I take cognizance of the arguments in Eichenbaum 1992 and Christiano and Eichenbaum 1992 (cited in Christiano, Eichenbaum and Evans, 1999) that innovations to broader monetary aggregates may reflect shocks to money demand and implement the analysis with the monetary base as a measure of the unconventional monetary policy stance. The results of the impulse responses (Figure A3) are qualitatively not different from the conclusions from the baseline analysis. Additionally, I capture non-standard monetary action using central bank assets and the findings (Figure A1.4) are qualitatively akin to the baseline analysis.

Figure 1. 8: Responses to an expansionary unconventional monetary policy shock (Top10)

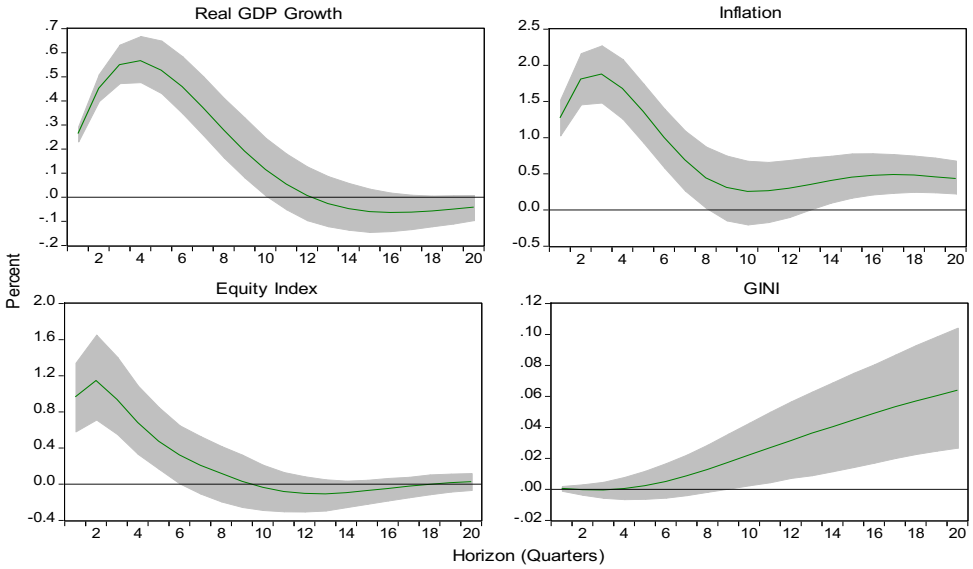


1.5.3 The role of the financial/portfolio channel

The investigation of the role of financial factors is restricted to three countries (Ghana, Kenya, and South Africa) due to data unavailability. Figure 1.9 shows that equity prices respond immediately and strongly in response to surprises in

unconventional monetary policies. This is in line with the results of Rogers, Scotti, and Wright (2014). One interpretation given hinges on investors' search for yield in a low interest rate environment that originates from monetary easing. The impulse responses show increasing effects of monetary policy on income inequality operating through its impacts on equity prices.

Figure 1. 9: Responses to expansionary unconventional monetary policy shock (financial channel)



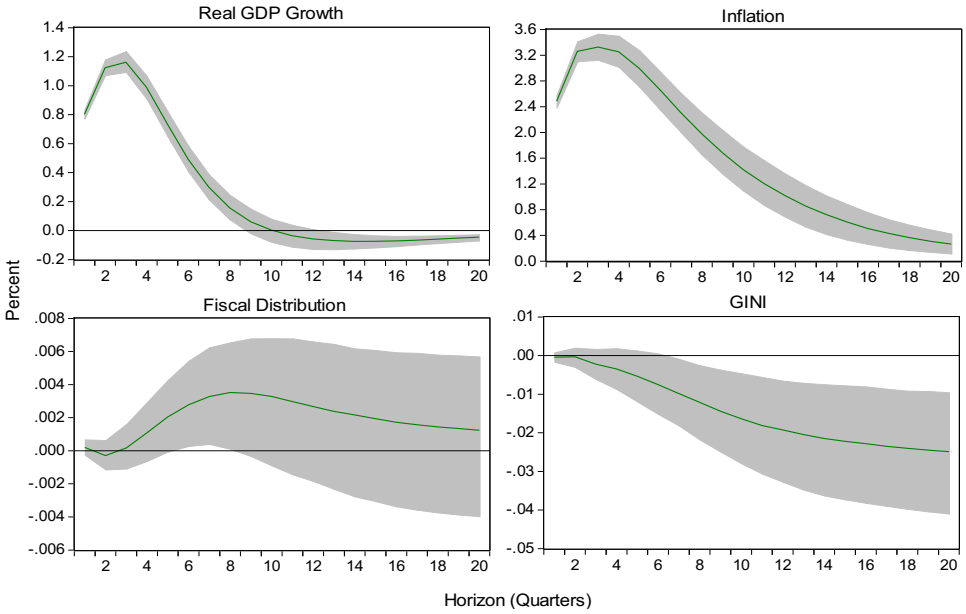
The evidence for my sample indicates that the financial/portfolio channel is relatively stronger for non-standard monetary policy than conventional monetary actions. Bernanke (2012) emphasises this conviction and indicates that an important propagation channel of unconventional policies hinges on portfolio rebalancing and wealth effects. Significant distributional effects of unconventional monetary policy operating via the portfolio/financial channel were also reported for Japan (Saiki and Frost, 2014) and the Euro area (Domanski et al., 2016).

1.5.4 The role of the fiscal response to a monetary shock

The response of fiscal transfers (Figure 1.10) is in stark contrast to its reaction to a surprised reduction in the policy rate. Unconventional monetary easing leads to a rise in fiscal transfers. The income gap declines owing to the increased fiscal distributions occasioned by improved fiscal space that arises from the transfer of central bank revenues to the government's treasury. This is highly likely in SSA

where monetary policy has had a history of fiscal dominance and fiscal deficits have often been financed by central banks. Sterk and Tenreyro (2018) document that the conduct of open market operation has garnered a stream of interest revenues on Central Bank's bonds holdings which have often been remitted to the Treasury account and accounts for an average of two percent of government expenditures per year.

Figure 1. 10: Responses to expansionary unconventional monetary policy shock (fiscal response)



1.5.5 Type of monetary policy shocks

Does the direction of monetary policy matter in its impact on income inequality? I interrogate this and estimate the framework in equation (4). The findings (Table 1.2) indicate that the direction of monetary policy action dictates its impacts on income inequality. Contrary to conventional monetary policy, it appears expansionary non-standard monetary policy impacts income distribution more than restrictive unconventional monetary policy. Again, income inequality displays a considerable degree of persistence as indicated by the statistically significant positive AR(1) term.

1.5.6 Country heterogeneity

The single country VAR analysis display differences in the impulse responses to innovations in unconventional monetary policy. Unanticipated non-standard monetary easing decreases income inequality in Burundi, Botswana, Gambia, Kenya, Namibia, Niger, Tanzania, Uganda, South Africa, and Zambia. However, a dis-equalising effect associated with unconventional accommodative monetary policy is observed in Côte d'Ivoire, Ghana, Mauritius, Malawi, and Rwanda. The reactions in the labour markets are also different across the countries. In response to an expansionary non-standard monetary policy shock, unemployment tends to decrease in Burundi, Botswana, Côte d'Ivoire, Gambia, Kenya, Mauritius, Malawi, and Rwanda and seems to increase in Tanzania and Uganda. Modest and negligible changes in the unemployment rates are observed in Ghana, Namibia, Niger, South Africa, and Zambia.

Table 1.2: Effect of unconventional monetary policy shocks on income inequality

Positive versus negative monetary policy shock	
Gini (t-1)	0.9945*** (6275.06)
Positive monetary policy shock (t)	-0.0030*** (-7.22)
Negative monetary policy shock (t)	0.0027*** (5.69)
Test of difference	60.10***
Positive monetary policy shock (t-1)	-0.0062*** (-14.99)
Negative monetary policy shock (t-1)	0.0029*** (6.14)
Test of difference	154.39***
Obs	1,575
N	15
Prob (Wald)	0.000

Note: z-statistics in parentheses, *** denotes significance at 1%. Controls included but not reported. The model in equation (4) is estimated using the dynamic panel system GMM technique.

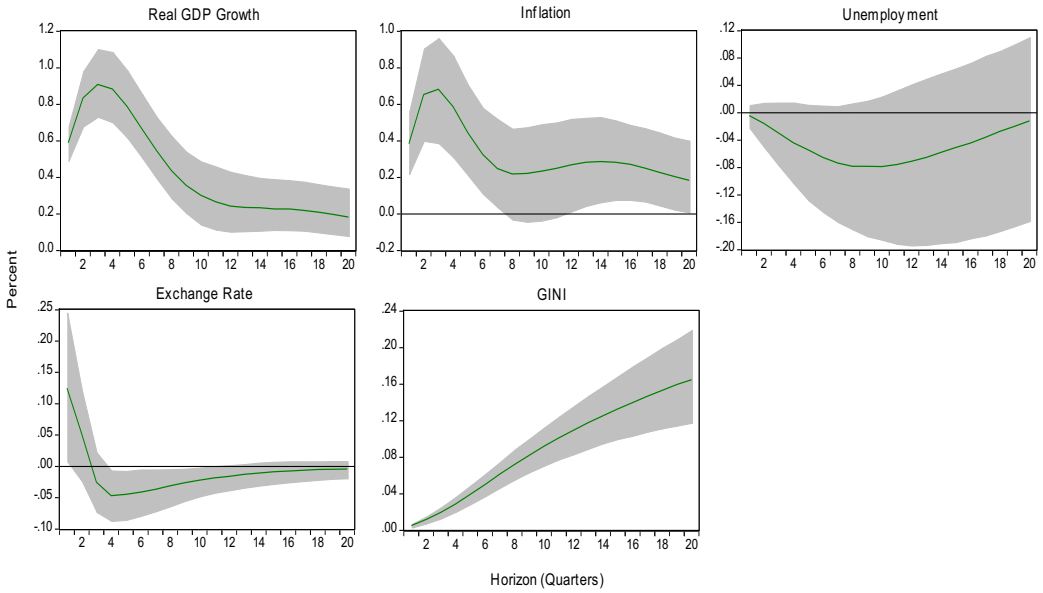
1.6 Estimates with current data

Monetary policy frameworks in SSA have been subjected to frequent reforms in efforts to 'modernise' the frameworks of monetary actions. The broader reform programs targeted at the liberalization of the exchange rate, interest rates and

domestic prices coupled with official debt relief and substantial donor assistance led to improved macroeconomic stability in the mid-1990s and were largely consummated in the early 2000s across the sub-region. Aside from the macroeconomic stability, the policy environment also witnessed a reduced role for the exchange rate as a nominal anchor coupled with smoother functioning of interbank markets, and domestic asset markets development and deepening. Greater private capital inflows followed substantial liberalization of the capital account while new legal charters reinforce the institutional independence of many central banks. From the mid-1990s, the adoption of formal or informal inflation targeting regimes and greater use of market-based operations in the region have made monetary policy more forward-looking and increased the role of market signals in monetary policy implementation.

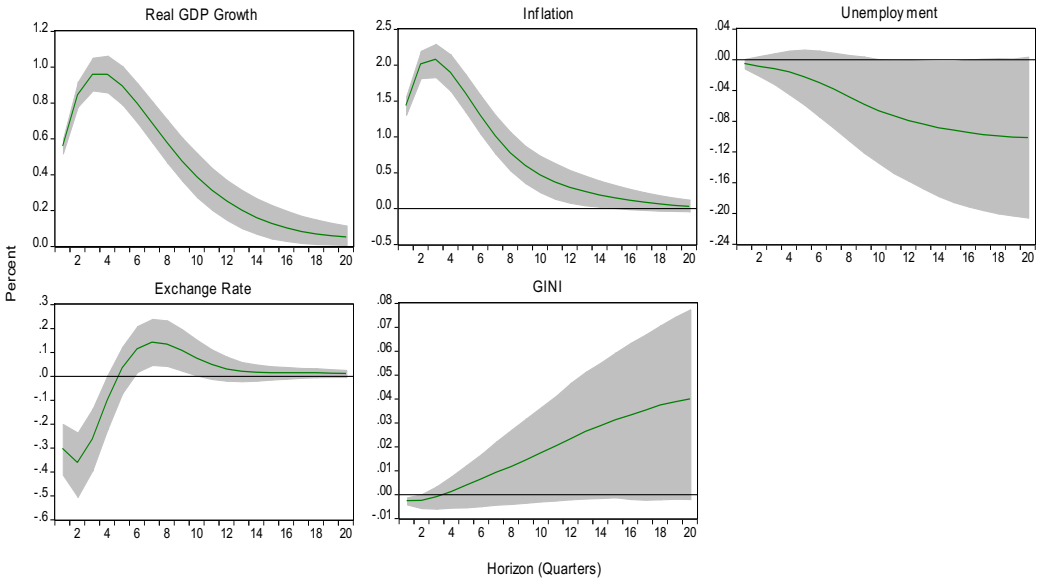
I explore the impact of these changes, the improved signal of policy intention and the significant clarity regarding the details of central bank operations on monetary transmission. I implement the PVAR for the period 2000Q1 to 2018Q4. The results of the impulse responses (Figures 1.11 and 1.12) show that expansion in both standard and non-standard monetary measures puts upward pressure on income inequality. The impact of conventional policy increases while the effect of unconventional monetary policy turns positive.

Figure 1. 11: Responses to expansionary conventional monetary policy shock (2000Q1 – 2018Q4)



This evidence raises questions about the distributional consequences of countercyclical monetary measures over the last two decades. This may suggest that economic expansion has not produced significant jobs and a commensurate reduction in inequality and poverty. The top of the distribution perhaps is the driving force of the growth and is largely the key beneficiary of the resource-driven growth. Growth may generate more employment opportunities to benefit the poor, but it appears economic outturns favour predominantly the top of the income ladder as entrepreneurs benefit the more and their profit margin soars. While countercyclical monetary actions may have been efficient, their distributional effects have been dis-equalising. Between efficiency and distribution, policy choices would most likely gravitate towards efficiency. Macro-economic stability and perhaps allocative efficiency roles have assumed central focus for monetary policy. Nevertheless, central bank actions exhibit redistributive effects. Economic management should consider complementary reforms and programs that ensure quality public expenditure, well-targeted transfers, and the progressivity of taxes to minimise the dis-equalising tendencies of monetary and perhaps other countercyclical measures. Quality social expenditure on education and health can also curtail inequality in opportunity and ensure that inequality in outcome is not entrenched.

Figure 1. 12: Responses to expansionary unconventional monetary policy shock (2000Q1 – 2018Q4)



1.7 Conclusions

Monetary policy in SSA may not be constrained by the zero lower bound on interest rates but is considerably richer and is characterised by the application of diverse instruments. In this paper, I investigate the role of conventional and unconventional monetary measures in explaining the evolution of income inequality in SSA countries.

In the partial equilibrium, both expansionary conventional and unconventional policies exhibit equalising effects. This is largely propelled by the interest rate channel / Fisher channel reflecting negative income effects and wealth transfer between net debtors and net creditors. In the general equilibrium, I find a procyclical response of income inequality to expansionary conventional monetary policy shock while unanticipated unconventional monetary easing evokes countercyclical reactions from the income gap. I find that when considering the most current data (from the year 2000), expansionary monetary policy shock (both standard and non-standard policy) exerts upward pressure on income inequality. These observations suggest that countercyclical monetary measures in the last two decades may have created undesirable side effects on income dispersion. The inequality effects of monetary actions are however small in magnitude. Consistent with the heterogenous agent models, the findings show that fiscal reaction shapes the inequality effects of monetary policy and may contribute to the aggregate macroeconomic response to monetary policy actions.

The evidence for my sample demonstrates possible disparities in the transmission of conventional monetary policy shocks and unconventional monetary policy shocks. Unambiguous differences are noticed in the response of the exchange rate, the fiscal response, and the reaction of the stock market. The exchange rate depreciates after unexpected non-standard monetary expansion but appreciates in response to accommodative standard monetary policy shock. The variation in the reaction of the exchange rate may be largely attributable to the relative strength of the liquidity demand feature of monetary transmission. Fiscal transfers increase after innovations in non-standard accommodative monetary measures but fall in response to expansionary conventional monetary policy shock.

The fiscal reactions betray the haunting fiscal dominance of central bank actions and the generally low level of tax revenues that limits the distributive capacity of governments in SSA countries.

The reaction of the stock market after unanticipated conventional monetary easing is comparably small. On the other hand, the equity index increases strongly after unforeseen, unconventional accommodative monetary action, lasting for about two and half years. This finding underscores the importance of the portfolio/financial channel in monetary policy transmission particularly in jurisdictions where there are significant equity holdings and constraints on the applications of conventional monetary actions compel monetary authorities to resort to non-standard monetary measures. The comparison of the financial/portfolio channel of monetary transmission across developed and less developed capital markets is an avenue for further research.

The behaviour of the exchange rate should ignite interest in the foreign exchange intervention policy of central banks in most emerging and developing economies. The reaction of the exchange rate to unconventional monetary policy shocks is consistent with conventional theoretical predictions. This may portray the usually observed foreign exchange interventions in emerging and developing economies that are reflected in the accumulation and the depletion of reserves to control exchange rate volatility or preserve competitiveness. The appreciation of the exchange rate after a surprising conventional monetary expansion may be premised on indirect effects of output and fiscal channels of monetary transmission. This is most likely, as the evidence shows that policy rate cuts impact more on real GDP and are less inflationary. Thus, the response of the exchange rate may suggest that many of the emerging and developing markets that engage in foreign exchange interventions also apply the short-term interest rate instrument to communicate policy and influence economic activity. This opens an avenue for further research on the application of multiple instruments and monetary transmission in developing and emerging markets.

Chapter 2

Financial development and the redistributive channel of monetary policy

2.1 Introduction

A rapidly growing literature analyses the redistributive effects of monetary policy both within theoretical frameworks (for example Gornemann, Kuester and Nakajima, 2016; Kaplan, Moll and Violante, 2018; Auclert, 2019) and empirical evaluations (for example, Mumtaz and Theophilopoulou, 2017; Furceri, Loungani and Zdzienicka, 2018; Guerello, 2018)[10]. The conclusion from these studies is that, apart from the macroeconomic and financial effects of monetary measures, redistribution is a side effect of monetary policy changes. Auclert (2019) argues that the effects of monetary policy on macroeconomic aggregates are realised via the redistribution channel. If the pass-through of monetary policy depends on the distribution of income and wealth, then understanding the strength of this transmission mechanism is important for improving the countercyclical effects of monetary policy and guiding policy responses to contain the distributional consequences of macroeconomic shocks. In this study, I evaluate the role of financial development in the monetary transmission to income inequality. My laboratory is Sub-Saharan Africa (SSA) where the financial systems of the countries have common features, suggesting a similar role of the financial systems. Nonetheless, the variations in the monetary frameworks and the structure of the countries' financial systems may point to important differences in the specific role that the financial system plays in the conduct of monetary policy in the sub-region.

While there has been increased awareness of the inequality consequences of monetary policy, how the redistributive effect of monetary policy depends on the extent of financial development has not been studied, despite the conventional view that financial development is relevant to the effectiveness of monetary transmission. This study addresses this important gap. I simultaneously analyse the inequality effects of monetary policy and financial development and explore the

[10] See Colciago, Samarina and de Haan (2019) for a detailed review of the literature.

role of financial development in the propagation of monetary policy shock to income inequality. This contribution also expands the literature on financial development and income distribution. Prior literature primarily examined the distributive effects of financial development. But which system generates more inequality—a bank-based or market-based financial system? Does a more market-based economy co-move positively with inequality? Does a predominantly bank-based economy correlate negatively with inequality? Empirical evidence of these correlations and distinctions is non-existent. My framework considers the different financial systems and evaluates which financial system is most regressive and in which system can the monetary authority tolerate the inequality effects of monetary actions in pursuit of macroeconomic stability and efficiency. This current contribution is imperative as Effiong, Esu and Chuku (2020) reveal that the cross-country differences in the monetary policy transmission in a monetary union are approximately accounted for by the idiosyncrasies in the financial structure of member countries. For the European Monetary Union, Elbourne and de Haan (2006) contend that the heterogeneity in the individual countries' financial structures ensures that regional monetary policy affects member countries differently.

In contrast to the practice in the literature on the interaction of financial development and monetary policy, I analyse the effects of monetary policy by relying on the structural innovations. By this novelty, I eschew the well-documented difficulty in the monetary transmission literature that centres on separating the monetary policy effects from the impacts originating from exogenous developments to which monetary policy reacts. I utilise a structural vector autoregression system comprising real economic activity, inflation and monetary policy and employ a recursive identification scheme to obtain the series of monetary policy innovations. I estimate straightforward regressions of a measure of income inequality on the monetary policy shocks, financial development and interaction between monetary policy and financial development. The results show that monetary expansion exerts a positive impact on income inequality, but when interacted with financial system variables, the effect is negative. The effects of monetary policy have been analysed in the literature with

the aid of vector autoregressions. To facilitate comparisons with this literature, I run panel vector autoregression with exogenous variables (PVARX), using the monetary policy shock series and its interaction with financial development as exogenous variables. The results of the dynamic multipliers confirm the findings from the baseline analysis.

A version of the analysis that includes only low-income countries shows that the interaction between monetary policy and financial development exerts insignificant impacts on inequality. This may indicate the shallow nature of financial systems and markets in developing countries. When I exclude the countries within the CFA franc zone from the sample, the result shows that monetary policy has no significant inequality effects. However, the interaction between monetary policy and financial development affects income inequality significantly. These findings highlight the significant role that the financial system plays in the transmission of monetary policy. The financial system may amplify the effects of monetary policy actions, and it may require less movement in policy directions to achieve policy intentions in financially developed economies. There is firm evidence that both monetary policy and financial development contribute to the development of income inequality. However, financial development exhibits the most redistributive effects and contributes more to the evolution of income inequality. The results are robust to monetary policy shocks identified via the sign restriction approach.

2.2 Related literature: The role of the financial system in the transmission process of monetary policy.

A strand of the literature on monetary transmission opines that the effectiveness of monetary transmission rests on the degree of financial development (for example Carranza, Galdon-Sanchez and Gomez-Biscarri, 2010; Rey, 2016; Caglayan, Kocaaslan, and Mouratidis, 2017). Effiong, Esu and Chuku (2020) allude to the monetary policy transmission as a financial process in which the financial system operates as the channel that carries monetary policy effects to macroeconomic aggregates.

There are two propositions on the nexus between the monetary transmission and the financial system (Effiong, Esu and Chuku, 2020). These include the credit and the traditional money perspectives of monetary policy transmission. Both views share a common thread: monetary policy actions are transmitted to the real economy by first effecting changes in the financial sector variables. Thus, both the traditional money and credit perspectives emphasize the role of the financial system in the monetary policy transmission.

The traditional money perspective regards the financial sector as a passive conduit for the transmission of monetary policy. Changes in the money supply affect the interest rate to separately impact the investment demand and the exchange rate. Monetary tightening, for example, raises interest rates, resulting in lower investment spending. Similarly, a higher interest rate causes the domestic currency to appreciate, resulting in a shift in spending from foreign to domestically produced goods. The functionality of this viewpoint is dependent on the conditions of market perfections and restricted price flexibility. As discussed, for example, by Tobin (1969), the traditional perspective of monetary policy transmission has concentrated on the interest rate channel and the substitutability of different asset classes by investors, including banks.

Beck, Colciago, and Pfajfar (2014) document that the credit view of monetary policy transmission focuses on changes in monetary policy actions affecting loan supply through credit market frictions with a magnifying effect. It thus draws on a large body of knowledge about the role of financial frictions and financial intermediaries in the real economy and across the business cycle. Beginning with Bernanke and Gertler (1989), this literature has established that information asymmetries between borrowers and lenders, as well as the accompanying agency problems, translate into a wedge between the cost of external and internal finance. Both the level of interest rates set by monetary authorities and the health of the borrower's balance sheet determine the size of the external finance premium. A financial accelerator effect causes the amplification. The external finance premium falls as the balance sheet quality improves due to improved economic conditions. This permits more borrowing and investment, fuelling the boom. In this

environment, a crisis can be triggered by a drop in asset values, which worsens borrowers' balance sheet conditions, leading to an increase in the external financing premium, and hence lower investment and economic activity.

The credit view literature distinguishes between the bank lending and the firm balance sheet channels. The functionality of the bank lending channel is centred on the imperfect substitutability of different funding sources. The bank lending channel traces the sensitivity of the supply of bank loanable funds to monetary policy actions. The ease with which banks can replace deposit liabilities with non-deposit funding determines the degree of the impact of monetary policy on the supply of loanable funds. The balance sheet channel focuses on how interest rate changes directly affect borrowers′ ability to borrow by impacting borrowers′ profitability, asset value and thus collateral. Both the bank lending and balance sheet channels give a theoretical linkage for the impact of monetary policy on the supply and demand sides of the financial system, respectively. Overall, the credit view's strength is determined by the degree of financial frictions. Higher levels of financial frictions magnify the impact of monetary policy on the real economy via a magnified impact on the external finance premium.

Beyond modifying credit availability, the literature has pointed to another credit channel of monetary policy: the risk profile of banks' credit decisions. According to Nicoló et al. (2010), low interest rates can heighten risk in three different ways. First, a low yield on safe assets encourages financial intermediaries to replace them with risky assets. Second, low interest rates may encourage a search for the yield of long-term savings institutions such as pension funds with long-term return commitments, resulting in riskier asset investments. The third channel centres on procyclical leverage ratios: risk-weighted assets fall as asset prices rise, causing banks to expand their balance sheets into riskier assets to maintain a stable leverage ratio.

Empirically, several studies have examined the role of the financial system in the monetary transmission. According to Ma (2018), the effects and transmission of monetary policy are shaped by the changes in the financial system; hence, monetary policy effects tend to be more pronounced as the structure of the financial

system becomes more market-based. In an earlier study, Banerjee, Devereux, and Lombardo (2016) show that macroeconomic spillovers from monetary actions may be exacerbated by financial frictions. Through a financial accelerator mechanism, financial market distortions are hypothesised to create a strong source of propagation which propels an unanticipated monetary restriction to decrease the firms' net worth and the demand for capital. This induces further reductions in investment and output. The adverse effects of shocks are theorised to be mitigated in an economy with deeper financial markets (Caglayan, Kocaaslan, and Mouratidis, 2017). The work of Doepke and Schneider (2006) shows that the redistributional consequences of inflation are a function of a household's nominal asset positions. In a related study, Ghossoub and Reed (2017) conclude that the redistributive effects of inflation are highest in economies with relatively small stock markets.

2.3 Empirical methods

The analysis evolves in two steps. First, I estimate monetary policy shocks for each country in a structural VAR identified by Cholesky decomposition. Finally, I regress a measure of income inequality on the estimated shocks and measures of financial development.

2.3.1 Monetary policy in SSA

In most SSA countries, the de jure policy regime in place is best described as a hybrid regime. The official nominal anchor for many SSA countries is money targeting, albeit there is significant flexibility in meeting the target. In a hybrid system, short-term interest rates have mostly featured within the toolbox of monetary actions; however, monetary aggregates persist as the overwhelming intermediate target. Hence, monetary aggregates provide the best direct indicator of the central banks' monetary policy actions in many SSA countries. A multiplicity of objectives (such as inflation, exchange rates, and credit output) and instruments (including interest rates, monetary aggregates, reserve requirement ratios, and foreign exchange intervention) characterised the monetary frameworks in SSA (IMF, 2008). Monetary aggregates play a fundamental role in the conduct of monetary policy in SSA and in most of these countries, interest rates play a

subordinated secondary role in the monetary policy frameworks to improve monetary transmissions. I follow Saiki and Frost (2014) and Guerello (2018) and measure monetary policy stance by central bank assets[11]. I consider changes in the central bank's balance sheet apt for the analysis to capture the multiplicity of objectives and instruments of monetary frameworks in SSA countries.

2.3.2 Monetary policy shocks

Exogeneous monetary policy shocks are required in the estimation of the causal effect of monetary policy on inequality (Furceri, Loungani and Zdzienicka, 2018). In the benchmark model, I apply the structural autoregressive (SVAR) approach to identify monetary policy shocks. Lütkepohl, Krätzig and Phillips (2004) explain that the errors in the SVAR system are interpreted as exogenous shocks. I consider an SVAR specification as follows[12]:

$$\mathrm{A}_0 Y_t = \sum_{i=1}^{p} \mathrm{A}_i \, Y_{t-i} + \mathrm{B}\varepsilon_t \qquad (1)$$

where p is the lag length and Y_t is a vector of endogenous variables, including real GDP, inflation, and the monetary policy indicator. A_i (i = 1, …, p) is a coefficient matrix capturing the lagged relationships between the endogenous variables. A_0 is a 3×3 matrix of parameters and specifies the instantaneous relationships between the endogenous variables. ε_t is a 3×1 vector of structural shocks with (diagonal) identity covariance matrix and a Gaussian distribution of mean 0. **B** is a 3×3 matrix and specifies the correlation structure of the errors. In this representation, the form of the matrix A_0 imposes the recursive structure, while the diagonal matrix **B**

[11] Ahiadorme (2021) and Saiki and Frost (2014) respectively find that using monetary base, broad money, and central bank assets as measures of monetary policy produces very similar results in the impulse responses in SSA and Japan.

[12] For notational convenience, deterministic terms are excluded from the model since they do not affect and are not affected by the impulses hitting the system. Likewise, exogenous variables may be ignored for the present purpose since they may not react to the stochastic shocks of the system (Lütkepohl, Krätzig and Phillips, 2004; Samarina and Nguyen, 2019)

orthogonalizes the effects of the innovations. The reduced form representation of the structural form in equation (1) is as follows:

$$Y_t = \sum_{i=1}^{p} C_i Y_{t-i} + u_t \qquad (2)$$

where $C_i = \mathrm{A}_0^{-1}\mathrm{A}_i$ ($i = 1, \ldots, p$) and $u_t = \mathrm{A}_0^{-1}\mathrm{B}\varepsilon_t$.

The concern is to isolate the monetary innovations from demand and supply/cost shocks. I follow the contemporaneous restrictions identification approach and impose a recursive structure on the instantaneous relations between the variables as per the following ordering, consistent with the standard assumption in the literature:

$$Y_t = \begin{pmatrix} real\ GDP \\ inflation \\ monetary\ policy\ stance \end{pmatrix}$$

Per this approach, the variables placed above are contemporaneously exogenous to the shocks of the variables below. The recursive restrictions identification scheme has been extensively applied and discussed in the literature on monetary policy shocks (see, for example, Bernanke and Mihov, 1998; Christiano, Eichenbaum and Evans, 1999; Davtyan, 2017). The assumptions of no contemporaneous effects are apt and more plausible with quarterly or monthly data (Walsh, 2010).

The structural parameters are estimated via the ML estimator. The trending properties of the variables reveal evidence of unit roots in the real GDP time series for some countries. Notwithstanding, I follow Lütkepohl, Krätzig and Phillips (2004) and include the variables in levels. According to Lütkepohl, Krätzig and Phillips (2004), even if the variables have unit roots, cointegration restrictions can be ignored and the ML estimator applied to a VAR model fitted to the levels. This is a frequent phenomenon in SVAR modelling, ostensibly to eschew imposing too many restrictions and losing information. The lag-length information criteria (Hannan-Quinn and Akaike's Information Criteria) suggest a VAR order of $p = 2$. The VAR(2) satisfies the stability conditions as no root lies outside the unit circle.

Data on real GDP, inflation and central bank assets are sourced from the IMF's International Financial Statistics (IFS). I utilise quarterly series and estimate the SVAR on the country level to identify monetary policy shocks for each country. I follow Romer and Romer (2004) and sum the quarterly observations into annual series to implement the analysis. The structural shocks are standardised to have zero mean and variance equal to one, so I can interpret the response of the Gini coefficient as the response to a one standard deviation change in the monetary policy shock.

2.3.3 Econometric estimation: dynamic panel model

In this paper, I seek to evaluate how financial development shapes the redistribution effects of monetary policy. My approach is to regress a measure of inequality on its own lagged values, a constant, and measures of financial development and monetary policy. I augment the model with an interaction term between financial development and monetary policy to capture how financial development affects the inequality effects of monetary policy. The financial development and monetary policy shocks are included individually to capture their direct impacts on income inequality and the lagged value of inequality is included to control for the normal dynamics of income inequality. A natural variation is to control for other variables that may affect income inequality. The basic specification, therefore, includes real income per capita as a control.[13] There is no reason to expect the monetary policy measure to be correlated with real GDP per capita since I control for the central bank's information about output growth in constructing the monetary policy measure. The baseline regression is specified as follows:

$$Inq_{i,t} = a_0 + a_1 Inq_{i,t-1} + a_2 gdppc_{i,t} + a_3 FD_{i,t} + a_4 MP_{i,t} + a_5 FD_{i,t} \times MP_{i,t} + \mu_i + \varepsilon_{i,t} \quad (3)$$

where Inq is income inequality, $gdppc$ is the log of real GDP per capita, FD represents measures of financial development, MP represents the monetary policy

[13] Excluding the constant and the control variable (real GDP per capita) has little impact on the results.

indicator, μ accounts for unobserved country-specific effects and ε is the remaining disturbance term. I apply the system generalized method of moments (GMM) of Arellano and Bond (1991); Blundell and Bond (2000) to estimate the model coefficients to address the endogeneity issue regarding the correlation between the lagged dependent variable and the error term. The empirical framework proposed here allows us to identify directly both whether monetary policy affects income inequality and whether financial systems affect the transmission of monetary policy shocks to income inequality.

2.3.4 Data

The sample focuses on countries and periods that have the data necessary for the investigation. I conduct the analysis using annual data for an unbalanced panel of 32 SSA countries over the period 2000–2017. The Standardized World Income Inequality Database's (SWIID 8.2) estimates of the Gini are used as a measure of income inequality. I take cognizance of the potential effects of monetary policy on inequality through redistribution (transfers and taxes) and focus the analysis on the net, rather than the gross Gini coefficient. The investigation utilizes the Financial Development (FD) Index constructed by the IMF[14]. The IMF's FD Index summarises how developed financial markets and financial institutions are in terms of their access, depth, and efficiency. Thus, the FD Index is an aggregate of the Financial Institutions (FI) Index and Financial Markets (FM) Index. The analysis also gauges the respective effects of financial institutions and financial markets on the dynamics of income inequality. Finally, I utilise data on real income per capita (GDPpc) and proxy monetary policy (MP) using the estimated structural innovations. The data on real GDP per capita is sourced from the World Bank's World Development Indicators.

[14] See Svirydzenka (2016) for the details of the methodology applied in the index construction.

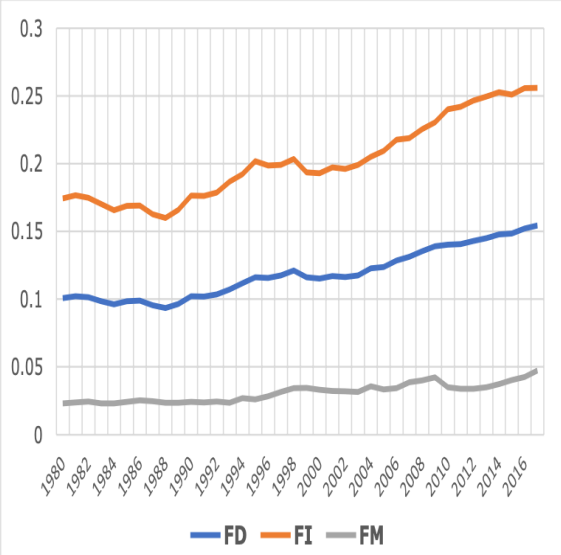


Fig. 2. 1A: Financial Development in SSA

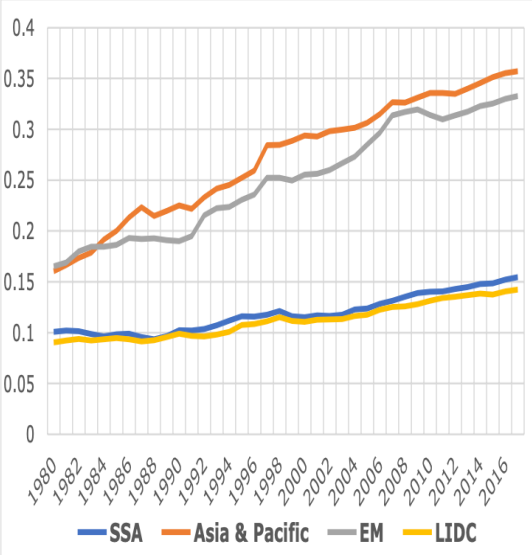


Fig. 2. 1B: Financial Development across Regions

Note: This figure shows the development of the financial system in SSA. Panel 2.1A shows the time path of the Financial Development (FD), the Financial Institution (FI) and Financial Market (FM) indices in SSA. Panel 2.1B compares the trend of financial development in SSA to the development of the financial system in Emerging Markets (EM), Income and Developing Countries (LIDC) and Asia & Pacific regions.

The data (Fig. 2.1A) shows that the financial system in SSA has improved over the years as the financial development indicators trend northwards and assume a relatively steep slope from the year 2000. The trend shows a broad-based move towards market-based financial systems. This is a testament to the varied financial sector reforms[15] implemented since the mid-1980s. The banking sector appears to have recorded significant progress, while the financial markets (particularly secondary markets) across the region remain undeveloped and shallow.

[15] The reforms included mainly financial and interest rate liberalization, financial markets development and improved financial infrastructure.

Table 2. 1: Sample and Summary Statistics (Mean value, 2000–2017)

Country	*GDPpc*	*Net Gini*	*FD Index*	*FI Index*	*FM Index*	*MP*
Benin	765.80	45.29	0.12	0.24	0.0002	-0.02
Botswana	6,467.61	58.07	0.25	0.42	0.07	0.13
Burkina Faso	559.19	44.07	0.11	0.22	0.002	0.10
Burundi	229.51	38.73	0.11	0.18	0.03	0.43
Cameroon	1,296.42	44.63	0.10	0.19	0.002	0.12
Cape Verde	3,061.61	50.26	0.21	0.42	0.002	0.37
Central African Republic	421.30	52.31	0.07	0.13	0.00	0.61
Côte d'Ivoire	1,294.97	49.94	0.19	0.24	0.13	0.46
Gambia	800.11	44.69	0.09	0.18	0.00	0.33
Ghana	1,292.28	42.51	0.11	0.17	0.04	0.31
Guinea-Bissau	555.13	42.77	0.05	0.09	0.00	0.11
Kenya	942.66	46.66	0.16	0.25	0.07	0.21
Lesotho	1,130.38	52.21	0.14	0.28	0.002	-0.22
Madagascar	475.96	43.98	0.10	0.18	0.006	0.58
Malawi	441.43	46.38	0.08	0.14	0.02	0.18
Mali	679.62	40.21	0.12	0.23	0.006	0.22
Mauritania	1,211.84	39.49	0.11	0.20	0.01	0.57
Mauritius	7,652.64	37.69	0.39	0.50	0.28	0.34
Mozambique	448.13	46.00	0.12	0.21	0.03	0.07
Namibia	5,206.40	65.55	0.34	0.61	0.05	0.01
Niger	350.08	38.89	0.10	0.18	0.01	0.24
Nigeria	2,078.71	43.82	0.22	0.22	0.22	0.14
Rwanda	545.62	50.05	0.09	0.17	0.004	0.15
Senegal	1,265.12	41.73	0.13	0.26	0.003	-0.002
Sierra Leone	402.48	42.16	0.07	0.14	0.004	0.03
South Africa	7,027.20	59.36	0.55	0.66	0.42	0.31
Sudan	1,475.18	37.99	0.09	0.18	0.001	0.55
Swaziland	3,994.36	58.64	0.15	0.28	0.01	-0.11
Tanzania	717.12	43.48	0.11	0.20	0.01	0.07
Togo	546.67	43.55	0.12	0.22	0.03	0.21
Uganda	576.95	44.17	0.10	0.18	0.02	-0.02
Zambia	1,339.15	55.00	0.10	0.18	0.02	0.14
Sample average	1,726.61	46.84	0.15	0.25	0.05	0.21

Note: This table reports the mean values of the variables used in the paper. The summary statistics show the mean value for each country and the total sample. The GDP per capita (GDPpc) is in constant US $. The Gini coefficient values are the disposable Gini. Higher values of the Gini show higher income inequality. Financial Development |(FD), Financial Institutions (FI) and Financial Markets (FM) indices range between 0 and 1. The closer the indices are to 1, the more developed the financial system. Monetary policy (MP) is represented by the structural shocks.

The development of the financial systems in SSA largely traces the trend in Low-Income and Developing Countries (LIDC) but remains considerably shallow relative to the financial systems in Emerging Markets (EM) and the Asia & Pacific region (Fig. 2.1B). The data (Table 2.1) shows that the financial system is most developed in South Africa, while Guinea-Bissau is the least financially developed economy. In the sample, the net Gini averaged 46.84 (Table 2.1). Namibia was the most unequal country, while Mauritius recorded the least income gap but the highest income per capita. Burundi posted the least income per person over the period 2000–2017.

2.4 Empirical results

Three key testable predictions are highlighted in the empirical frameworks. First, there are inequality effects from financial development. Second, there are redistributive consequences from monetary policy. Finally, the redistributive effects of monetary policy depend on the financial system. The findings (Table 2.2) show that expansionary monetary policy exerts a significant positive impact on income inequality and the financial system dampens these effects. The results show the importance of financial development in shaping the potential effects of monetary actions on the income gap. The redistribution effects of monetary policy depend not only on the activities of the financial markets but also on the arrangements pertaining to financial intermediation.

There are several factors underscoring these results. In the financial markets, the resultant reductions in interest rates from expansionary monetary action decrease interest income to redistribute between the top and the bottom of the income ladder. This is the case since the top of the income distribution is conventionally believed to be the chief holders of financial assets. Meanwhile, the relatively less developed stock markets in the sub-region may undermine the direct impact of rising stock prices on income distribution. Also, monetary expansion operating via the financial system redistributes away from net nominal creditors to net nominal debtors by affecting interest payments. The orthodox assumption suggests that the rich are the net savers while the bottom of the income ladder

features net borrowers. The reduced interest rate arising from monetary easing indicates lower interest payments by net borrowers to narrow the income gap.

The importance of financial intermediation in the determination of aggregate demand may underscore these results as well. Through the credit channel of monetary transmission, monetary expansion bolsters credit expansion, investments, and economic activities to generate labour demand, additional labour income and reduce income inequality. This may imply that monetary expansion may increase aggregate demand via the redistribution channel. This result is consistent with the conclusion of Auclert (2019) that the redistribution channel amplifies the effects of monetary policy since those who gain from an accommodative monetary policy have higher marginal propensities to consume (MPCs) than those who lose. The results of this paper bring to the fore the role of liquidity constraints in the overall effectiveness of monetary policy. Werning (2015) disputes the significance of liquidity constraints to the efficiency of monetary policy. However, in line with the observations of Kaplan, Moll and Violante (2018), the findings of this study demonstrate the importance of the responses of price and quantity of credit/capital in the indirect channel of monetary transmission.

The findings suggest that monetary policy actions are propagated to aggregate variables and the real economy via financial sector variables and aggregate demand behaviour. The results illustrate quantitatively, an important point: the effects of monetary policy actions depend strongly on the reactions of financial sector variables and investment. These results are in sharp contrast to the general notion that developing and emerging economies are characterised by undercapitalized banks which significantly constrains credit expansion and undermines the effectiveness of monetary policy transmission. It is however instructive to note that the findings may suggest that in a more developed financial system, less shift in the policy position is needed to achieve policy objectives. Perhaps, the relatively low financial development in developing and emerging economies may explain the large movements in monetary policy stance usually observed in these jurisdictions.

Table 2. 2: Redistributive effects of monetary policy and financial development

	1	2	3	4
Gini (t-1)	1.034***	1.019***	1.034***	1.046***
	(0.015)	(0.013)	(0.007)	(0.012)
gdppc	0.152***	0.249***	0.041	5.368***
	(0.040)	(0.051)	(0.049)	(0.888)
MP	0.010***	0.017***	0.010***	0.007**
	(0.003)	(0.002)	(0.003)	(0.003)
FD	-1.062***			-2.485***
	(0.195)			(0.619)
FD×MP	-0.031***			
	(0.011)			
FI		-1.397***		
		(0.254)		
FI×MP		-0.042***		
		(0.005)		
FM			0.831	
			(0.547)	
FM×MP			-0.110*	
			(0.064)	
$gdppc^2$				-0.372***
				(0.065)
FD^2				4.395***
				(1.192)
Constant	-2.459***	-2.273***	-1.860***	-20.960***
	(0.746)	(0.748)	(0.389)	(3.212)
Obs	418	418	418	418
N	32	32	32	32
Wald (p-value)	0.00	0.00	0.00	0.00
Sargan[p-value]	20.22[0.99]	22.61[0.99]	17.41[0.99]	24.87[0.99]
AR(1) test[p-value]	-3.92[0.00]	-3.94[0.00]	-4.15[0.00]	-3.64[0.00]
AR(2) test[p-value]	1.03[0.30]	1.24[0.21]	1.35[0.18]	1.39[0.16]

Notes: This table presents the results from the regressions of income inequality on GDP per capita, monetary policy (MP), financial development (FD) and the interaction between monetary policy and financial development. The dependent variable is the net Gini coefficient. Columns 2 and 3 consider respectively, the financial institution (FI) and financial markets (FM) aspects of the financial system. Column 4 captures the hypothesized non-linear relationship between growth, financial development, and inequality. *, **, *** denote significance at the 10%, 5% and 1% levels. Standard errors in parentheses. The results reported are for the two-step estimations and 2 maximum lags of the dependent variable are specified as instruments. For the estimation involving FM, the instrument specification includes 3 maximum lags of the dependent variables.

The findings are coherent with theories that predict equalising effects of financial development. Financial development reduces financing and borrowing constraints to enable the efficient allocation of capital which enhances growth, ceteris paribus. Improved economic growth may generate increased employment and enhanced labour income to reduce income inequality. However, there are heterogeneities in the inequality effects of the different financial arrangements. The evidence from the sample shows that financial markets worsen the income gap (though insignificant) while financial institutions exert equalising effects. Financial markets disproportionately improve the wealth of the top of the income distribution who are the usual participants in these markets. In economies with predominant public bond markets, the government's debt demand crowds out the credit needs of the private sector to limit private investment and further lessens general employment and income while generating higher returns for participants in the bond market who are chiefly the top of the income ladder. Meanwhile, potential inflation erodes the non-indexed income of the bottom of the distribution who are exposed to liquidity risk to further worsen the income gap. Financial intermediation activities and credit expansions anchored by financial institutions, may improve income, and narrow the income gap.

These results are consistent with the observation that the financial system in SSA appears to be predominantly bank-based. Also, these results may suggest that the market-based financial system generates more inequality than the bank-based financial system. However, both bank-based and market-based financial systems significantly affect the transmission of monetary policy to income inequality. The results show that monetary easing is more equalising via the financial markets than through the financial institutions. This evidence may suggest that the influence of monetary policy is relatively stronger in the bond market than in the stock market in SSA. A stronger influence in the stock markets would have widened the income gap through upticks in stock prices and the associated surge in capital gains which benefit mainly the top of the distribution. The impacts of financial markets and financial institutions on the inequality effects of monetary policy may indicate evidence of relatively weak stock markets but high dependence on bank credit and the bond market in SSA.

In column 4 of Table 2.2, I include the square term of financial development and income per capita in the specification to verify the non-linear relation between inequality and growth on the one hand and between inequality and financial development on the other hand[16]. The evidence from the sample shows a U-shaped relationship between financial development and income inequality, contrary to the predictions of Greenwood and Jovanovic (1990). Financial development is equalising at the early stages but dis-equalising at later stages of its evolution. This may be explained by the notion of the "vanishing effect" of financial development. This finding supports the observations of Law and Singh (2014) and Arcand, Berkes, and Panizza (2015) and shows that the level of financial development is beneficial to growth only up to a certain threshold, beyond which further financial development reduces economic growth. The U-shaped relationship between financial development and income inequality may suggest that monetary policy transmission via the financial system is likely to be dominated by the bank lending channel at lower levels of financial development while the wealth channel dominates at the higher levels of financial development.

The relationship between income inequality and real income per capita displays the Kuznets' (1955) curve - the inverted U-shaped path of income inequality along the trajectory of economic development. Real income per capita worsens the income gap at the initial stages but reduces income inequality at later stages of its evolution. Finally, the results indicate persistence in income inequality, as the Gini coefficient exhibits statistically significant positive AR(1) terms in all regressions.

[16] I investigate the hypothesis that inequality is a non-linear function of income and financial development by estimating a quadratic model of the form:

$$Inq_{i,t} = \alpha_0 + \alpha_1 Inq_{i,t-1} + \alpha_2 gdppc_{i,t} + \alpha_3 FD_{i,t} + \alpha_4 MP_{i,t} + \alpha_5 gdppc_{i,t}^2 + \alpha_6 FD_{i,t}^2 + \mu_i + \varepsilon_{i,t}$$

This hypothesis implies that the income and financial development elasticities of the Gini coefficient – equal to $\alpha_2 + 2\alpha_5 gdppc$ and $\alpha_3 + 2\alpha_6 FD$ – are not constant but depend on the level of income and financial development, respectively.

2.4.1 Robustness of the baseline results

I test the sensitivity of the results by excluding South Africa from the sample. South Africa appears to be markedly developed financially, positing an average FD index of 0.55 relative to the average sample FD index of 0.15 and an average FD index of 0.39 for the second most financially developed country. I estimate the baseline specification without South Africa to test the sensitivity of the results to the presence of a potential influential outlier. The results are presented in Table A2.1 (Appendix) and show that excluding South Africa has little impact on the conclusions and therefore parallels the findings in the baseline analysis.

Further, I restrict the analysis to low-income countries to test the robustness of the results to the exclusion of emerging economies. Six (6) emerging countries (Botswana, Mauritius, Namibia, Nigeria, Swaziland, and South Africa) are exempted from the sample and the baseline specifications are estimated for 26 low-income countries.[17] The results are shown in Table A2.2 (Appendix) and confirm qualitatively, the findings from the total sample. Monetary policy increases income inequality while financial development produces equalising effects. Financial institutions exert significant decreasing impacts on the income gap while financial markets have positive but insignificant effects on the income distribution. Generally, the interaction between monetary policy and financial development produces insignificant effects on income inequality. These findings suggest weak financial systems in peripheral and low-income countries. In most developing economies, financial institutions and systems are shallow while financial and assets markets are less developed and practically non-existent in some instances. The shallow nature of the financial systems may weaken the changes in financial conditions resulting from monetary policy and undermine the effectiveness of monetary policy transmission.

[17] The categorisation into low income and emerging economies is according to IMF income classification. Due to insufficient observations, the analysis is not performed for the emerging economies.

Monetary policy regimes: The sample includes ten (10) countries[18] that are members of the CFA franc zone with their currency pegged to the euro. The countries within the common monetary area have been widely credited for macroeconomic stability and very low rates of inflation in the sub-region. I explore the impact of this heterogeneity by excluding the ten countries from the sample[19]. The results presented in Table A2.3 (Appendix) suggest that contrary to the baseline results, monetary policy is distributionally neutral. This may strengthen the doubt about the real impact of monetary policy in SSA outside of the CFA franc zone. The insignificant impact of monetary policy lay credence to the perceived deep uncertainty of monetary transmission in Sub-Saharan Africa largely on the account of policy incredibility, cloudiness of monetary frameworks, domestic and external supply shocks, and financial and economic uncertainties. Within the CFA franc zone, these issues are principally subdued. However, when interacting with financial development indicators, monetary policy exerts significant impacts on income inequality. This emphasises the importance of the financial system in the effective transmission of monetary policy. The finding suggests that the strength of the monetary policy transmission is less dependent on the monetary regimes than the development of the financial system.

Panel vector autoregression: I investigate the robustness of the baseline results along two additional dimensions. First, I engage an alternative econometric approach which entails estimating a PVARX model. The PVARX has the following reduced form:

$$Y_{i,t} = \sum_{j=1}^{p} \mathrm{A}_j Y_{i,t-j} + \gamma X_{i,t} + \varepsilon_{i,t} \qquad (4)$$

where Y is the vector of endogenous variables, comprising the net Gini coefficient and the annual change in real GDP per capita; X is an exogenous monetary policy

[18] Benin, Burkina Faso, Cameroon, Central African Republic, Côte D'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo

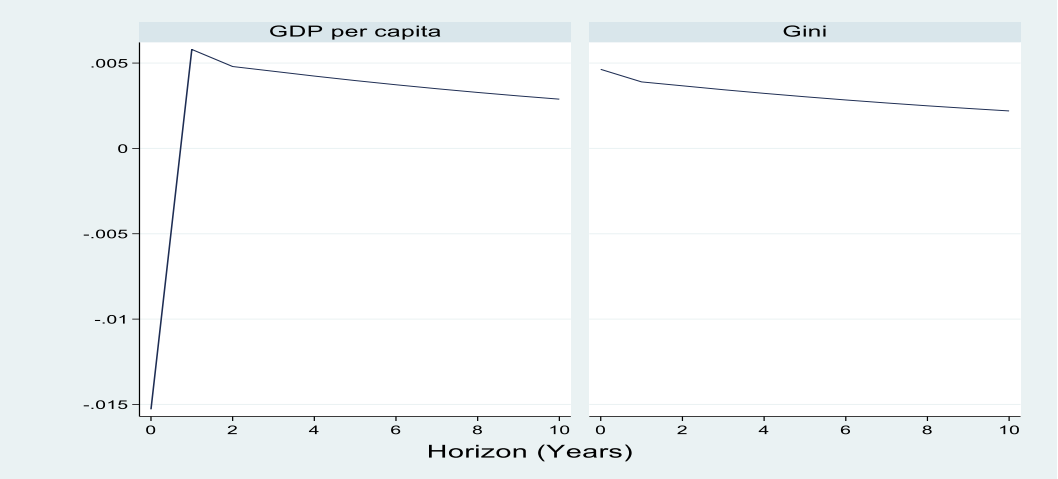
[19] The analysis is not performed for the countries within the CFA franc zone due to insufficient observations.

shock identified from the SVAR and ε is a vector of errors. Consistent with Stock and Watson (2005), the VAR errors are assumed to follow a Gaussian distribution with zero mean and variance-covariance matrix Ω_{it}. The endogenous variables are included with a first lag[20] while the exogenous structural shock is included contemporaneously. I follow the standard technique of Abrigo and Love (2016) and estimate the PVARX model using the GMM procedure. I use the estimated PVARX and compute the dynamic multipliers to measure the impact of a one standard deviation change in monetary policy innovation on income inequality over time. The dynamic evolution of the monetary policy transmission to income inequality is presented in Figure 2.2. The Gini increases in response to monetary policy shock while the income per capita declines first before increasing about a year after the shock.

Further, I estimate the PVARX model by utilising the interaction term between financial development and monetary policy shock as the exogenous variable. The results of the dynamic multipliers (Figure 2.3) show that the Gini coefficient reacted by decreasing while the real income per capita increases before returning to pre-shock levels. The PVARX yields results that are qualitatively similar to those in the baseline specification. Monetary easing increases income inequality but when combined with financial development, the effect on inequality is negative. This suggests that there are important interaction effects between monetary policy and the financial system and leaves the conclusions from the baseline analysis unchanged.

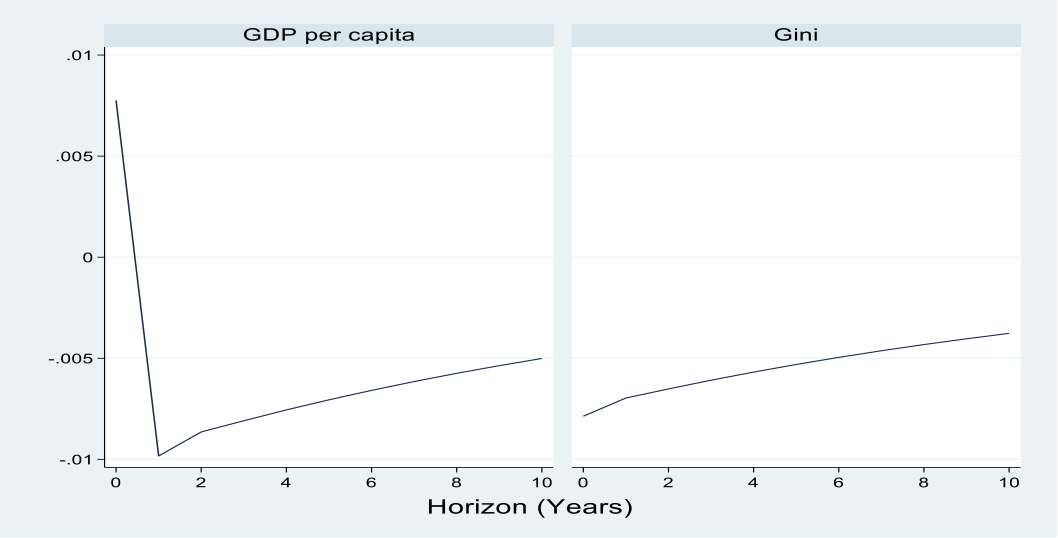
[20] I test for the presence of a unit root in the series (Appendix – Table A4) and estimate the PVARX on stationary variables (with those of order 1 first differenced). Estimating the PVARX with $p = 2$ lags of endogenous variables leaves the results unchanged.

Figure 2.2: Responses to an expansionary monetary policy shock



Note: This figure plots impulse responses of GDP per capita, and the Gini coefficient to one standard deviation positive monetary policy shock. The vertical axis shows the response in percent.

Figure 2.3: Responses to an expansionary monetary policy shock interacted with financial development.



Note: The figure plots impulse responses of GDP per capita, and the Gini coefficient to one standard deviation positive monetary policy shock interacted with financial development. The vertical axis shows the response in percent.

Alternative identification of monetary policy shocks: Finally, I verify if the results are also robust to monetary policy shocks identified by sign restriction. Cholesky decomposition imposes a recursive structure in the VAR to identify structural shocks. However, Uhlig (2005) and Arias, Caldara and Rubio-Ramirez (2019) espouse the idea of sign restriction and identify structural shocks by imposing restrictions on the signs of the impulse responses over a specific horizon. Table 2.3 shows the sign restrictions imposed to identify macro model shocks.

Table 2. 3: Sign Restrictions for Macro Model Shocks

Variable/Shock	Demand	Supply/Cost-push	Monetary Policy
Output	+	-	+
Inflation	+	+	+
Interest Rate	+	+	-

Note: The sign restrictions are for positive demand and supply shocks and negative monetary policy shocks.

My interest is to identify monetary policy shocks; thus, I assume that output and prices would increase in response to monetary easing[21]. The identification procedures are applied on country level SVAR and monetary policy shocks identified for each country. Following the transformations explained in section 2, I generate the series of monetary policy shocks identified by sign restriction and estimate the baseline specification in equation (3). The results of estimating equation (3) using the sign restricted shock series are reported in Table 2.4.

Using the shock series derived from the alternative identification of structural innovations in monetary policy stance also has little impact on the results. The coefficient estimates show that income inequality increases in response to changes in monetary policy but behaves countercyclically in its reaction to the combined effects of monetary policy and financial development.

[21] I exploit the Matlab codes by Breitenlechner, Geiger and Sindermann (2018) to estimate the sign restricted model à la Uhlig (2005) and Rubio-Ramirez, J.F. Waggoner and Zha (2010).

Table 2. 4: Results using sign restricted monetary policy shocks.

	1	2	3	4
Gini (t-1)	1.052***	1.033***	1.043***	1.053***
	(0.005)	(0.009)	(0.005)	(0.009)
gdppc	0.207***	0.359***	0.013	5.787***
	(0.041)	(0.049)	(0.068)	(0.716)
MP	0.005**	0.011***	0.010***	0.010***
	(0.002)	(0.002)	(0.001)	(0.002)
FD	-1.446***			-2.465***
	(0.079)			(0.898)
FD×MP	-0.001			
	(0.008)			
FI		-1.850***		
		(0.392)		
FI×MP		-0.016*		
		(0.008)		
FM			1.694**	
			(0.691)	
FM×MP			-0.057**	
			(0.023)	
$gdppc^2$				-0.408***
				(0.051)
FD^2				4.519***
				(1.437)
Constant	-3.647***	-3.567***	-2.165***	-22.460***
	(0.282)	(0.616)	(0.423)	(2.482)
Obs	418	418	418	418
N	32	32	32	32
Wald (p-value)	0.00	0.00	0.00	0.00
Sargan[p-value]	23.13[0.99]	25.20[0.99]	25.45[0.99]	26.31[0.98]
AR(1) test[p-value]	-3.86[0.00]	-3.81[0.00]	-4.02[0.00]	-3.47[0.00]
AR(2) test[p-value]	1.11[0.27]	1.25[0.21]	1.04[0.29]	1.52[0.13]

Notes: This table presents the results from the regressions of income inequality on GDP per capita, monetary policy (MP), financial development (FD) and the interaction between monetary policy and financial development. The dependent variable is the net Gini coefficient. Columns 2 and 3 consider respectively, the financial institution (FI) and financial markets (FM) aspects of the financial system. Column 4 captures the hypothesized non-linear relationship between growth, financial development, and inequality. The results reported in this table use monetary policy shocks identified by sign restrictions. *, **, *** denote significance at the 10%, 5% and 1% levels. Standard errors in parentheses. The results reported are for the two-step estimations and 3 maximum lags of the dependent variable are specified as instruments. For the estimation involving FI, the instrument specification includes 4 maximum lags of the dependent variables.

2.5 Conclusion

This paper investigates the importance of financial development in evaluating the distributional effects of monetary policy. The analysis provides evidence that monetary policy has empirically significant redistributive effects: expansionary monetary policies lead to a significant increase in income inequality. When I examine the role of financial systems, I observe that financial development plays a significant role in the transmission of monetary policy shocks. The results provide evidence that, although monetary easing may have adverse effects on income inequality, such effects reverse with financial development. However, when the analysis is restricted to low-income countries, the inequality effect of the interaction between monetary policy and financial development is insignificant. I also examine the redistributive effects of financial development and find that while financial institutions decrease income inequality, financial markets worsen the income gap. Both financial markets and financial institutions, however, dampen the inequality effects of monetary policy.

The evidence from the sample presents important policy implications, as it highlights the critical role of the financial system in the transmission of monetary policy shocks and the effectiveness of central bank actions. The results may suggest that less movement in policy positions is needed to achieve monetary objectives when the financial system is more developed. The findings of this paper may suggest that in a more developed financial system, central banks may accommodate adverse distributional consequences of monetary policy actions as the reactions in the financial systems may alleviate such effects in the medium term. The evidence shows that both monetary policy and financial development contribute to the income gap. Notwithstanding, the impacts of the financial systems seem to becloud the inequality effects of monetary policy and contribute more to the evolution of income inequality. The results of my framework indicate that a more market based financial system is most regressive. An economy with predominantly bonds and equity markets generates relatively high-income inequality. It does so because it raises the income of capital owners who usually form the top of the income ladder. A highly developed bank-based financial system

produces the highest levels of aggregate welfare. The improved capital formation generates the highest levels of economic activity and enhances the incomes and welfare of each group.

Future work can build on these empirical results in several ways: first, by obtaining measures of stock and bond markets developments to ascertain which financial market arrangement is more regressive and how the interest rate exposure channel operates in these systems; second, by performing the analysis across groups of agents or regions to enhance the debate on the role of the financial systems in the redistributive effects of monetary policy. On the nexus between income inequality and financial development, the analysis can be performed for different periods for countries with data for longer periods, to evaluate if the evolution of the financial system shapes the moderating role of financial development on the distributional consequences of monetary policy.

Chapter 3
Monetary policy in search of macroeconomic stability and inclusive growth

3.1 Introduction

"… I doubt that there is any particular monetary policy framework that is suitable for all countries for all times. The central bank's choice of monetary policy framework should depend on the objectives it aims to achieve, on the challenges that the economy faces, and on the structure of the financial markets and the economy in which it operates. And it is likely that the monetary policy framework will change over time as the domestic economy and the international financial system develop."

Fischer, 2015, pp. 9-10.

A key policy issue facing central banks today may be the policy towards inclusive growth and welfare. This recognition is part of a broader, worldwide trend of visibly greater engagement of policy for welfare and equity purposes. Since the advent of the global financial crisis, some economists have pointed to the seemingly fragile nature of economic growth with some arguing that growth is generally non-inclusive and its benefits accrue mostly to the top of the income ladder. The Coronavirus pandemic and the not-too-distant financial crises have renewed keen interest in resilient and inclusive growth. The OECD estimates that amidst the Covid-19 pandemic, the global economy plummeted by about 4.5 percent in 2020 as the poor and the vulnerable felt greatly the brunt of the raging pandemic. Within the policy environment, the recovery plan includes an emphasis to kick start a new inclusive growth cycle. The focus of the discussion is shifting towards what can be done to stabilise employment, mitigate poverty and the rising inequality to foster greater inclusion. It is important to reflect on the outcome of policy choices of the past and shift the focus away from policy designs that target efficiency in isolation.

Policy institutions are faced with the duty to implement (monetary) policy consistent with achieving higher employment to address poverty, and rising inequality and attain inclusive growth. Jonathan D. Ostry of the IMF cautions that if they (policy institutions) fail, “progrowth reforms will lose political legitimacy, enabling destructive nationalist, nativist and protectionist forces to gain further traction and undermine sustainable growth”. The call is for inclusive growth rather than a straightforward economic growth strategy. This paper seeks to ascertain the inclusive growth impacts of macroeconomic stabilisation objectives of monetary policy. The research is motivated by the joint contribution of the ILO, UNCTAD, UNDESA, and WTO, as part of the post-2015 development agenda, indicating that: “the broad objective of macroeconomic policy is to contribute to economic and social wellbeing in an equitable and sustainable manner”. In a World Bank contribution, Ferreira, Prennushi and Ravallion (1999) emphasise that macroeconomic stabilization policies should achieve their macroeconomic objectives at the least cost to the most vulnerable. Notwithstanding the considerable differences among researchers, the general understanding is that economic policies that seek to stimulate growth must consider the implications for inequality and poverty, by emphasising equitable growth policies (Dagdeviren, van der Hoeven and Weeks, 2001).

At least there is anecdotal evidence that sustained and inclusive growth critically depends on supportive macroeconomic policies (see, for example, Galli and von der Hoeven, 2001). The European Central Bank (ECB) emphasises the desire for macroeconomic stability in its strategy, believing that:

"A monetary policy that maintains price stability in a credible and lasting way will make the best overall contribution to improving economic prospects and raising living standards."

ECB Monthly Bulletin, January 1999, p. 39.

This paper offers a contribution to the inclusive growth literature within the context of a macroeconomic stabilisation policy. To contribute a different angle to the debate, I concentrate on one aspect of macroeconomic policy, namely monetary

policy. This choice was not only dictated by concerns to keep the research focused but also by the persistent global application of monetary policy as an active instrument of economic policy. Monetary policy has assumed increasing importance across the globe as the last two decades have witnessed a plethora of monetary actions in both developing and developed economies of the world.

Inclusive growth parameters may generally not represent the mandate of central banks in the conduct of monetary policy. This observation provides the motivation to formulate inclusive growth as a function of the explicit macroeconomic stabilisation objectives of central banks; a process which would yield a reliable gauge for policy design towards "quality growth" as it would provide an indirect way to get at the realistic inclusive-growth implications of the monetary policy stance. As the central bank's policy is implemented to achieve inter alia, stable prices and moderate economic growth[22], the study analyses the relationship between inclusive growth indicators and inflation and growth. Thus, the centrepiece of the analysis is a representation in which growth inclusiveness is a function of policy-related variables – a social welfare function that includes both inflation and economic growth. The study is consistent with the previous studies that tested the hypothesis according to which monetary policy indirectly impacts inequality. By this approach, the findings of this study can be extended to all countercyclical and stabilisation economic policies and perhaps, partly address the concerns regarding the coherence of policy packages in pursuit of the inclusive growth agenda.

This study seeks a data-driven answer to the realistic implications for the inclusive-growth impact of monetary policy via the mechanisms of price and growth stabilisation. This is crucial to provide robust empirical evidence on monetary policy design that is a win-win for inclusive growth. Monetary policy can contribute to employment stability since it seeks to stabilize the economy and minimize business fluctuations. Changes in monetary policy tend to influence

[22] The IMF's Article of Agreement indicates that monetary policy should have the twin objectives of reasonable price stability and orderly economic growth, thus recognising both price and output stabilisation roles.

poverty and income inequality via various transmission channels including interest rate, inflation, income, and asset prices channels. Thus, monetary policy tends to influence aggregate demand, growth and inflation and can affect the real economy and promote inclusive growth. Macroeconomic instability creates uncertainty, generates expectations of further instability, disrupts financial markets, and discourages physical and human capital investments. This retards growth and generally reduces average income to undermine inclusion.

This current research is not an attempt to exhaustively explain the drivers/policy packages to steer inclusive growth but to investigate whether the monetary policy environment matters for growth inclusiveness. I use data for 144 countries over the period 2000 to 2018 in short and long-term analyses to test the hypothesis that a part of the variation in growth inclusiveness among countries can be explained by monetary policy related variables. In terms of estimation technique, I utilise a system generalised method of moments (GMM) estimator in consideration of possible endogeneity and heteroscedasticity problems with the dynamic panel methodological approach. The estimation results show that macroeconomic stability is equalising and enhances the income of the poor to improve growth inclusiveness. These relationships are statistically significant in both the short and long term and are quantitatively larger in the long term. These results suggest that monetary policy that controls inflation and output variability is likely to reduce poverty and income inequality and promote the inclusion agenda. Thus, monetary policy towards inclusive growth is most likely, sound monetary policy. The analysis also identifies investment in human development as a super pro inclusive growth strategy. The empirical findings indicate that even after controlling for the effect of economic growth, policies that lower inflation and promote human development can have a direct impact on the well-being of the poor and promote the inclusion agenda. This is however conditional on the initial inflation in the economy. In advanced economies where inflation rates are near zero, further disinflation induces huge unemployment cost, harms the income of the bottom of the distribution and hurts inclusion efforts. The indication from the analyses is that the twin objectives of macroeconomic stability and inclusive growth offer no trade-offs. Macroeconomic stabilisation policies should seek to

achieve stable economic growth and complement this key objective with the need to stabilise prices and external balances to steer the economy towards sustainable inclusive growth. The evidence from the sample shows that greater inclusiveness depends on employment generation, distribution of income and poverty reduction.

3.2 **Related literature: Monetary Policy-Implications for Inclusive Growth**

Fluctuations and shocks in the economy may generate welfare losses. Some macroeconomic predictions particularly the RBC theory primarily concludes that cyclical fluctuations are an efficient response to uncertainties. However, the response of the economy to shocks is plagued with general inefficiencies, thus the opportunity for welfare-enhancing policies. Largely, the New Keynesian models espouse the non-neutrality of monetary policy at least in the short run, refraining from the real and nominal variables dichotomy and leaving the economy with a nominal anchor. The general capability of central banks to control inflation and potentially influence output and employment at least in the short run, position welfare impacts as natural consequences of monetary policy, at least in theory.

Colciago, Samarina and de Haan (2019) document that the general equilibrium models characterized by household heterogeneity and incomplete financial markets form the basis of recent theoretical research on monetary policy. Different channels identify the monetary policy impacts on the household sector and growth inclusion.

First, monetary stimulus boosts economic growth and leads to increased employment and wage growth. The effects of monetary policy on households are determined by how strongly policies are reflected in household income and employment in the various income categories. The creation of new jobs benefits low-income households in particular, as unemployment is more widespread among these households. In this regard, accommodative monetary policy has the potential to reduce poverty, alleviate income disparity, and improve growth inclusion. Wage increases, on the other hand, mostly benefit individuals who are already employed, and employment prospects are generally stronger among highly educated, upper-income households. As a result, expansionary monetary policy may exacerbate income disparities and worsen social exclusion.

Secondly, interest rate changes, resulting from monetary policy, may ignite substitution and income effects to impact the income gap. The substitution effect results from interest rates induced changes in the price of current vis-à-vis future consumption. The income effect is realised as interest rate changes, resulting from monetary policy, directly affect interest payments to savers and that paid by borrowers. Price stability, according to Bulir (2001), is beneficial to the poor and has declining effects on income inequality through direct channels and indirectly through income preservation and the boost in demand for money. Erosa and Ventura (2002) observe that the share of cash in the financial asset mix of poor households is more relative to rich households. Consequently, monetary policy through the inflation channel exposes poor households to greater hurt as they pay a disproportionate share of the inflation tax. Inflation also leads to a greater concentration of wealth as inflation expectations ignite precautionary savings.

Lastly, the wealth effect sets in as the values of assets such as real estate, equities, and bonds, respond to changes in monetary policy. Expansionary monetary policy supports the value of stocks and other financial assets by raising demand for diverse securities and lowering discount rates on the financial market. Furthermore, low interest rates on mortgages enhance housing demand, which leads to increased house prices. At the same time, higher economic growth boosts dividend and rental income while low deposit rates lower interest income. These benefits households with significant financial wealth, often the wealthiest households. Meanwhile, the financial assets of households in the lower wealth quintiles, if any, are mostly deposits. In this regard, expansionary monetary policy has the potential to hurt the poor, exacerbate the income gap and discourage growth inclusion.

Colciago, Samarina and de Haan (2019) clarify that the interaction of these effects coupled with various degrees of household heterogeneity accounts for the transmission of monetary policy to poverty, and income equality. Goyal (2014) explains that since monetary policy affects a larger part of the economy, it can directly affect inclusion by affecting the pace of job creation and price stability.

Empirically, the literature on the trends and determinants of inequality and poverty is substantial, but there are sparse attempts at the implications of macroeconomic stabilization policy, especially, monetary policy for inclusive growth. In their seminal paper, Romer and Romer (1999) investigate the short-run and long-run impacts of monetary policy on inequality and poverty. Their analysis shows that in the short run, expansionary monetary policy improves poverty but has negligible effects on income distribution. In the long term, however, monetary easing aggravates income inequality and diminishes the income of the poor. Easterly and Fischer's (2001) study identifies inflation as a top concern to the poor than the rich and suggests that inflation aggravates the income imbalance. Bulir (2001) finds a positive but non-monotonic impact of price stability on income inequality. As inflation reduces, inequality slows. However, the depressing effects of inflation on inequality decline at low levels of inflation. Leite, Tsangarides, and Ghura (2002) conclude that growth and inflation feature among pro-poor conditions that are influenced by policy. Crowe (2006) and Albanesi (2007) resort to theoretical frameworks in their studies and find support for the predicted interaction effect between inflation and income inequality. In another empirical study, Kang, Chung and Sohn (2013) find that the real interest rate correlates positively with poverty while both inflation rate and income growth are negatively correlated to poverty. Also, both inflation rate and income growth decrease the Gini coefficient while the real interest rate has no statistically significant effects on the Gini coefficient. Finally, they find that there are long-term effects of monetary policy on poverty. Utilising unemployment as a measure of growth inclusiveness, Adediran, et al. (2017) find that monetary actions significantly influence the inclusiveness of growth in Nigeria. Chang and Jaffar (2014) conclude that the Bank of Korea's interest rate policy directly contributes to inclusive growth by effectively stabilizing and expanding employment. This current contribution expands the literature and investigates whether the twin objectives of macroeconomic stability and growth inclusion offer any trade-off.

Ostry, Loungani, and Berg (2019) indicate that while economists have emphasized the risk of growth stagnation in the wake of the financial crisis, the risk of growth exclusion in many countries is probably just as salient. Fortunately,

central bankers are becoming increasingly aware of the need to drive the inclusion agenda. Yellen (2015) cites the widening gap between the rich and the poor as a major concern in the minds of citizens around the world and indicates that economic inequality has long been a great concern within the Federal Reserve System. Draghi (2015) acquiesces that monetary policy instruments can have consequences on the allocation of resources and the distribution of wealth and emphasizes the increasing importance of identifying and weighing those consequences and mitigating them as may be necessary. Bernanke (2015) admits the potential distributional impacts of monetary policy and adds that further research is required to ascertain and measure the many channels through which these effects are transmitted.

Ostry, Berg and Kothari (2021) emphasize that inequality and growth exclusion are driven to an important extent by the very policies that are the basic tools of the economist's trade. These include not only macroeconomic policies (including monetary policy) but also supply-enhancing policies. The implication is clear: when designing such policies, some assessment of their impact not only on the quantity of growth but on the distributional and inclusion consequences, should be taken into consideration. Unfortunately, there is insufficient attention to macro-inclusion linkages. Thus, this current contribution is critical.

3.3 Empirical methods

3.3.1 Data

The empirical work focuses on 144 countries over the period 2000 – 2018; this period is chosen based on data availability. I restrict my attention to countries that have sufficient data for the analysis.

Inclusive growth indicators

Inclusion is a term of relatively recent coinage but is well distinct and extends the objectives beyond increasing gross domestic product. While there is little clarity about how an inclusive approach differs from the standard approaches,

drawing on the literature, it is evident that the inclusive growth debate introduces the demand for the benefits of growth to be more broadly experienced.

The Organisation for Economic Cooperation and Development (OECD, 2011) in a report on inclusive growth, identifies poverty, unemployment, and inequality as the three problems that even the record levels of growth of the 1990s and decade of 2000s failed to tackle. These three highlight the key elements to steering growth inclusiveness. Inclusive-growth minded policies emphasise reductions in unemployment (De Mello and Dutz, 2012; Vellala, Madala and Utpat, 2014) and decreases in poverty and income inequality (Swarmy, 2010; Raumiyar and Kanbur, 2010; Goyal, 2013). Poverty, unemployment, and inequality are the three objectives of inclusive growth policy that are the focus of this study, and the investigation herein utilises data on a large sample of countries and examines possible systematic relationships between poverty, unemployment, income inequality and the variables directly affected by monetary policy.

Because data on poverty, unemployment, and income distribution are only available annually for most countries, I use annual data throughout the analyses. The data for the inclusive growth indicators include the poverty gap – the ratio by which the mean income of the poor falls below the poverty line; the unemployment rate; and the Gini coefficient as a measure of income inequality. The data on the Gini coefficient come from the Standardized World Income Inequality Database (SWIID 9.0). Data on unemployment rates (ILO estimates) and poverty are gleaned from the World Bank's World Development Indicators and PovcalNet respectively[23].

I construct an inclusive growth index which groups all the indicators into a single composite index and encapsulates the multidimensional aspect of growth inclusiveness. I perform principal components analysis (PCA) to arrive at the inclusive growth index (IGI) and normalise the index to range between 0 and 1 using a min-max normalisation technique. Given the indicators of inclusive

[23] Utilising alternative measures of inequality and poverty – the top 10 income share and the headcount ratio respectively, leaves the results qualitatively unchanged.

growth, the closer the IGI is to 0, the higher the growth inclusiveness and vice versa.

Evidence from the data shows that growth is most inclusive in advanced economies (Figure 3.1) and in comparison, economic progress is over four times less inclusive in low-income and developing economies. Poverty is most perverse in low-income economies while income inequality is most pervasive in developing and emerging economies. This may suggest that slow progress in addressing poverty and inequality has contributed to depleting social cohesion around the globe. While the market Gini averaged around the same across the income groups, the disposable Gini is significantly lower in advanced and emerging economies (Table 3.1). This shows that the low distributive capacity of the state and less progressive transfers have contributed to the relatively high levels of income inequality in developing economies. Surprisingly, the average unemployment rate is lowest in low-income economies and highest in middle-income economies (Figure 3.1). Accounting for the number of countries, the average unemployment rate per country is highest in advanced economies. Among the advanced economies, the United States is the least inclusive economy while Slovenia, Denmark, Czech Republic, Slovakia, Norway, Finland, Sweden, Netherlands, Belgium, and Iceland are the top ten inclusive economies. Overall, Belarus is the best-performing economy while the Central African Republic is the least inclusive economy. The worst 20 performing countries feature 19 Sub-Saharan African countries with Haiti being the other.

Macroeconomic/Policy related variables

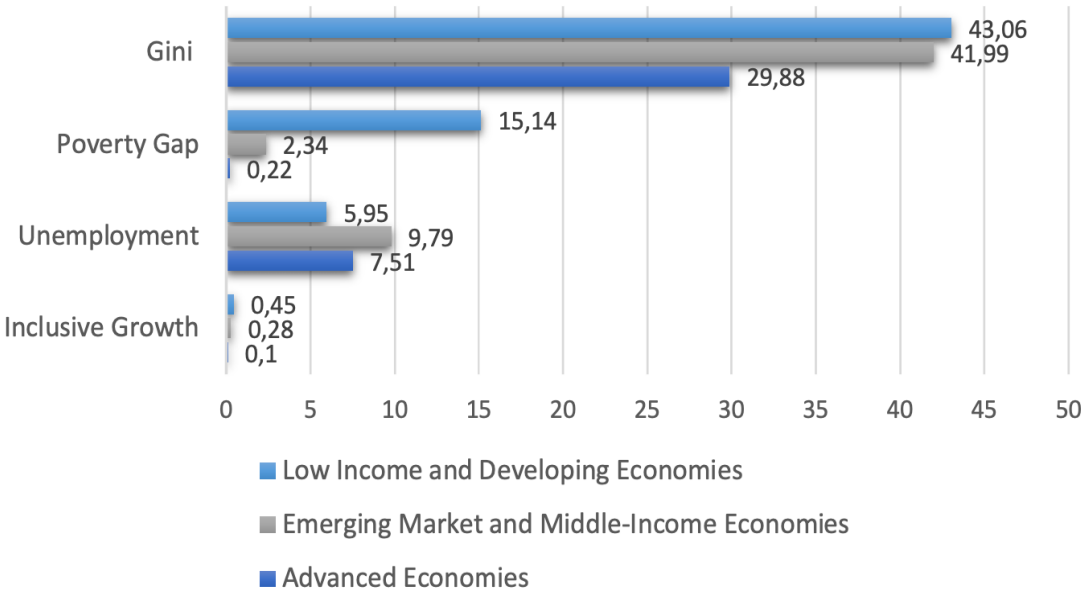
Macroeconomic stability represents an important recipe for growth inclusiveness. Monetary policy can control average inflation and the variability of aggregate demand. Thus, I focus on real GDP and inflation as the indicators of the performance of monetary policy. Besides, as mentioned in precedent studies, macroeconomic policies can have an impact on poverty, inequality, and unemployment, through incurring changes in income growth, and inflation. I use real GDP growth as the cyclical indicator. The measure of inflation is the annual

change in the CPI Index. The policy-related variables used in this study as explanatory variables are based on data from the IMF's International Financial Statistics. Aside from macroeconomic stability, investment in human capital is an important factor for inclusive growth (see Hull, 2009; ECLAC, 2011). The productivity of the labour supplied by the poor is an important determinant of their ability to benefit from the enhanced opportunities (Leite, Tsangarides and Ghura, 2002). Thus, I include as a covariate, human capital development measured by the Human Development Index (HDI). The data on the HDI is sourced from the United Nations Development Programme (UNDP).

The data shows that the best GDP growth performance is recorded in low-income economies while the pace of economic growth is lowest in advanced economies (Table 3.1). The anaemic economic growth may have contributed to the rising unemployment rates in advanced economies. Inflation rates are highest in emerging economies and in comparison, about four times lower in advanced economies. While average unemployment rates are highest in advanced economies, inflation is considerably lower in these countries as well. This strongly suggests that near-zero inflation may not deliver the lowest long-term unemployment rate. It appears the output cost of disinflation is greatest in middle-income economies. The human development index is highest in advanced economies and in comparison, about two times lower in developing economies.

Emerging and developing economies' data show a disconnect between GDP growth and inclusion. This raises questions regarding the quality of growth in these economies in terms of job creation, poverty, and inequality reduction. This suggests that GDP growth may be a necessary but not sufficient condition for achieving broad-based progress in living standards and welfare. Policymakers should not expect higher growth to be a panacea to low living conditions and deteriorating welfare. Inclusive economic progress appears to be correlated with higher levels of human capital development (Table 3.1); economies, where human capital development is higher, also tend to perform well on the inclusive growth index (IGI). This points to the need for greater human-centric investment to ensure that the benefits of growth are more broadly experienced.

Figure 3. 1: Inclusive Growth Trends by Income Group



Note: Average values over the period 2000-2018. The income groupings are based on IMF country classifications.

Table 3.1: Summary statistics, 2000 - 2018

	Advanced Economies	Emerging Market and Middle-Income Economies	Low Income and Developing Economies	Total Sample
IGI	0.10	0.28	0.45	0.29
Unemployment	7.51	9.79	5.95	8.01
Poverty Gap	0.22	2.34	15.14	6.03
Gini Disposable	29.88	41.99	43.06	39.56
Gini Market	46.99	46.62	46.04	46.52
HDI	0.88	0.71	0.49	0.68
Inflation	2.11	8.98	7.09	6.79
Real GDP growth	2.43	4.08	4.56	3.86
Number of Countries	33	64	47	144

Note: This table reports the mean values across the income groups

3.3.2 Methods

The goal of policy is assumed to be the maximisation of inclusive growth (*IG*). Suppose *L* is a vector of the inclusive growth parameters. Based on the measures of inclusive growth defined earlier, higher values of *IG* correspond to lower values of *L*. Thus, over the set of admissible policies, I assume a simple mandate which can be captured by the following approximate welfare (loss) function.

$$L = \mathbb{L}(\pi, x) \tag{1}$$

where π is inflation and x is a measure of economic activity. I indicate economic activity by real GDP growth and represent the average welfare loss per period by the following linear combination of real GDP growth and inflation.

$$L_t = \gamma_1 x_t + \gamma_2 \pi_t \tag{2}$$

Considering the response variables, I augment equation (2) to include other determinants of inclusive growth and specify the short and long-term model as follows.

$$\omega_{it} = \alpha + \delta\omega_{it-1} + \gamma_1 x_{it} + \gamma_2 \pi_{it} + \gamma_3 HDI_{it} + \mu_i + \varepsilon_{it} \tag{3}$$

where the subscripts $i = 1, \ldots, n$ represent the country and $t = 1, \ldots, T$ index the time, α is a constant term, ω represents the response variable (inclusive growth indicators), μ is the unobserved country-specific effects while ε is the remaining disturbance term. HDI is the Human Development Index. The auto-correlation term which is the lagged dependent variable contributes to assessing the long-term effects. Equation (3) is consistently and efficiently estimated by the system GMM[24].

[24]The presence of the lagged dependent variable gives rise to endogeneity problems. The past realization of welfare is likely to be correlated with the fixed effects present in the error term. Again, time-invariant country characteristics (fixed effects) may be correlated with the explanatory variables. Blundell and Bond's (1998) dynamic panel system GMM allows for endogeneity and increases efficiency (Mileva, 2007). According to Blundell and Bond (2000), the dynamic panel system GMM produces significant reductions in finite sample bias by exploiting additional moment conditions. The autocorrelation tests and the Sargan test are used to test for the reliability of the system GMM estimation. An

Following equation (3), the short-term and the long-term coefficients can be recovered as follows:

$$\text{Short-term effect} = \frac{\partial y_t}{\partial x_t} = \gamma_x \quad (4)$$

$$\text{Long-term effect} = \frac{\sum_{t=s}^{\infty} \partial y_t}{\partial x_s} = \frac{\gamma_x}{(1-\delta)} \quad (5)$$

Thus, my approach follows Romer and Romer (1999) and focuses on the short and long-term impacts of economic fluctuations and inflation on poverty, income distribution and unemployment. From equation (3), γ_1, γ_2 and γ_3 respectively capture the marginal effect of current income growth, inflation and HDI on the current welfare, which represent the short-term effects in equation (4). If the coefficient of the auto-correlation term (δ) is significantly positive, the welfare in the past can affect the current welfare. Kang, Chung and Sohn (2013) explain that then the coefficients of the independent variables can affect both current and next period values of the response variable. Thus, the effects of monetary policy on growth inclusiveness will become accumulated along the infinite geometric sequence with the common ratio δ, which is the long-term effect in equation (5).

3.4 Short-run and long-run relationships[25]

Table 3.2 presents the estimated coefficients of the dynamic regressions and the implied long-run effects. The results reported are for the two-step estimations

insignificant AR(2) test shows the absence of second order serial correlation between errors of the first-differenced equation while an insignificant Sargan test proves the validity of the overidentifying restrictions of the dynamic panel data model.

[25] The study of socioeconomic phenomenon is typically plagued by model uncertainty and inconsistent empirical estimates. I attempt to account for model uncertainty by employing all possible combinations of the predictors. The results are robust to different permutations in the explanatory variables. Also, I take cognizance of Ghosh and Phillips' (1998) suggestion to use logged inflation rates (GDP growth rates) to avoid the regression results being distorted by a few extreme observations. Since the sample contains negative inflation and growth rates, I follow Drukker *et al.* (2005); Khan, Senhadji and Smith (2006); Kremer, Bick, and Nautz (2013) to employ a semi-log transformation of the inflation and growth rates (X_{it}) as follows:

$$\widetilde{X_{it}} = \begin{cases} X_{it} - 1, & if\ X_{it} \leq 1\% \\ ln\,(X_{it}), & if\ X_{it} > 1\% \end{cases}$$

and the instrument specification includes 2 maximum lags of the dependent variables. The estimated coefficients are highly significant in all regressions and the solved long-run coefficients on inflation, growth and HDI are all highly significant. The estimation results show that lower inflation and stable economic growth are correlated with lower income inequality, reduced poverty, and improved growth inclusion in both the short and long terms. The effects are quantitatively larger in the long run. This suggests that monetary policy that aims at minimising output fluctuations and restraining inflation is most likely to improve the income of those at the bottom of the distribution and improve growth inclusiveness. A possible hypothesis could be that the policy-related variables respectively wield different impacts on the inclusive growth indicators. The evidence (Table 3.2) shows that apart from inflation, all the variables exert qualitatively, the same impact on all the inclusive growth measures.

Increases in inflation and economic growth are correlated with falls in unemployment. The negative correlation between inflation and unemployment variability appears to be driven by the link between the behaviour of average income and monetary policy. This implies that cyclical expansions over the last two decades have been largely effective in reducing unemployment rates. Inflation reduction improves growth inclusion notwithstanding the significant trade-off between inflation and unemployment. This may indicate that the unemployment effect of price stability is beclouded by the real wage effect on the income of the poor.

The GDP growth coefficient is negative and statistically significant in all the regressions. This finding provides further support for the proposition that an increase in overall economic activity reduces inequality, poverty, and unemployment and is a necessary condition for inclusive growth. Generally, the estimates show that the output elasticities of inclusive growth indicators outweigh the inflation elasticity of inclusive growth measures. This may imply that monetary

where inflation and growth rates below 1 are rescaled for continuity's sake. The estimation with the modified series leaves the results qualitatively unchanged. Thus, I report results with the series in their levels.

policy must stabilise output in the face of adverse shocks to protect the employment and income of the poor. Perhaps, policymakers may have to accept moderate inflation as a trade-off, as may be likely, to protect the well-being of the poor and improve growth inclusiveness.

Table 3. 2: Monetary policy performance and inclusive growth

	Inequality	Poverty	Unemployment	Inc. Growth
Lagged Response Var.	0.857*** (0.002)	0.895*** (0.0003)	0.929*** (0.003)	0.886*** (0.001)
Inflation	0.002*** (0.0001)	0.001*** (0.0001)	-0.003*** (0.0003)	0.001*** (0.0001
GDP Growth	-0.001** (0.0003)	-0.135*** (0.0002)	-0.128*** (0.003)	-0.002*** (0.0001)
HDI	-2.278*** (0.131)	-3.037*** (0.022)	-3.517*** (0.141)	-0.064*** (0.002)
Constant	7.133*** (0.133)	2.993*** (0.017)	3.382*** (0.115)	0.080*** (0.001)
Implied Long-Run Coefficients				
Inflation	0.001*** (0.0004)	0.011*** (0.001)	-0.037*** (0.004)	0.001*** (0.0001)
GDP Growth	-0.006** (0.002)	-1.295*** (0.002)	-1.793*** (0.038)	-0.014*** (0.0001)
HDI	-15.945*** (0.917)	-29.041*** (0.214)	-49.376*** (1.984)	-0.558*** (0.015)
Obs.	2570	2570	2570	2570
N	144	144	144	144
Wald	25244.45	16000	1264.20	12200
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
Sargan	109.71	132.54	120.83	132.51
[p-value]	[0.31]	[0.11]	[0.11]	[0.11]
AR(1) [p-value]	-3.87[0.00]	-2.57[0.01]	-6.38[0.00]	-2.57[0.01]
AR(2) [p-value]	-2.08[0.14]	0.80[0.42]	-2.66[0.11]	0.81[0.42]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level.

The HDI coefficient is negative and statistically significant in all the regressions. The HDI exerts the most quantitative impact on the inclusion indicators. This demonstrates that investment in human capital is a key pillar in the

drive towards inclusive growth. Cloaked with a good level of education and health, the poor can participate in and benefit from economic progress. This points to human development as an important synergy between growth promotion and inclusion. Quantitatively, the impact of economic growth and human development on unemployment and poverty considerably outweighs their inequality effects. Thus, the inclusion impacts of economic growth and human development are largely driven by their declining influences on unemployment and poverty. Also, the inequality effects of economic growth and human development are most likely, chiefly contributed by their tendency to generate employment and improve the income of the bottom of the distribution – the rise in employment and average income will warrant upward mobility on the income ladder.

Clearly, cyclical policies affect inclusive growth indicators through their impact on average income and inflation. The empirical findings stand contrary to previous studies (for example Roemer and Gugerty, 1997; Dollar and Kraay, 2002), which find that once the overall effect of income has been accounted for, the policy environment matters little to the well-being of the poor. The evidence from the sample shows that even after controlling for the effect of economic growth, policies that restrain inflation and improve human capital can directly impact the income of the poor and inclusive growth. These variables improve growth inclusiveness directly, as well as through the economic growth channel[26]. The direct and indirect effects are mutually reinforcing, thus policy towards inclusive growth may not involve significant trade-offs with respect to the twin goals of growth promotion and inclusion. The empirical findings clearly show that reducing unemployment, poverty and income inequality is critical to the drive towards more inclusive growth. Thus, for growth to be inclusive, it needs to be pro-employment, pro-poor and equalising.

[26] Directly, inflation can affect the money purchasing power and the real value of debt to impact the income of the bottom of the income ladder. Indirectly, the disinflation process achieves macroeconomic stability to stimulate investment and enhance long run growth. Human development enhances labour supply and worker productivity, capital accumulation, and technological progress to promote economic growth and inclusion.

Table 3.3: Results for advanced economies

	Inequality	Poverty	Unemployment	Inc. Growth
Lagged Response Var.	1.016***	0.458***	0.904***	0.999***
	(0.003)	(0.005)	(0.005)	(0.008)
Inflation	-0.002	-0.014**	-0.130***	-0.002***
	(0.003)	(0.001)	(0.005)	(0.0001)
GDP Growth	-0.006***	-0.007***	-0.343***	-0.002***
	(0.001)	(0.0001)	(0.007)	(0.0002)
HDI	-1.652***	-1.525***	-22.715**	-0.037***
	(0.211)	(0.036)	(0.774)	(0.004)
Constant	1.032***	1.515***	21.843***	0.034***
	(0.221)	(0.035)	(0.703)	(0.003)
Implied Long Run Coefficients				
Inflation	0.149	-0.026***	-1.358***	-1.806***
	(0.163)	(0.001)	(0.049)	(0.115)
GDP Growth	0.347***	-0.013**	-3.576***	-1.861***
	(0.045)	(0.0002)	(0.068)	(0.151)
HDI	102.299***	-2.813***	-236.519**	-301.874***
	(13.056)	(0.067)	(8.057)	(28.429)
Obs.	594	594	594	594
N	33	33	33	33
Wald	17518.93	41334.29	48590.12	6319.27
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
Sargan	29.96	30.81	31.23	28.07
[p-value]	[0.62]	[0.58]	[0.98]	[0.99]
AR(1)	-3.18	-2.72	-3.43	-3.54
[p-value]	[0.00]	[0.01]	[0.00]	[0.00]
AR(2)	-2.62	0.81	-0.74	-0.59
[p-value]	[0.11]	[0.42]	[0.46]	[0.56]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level.

I test the stability of the coefficients to variations in the sample. How exactly is the impact of the performance of monetary policy distributed across the levels of development? I estimate equation (3) for each income group and Tables 3.3, 3.4, and 3.5 present the estimated coefficients in each case. Across the income groups, there are great deal of variations in the short and long terms performance of monetary policy. Price stability and stable economic growth improve inclusion in emerging and developing economies in both the short and long terms. The coefficients in the regression involving unemployment are remarkably stable

across the income groups. Regardless of the income group, output and price variability have serious implications for unemployment rates – both are negatively correlated with variability in unemployment rates. Cyclical expansion enhances employment generation in most, if not all economies. Price stability improves the income of the poor and enhances inclusion in both emerging and developing economies. Improvement in average income permanently enhances the well-being of the poor, generates more employment opportunities, and promotes greater inclusion in most, if not all countries.

The estimates for advanced economies show that higher inflation is associated with a higher income for the poor, a lower Gini coefficient and improved growth inclusiveness in the short term. In the short term also, higher inflation reduces income inequality in developing economies. These results support the findings by Galli and von der Hoeven (2001) - the effect of inflation on income inequality depends on the initial level of inflation: when initial inflation is low, reducing inflation might come at the cost of higher inequality; but when the initial inflation is high, reducing inflation might decrease inequality. In the sample, average inflation is highest in emerging economies, followed by developing economies and substantially lower in advanced economies. Galli and von der Hoeven explain that in low and moderate inflation economies, inflation is unlikely to create a degree of macroeconomic instability that discourages investment and dampens long-run growth to worsen poverty and inequality. Also, given that nominal wages are downwardly more rigid in advanced economies, a reduction in inflation may imply higher real wages as cuts in nominal wage lag the decline in inflation and lead to worsening unemployment and inequality. Indeed, the evidence from the sample shows that the unemployment cost of disinflation is highest in advanced economies while these countries also stage the greatest output cost of unemployment.

Lower inflation heightens inequality in advanced and developing economies. Thus, the reports of up-ticking debt profiles raise the question regarding the debt profile of the bottom and the top of the income ladder in these economies. Is the rich financing the debt of the poor? One of the usually cited effects of inflation is that it redistributes away from creditors. Lower inflation improves the real value

of nominal assets and liabilities and causes real capital losses for nominal debtors and real capital gains for nominal creditors. If the bottom of the distribution is the nominal debtors, these effects on net, harm them and widen the income gap. In all the economies, the results show that human development engenders inclusive growth, suggesting that social sector spending and public investments in education, training and health permanently improve inclusion.

Table 3.4: Results for emerging economies

	Inequality	Poverty	Unemployment	Inc. Growth
Lagged Response Var.	0.835*** (0.004)	0.799*** (0.001)	0.897*** (0.005)	0.931*** (0.003)
Inflation	0.002** (0.0001)	0.001*** (0.0002)	-0.001** (0.0004)	0.001*** (0.0001)
GDP Growth	-0.005*** (0.001)	-0.042*** (0.0003)	-0.113*** (0.005)	-0.001*** (0.0001)
HDI	-5.069*** (0.294)	-5.466*** (0.079)	-7.848*** (0.418)	-0.025*** (0.002)
Constant	10.439*** (0.328)	4.377*** (0.062)	6.925*** (0.312)	0.037*** (0.002)
Implied Long Run Coefficients				
Inflation	0.001** (0.001)	0.004*** (0.0001)	-0.010** (0.004)	0.001*** (0.0002)
GDP Growth	-0.028*** (0.005)	-0.212*** (0.002)	-1.096*** (0.051)	-0.010*** (0.0002)
HDI	-30.685*** (1.777)	-27.307*** (0.397)	-76.154*** (4.056)	-0.359*** (0.027)
Obs.	1140	1140	1140	1140
N	64	64	64	64
Wald	11255.37	17500	45658.83	35558
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
Sargan	56.28	58.71	55.49	57.89
[p-value]	[0.22]	[0.16]	[0.24]	[0.18]
AR(1) [p-value]	-1.87[0.06]	-2.44[0.01]	-4.45[0.00]	-2.54[0.01]
AR(2) [p-value]	-1.23[0.22]	0.77[0.44]	-0.79[0.43]	0.66[0.51]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level.

Table 3.5: Results for developing economies.

	Inequality	Poverty	Unemployment	Inc. Growth
Lagged Response Var.	1.104***	0.912***	0.782***	0.921***
	(0.015)	(0.003)	(0.002)	(0.006)
Inflation	-0.005***	0.007***	-0.003***	0.001***
	(0.0004)	(0.002)	(0.0002)	(0.0001)
GDP Growth	0.005***	-0.287***	-0.010***	-0.003***
	(0.0003)	(0.004)	(0.001)	(0.0004)
HDI	-0.321*	-4.311***	-4.501***	-0.039**
	(0.169)	(0.359)	(0.063)	(0.013)
Constant	-4.307***	4.263***	3.564***	0.064***
	(0.680)	(0.194)	(0.048)	(0.009)
Implied Long Run Coefficients				
Inflation	0.050***	0.083***	-0.012***	0.001***
	(0.004)	(0.018)	(0.001)	(0.0002)
GDP Growth	-0.052***	-3.244***	-0.046***	-0.043***
	(0.003)	(0.043)	(0.002)	(0.001)
HDI	3.097*	-48.763***	-20.647***	-0.499**
	(1.638)	(4.069)	(0.289)	(0.169)
Obs.	836	836	836	836
N	47	47	47	47
Wald	14604.96	14268.30	47882.28	37757.48
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
Sargan	40.88	43.95	46.69	45.64
[p-value]	[0.79]	[0.68]	[0.57]	[0.99]
AR(1) [p-value]	-2.99[0.00]	-2.00[0.05]	-2.38[0.02]	-1.99[0.05]
AR(2) [p-value]	1.59[0.11]	0.62[0.54]	-1.70[0.19]	0.66[0.51]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level.

In both emerging and developing economies, it appears the improvement in the income of the poor from disinflation, has roughly offset the potential rise in unemployment to improve growth inclusiveness. Growth increases inequality in the short term in developing economies and in the long term in advanced economies. Nonetheless, growth improves permanently, inclusive growth in both high and low-income economies. Instructively, cyclical expansions appear effective in enhancing the conditions of the poor and greater inclusion in most if not all economies. The growth-inequality relationship in advanced economies shows the opposite of the Kuznets' inverted U-curve hypothesis. Notwithstanding,

Kuznets' (1955) ideas may still be at play here: income inequality tends to increase at an initial stage of development and then decrease as the economy develops; however, when income has kept rising and reached a high level, income inequality increases again.

3.5 Threshold Analysis

The foregoing analysis shows no trade-off between inclusive growth and macroeconomic stability objectives of monetary policy. But how much inflation and growth would suffice for greater inclusion? Some previous studies (Bulir and Gulde, 1995; Easterly and Fischer, 2001; Bulir, 2001; Galli and von der Hoeven, 2001) hypothesise a non-monotonic relationship between inflation and the well-being of the bottom of the income ladder. I illustrate the reinforcing effect of policy-related variables on inclusive growth in a cross-country setup in Figures A3.1 and A3.2 (Appendix) and there appears to be preliminary evidence of a non-linear relationship. I test the hypothesised existence of a non-monotonic relationship by estimating a threshold model of the form:

$$\omega_{it} = \mu_i + \delta\omega_{it-1} + \beta_1 q_{it} I(q_{it} \leq \gamma) + \beta_2 q_{it} I(q_{it} > \gamma) + \alpha X_{it} + \varepsilon_{it} \qquad (6)$$

where *I*(.) is an indicator function indicating the regime defined by the threshold variable q (inflation/growth), and the threshold value γ. In this application, the threshold variable also serves as the regime-dependent regressor. The independent regime control variables *X,* include growth/inflation and HDI. All other notations stand as previously defined in equation (3). I follow Kremer, Bick and Nautz (2013), Lay (2020) and Diallo (2020) to estimate the structural equation (6) by the system GMM estimator to allow for endogeneity.

Tables 3.6 and 3.7 respectively, show the results of the inflation and growth threshold effects. The upper part of the table displays the estimated thresholds and the corresponding 95% confidence interval. The middle part shows the regime-dependent coefficients of inflation/growth on inclusive growth. Specifically, β_1 (β_2) denotes the marginal effect of inflation/growth on inclusive growth when

inflation/growth is below (above) the estimated threshold value. The coefficients of the control variables are presented in the lower part of the table.

Table 3.6: Inflation thresholds and inclusive growth

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	2.27	10.49	6.72	5.04
95% confidence interval	[1.63-2.81]	[0.46-12.48]	[0.47-7.53]	[0.47-12.43]
Impact of inflation				
β_1	0.110***	0.062***	0.050***	0.001***
	(0.002)	(0.004)	(0.001)	(0.0001)
β_2	0.001**	0.002***	-0.003***	-0.005***
	(0.0004)	(0.0001)	(0.0004)	(0.0004)
Impact of covariates				
Lag of Response Var.	0.821***	0.936***	0.854***	0.780***
	(0.001)	(0.0004)	(0.001)	(0.001)
Real GDP growth		-0.197***	-0.290***	-0.002***
		(0.0002)	(0.001)	(0.0004)
HDI	-2.604***		-10.055***	-0.206***
	(0.0533)		(0.087)	(0.001)
Constant	8.796***	0.713***	8.922***	0.208***
	(0.056)	(0.007)	(0.072)	(0.001)
Obs.	2570	2592	2570	2570
N	144	144	144	144
Wald [p-value]	22800[0.00]	10800[0.00]	10900[0.00]	58400[0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table 3.7: GDP growth thresholds and inclusive growth

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	6.16	6.21	5.47	6.21
95% confidence interval	[0.01-7.89]	[0.01-7.73]	[4.03-7.87]	[0.01-6.77]
Impact of GDP				
β_1	-0.006*** (0.0003)	-0.233*** (0.0001)	-0.339*** (0.001)	-0.003*** (0.0002)
β_2	0.020*** (0.0005)	-0.132*** (0.0001)	-0.236*** (0.0003)	-0.001*** (0.0002)
Impact of covariates				
Lag of Response Var.	0.859*** (0.001)	0.922*** (0.0002)	0.869*** (0.001)	0.937*** (0.0002)
Inflation	0.001*** (0.0001)	0.001*** (0.0004)	-0.003*** (0.0003)	0.002*** (0.0004)
HDI			-7.668*** (0.099)	
Constant	5.528*** (0.039)	0.938*** (0.005)	7.218*** (0.093)	0.022*** (0.0001)
Obs.	2592	2592	2570	2592
N	144	144	144	144
Wald [p-value]	25100[0.00]	58600[0.00]	29900[0.00]	56900[0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Inclusive growth is a non-linear function of inflation but exhibits a monotonic relationship with economic growth. Economic progress monotonically decreases unemployment, improves the income of the poor, and promotes greater inclusion. However, growth decreases inequality below the threshold only to heighten the income gap above the threshold level to exhibit a U-curve relationship. Lower inflation improves growth inclusiveness; however, inclusion negatively correlates with the inflation transformation when the inflation rates exceed the threshold level (5.04 percent)[27]. The inflation – inclusion relationship appears to be driven largely

[27] The inflation threshold estimates for the respective income groups: advanced economies (1.95 percent), emerging economies (3.42 percent) and developing economies (5.02 percent)

by the non-linear relationship between inflation and unemployment. Unemployment is a non-linear function of inflation consistent with the findings of Wyplosz (2001). The shape of the empirical relationship shows that the rate of unemployment decreases for rates of inflation above the threshold level (6.72 percent).

As observed earlier, the negative correlation between inflation variability above the threshold and inclusion appears to be driven by the long-run nexus between the behaviour of average income and monetary policy[28]. Thus, for monetary policy to have an important impact on inclusive growth and the well-being of the poor in the long run, it must have an important effect on the long-run behaviour of average income and unemployment. In sum, lower inflation decreases monotonically income inequality and poverty, suggesting that price stability is good for the poor. This can be linked to the slower erosion of money purchasing power (real value of monetary assets, real value of unindexed transfers). Besides, a successful disinflation particularly when the initial inflation is high can lead to a reduction in the risk premium and lower real interest rates in the long run, which would benefit net borrowers (the poor) and distribute away from net lenders (who are usually at the top of the distribution).

As a robustness check, I split the sample between advanced, emerging and developing economies. The estimates for the respective income groups (Tables A3.1, A3.2, A3.3, A3.4, A3.5, A3.6 - Appendix) reveal some variations. The inflation – unemployment relationship in developing economies, on the contrary, shows that the permanent trade-off between unemployment and inflation is accentuated at inflation rates below the threshold. This may suggest that in these countries, workers are more averse to actual declines in nominal wages than to reductions in real wages obtained through less than proportionate rise in nominal wages relative to inflation. The inflation threshold estimates of 14.70 percent for developing economies is however significantly higher compared to the estimates of 1.81 percent for advanced economies and 4.27 percent for emerging economies.

[28] The neoliberal view is that monetary easing in the long run tends to accelerate inflation. It appears, moderate inflation may not harm the poor and may not be harmful for growth.

The findings of this paper explain the poor performance of the Philips curve estimates for most advanced economies. This brings to the fore again, the seeming relevance of the initial level of inflation in the relationship between monetary policy and welfare. In high inflation economies, disinflation has welfare gains thanks to improved macroeconomic stability with the associated higher investment and long-run growth and slower erosion in money purchasing power. However, in low inflation countries, the inclusion and welfare gains of disinflation are likely to be minimal, whereas there is some possibility of incurring unemployment costs[29]. This may suggest that the near-zero inflation in most advanced economies, while within the range of acceptability, may not be generating the desired impact on unemployment.

The inequality – economic growth relationship in developing and emerging economies is also at variance with the evidence from the total sample. Economic growth tended to increase income inequality at lower income levels but helped to decrease the income gap when growth exceeded a threshold level to typify the Kuznets' inverted-U-curve hypothesis. One can conclude that loose-paced economic progress could be the reason for the higher level of income inequality among developing and emerging countries.

On average, growth inclusion is much better in countries where monetary policy has kept aggregate demand stable and inflation low. This conclusion is however open to considerable caution: there may be omitted variables that are correlated with the performance of monetary policy that may be the key determinants of inclusive growth. As observed by Romer and Romer (1999), "inflation reduction is often part of a comprehensive package of policies including fiscal discipline, macroeconomic stabilisation and microeconomic linearization". If the package improves growth inclusion, the question of whether it was the other policy changes or a reduction in inflation is of secondary importance. The policy-relevant conclusion is that policies/combination of policies that generate growth,

[29] Akerlof, Dickens and Perry (1996, 2000) challenge the assumption of 'no cost to price stability' and argue that a moderate level of inflation provides some 'grease' to the price and wage setting process. This source of real wage flexibility helps to durably, reduce the natural, or long-run, rate of unemployment.

achieve macroeconomic stability, and improve human development will permanently improve growth inclusion.

The analysis shows that monetary policy can affect inclusion by affecting macroeconomic stability and the pace of job creation. Of course, there are problems (including fiscal indiscipline) that tend to heighten inflation and raise the price at which output is attained; if these are addressed, monetary policy can better support the inclusive growth agenda. Fortunately, the threshold results indicate that the upper range of moderate inflation (12.43%)[30] is not harmful to employment and growth inclusiveness. Macroeconomic stabilisation policy should aim to attain stable economic growth, and this should be complemented by the need to stabilise prices to put an economy on a sustainable and inclusive growth path.

3.6 Conclusion

Inclusive growth concerns have become notable in the crises-plagued world and should be considered in the design of policy responses including the basic elements of a macroeconomic stabilisation policy. Appropriate policies can help fashion greater inclusion by dampening changes in the key variables that negatively affect household incomes and inclusion – prices and average incomes. A macroeconomic policy that increases the overall economic efficiency and is a win-win for inclusion is desirable. In this paper, I evaluate the implications of monetary policy for inclusive growth. Monetary policy shocks can influence inclusion through changes in relative prices, changes in aggregate demand and average income and implied changes in the real returns on net assets.

This paper reaffirms the primacy of improving average income among the actions that can be taken to generate employment, improve the income of the bottom of the distribution and enhance inclusion. Price stability benefits the poor and improves inclusion; thus, in choosing a combination of policies, high inflation should be avoided. The positive impact of price stability on inclusive growth is non-linear. The relative effects of inflation on inclusion are specific to the

[30] The upper range of inflation differs for each income group: advanced economies – 3.72 percent, emerging economies – 13.65 percent and developing economies – 14.71 percent.

economic histories and initial conditions of each economy. In economies where inflation rates are considerably lower, disinflation intensifies inequality and poverty and hurts the inclusion drive. The empirical findings indicate that human development is an important vehicle for inclusion. This implies that there is a role for policies that seek to improve human capital development.

Central banks should choose monetary policy positions to achieve their macroeconomic stabilisation objectives without sacrificing greater inclusion. Inflation pressures should be contained to protect the income of the poor and steer more inclusive growth. However, as soon as a sustainable balance has been reached, policy should be eased to promote efficiency and help offset the worst effects of unemployment on inclusion. Contractions in aggregate demand can severely impact the bottom of the income ladder by reducing the demand for their labour, which is their main asset. The primary goal of monetary policy and indeed all other macroeconomic stabilisation policies should be stable economic growth. To position the economy on a sustainable inclusive growth path, this key policy objective should be complemented by the need to stabilise prices and external balances, given their effects on investment decisions.

The relevant policy implications: inclusive growth is growth that is pro-poor and employment and equity enhancing. In high inflation economies, price stability offers no medium or long-term inclusive growth cost of disinflation. In most, if not all economies, economic progress permanently improves greater inclusion. At this stage, I can conclude that the twin objectives of macroeconomic stability and growth inclusion offer no trade-off. It is obvious that the poor suffer from bad policy-making and sound policy-making also matters for the inclusion agenda.

Chapter 4

Unpleasant Surprises? Debt Reliefs and Risk of Sovereign Default

4.1 Introduction

The Covid-19 pandemic has rekindled interest in sovereign debt crises amidst calls for debt relief for developing and emerging countries. The World Bank and the International Monetary Fund (IMF) have called for the Debt Service Suspension Initiative (DSSI)[31]. The International Debt Statistics (IDS) 2021 report indicates that many countries entered the pandemic with elevated debt levels. The total external debt of the low- and middle-income countries rose by 5.4 percent to $8.1 trillion at end-2019. In many low- and middle-income countries, the ratio of external debt stocks to GNI has increased over the past decade. Almost one-third of low- and middle-income countries had external debt-to-GNI ratios above 60 percent at end-2019, compared with 23 percent in 2010, and in 9 percent of the countries, the ratio exceeded 100 percent. According to the International Debt Statistics 2021 report, the total external debt stocks of low-income countries eligible for the DSSI rose by 9 percent in 2019 to $744 billion, equivalent on average to one-third of their combined gross national income. It appears debt burdens are at unsustainable levels just at the back of two decades of debt relief initiatives championed by the World Bank, in partnership with the International Monetary Fund (IMF) and the international community. The covid-19 pandemic may leave in its wake a new generation of sovereign debt crises. But has debt relief lessened the debt burdens of emerging and developing economies? The objective of this paper is to empirically address this question. In particular, the focus is on the implications of debt relief and institutional qualities for sovereign debt in emerging and developing economies. Emerging and developing economies are confronted with a substantial risk of being awakened by the unpleasant surprise of a wave of debt crisis and it is important to understand which countries are more likely to be affected. An empirical investigation of debt reliefs in terms of the

[31] See Lang, Mihalyi and Presbitero (2021) for a detailed description of the DSSI.

dynamics of sovereign defaults is also a necessary effort for the policy reaction to be as effective as possible.

Eaton and Gersovitz (1981) in their seminal paper, point out the distinction between the 'ability to pay' and the 'willingness to pay' in the sovereign debt discussion. In furtherance, Verma (2002) emphasises the distinction between the 'ability to pay' and the 'willingness to pay' in the research of the determinants of sovereign defaults. Country-specific economic and structural factors influence the ability to honour sovereign debts while political and institutional factors explain the willingness to repay sovereign loans. Thus, various studies examine whether debt and fiscal variables, investments, GDP growth, reserves, interest rates and measures of a country's political and institutional environment play an important role in explaining sovereign defaults (see, for example, Kraay and Nehru, 2006; Cuaresma, Vincelette and Bandiera, 2010; Ordoñez-Callamand, Gomez-Gonzalez and Melo-Velandia, 2017; Ghulam and Derber, 2018; Balima and Sy, 2021; Augustin et al., 2021 and the other studies cited therein). After the global financial crisis, global risk factors and external developments have also become more dominant in explaining sovereign risk (for instance, Gómez-Puig, Sosvilla-Rivero and del Carmen Ramos-Herrera, 2014; Amstad, Remolona and Shek, 2016). Some part of the sovereign default literature evaluates the determinants of market perceptions of default risk rather than the actual default episodes. These studies proxy the default risk using bond prices and investor surveys (see, for example, Reinhart et al., 2003; Uribe and Yue, 2006; Catão and Kapur, 2006). Other topics examined within the sovereign risk literature include the financial sector and vulnerability and crisis-related determinants of sovereign defaults (for example, Reinhart, 2002; Ebner, 2009; Mody, 2009; Borensztein and Panizza, 2009; Caceres, Guzzo and Segoviano, 2010). This strand of the literature dwells on the simultaneous occurrence of banking and currency crises (the so-called "twin crises"). Among these covariates in the sovereign risk equation, the extent and composition of external debt play a central role as an explanatory variable and is usually the object of analysis of most empirical contributions to the determinants

of sovereign default. Although the extant studies find some empirical regularities[32], they by no means settle the debate over the stable and significant determinants of sovereign defaults. Aside from the structural and economic factors, this study investigates the role of political and institutional circumstances in the debtor nation and the implications of debt relief benefits for sovereign risk. The framework also focuses on whether the different forms of debt reliefs exert distinctive impacts[33].

The rising debt distress in some developing and emerging countries is a testament to the lingering concern that despite massive debt relief efforts, the sovereign debt crisis is still unfolding, and sovereign debt markets need close monitoring. Dailami (2010) identifies the hidden dynamics between sovereign and corporate debt and contends that rising sovereign risks represent a major source of policy concern and market anxiety, due to the risk of a negative feedback loop once investors lose confidence in the government's ability to use public finances to provide a safety net to corporations in distress or stabilize the economy. Manasse and Roubini (2009) indicate that the evaluation of the macroeconomic and structural weaknesses leading to sovereign defaults remains unexhaustive and most economists and practitioners struggle to properly appreciate the underlying mechanisms of sovereign defaults. It appears sovereign defaults require to be fully endogenized to produce comparable and more insightful results, and the contribution of this paper is valuable. Also, this paper contributes to the literature on the effects of debt reduction. Existing research documents somehow contrary results. Cassimon *et al*. (2015) find that the Heavily Indebted Poor Countries (HIPC) Initiative increased domestic revenue and investment in Africa. The Multilateral Debt Relief Initiative (MDRI) exerted similar effects but to a lesser degree. Romero-Barrutieta, Bulíř, and Rodríguez-Delgado (2015) analyse Ugandan data for the period 1982–2006 and report that the investment-to-GDP

[32] The probability of sovereign debt distress is explained by the debt burdens, institutional quality indicators, monetary conditions, and macroeconomic fundamentals, such as economic growth and trade openness. The empirical analysis also shows strong relationship between sovereign bond spreads and macroeconomic fundamentals such as debt and debt-related variables, trade openness, risk-free rates, and political risk.

[33] This is imperative as Reinhart and Trebesch (2016) show that the form of the relief is crucial in assessing its consequences.

ratio is sixty percent lower in the presence of debt reliefs while long-run debt and consumption-to-GDP ratios are about twice as high with debt relief than without it. In a later study, Gamel and Van (2018) find that debt reduction increases GDP per capita growth rates and household consumption. They show that debt reduction leads to higher investment in physical capital in both the short run and the long run. I contribute a different angle – I evaluate the possible impacts of the different forms of debt reliefs on the sovereign debt crises.

In analysing the impacts of debt relief on the debt problems of developing and emerging economies, I rely on the intervention theory that debt relief may exert direct and indirect effects on sovereign risk. Directly, debt reliefs may decrease the size of the debt stock, which may lead to a reduction of the debt overhang and lessen recurring debt payments. Indirectly, debt relief may produce a positive impact on economic growth to ease the sovereign debt crises via the following channels: renewed access to international private capital and the release of resources for improved investments. The improved conditions and public debt reduction should increase public spending and coupled with the inflow of private capital, increase investment, stimulate economic growth and impact the sovereign debt conditions of the debtor country. This study is structured around two major themes: first, understanding the forces affecting sovereign defaults and the dynamics of sovereign debt; and second, assessing the implications of the debt relief initiatives, in their different forms, for sovereign debt and risk in different groups of countries.

The model extends the framework on the probability of default by incorporating the receipt of debt reliefs by a debtor country. Doing so allows us to better explain movements of sovereign defaults relating to debt reliefs. I estimate the model via the regular probit regression since the test of exogeneity shows the absence of endogeneity problems in the sample. My framework delivers the joint incidence of debt reliefs and defaults. I establish that default events are associated with debt reliefs. The analysis shows the persistence of defaults in emerging and highly indebted poor countries. Instructively, the evidence suggests that sovereign debt crises and associated policy response of debt reliefs may just underscore self-

fulfilling debt crises. Debt reliefs dampen the creditworthiness of debtor nations and may fuel expectations of the inability to honour sovereign commitment and result in a lower flow of private capital and a worsening of investments and output. This raises questions regarding the optimality of debt reliefs alone in response to debt crises. The analysis shows that growth is fundamental to the debt problem resolution and sound debt management policies and institutions are essential to ensuring debt sustainability and deflating sovereign risks. The framework successfully delivers key empirical features of sovereign default: risk of sovereign default correlates negatively with output and investment and exhibits a positive correlation with the debt burden and cost of funds. I analyse the impacts of the different forms of debt relief and show that debt burdens have become less unsustainable with debt forgiveness than with debt rescheduling. This may suggest that the sovereign debt crises in emerging and developing countries may be a lack of solvency problem rather than a lack of liquidity problem.

4.2 Related literature: Sovereign debt and the risk of sovereign defaults

This chapter builds on a large body of literature on sovereign debts. Several attempts have been made in the literature to identify the risk factors associated with sovereign defaults (see Aguiar and Amador 2014, for the survey of the literature). Typically, the analysis in the literature has focused on the effects and determinants of sovereign debt crises. A strand of the literature models the sovereign debt analysis as a bargaining game between a sovereign debtor and its creditors (for example, Bai and Zhang, 2010; Yue, 2010; Pitchford and Wright, 2012; Bai and Arellano, 2014; and Hatchondo, Martinez and Padilla, 2014). In a related study, Asonuma and Trebesch (2016) focus on the preemptive implementation of sovereign debt restructurings —sovereign debt restructuring before a payment default. Prior to the work by Asonuma and Trebesch (2016), Duggar (2013) and Erce (2013) empirically examined the preemptive and post-default sovereign debt restructurings based on case studies.

The implementation of debt relief programmes occasioned another thread of the literature on sovereign debt. The literature has typically focused on the welfare-enhancing abilities of debt relief initiatives. Bird and Milne (2003) investigate the

economic growth and poverty reduction abilities of debt relief while Omotola and Saliu (2009) explore the development prospects of debt relief. Arslanalp and Henry (2005) question the efficiency of the Brady debt reduction deals and conclude that debt relief can generate large efficiency gains when the borrower suffers from debt overhang. Reinhart and Trebesch (2016) ascertain the economic impacts of debt reliefs and indicate that higher economic growth is associated with debt relief operations, only if these involve debt write-offs. Here, I focus on the potential of debt reliefs to underscore self-fulfilling debt crises. I separate debt write-offs and debt restructuring and empirically assess their potential to resolve the sovereign debt crises.

Is debt relief beneficial or not? The theory is ambiguous. Krugman (1988), Sachs (1990), and Obstfeld and Rogoff (1996) emphasize the potential welfare benefits of debt reliefs in a situation of debt overhang. A reduction in the debt level should support higher growth since an excessive debt stock and the prospect of large future debt repayments act as a tax on domestic investment and subdue the present value of investors' claims. However, related literature suggests that a restructuring can cause reputational damage and trigger sanctions and output losses (for example, Eaton and Gersovitz, 1981; Bulow and Rogoff, 1989; Cole and Kehoe, 1998; Aguiar and Gopinath, 2006; and Arellano, 2008). In addition, Easterly (2002) suggests that debt relief may reduce the incentives to implement economic reforms.

Marchesi and Masi (2021) explain that debt relief could affect a country's prospects in at least two alternative ways. Default involving haircut/restructuring higher may entail more severe reputational costs. On the other hand, the channel of debt relief operates in the opposite direction. Since higher haircuts reduce the level of government's debt more substantially, such debt reduction may allow countries to exit a debt overhang improving in this way economic prospects, as described by Krugman (1988). The overall impact of a debt restructuring on a country's economy is then theoretically ambiguous and remains an empirical question. My results illustrate this trade-off.

4.3 Public Debt in Crises and Debt Reliefs: Historical Statistics

The ongoing Covid-19 pandemic poses unprecedented consequences for government finances and may yet trigger a wave of sovereign defaults. Even before the pandemic, sovereign debts have reached significant heights. According to the International Debt Statistics 2021 report, external debt stocks at end-2019 for 120 low- and middle-income countries passed the $8 trillion mark. Long-term external debt rose by 7 percent from 2018 to $6 trillion, equivalent to 73 percent of total external debt stock. The IDS 2021 report observes that the developments in the external debt of low- and middle-income countries in 2019 took place against the backdrop of a synchronized downturn in the global economy as the pace of GDP growth in low- and middle-income countries decelerated to about 3.5 percent in 2019 from 4.3 percent in 2018. Thus, it appears the explosion in the supply of public debt is happening at a time when sovereign issuers may be experiencing liquidity problems.

The data shows that the number of sovereigns has increased from 126 in 1960 to 215 in 2019 (Fig. 4.1a) while the number of sovereigns in default has increased by over a hundred percent over the same period, reaching 88 at end-2019. The default rates (as percent of all sovereigns) stood at about 41 percent in 2019 compared to the rate of 13 percent in 1960. Between 1988 and 2005, at least 50 percent of sovereigns were in default. Despite the rising number of sovereign defaults, the ratio of sovereign defaults to World GDP has declined substantially from the considerable high of 2.1 percent in the 1980s to 0.3 percent in 2019 (Fig. 4.1b) as the global economy expanded.

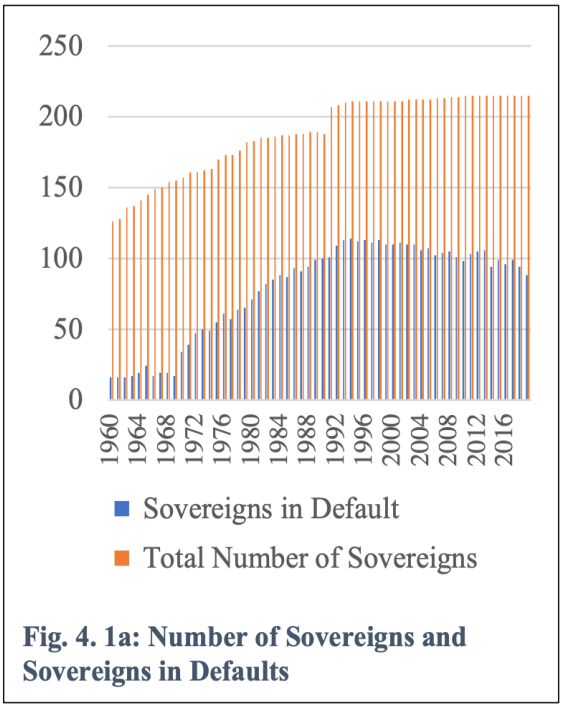


Fig. 4. 1a: Number of Sovereigns and Sovereigns in Defaults

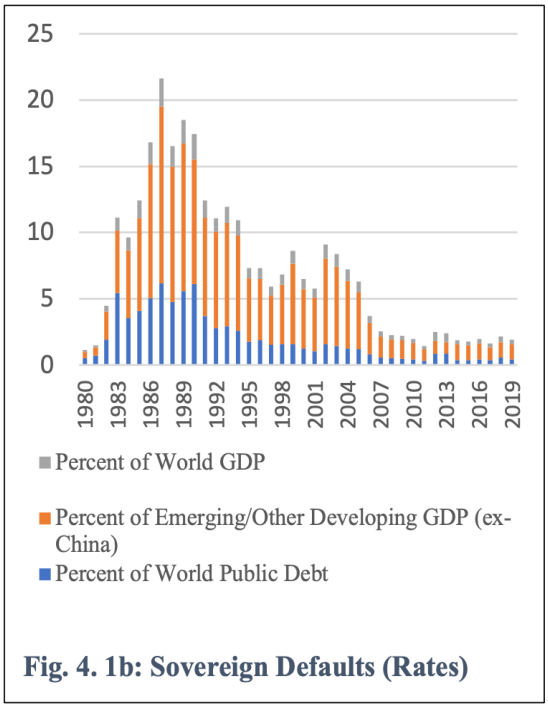


Fig. 4. 1b: Sovereign Defaults (Rates)

Data Source: Bank of Canada and Bank of England Sovereign Default Database

The total amount of sovereign debts in defaults burgeoned in 1982 and has since remained above US$200 billion, reaching a high of US$526 billion in 2013 (Fig. 4.2a). Sovereign defaults up-ticked significantly in 2012 and 2013 on the account of the debt crises in advanced economies, highlighted by the Greek sovereign debt default. The data shows that problematic debt has persisted since the 1980s (Fig. 4.2b). Emerging markets accounted for over 90 percent of sovereign defaults in the early 1970s and at least 80 percent of sovereign debts in defaults were from emerging economies in the 1980s. Generally, sovereign debt crises have involved debts from developing and emerging economies. Advanced economies disappeared from the sovereign debt stress scene in 1966, only to appear again in 2012.

The financial crisis of 2008–09 was perhaps one of the worst crises since the great depression and triggered grave consequences for the global economy and government finances. Notwithstanding, it appears the financial crises did not produce a wave of sovereign defaults, as was feared. Have debt relief initiatives moderated the sovereign debt burdens? Or perhaps most vulnerable countries were

insulated from the turbulence due to low access to financial markets. Cuaresma, Vincelette and Bandiera (2010) contend that most emerging economies, especially in East Asia and Latin America, entered the global financial crisis with substantially reduced debts, consolidated fiscal positions, and accumulated buffer of reserves.

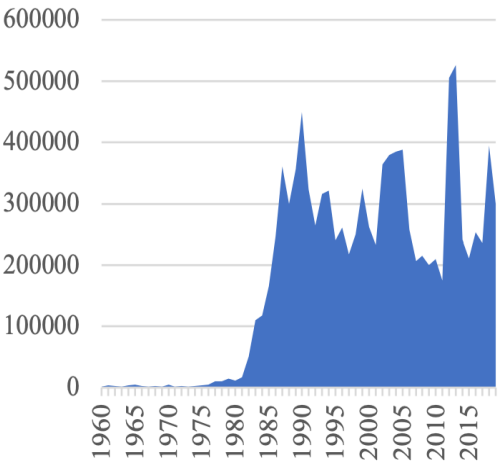


Fig. 4.2a: Total Debt in Default (US$ mil)

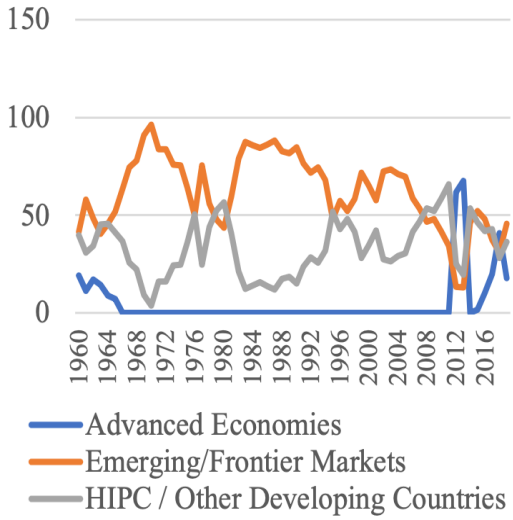


Fig. 4.2b: Total Sovereign Debt in Default (US$ mil) by Economies

Data Source: Bank of Canada and Bank of England Sovereign Default Database

Surprisingly, middle-income economies were the greatest beneficiaries of debt reliefs, both in terms of debt forgiveness and rescheduling (Figures 4.3b and 4.4b). Low-income economies appeared to have benefitted more from debt forgiveness than debt rescheduling. This may suggest that the debt problem in low-income countries was diagnosed as a problem of persistent insolvency rather than a question of temporary illiquidity. The highest amount of sovereign debt written off was recorded in 2005. Countries within Sub-Saharan Africa benefitted the most from debt forgiveness, while countries within Europe & Central Asia and East Asia & Pacific regions counted less among debtor nations that received debt forgiveness (Fig. 4.3a). In terms of debt rescheduling, Latin America & Caribbean nations were the greatest beneficiaries (Fig. 4.4a). The East Asia & Pacific region featured less among the recipients of debt reliefs, while Sub-Saharan Africa and Latin America & Caribbean countries received the greater considerations for debt reliefs.

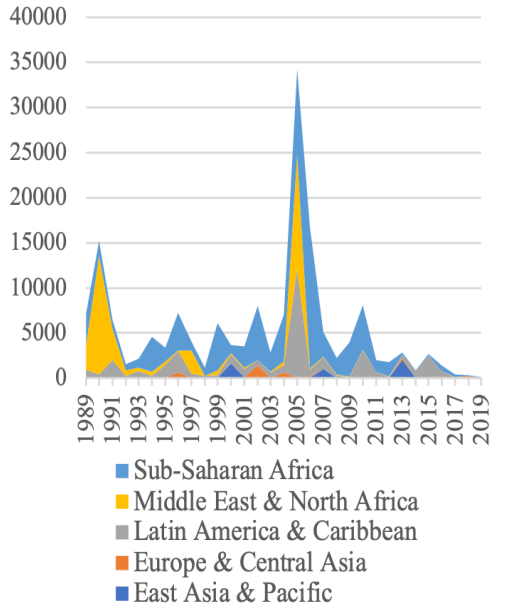


Fig. 4. 3a: Debt Forgiven (US$ mil) by Region

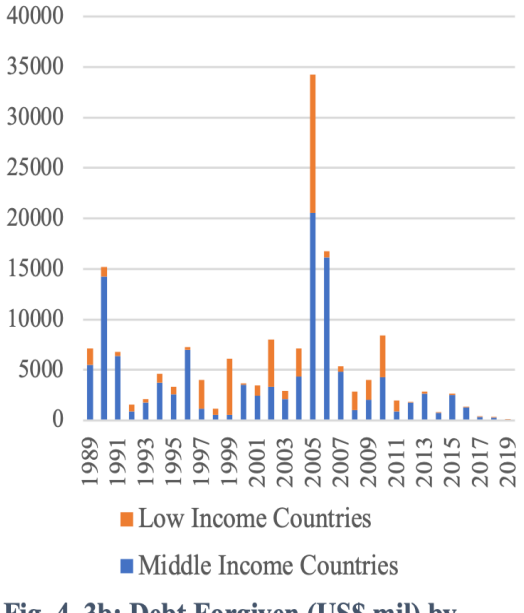


Fig. 4. 3b: Debt Forgiven (US$ mil) by Income Group

Data Source: International Debt Statistics (IDS). High income countries are excluded from the data for the various regions.

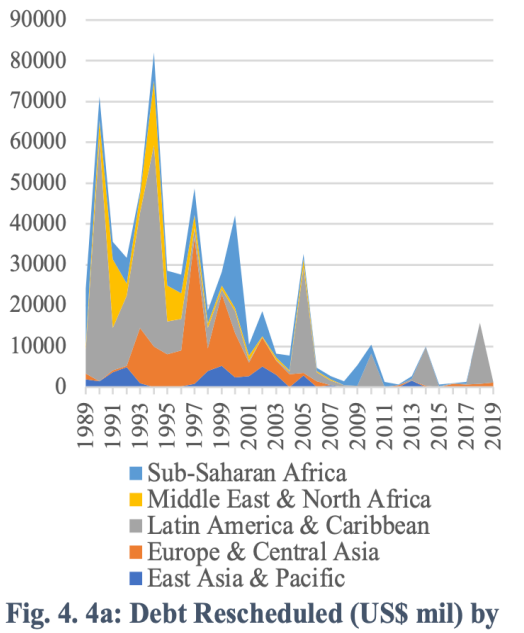


Fig. 4. 4a: Debt Rescheduled (US$ mil) by Region

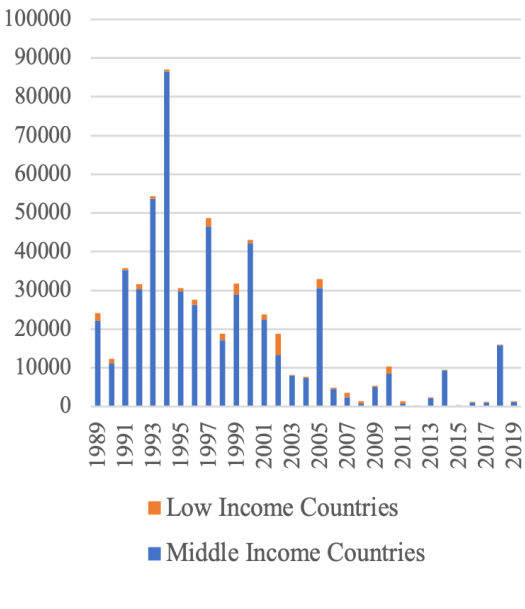


Fig. 4. 4b: Debt Rescheduled (US$ mil) by Income Group

Data Source: International Debt Statistics (IDS). High income countries are excluded from the data for the various regions.

4.4 Empirical Frameworks

4.4.1 Methods

The usual econometric approach used to assess sovereign default determinants is to start by defining a binary variable (y) that takes the value of 1 at default periods ($y = 1$) and 0 in the rest of the sample ($y = 0$). Thus, the dependent variable is taken to be the probability of default. The probit model assumes that the probability of default is related to a vector of variables, X_i $(i = 1, \dots, K)$ and if X_k denotes a group of $k \leq K$ variables from the set X_i, then the model explaining default with this group of covariates is given by[34]:

$$P(y = 1|X_k) = \Phi(X_k\beta) \quad (1)$$

where $\Phi(.)$ is a Gaussian distribution function and β is a vector of parameters to be estimated.

I define the sovereign risk outlook as a function of nine (explanatory) variables. I trace the time path of default episodes relating to debt reliefs by including a measure of debt relief on the right-hand side of equation (1). I gauge that a debtor country received debt relief if the interest or/and principal was forgiven or rescheduled in any given year. The sum of debt forgiven, and debt rescheduled constitutes total debt relief. In the core specifications, debt relief is a binary variable: it is equal to 1 if incidences of debt relief occurred in a given year and 0 otherwise. Some other most common covariates are included, consistent with Manasse and Roubini (2009) and the other studies cited therein. I include external debt/GNI as a summary of the overall debt burden of a country. The growth rate of GDP per capita and total investment (gross fixed capital formation as a ratio of GDP) are included as measures of the repaying capacity of the debtor country. Kraay and Nehru (2006) indicate that including a measure of GDP crudely helps to capture the various shocks, both exogenous and endogenous, that countries

[34] In the framework, I restrict ourselves to linearities in the relationship between sovereign default and its determinants. Manasse, Roubini and Schimmelpfennig (2003) argues that the nonlinearities in the relationship between debt crises and their determinants is better captured by binary recursive tree analysis. Consistent with Kraay and Nehru (2006), my interest is primarily the incidence of distress episodes and debt reliefs rather than their precise timing. Thus, the simple probit specification is adequate.

experience. The CPIA debt policy rating is used to gauge the debt management environment. Political risk is estimated by an index of political stability and absence of violence and is included as a measure of the debtor country's willingness to repay loans. External solvency is linked to a sustainable level of external indebtedness, and this motivates the inclusion of trade openness (proxied by the ratio of exports plus imports to GDP). The average interest rate on new external debt commitments is included as a measure of the cost of borrowed funds. Finally, I include the average maturity on new external debt commitments (in years) as a measure of the refinancing risk or increased uncertainty about the debtor country's ability and wiliness to repay.

Endogeneity issues have generally undermined efforts to identify risk factors associated with sovereign defaults. Most sovereign default models violate the requirement of strict exogeneity as most measures of default risk may influence some frequently included determinants. I suspect that unobservable shocks affecting the probability of default may also affect the decision to offer debt relief. Therefore, I treat debt relief as endogenous and estimate the model via the Instrumental Variable Probit technique (ivprobit)[35]. However, the Wald test of the exogeneity of the instrumented variable shows there is not sufficient information in the sample to reject the null hypothesis of no endogeneity. Thus, a regular probit regression is appropriate for the model. I take cognizance of the possible correlation in the observations and utilise the Generalized Estimating Equation (GEE) population-average estimators to produce consistent estimates[36]. According to Ghisletta and Spini (2004), the GEE is a convenient and general approach to the analysis of several kinds of correlated data. The primary advantage of GEE resides

[35] The ivprobit fits models with dichotomous dependent variables and where one or more of the regressors are endogenously determined. It is applied to a probit model when one or more of the regressors are suspected to be correlated with the error term. By default, ivprobit uses maximum likelihood estimation (Baum et al., 2012). In the ivprobit estimation, I apply the log of the amount of debt relief since the estimator assumes that the endogenous regressors are continuous.

[36] Estimates via the random-effects estimator (a cluster-specific estimator) are not qualitatively different from the population-averaged estimates.

in the unbiased and consistent estimation of population-averaged regression coefficients even when the correlation structure is misspecified.

4.4.2 Data

Emerging market and developing economies have historically been more vulnerable to debt crises than higher-income countries, thus the analysis is based on a data set of 86 emerging market and developing economies[37], comprising annual observations for the period 1990–2019. The sample consists of unbalanced and irregularly spaced observations of debt reliefs and default episodes.

I rely on the Bank of England and Bank of Canada (BoC–BoE) Sovereign Default Database[38] for the data on sovereign defaults. On the regressors' side, I include proxies for the most important determinants of sovereign defaults considered in the literature. Explanatory variables are sourced from IMF's World Economic Outlook (WEO), and the World Bank's International Debt Statistics (IDS) and World Development Indicators (WDI) databases[39]. The measure of political risk was obtained from the International Country Risk Guide (ICRG). The sample excludes the default episodes occurring in the 1980s. This is because the data on debt reliefs were constructed from the IDS data on debt forgiveness and

[37] Table A4.1 (Appendix) presents the details of the countries.

[38] Refer to Beers, Jones and Walsh (2020) for details of the methodology used to construct the database. The BoC–BoE Sovereign Default Database considers that "a default has occurred when debt service is not paid on the due date or within a specified grace period, when payments are not made within the time frame specified under a guarantee or, absent an outright payment default, and in circumstances (*as follows*) where creditors incur material economic losses on the sovereign debt they hold". These circumstances include agreements between governments and creditors that reduce interest rates and/or extend maturities on outstanding debt; government exchange offers to creditors where existing debt is swapped for new debt on less economic terms; government purchases of debt at substantial discounts to par; government redenomination of foreign currency debt into new local currency obligations on less economic terms; swaps of sovereign debt for equity (usually relating to privatization programs) on less economic terms; retrospective taxes targeting sovereign debt service payments; conversion of central bank notes into new currency of less-than-equivalent face value; government domestic arrears not paid on their due dates.
The BoC–BoE database is distinct from and complements the datasets measuring the creditor losses involving private creditors and Paris Club official creditors and nominal value of sovereign debt restructuring agreements published by Das, Papaioannou and Trebesch (2012) and Cruces and Trebesch (2013), respectively.

[39] WEO – Total investment; IDS – External debt/GNI, debt reliefs, interest rate, maturity; WDI – Trade openness, GDP per capita growth, CPIA debt policy.

rescheduling, which were not available for those periods. However, it appears that the sample contains most of all defaults. The data on defaults and debt reliefs did not distinguish between creditors, private or official.

Table 4.1: Summary Statistics (Mean 1990–2019)

Variable	Full Sample	HIPC/Developing countries	Emerging Economies
Sovereign Default	0.89	0.95	0.81
Debt Relief	0.56	0.64	0.44
Debt Forgiven	0.43	0.55	0.26
Debt Rescheduled	0.34	0.39	0.28
External debt/GNI	67.36	76.94	53.51
Total Investment	21.94	20.98	23.40
Trade openness	70.36	68.12	73.53
GDP per capita growth	1.67	1.44	1.99
CPIA debt policy	3.36	3.35	3.47
Political risk	0.68	0.65	0.71
Average interest rate	2.90	1.88	4.31
Average maturity (years)	24.56	29.09	18.66
Number of Countries	86	51	35

Note: The country classifications are based on IMF income group classifications

Unsurprisingly, the summary statistics (Table 4.1) show that default episodes occurred more frequently in HIPC and developing economies than in emerging economies. Emerging economies were offered more debt rescheduling than debt forgiveness while the reverse occurred for HIPC and developing economies. Overall, HIPC and developing economies benefited more from debt reliefs. Emerging economies were less indebted and performed better in terms of trade openness, investments, debt management, economic growth, and political stability. Emerging countries paid higher interest on borrowed funds and for relatively shorter maturities. This is contrary to the conventional view that debtor countries usually would have to pay a higher premium on long-term debts.

4.5 **Empirical Results**[40]

The results of the probit estimations are presented in Table 4.2. The results suggest that default events are persistent and debtor nations receiving debt reliefs are at greater risk of sovereign default. The current structure of debt reliefs may come at the cost of making it more tempting to default, which reduces the country's welfare overall. This may imply that while debt reliefs initiatives may be credibility-inducing[41], they can produce perverse effects contrary to expectations. Ordinarily, debt relief programmes may be a tempting action to reduce the cost of default to a debtor country. However, it appears the initiative may come at a cost of less favourable access to credit and potentially breeds further defaults. The international credit markets may perceive debt relief actions as creating an incentive for that country, as well as other countries, to default in the future, raising the interest rates charged on sovereign borrowing.

I separate debt forgiveness and debt rescheduling to evaluate their respective impacts on default episodes. Both debt forgiveness and debt rescheduling exhibit a strong positive co-movement with sovereign defaults. However, the estimates show that debt rescheduling improves the significance of debt policy and maturity in explaining the risk of sovereign defaults. Longer maturities increase the risk of default while improved debt management reduces the sovereign risk. The link between the maturity structure of sovereign debt and debt crises has generally underscored the urge for governments to increase the maturity of their debts. It is argued that shorter and more concentrated debt maturities increase the risk of default as short-term liabilities pose greater vulnerabilities to the economy. Besides, restructuring the debt portfolio towards the shorter end of the term structure may also reduce the refining risk arising from the exposure to sharp increases in interest rates. However, lengthening the maturity may come at a cost since longer-term debts require a higher premium that may reflect uncertainties

[40] Lagging debt relief measures by one period leaves the results qualitatively unchanged, so I report the contemporaneous relationships. A test of granger causality between sovereign default and debt relief shows the standard reverse causality problem.

[41] The public good nature of debt relief means that the offered debt relief by a creditor reduces its claims on a debtor country, thus, improving the value of all other claims.

about the debtor nation's ability and willingness to repay. Shifting the maturity structure towards the longer end of the yield curve increases repayment uncertainties and heightens the risk of sovereign default.

The empirical evidence shows that strong public debt management institutions and policies are important in public debt sustainability and mitigating the risk of sovereign defaults in low and middle-income countries. This result implies that developing and emerging countries need to strengthen crucial areas of debt management, to reduce sovereign risk and ensure debt sustainability. Wasteful policies hurt economic growth and investments and adversely impact the country's ability to repay its debts. Easterly (2002) concludes that poor policies have neutralized past debt-relief efforts and have resulted in high debt accumulation. This finding suggests that offering debt reliefs to countries with bad debt management policies would exert little or no impact at all on their debt sustainability.

External solvency is linked to a sustainable level of external indebtedness and factors that affect it such as trade openness. It is believed that a low degree of openness can increase the probability of external default by affecting the trade surplus. Consistent with conventional expectations, the estimation shows trade openness correlates negatively with the risk of sovereign default. Nonetheless, it is not significant in any of the regressions, casting doubt on the dominance of global factors in explaining the risk of sovereign defaults. Also, the evidence from the sample does not support the hypothesis that political stability improves the willingness to pay and reduces the risk of default. Consistent with Verma (2002), the findings show that political considerations affect the decision to default but countries with stable democracies exhibit a greater probability of default.

Idiosyncratic factors including debt burdens, economic growth, investments, and the debt management environment appear as important factors explaining sovereign risk. Macroeconomic stabilities play a key role in explaining differences in sovereign default probabilities. Based on these results, the key factors to avoiding sovereign defaults include reduced debt burdens and improved economic

growth. This raises concerns that the more protracted the Covid-19 pandemic, the higher the risk of sovereign default.

Table 4.2: Sovereign defaults and debt reliefs (Probit model)

Variable	(1)	(2)	(3)
Debt Relief	1.266***		
	(0.318)		
Debt Forgiven		1.199***	
		(0.319)	
Debt Rescheduled			1.366**
			(0.607)
External debt/GDP	0.013*	0.013*	0.017**
	(0.008)	(0.008)	(0.009)
Trade Openness	-0.004	-0.003	0.005
	(0.006)	(0.005)	(0.058)
GDP per capita growth	-0.063*	-0.068**	-0.069**
	(0.033)	(0.032)	(0.033)
Total Investment	-0.028**	-0.029**	-0.028**
	(0.014)	(0.014)	(0.013)
CPIA debt policy	-0.209	-0.178	-0.342*
	(0.189)	(0.184)	(0.185)
Political risk	3.359**	3.199**	3.469**
	(1.579)	(1.493)	(1.426)
Interest Rate	0.04	0.045	0.065
	(0.088)	(0.081)	(0.085)
Maturity	0.022	0.020	0.031*
	(0.017)	(0.081)	(0.017)
Wald [*p-value]*	52.92[0.00]	54.75[0.00]	65.15[0.00]
N	86	86	86

Note: The dependent variable is the probability of default. Standard errors are in parentheses. *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

4.5.1 Sensitivity and robustness checks

I test the sensitivity of the results using an alternative specification of the dependent variable. I use a basic log model as follows:

$$logs_{it} = \sum_{k=1}^{K} \beta X_{it} + \varepsilon_{it} \quad (2)$$

In this representation, the dependent variable is the log of the amount in default, X is a vector of the explanatory variables, β is a vector of parameters to be estimated

and ε represents the idiosyncratic errors. Again, I estimate the coefficients via the population-averaged estimator. The results of the log model are presented in Table 4.3. I find that the results on the debt reliefs variables remained unaltered. Debt relief measures are positively correlated with the risk of sovereign default. Thus, the empirical results are robust to an alternative specification of sovereign risk. This set of estimations conforms with the probit estimations, which find that global factors play a much less important role than local factors in determining the risk of sovereign defaults. An increase in the debt burden increases sovereign defaults while improved debt management policy decreases the risk of sovereign defaults, emphasising the importance of the debt management environment and sustainable debt levels in moderating the sovereign debt distress. Longer maturities increase the rate of sovereign defaults to underscore the relevance of uncertainties of future repayments in predicting the risk of sovereign defaults. The specification involving forgiveness as the form of debt relief shows a significant coefficient for interest rate, suggesting that debt forgiveness may heighten the cost of future funds from the international capital market and lead to sovereign defaults.

The analysis involving HIPC and other developing economies: I estimate the core specification for HIPC and other developing countries. The results of the regressions of the various forms of debt reliefs and the structural variables and institutional and political variables on the probability of default are summarised in Table 4.4. The results are not qualitatively different from the analysis involving the full sample. Debt reliefs co-move positively with the risk of sovereign default; however, the coefficient for debt rescheduling is statistically insignificant. Debt burdens worsen the risk of sovereign default while economic growth and total investments decrease the sovereign risk. Enhanced debt policy and institutions are important in alleviating sovereign debt distress in low-income countries. The results show that political risk, interest rates and maturities co-move positively with the probability of sovereign defaults in developing countries. Concerning openness, although insignificant, the results show that openness may be associated with better economic performance and therefore lower sovereign defaults. The effects of debt reliefs, debt burdens, debt policy, shocks (proxied by GDP growth

and investment), cost of funds and uncertainty of repayments (shown by maturities) are larger for HIPC and developing countries than the full sample.

Table 4.3: Sovereign defaults and debt reliefs (Log model)

Variable	(1)	(2)	(3)
Debt Relief	0.251*** (0.069)		
Debt Forgiven		0.287*** (0.069)	
Debt Rescheduled			0.285*** (0.068)
External debt/GDP	0.010*** (0.002)	0.009*** (0.002)	0.008*** (0.002)
Trade Openness	0.003 (0.002)	0.003 (0.009)	0.003 (0.002)
GDP per capita growth	0.004 (0.009)	0.003 (0.009)	0.003 (0.009)
Total Investment	-0.003 (0.005)	-0.002 (0.005)	-0.003 (0.005)
CPIA debt policy	-0.172** (0.072)	-0.166** (0.071)	-0.157** (0.072)
Political risk	2.224*** (0.072)	2.143*** (0.502)	2.206*** (0.499)
Interest Rate	0.045 (0.030)	0.051* (0.029)	0.042 (0.029)
Maturity	0.015*** (0.006)	0.015*** (0.006)	0.017*** (0.005)
Wald [*p-value]*	303.35[0.00]	306.35[0.00]	302.26[0.00]
N	86	86	86

Note: The dependent variable is the log of amounts in default. Standard errors are in parentheses.
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 4.4: Sovereign defaults and debt reliefs (HIPC / Other developing countries)

Variable	(1)	(2)	(3)
Debt Relief	1.385***		
	(0.391)		
Debt Forgiven		1.303***	
		(0.392)	
Debt Rescheduled			1.945
			(1.440)
External debt/GDP	0.019*	0.019*	0.024**
	(0.010)	(0.009)	(0.011)
Trade Openness	-0.007	-0.006	-0.004
	(0.006)	(0.006)	(0.006)
GDP per capita growth	-0.061	-0.068*	-0.070*
	(0.041)	(0.040)	(0.040)
Total Investment	-0.035**	-0.035**	-0.029*
	(0.016)	(0.015)	(0.016)
CPIA debt policy	-0.333	-0.295	-0.516**
	(0.233)	(0.226)	(0.227)
Political risk	4.129**	3.823**	4.376**
	(2.001)	(1.872)	(1.777)
Interest Rate	0.039	0.049	0.064
	(0.110)	(0.101)	(0.105)
Maturity	0.030	0.030	0.042**
	(0.021)	(0.020)	(0.019)
Wald [*p-value]*	55.00[0.00]	57.58[0.00]	68.61[0.00]
N	51	51	51

Note: The dependent variable is the probability of default. Standard errors are in parentheses. *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

The core specification is not estimated separately for emerging economies due to insufficient observations. Notwithstanding, I employ bivariate relationships to facilitate comparisons between these two groups (Figures A4.1a and A4.1b, Appendix). Debt reliefs co-move positively with sovereign default for the two groups of countries. The relationship between debt rescheduling and sovereign defaults generates largely the same slope for both emerging and developing countries. In terms of debt forgiveness, the slope is steeper for emerging economies than for developing countries. The intercepts appear much larger for HIPC and developing countries than for middle-income countries in both cases of debt forgiveness and rescheduling. This may suggest that other factors other than debt

reliefs explain the debt distress in low-income countries than in emerging economies. Differences in the probability of sovereign debt distress may be explained largely by structural factors such as macroeconomic fundamentals, debt burdens and institutional quality indicators.

4.5.2 Debt Sustainability and Debt Relief:

Aside from the direct impacts of debt reliefs on the risk of sovereign defaults, I investigate the extent to which debt reliefs affect the debt burdens, economic growth, and flow of capital to influence the risk of debt distress. First, I examine the impact of debt reliefs on the debt sustainability situation by looking at the possible effects on debt burden and payment obligations via bivariate relationships.

Did debt reliefs produce large reductions in the debt burden? The data (Figures 4.5a and 4.5b) shows a tendency for both lower- and middle-income countries to exit debt relief programmes more highly indebted. Among both groups of countries, debt forgiveness and rescheduling correlates positively with increases in debt to GNI ratio. The increases were especially large in HIPC and developing economies and debt rescheduling produces the biggest impact in these countries. It suggests that debt relief initiatives do not always successfully reduce a country's long-term debt burden. There is the likelihood that new loans are procured which may exceed the amount of debt forgiven. Debt reliefs may induce an incentive effect that broods on the knowledge that debt may be restructured which may lead to careless and inefficient borrowing by governments. The question of adverse selection problems also arises, to the extent that countries with wasteful and bad policies and economic management are offered more debt reliefs chiefly because of their unsustainable debt built up.

Also, debt reliefs did not reduce the flow of debt payments. This may imply that debt reliefs do not guarantee improved fiscal space and increased public spending. All things being equal, it appears debt relief improves the sustainability of debt burdens in emerging economies than HIPC and other developing economies. In both groups of countries, debt forgiveness tends to lighten the debt service obligation than debt rescheduling (Figures 4.6a and 4.6b). Indeed, the evidence (Figures A4.2a and A4.2b, Appendix) shows that debt forgiveness

decreases the country's exposure to refinancing risk and allows debtor countries to lengthen their debt maturities and spread out the expiration period of their debt across an extended time. Given that maturity-choice behaviours exhibit refinancing risk concerns, debt rescheduling did not improve the countries' exposure to refinancing risk and for emerging economies, debt rescheduling heightens the refinancing risk concerns. Debt burdens have become less unsustainable with debt forgiveness than with debt rescheduling; albeit the debt stocks and payment obligations have hardly reduced because of debt reliefs. The prospects of debt reliefs ensuring long-term debt sustainability look bleak given the likelihood of new debts building up in debtor nations.

This result may give credence to the theoretical possibility of self-enforcing debt crises advocated by Calvo (1988). In this case, indebted nations build up more debts in what appears to be debt endogenously breeding more debts. This may suggest that default episodes may be self-inflicting, making the debt overhang problem persistent. Indeed, the question of moral hazard tendencies also arises – recipients of debt reliefs engage in irresponsible borrowing in anticipation of more debt reliefs. Also, the results may suggest that far fewer debt reliefs were offered to the debtor countries than they required. Perhaps, the debt problem was also inappropriately diagnosed (insolvency problem rather than temporary illiquidity problem), and the debt reliefs were offered in an inappropriate form (debt forgiveness instead of rescheduling). Overall, debt rescheduling leads to large increases in indebtedness than forgiveness in emerging and developing countries.

Figure 4.5a: Debt forgiveness and debt burdens

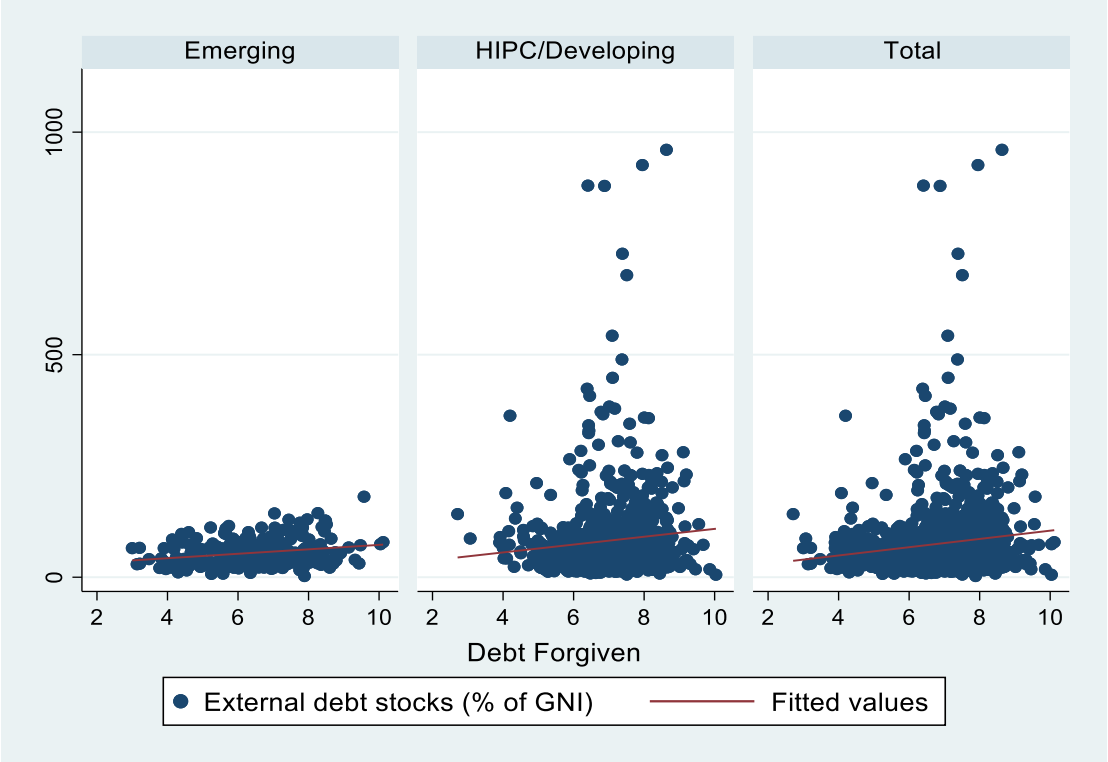


Figure 4.5b: Debt rescheduling and debt burdens

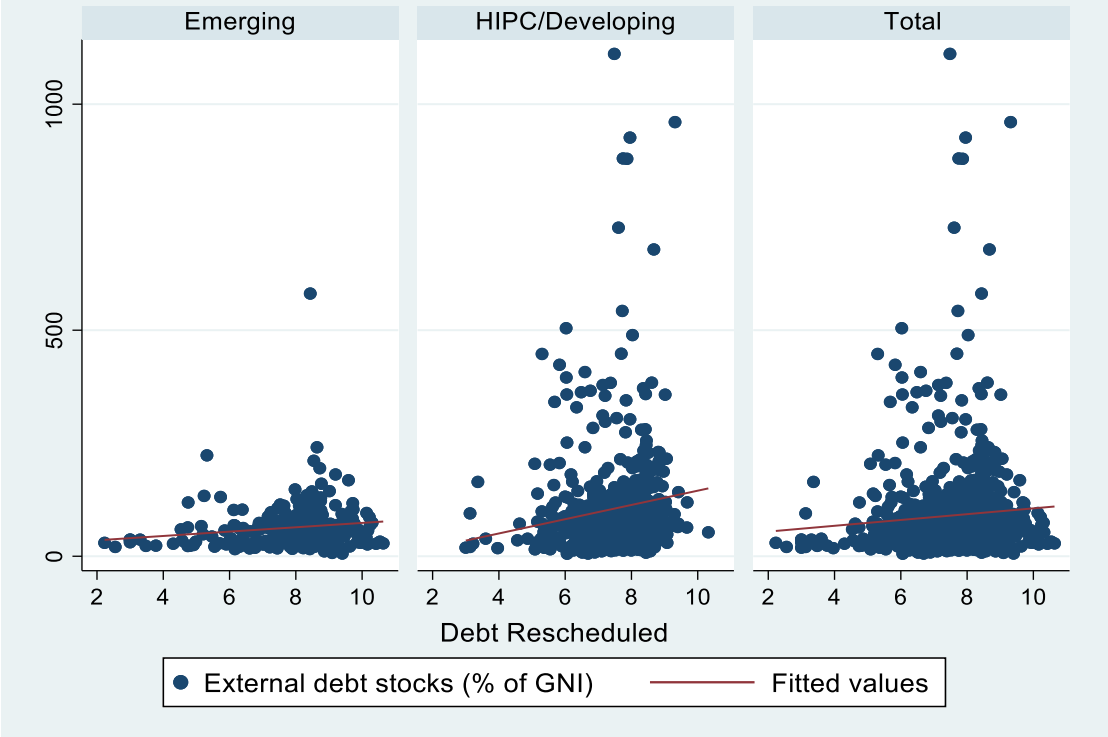


Figure 4.6a: Debt forgiveness and debt payments

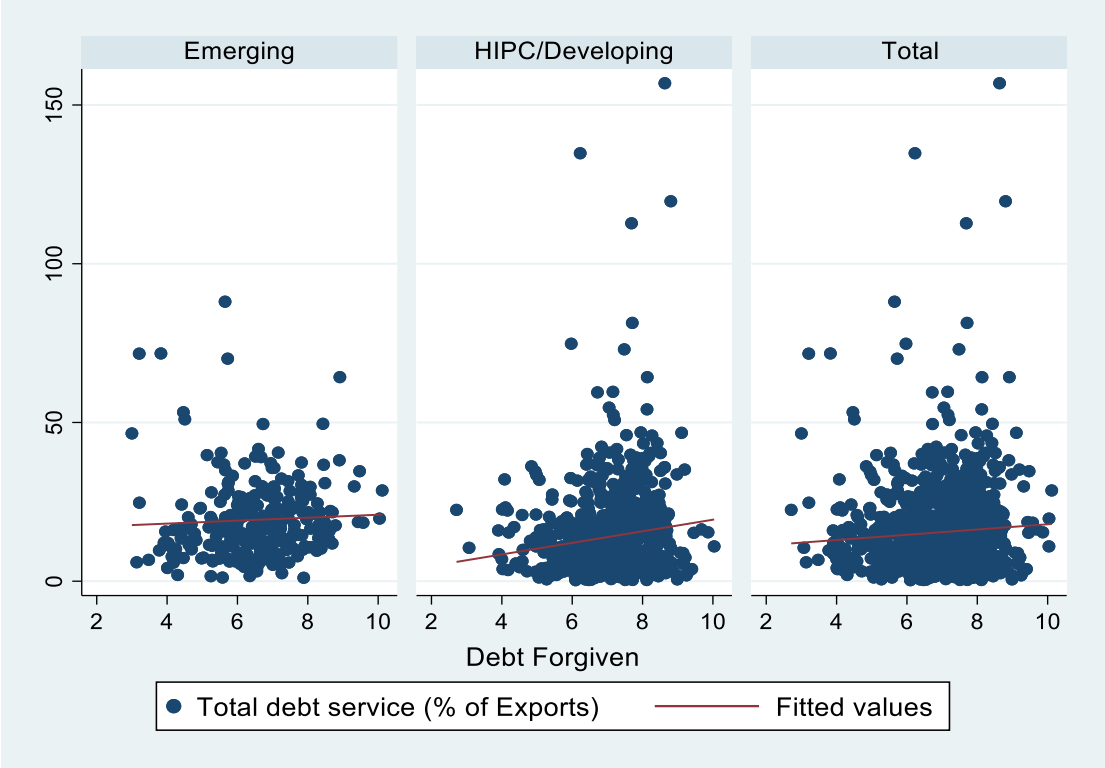
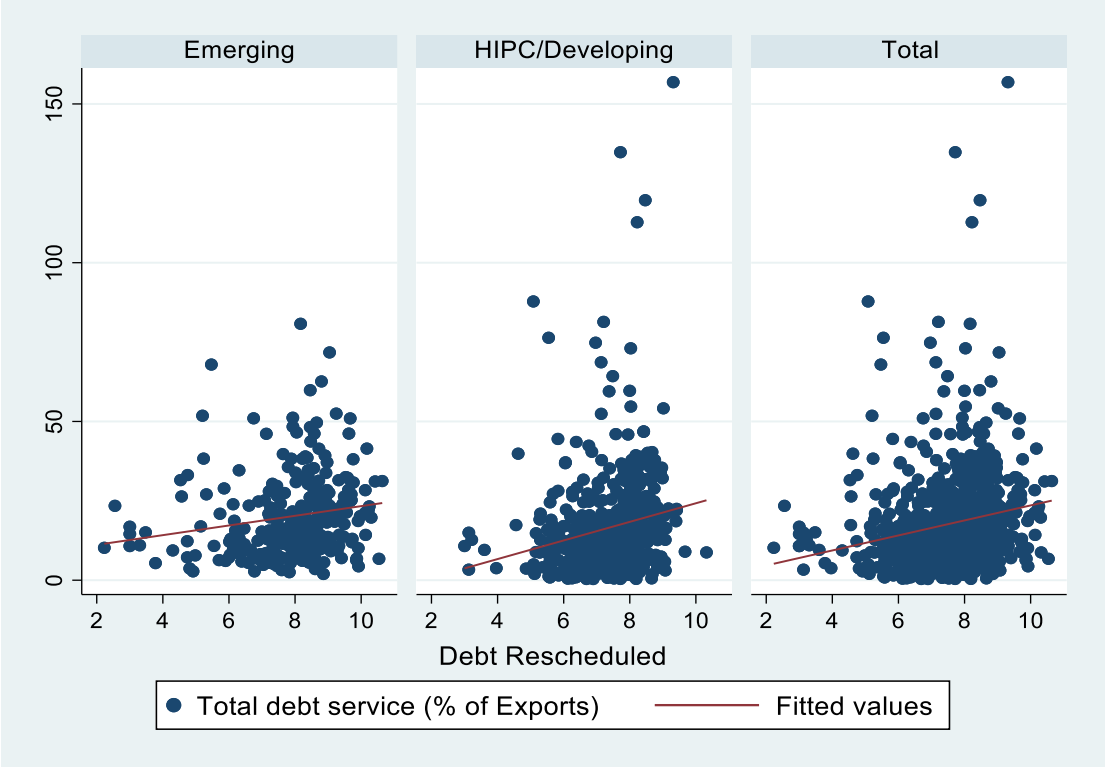


Figure 4.6b: Debt rescheduling and debt payments



4.5.3 Debt reliefs and economic growth:

I examine whether there are potential effects of debt reliefs traceable in the form of improved economic growth. A bivariate relationship does not attest to a positive effect of debt reliefs on economic growth (Figures 4.7a and 4.7b). The evidence raises concerns regarding the prospects of debt reliefs to improve economic progress and welfare over time. The results corroborate the conclusion by Sachs (2002) that debtor nations were offered just enough reliefs to enable them to defray their obligations to primary creditors, but not enough to grow their economies. Regarding the forms of debt relief, debt forgiveness offers more favourable prospects and appears to increase with GDP per capita growth in emerging economies. Debt rescheduling on the other hand depresses GDP per capita growth in both emerging and developing economies.

It is expected that debt reliefs would moderate the debt overhang problem and lessen the distortions in investment decisions. I evaluate the impacts of debt reliefs on total investment. The data shows that total investments did not improve with debt reliefs (Figures 4.8a and 4.8b). Both debt forgiveness and rescheduling tend to depress total investments and the effect appears more pronounced with debt rescheduling. The evidence also shows that debt reliefs decrease investments more in emerging economies than HIPC and other developing countries. Debt reliefs may not result in a substantial reduction of the debt burden facing a country and the debt overhang problem may persist. Thus, volatility in debt payments may not reduce and uncertainty regarding future payments may persist. This may lead to underinvestment in the debtor country and frustrates recovery from the debt crises.

Figure 4.7a: Debt forgiveness and economic growth

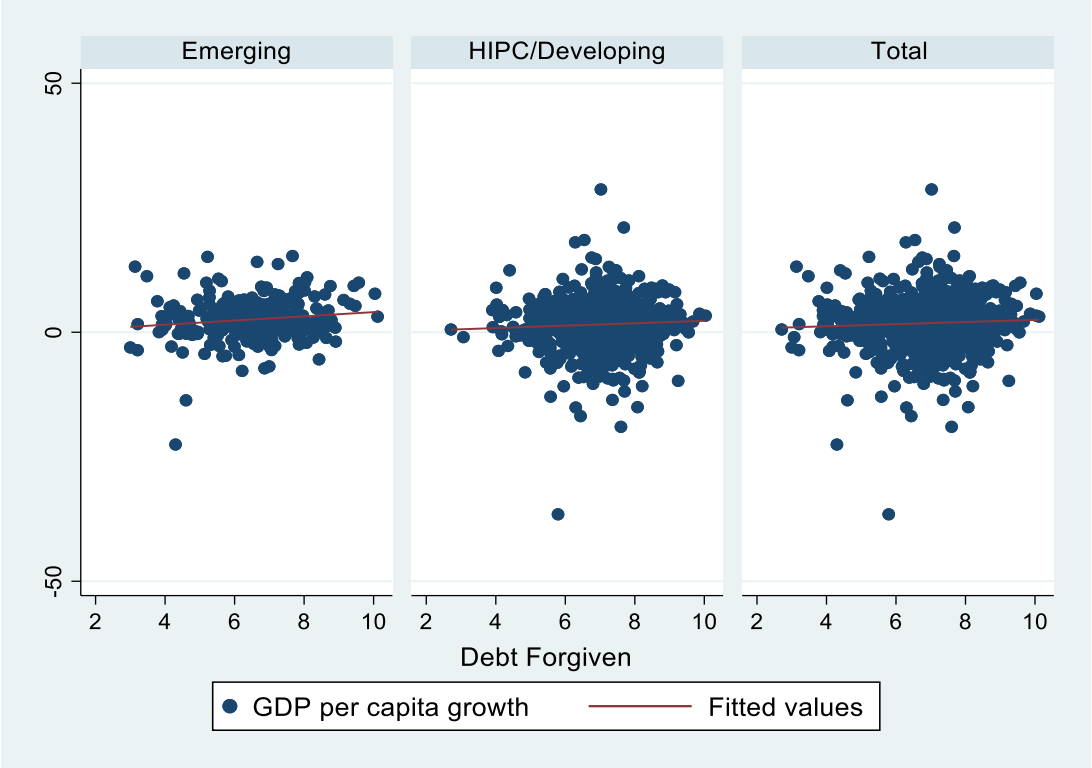


Figure 4.7b: Debt rescheduling and economic growth

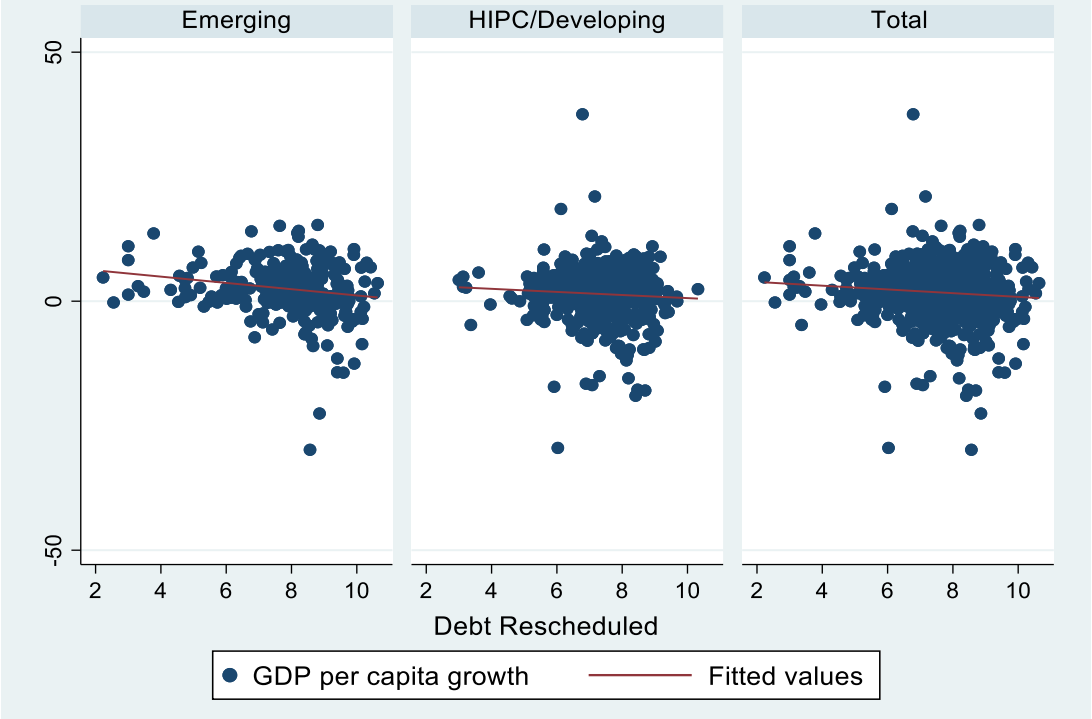


Figure 4.8a: Debt forgiveness and total investment

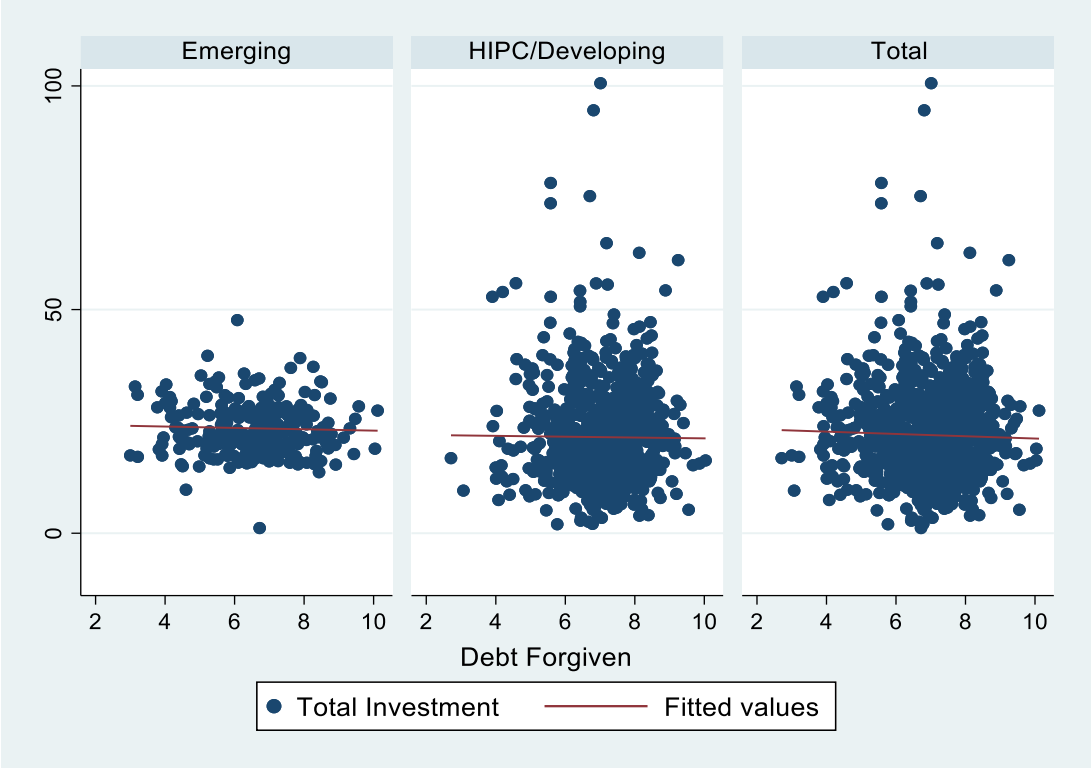
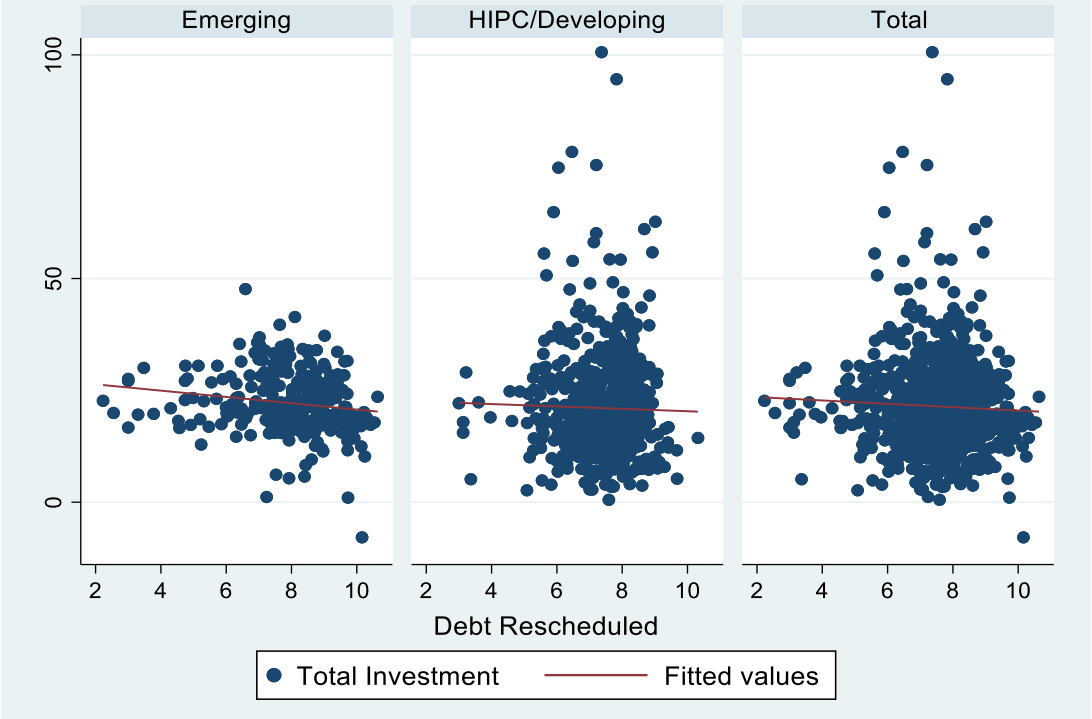


Figure 4.8b: Debt rescheduling and total investment



4.5.4 Debt reliefs and access to credit

Debt overhang may inhibit access to new credit and leaves the debtor country even more vulnerable to crisis. I examine the prospect of debt reliefs improving credit flows to the indebted countries. The evidence shows that debt reliefs do not cause an inflow of new private capital (Figures 4.9a and 4.9b). This finding casts doubts on the clout of debt reliefs initiatives to improve indebted countries' creditworthiness. The finding corroborates the fact that the level of indebtedness to private creditors may decline following debt reliefs. This does suggest that private creditors are usually able or/and the first to detect the insolvency problems of debtor nations. The reduction in private capital flows is graver in HIPC and other developing countries while greater reductions in the private capital flow are associated with debt forgiveness than debt rescheduling. For emerging economies, private credit flows tend to increase if the debt relief takes the form of rescheduling.

New creditors are not just reluctant to lend to a country receiving debt reliefs, it appears new funds are offered at a higher cost (Figures A4.3a and A4.3b, Appendix). Consistent with Eaton and Gersovitz (1981), I find that debt reliefs may damage the debtor's reputation for repayment and hike its future cost of funding from international capital markets. Greater increases in the cost of new funds are associated with debt rescheduling than debt forgiveness. These results appear to underscore a self-fulfilling debt crisis. In what Calvo (1988) describes as the perverse outcome of a snowball effect, the endogenous fear that debt can become unmanageable leads to unmanageable debts. Debt reliefs hurt the creditworthiness of debtor nations and increase the uncertainty of future repayments. This results into a lower flow of private capital which consequently worsens investments and output to increase the risk of sovereign default.

These results suggest that the risk of debt distress is greatly considered by private creditors in the decision of resource transfers to middle and low-income countries. The scale-down of capital flows should be of particular concern since it may lead to a slowdown in productive investments in debtor countries and potentially compound the debt crises. The reduction in flows from private capital should be associated with official lending (more importantly, concessional

financing) to low-income countries to forestall any shortfall in resources for investments and worse cases of debt distress.

Figure 4.9a: Debt forgiveness and private credit flows

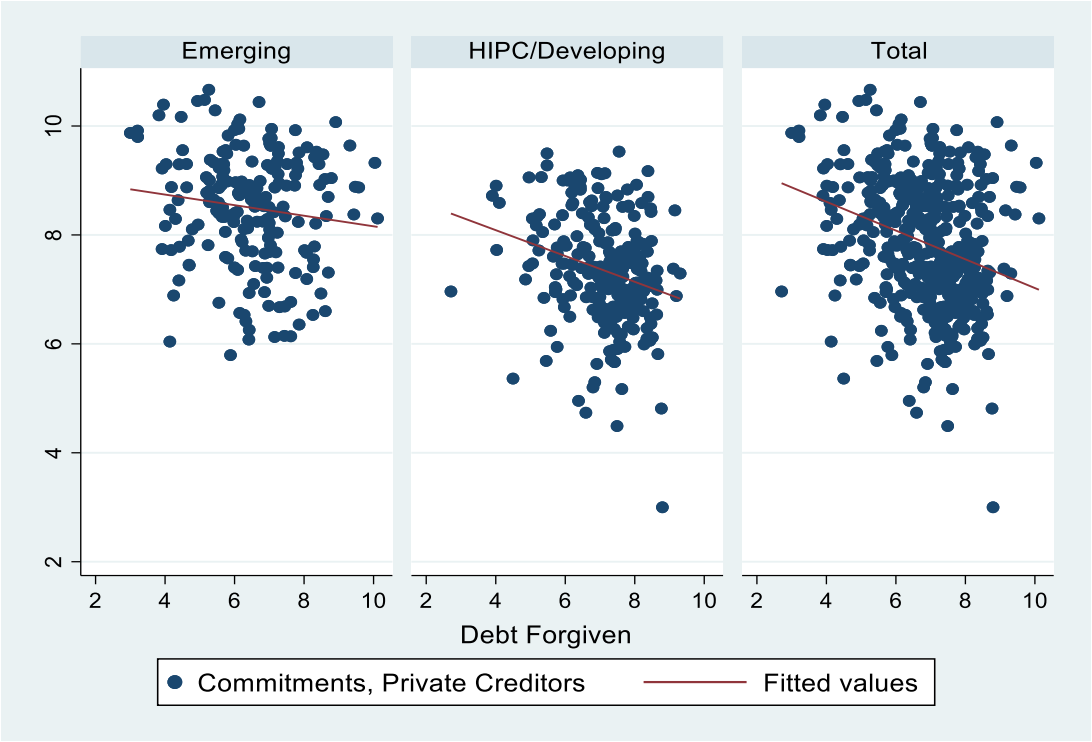
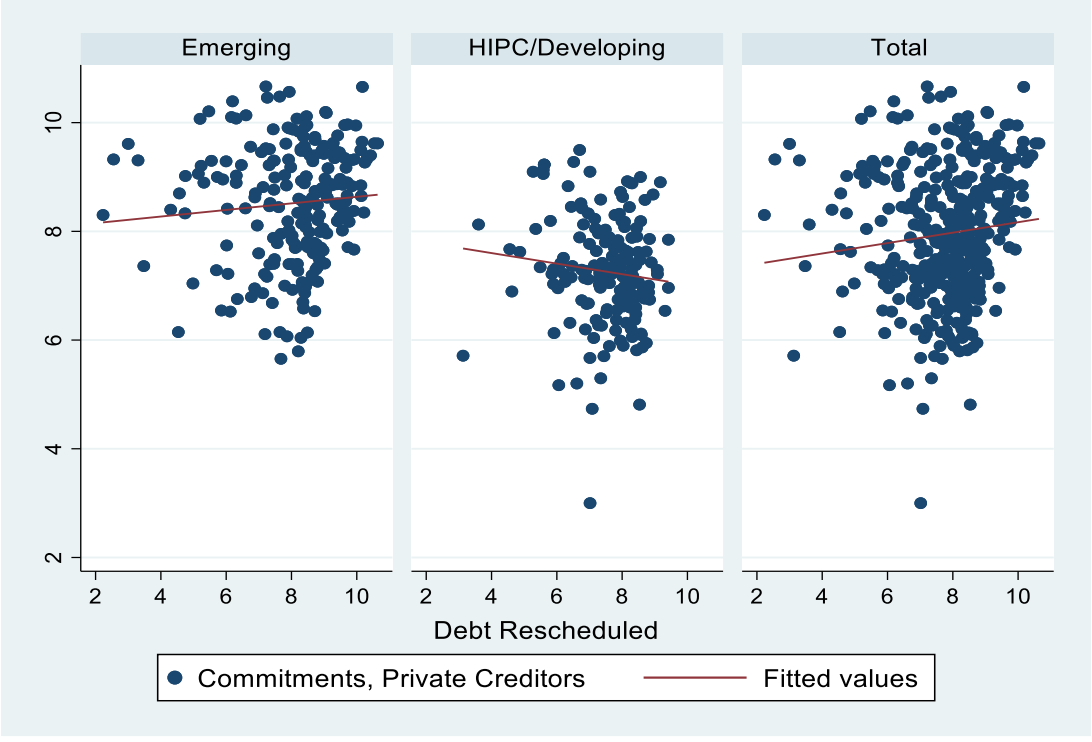


Figure 4.9b: Debt rescheduling and private credit flows



4.6 Conclusion

Understanding the impacts of debt reliefs on sovereign risk, investment, and growth, is pivotal to appreciating the circumstances under which debt relief can be expected to yield welfare gains. I show a strong positive co-movement of sovereign defaults with debt reliefs. The empirical analysis shows that debt relief over the period failed to lessen the debt overhang problems as it appears the amount of debt creditors are willing to write off is limited. Even if debt relief eases the debt-overhang problem, it may only represent a partial solution since the already heightened debt build-up continues to distort investment decisions in the debtor nation. Debt reliefs increase investors' perceptions of sovereign debt problems in emerging and developing economies and translate into higher costs of capital. Debt reliefs do not improve creditworthiness as private credit flows decline and investment reduces. Thus, debt reliefs hardly improve economic growth.

There appears to be an incentive effect that tends to reinforce expectations of future debt-relief initiatives, and this should be critically considered in any debt-relief mechanism. Regarding the forms of debt relief, the analysis shows that debt forgiveness offers more favourable prospects in terms of impacts on debt sustainability and economic growth than debt rescheduling. This may suggest that the sovereign debt crises in developing and emerging economies may be a permanent payment (lack of solvency) problem rather than a temporary repayment (lack of liquidity) problem.

Overall, the model specifications point toward a strong relationship between debt reliefs and the risk of sovereign defaults in emerging and developing economies. However, other factors such as debt burdens, shocks (proxied by economic growth and investments), the debt policy environment, repayment uncertainties (shown by maturities), cost of funds, political stability and trade openness may also affect the sovereign risk, given their potential impact on the ability and willingness of governments to repay sovereign loans. Countries with a high debt burden, low GDP growth, low investments, and high cost of funds are more likely to experience debt distress episodes. The evaluation shows that shortening the maturity of debts reduces the risk of sovereign default. Lengthening

the maturity can reduce the refinancing risk but may not shrink the crisis zone, since it increases uncertainty

One concrete conclusion from the analysis is that strengthening debt management capacity in developing and emerging countries, will be an indispensable tool in preventing and mitigating debt crisis effects. The macro-management of the sovereign debt crises should consider efforts to improve creditworthiness at the sovereign level and reassure investors by focusing on the policymakers' ability to address and recover from economic downturns and ensure debt sustainability. Ultimately, a comprehensive programme to promote economic growth and efficient investments remains central to solving the sovereign debt problem.

The findings of this study may be indicative and raise doubts regarding the impacts of debt reliefs even as a welfare-improving intervention. Notwithstanding, it is uncertain if the results can be used to forecast the potential impacts of debt reliefs on developing and emerging economies. At some levels, these results should not be too surprising; nonetheless, they have important implications for debt restructuring and debt reliefs programmes.

Do creditors offer debt relief only if they expect to benefit from it? Occhino (2010) postulates that creditors can benefit from forgiving a portion of the debt in instances of a severe debt-overhang problem. Forgiving a portion of the debt and lowering the debt burden may reduce the risk of default and improves the market value of the remaining debt. If this effect is strong enough, the market value of the total debt in the absence of debt forgiveness can be lower than the market value of the remaining debt in the wake of debt forgiveness. Also, Arslanalp and Henry (2005) suggest that in instances of debt overhang, both borrowers and lenders can benefit from debt relief as the stock market appreciates, increasing shareholder value. It will be interesting to evaluate the relative impact of debt reliefs on both borrowers and creditors.

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Appendix

Table A1.1: Data description and sources

Variable	Description	Sources
RGDP	Real Gross Domestic Product growth rates	International Financial Statistics (IFS), IMF
UNEMPL	Unemployment, total (% of total labour force) (modelled ILO estimate)	World Development Indicators (WDI), World Bank
REER	Real Effective Exchange Rate, Consumer Price Index. The growth rate is computed taking the log	IFS
INF	Inflation rates, percentage change in Consumer Price Index, (All items, Index, 2010 =100)	IFS
Stock Prices	Local financial market main equity index. The growth rate is computed taking the log	Bloomberg, IFS
Monetary Policy	Monetary policy rate Broad money (The growth rate is computed taking the log)	IFS, WDI
Inequality	Gini coefficient of income inequality, Top 10 income share	SWIID 8.2 WID.world

Table A1.2: List of countries and Descriptive statistics (Mean Values: 1990 – 2018)

Country	Real GDP Growth	Inflation	Unemployment (Rate)	Gini	Broad Money Growth
Botswana	4.46	8.31	18.44	57.83	16.08
Burundi	1.59	10.92	1.74	38.83	16.26
Côte d'Ivoire	3.03	3.56	5.04	49.61	9.93
Gambia, The	3.04	6.04	9.31	44.83	16.26
Ghana	5.49	19.63	6.24	41.90	33.38
Kenya	3.73	12.03	2.80	46.98	15.85
Malawi	4.19	20.95	5.85	47.35	29.81
Mauritius	4.67	5.69	8.40	37.68	11.85
Namibia	3.98	7.16	20.87	65.89	17.06
Niger	3.89	2.87	1.29	38.89	9.32
Rwanda	5.52	7.33	0.82	48.91	16.33
South Africa	2.29	6.92	28.11	59.38	11.97
Tanzania	5.40	12.67	3.02	42.98	20.20
Uganda	6.49	5.62	2.27	43.88	22.10
Zambia	4.15	34.94	13.33	54.68	31.12

Figure A1.1: Responses to an expansionary conventional monetary policy shock (annual series)

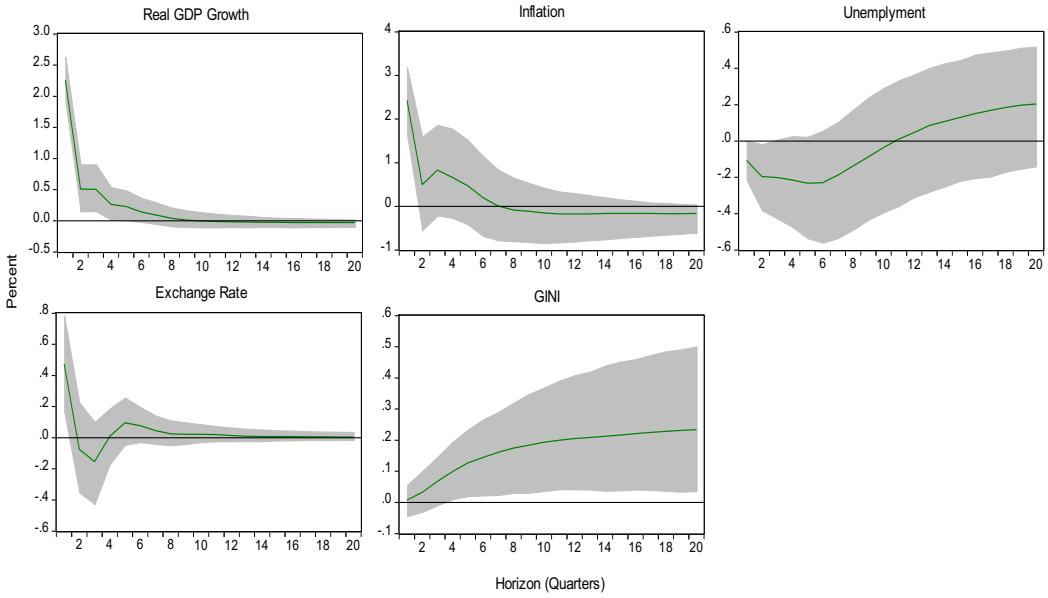

Figure A1.2: Responses to an expansionary unconventional monetary policy shock (annual series)

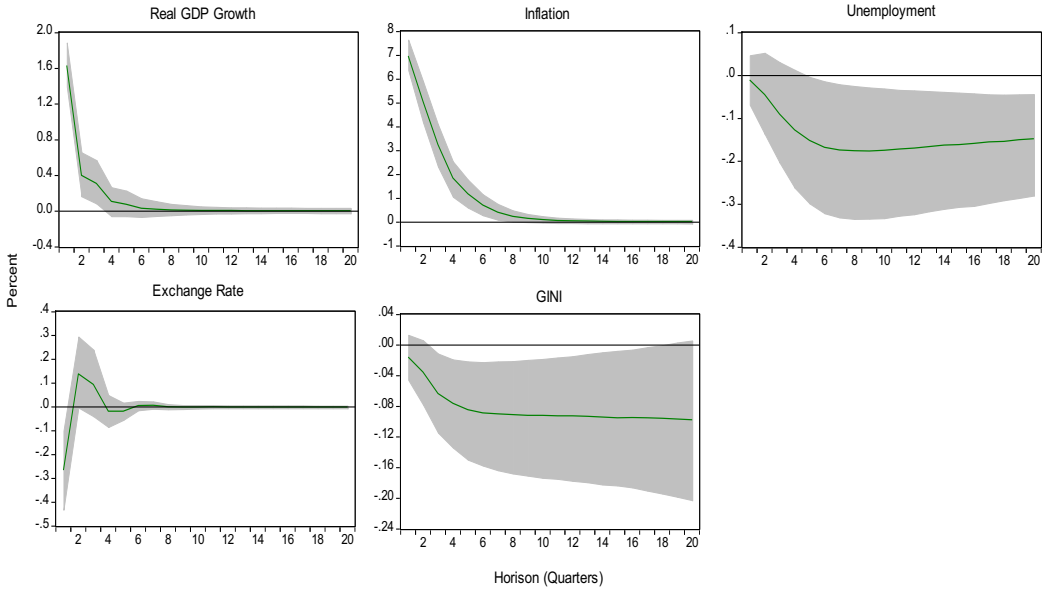

Figure A1.3: Responses to an expansionary unconventional monetary policy shock (Monetary base)

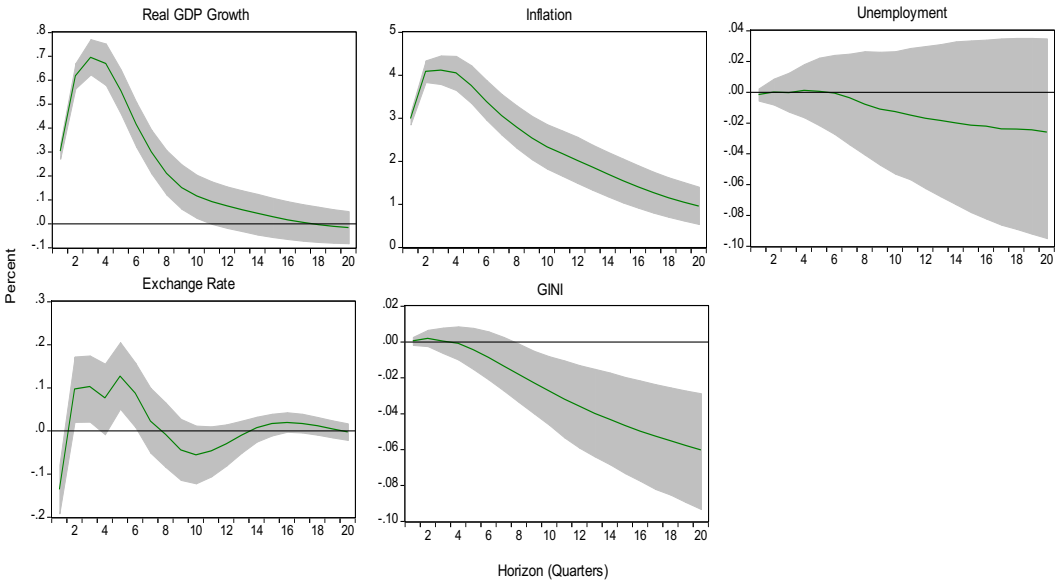

Figure A1.4: Responses to an expansionary unconventional monetary policy shock (Central bank asset)

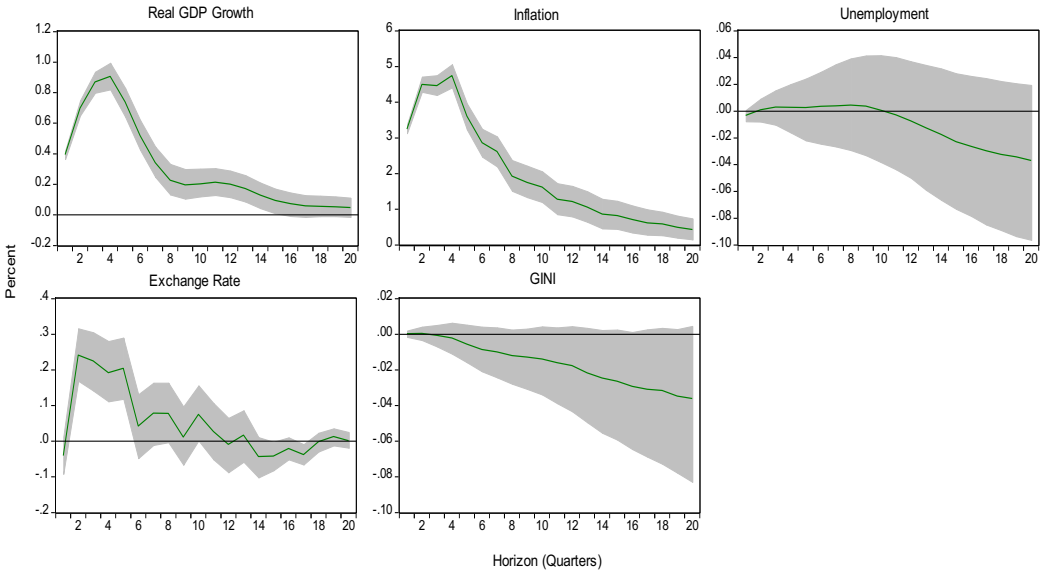

Figure A1.5: Responses to an expansionary conventional monetary policy shock identified by Cholesky decompositions

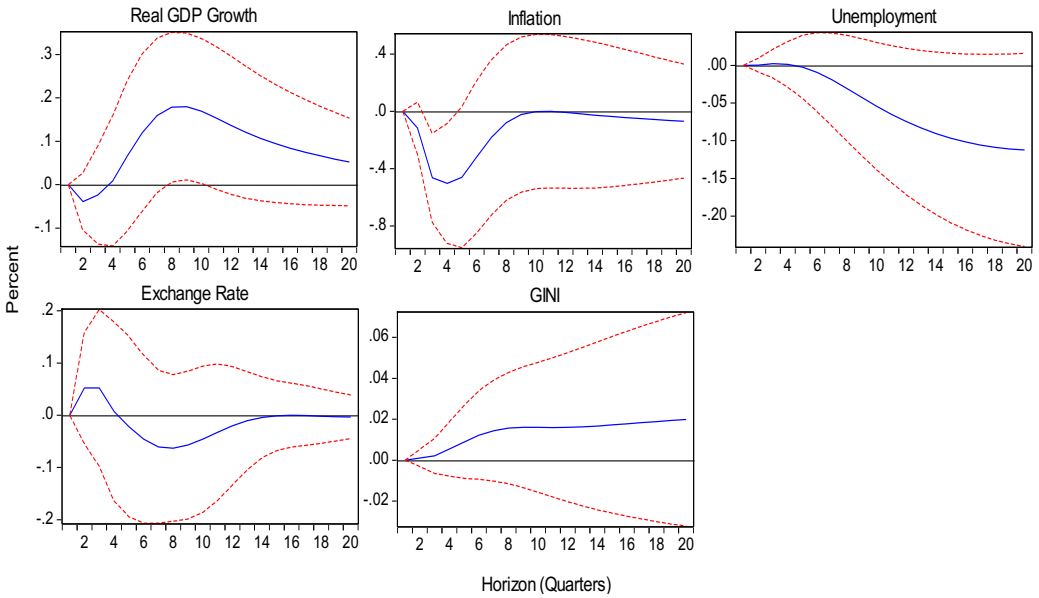

Figure A1.6: Responses to an expansionary unconventional monetary policy shock identified by Cholesky decompositions

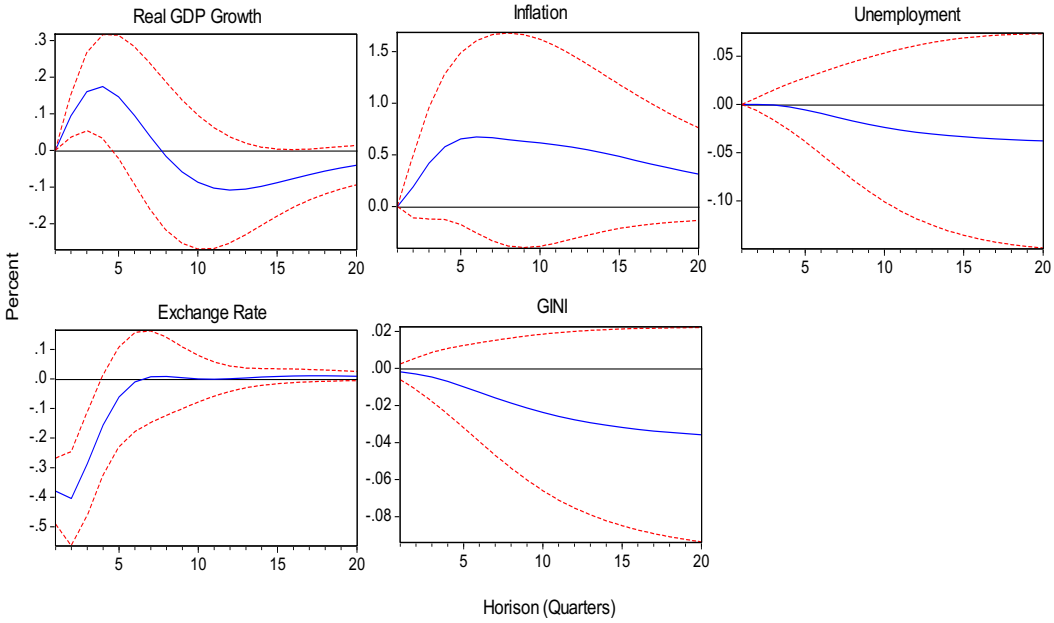

Table A2.1: Robustness to the exclusion of South Africa

	1	2	3	4
Gini (t-1)	1.039***	1.024***	1.042***	1.074***
	(0.017)	(0.015)	(0.006)	(0.015)
gdppc	0.304***	0.332***	- 0.045	5.264***
	(0.067)	(0.057)	(0.047)	(1.291)
MP	0.032***	0.030***	0.006***	0.008***
	(0.004)	(0.005)	(0.001)	(0.002)
FD	-3.341***			-4.031***
	(0.438)			(0.875)
FD×MP	-0.200***			
	(0.021)			
FI		-2.265***		
		(0.219)		
FI×MP		-0.105***		
		(0.014)		
FM			2.717***	
			(0.756)	
FM×MP			0.053	
			(0.052)	
$gdppc^2$				-0.369***
				(0.092)
FD^2				8.204***
				(2.116)
Constant	-3.432***	-2.893***	-1.730***	-21.560***
	(0.835)	(0.902)	(0.270)	(4.171)
Obs	403	403	403	403
N	31	31	31	31
Wald (p-value)	0.00	0.00	0.00	0.00
Sargan	22.14	25.62	14.98	26.42
[p-value]	[0.99]	[0.98]	[0.99]	[0.99]
AR(1) test	-4.12	-3.81	-3.71	-3.68
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
AR(2) test	0.71	0.88	0.21	0.86
[p-value]	[0.48]	[0.38]	[0.84]	[0.38]

Notes: This table presents the results from the regressions of income inequality on GDP per capita, monetary policy (MP), financial development (FD) and the interaction between monetary policy and financial development. The dependent variable is the net Gini coefficient. Columns 2 and 3 consider respectively, the financial institution (FI) and financial markets (FM) aspects of the financial system. Column 4 captures the hypothesized non-linear relationship between growth, financial development, and inequality. The results reported in this table exclude South Africa from the sample. *, **, *** denote significance at the 10%, 5% and 1% levels. Standard errors in parentheses. The results reported are for the two-step estimations and 2 maximum lags of the dependent variable are specified as instruments. For the estimation involving FM and square terms (column 4), the instrument specification includes 3 maximum lags of the dependent variables.

Table A2.2: Results for Low-Income Countries

	1	2	3	4
Gini (t-1)	1.057***	1.062***	1.055***	1.048***
	(0.014)	(0.018)	(0.013)	(0.012)
gdppc	0.295***	0.240**	0.113*	5.751***
	(0.078)	(0.093)	(0.061)	(1.684)
MP	0.005	0.011**	0.013**	0.010***
	(0.014)	(0.005)	(0.005)	(0.003)
FD	-2.100***			-6.172**
	(0.755)			(2.974)
FD×MP	0.035			
	(0.126)			
FI		-1.309***		
		(0.434)		
FI×MP		-0.010		
		(0.022)		
FM			0.188	
			(1.083)	
FM×MP			-0.260	
			(0.277)	
$gdppc^2$				-0.425***
				(0.127)
FD^2				22.064*
				(13.264)
Constant	-4.236***	-4.075***	-3.192***	-21.089***
	(0.703)	(0.916)	(0.794)	(5.491)
Obs	341	341	341	341
N	26	26	26	26
Wald (p-value)	0.00	0.00	0.00	0.00
Sargan	13.47	13.44	18.67	18.83
[p-value]	[0.99]	[0.99]	[0.99]	[0.93]
AR(1) test	-3.50	-3.63	-4.37	-3.53
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
AR(2) test	0.29	0.31	0.93	0.50
[p-value]	[0.77]	[0.76]	[0.35]	[0.62]

Notes: This table presents the results from the regressions of income inequality on GDP per capita, monetary policy (MP), financial development (FD) and the interaction between monetary policy and financial development. The dependent variable is the net Gini coefficient. Columns 2 and 3 consider respectively, the financial institution (FI) and financial markets (FM) aspects of the financial system. Column 4 captures the hypothesized non-linear relationship between growth, financial development, and inequality. The results reported in this table exclude middle-income countries from the sample. *, **, *** denote significance at the 10%, 5% and 1% levels. Standard errors in parentheses. The results reported are for the two-step estimations and 4 maximum lags of the dependent variable are specified as instruments. For the estimation involving FI and square terms (column **4)**, the instrument specification includes 3 and 1 maximum lags of the dependent variables, respectively.

Table A2.3: Results for Non-CFA countries.

	1	2	3	4
Gini (t-1)	1.022***	1.001***	1.013***	1.023***
	(0.016)	(0.021)	(0.021)	(0.014)
gdppc	0.008	0.222**	-0.068	-2.367
	(0.085)	(0.092)	(0.071)	(1.747)
MP	0.012	0.014	0.002	-0.005
	(0.013)	(0.009)	(0.003)	(0.004)
FD	0.512			-3.727*
	(0.540)			(2.234)
FD×MP	-0.089			
	(0.069)			
FI		-1.137**		
		(0.510)		
FI×MP		-0.049***		
		(0.018)		
FM			1.564***	
			(0.601)	
FM×MP			-0.051***	
			(0.018)	
$gdppc^2$				0.172
				(0.124)
FD^2				6.032*
				(3.297)
Constant	-1.169	-1.285	-0.237	7.309
	(0.968)	(1.094)	(0.996)	(6.293)
Obs	300	300	300	300
N	22	22	22	22
Wald (p-value)	0.00	0.00	0.00	0.00
Sargan	12.78	11.41	10.09	9.47
[p-value]	[0.99]	[0.99]	[0.99]	[0.99]
AR(1) test	-2.91	-3.06	-3.18	-3.21
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
AR(2) test	0.79	1.17	0.82	1.32
[p-value]	[0.43]	[0.24]	[0.41]	[0.19]

Notes: This table presents the results from the regressions of income inequality on GDP per capita, monetary policy (MP), financial development (FD) and the interaction between monetary policy and financial development. The dependent variable is the net Gini coefficient. Columns 2 and 3 consider respectively, the financial institution (FI) and financial markets (FM) aspects of the financial system. Column 4 captures the hypothesized non-linear relationship between growth, financial development, and inequality. The results reported in this table exclude CFA countries from the sample. *, **, *** denote significance at the 10%, 5% and 1% levels. Standard errors in parentheses. The results reported are for the two-step estimations and 2 maximum lags of the dependent variable are specified as instruments.

Table A2.4: Panel unit root tests

	LLC		ADF-Fisher	
Variables	Level	First difference	Level	First difference
Gini	-3.99**	-2.64**	67.45**	31.73*
MP	-15.38**	-14.67**	191.92**	186.12**
FD	3.75	-11.37**	2.61	135.13**
GDP per capita	9.77	-5.49**	1.59	74.82**
MP*FD	-14.88**	-15.91**	185.02**	178.19**

*/** indicate significance at the 1/5% level.

Figure A3.1: Inclusive Growth and Inflation

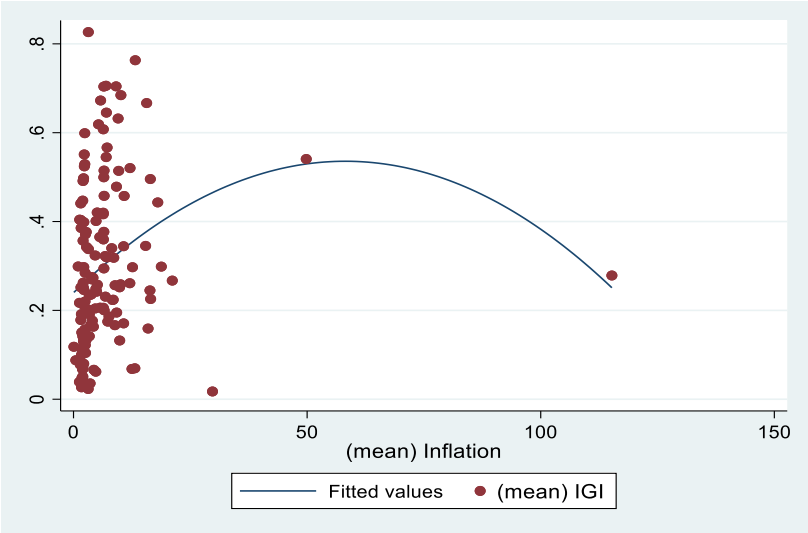

Figure A3.2: Inclusive Growth and Real GDP Growth

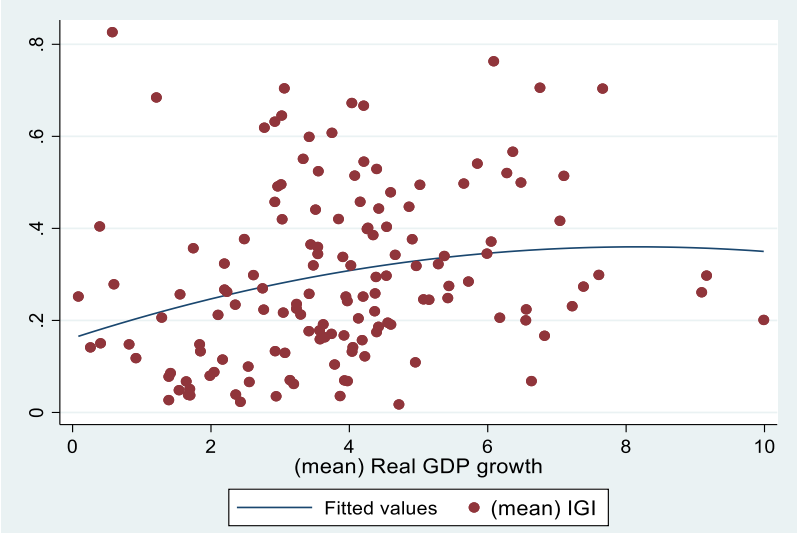

Table A3.1: Inflation thresholds and inclusive growth for advanced economies

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	2.214	2.709	1.813	1.954
95% confidence interval	[1.08-3.65]	[0.09-3.93]	[0.09-3.93]	[1.06-3.72]
Impact of inflation				
β_1	0.090***	-0.033***	0.067***	0.001***
	(0.011)	(0.001)	(0.020)	(0.0002)
β_2	0.009**	-0.022***	-0.097***	-0.002***
	(0.004)	(0.0003)	(0.010)	(0.0004)
Impact of covariates				
Lag of Response Var.	0.796***	0.344***	0.867***	0.791***
	(0.001)	(0.008)	(0.007)	(0.032)
Real GDP growth	-0.008***	-0.006***	-0.365***	-0.002***
	(0.002)	(0.0003)	(0.006)	(0.0002)
HDI	0.287	-0.286***	-14.393***	-0.012**
	(0.175)	(0.092)	(0.611)	(0.005)
Constant	5.822***	0.454***	14.691***	0.031***
	(0.865)	(0.080)	(0.565)	(0.003)
Obs.	594	594	594	594
N	33	33	33	33
Wald [p-value]	6037.42 [0.00]	11488.43 [0.00]	42923.53 [0.00]	5894.38 [0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table A3.2: Inflation thresholds and inclusive growth for emerging economies

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	2.581	13.54	4.27	3.42
95% confidence interval	[0.93-13.65]	[0.93-13.65]	[0.93-13.65]	[0.93-13.65]
Impact of inflation				
β_1	0.049***	-0.076***	0.064***	0.001***
	(0.002)	(0.0002)	(0.006)	(0.0002)
β_2	0.0003**	0.001***	-0.001***	-0.0003
	(0.0001)	(0.0001)	(0.0003)	(0.0003)
Impact of covariates				
Lag of Response Var.	0.837***	0.702***	0.803***	0.876***
	(0.003)	(0.001)	(0.005)	(0.003)
Real GDP growth	-0.003***		-0.190***	-0.001***
	(0.0003)		(0.003)	(0.0001)
HDI	-3.944***	-9.399***	-9.517***	-0.057***
	(0.138)	(0.035)	(0.314)	(0.003)
Constant	9.536***	7.555***	9.177***	0.074***
	(0.171)	(0.033)	(0.268)	(0.003)
Obs.	1140	1140	1140	1140
N	64	64	64	64
Wald [p-value]	13100[0.00]	16400[0.00]	10660.05[0.00]	15400[0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table A3.3: Inflation thresholds and inclusive growth for developing economies.

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	6.60	5.02	14.70	5.02
95% confidence interval	[5.17-7.63]	0.46-14.71]	[0.46-14.71]	[0.46-14.71]
Impact of inflation				
β_1	-0.016*** (0.001)	0.041*** (0.015)	-0.026*** (0.002)	0.001 (0.0001)
β_2	-0.006*** (0.0003)	-0.017*** (0.003)	0.006*** (0.001_	-0.002*** (0.0003)
Impact of covariates				
Lag of Response Var.	0.885*** (0.001)	0.759*** (0.008)	0.637*** (0.004)	0.788*** (0.014)
Real GDP growth	0.001 (0.001)	-0.235*** (0.006)	-0.051*** (0.001)	-0.003*** (0.0001)
HDI	-1.036*** (0.104)	-24.507*** (1.137)	-8.009*** (0.321)	-0.212*** (0.025)
Constant	5.425*** (0.189)	16.306*** (0.707)	6.297*** (0.174)	0.207*** (0.019)
Obs.	836	836	836	836
N	47	47	47	47
Wald [p-value]	16683.98 [0.00]	69529.14 [0.00]	49464.16 [0.00]	42352.85 [0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table A3.4: GDP growth thresholds and inclusive growth for advanced economies

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	5.26	5.49	5.26	5.26
95% confidence interval	[0.63-5.50]	[0.63-5.50]	[3.84-5.47]	[0.63-5.50]
Impact of GDP				
β_1	-0.010***	-0.009***	-0.420***	-0.003***
	(0.002)	(0.0004)	(0.009)	(0.0005)
β_2	0.001	-0.003**	-0.237***	0.001
	(0.004)	(0.001)	(0.007)	(0.0001)
Impact of covariates				
Lag of Response Var.	0.809***	0.355***	0.868***	0.805***
	(0.035)	(0.010)	(0.014)	(0.028)
Inflation		-0.022***	-0.095***	-0.002***
		(0.0004)	(0.014)	(0.0004)
HDI	0.767	-0.330***	-12.266***	0.001
	(0.520)	(0.089)	(0.971)	(0.006)
Constant	4.978***	0.477***	12.808***	0.019***
	(0.785)	(0.073)	(0.963)	(0.006)
Obs.	594	594	594	594
N	33	33	33	33
Wald [p-value]	2029.08 [0.00]	11596.09 [0.00]	40829.48 [0.00]	1420.18 [0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table A3.5: GDP growth thresholds and inclusive growth for emerging economies

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	6.51	7.99	5.44	8.21
95% confidence interval	[0.12-8.29]	[0.12-8.29]	[0.12-8.29]	[0.12-8.29]
Impact of GDP				
β_1	0.001 (0.001)	-0.044*** (0.0001)	-0.198*** (0.003)	-0.001*** (0.0001)
β_2	-0.006*** (0.0003)	-0.077*** (0.0001)	-0.193*** (0.003)	-0.001*** (0.0001)
Impact of covariates				
Lag of Response Var.	0.843*** (0.002)	0.711*** (0.0004)	0.814*** (0.007)	0.877*** (0.002)
Inflation	0.003*** (0.0001)		-0.002*** (0.0003)	
HDI	-3.563*** (0.173)	-9.587*** (0.045)	-9.307*** (0.506)	-0.058*** (0.002)
Constant	9.038*** (0.197)	7.564*** (0.047)	9.068*** (0.423)	0.076*** (0.002)
Obs.	1140	1140	1140	1140
N	64	64	64	64
Wald *[p-value]*	86485.73 [0.00]	50700 [0.00]	78560.52 [0.00]	59100 [0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table A3.6: GDP growth thresholds and inclusive growth for developing economies.

	Inequality	Poverty	Unemployment	Inc. Growth
Threshold estimates				
γ	7.55	6.19	8.36	5.99
95% confidence interval	[0.58-8.45]	[0.58-8.49]	[0.58-8.45]	[0.58-8.45]
Impact of GDP				
β_1	0.004*** (0.001)	-0.303*** (0.002)	-0.086*** (0.002)	-0.003*** (0.0004)
β_2	-0.004*** (0.001)	-0.171*** (0.006)	-0.002 (0.002)	-0.002*** (0.0001)
Impact of covariates				
Lag of Response Var.	0.893*** (0.009)	0.917*** (0.003)	0.655*** (0.004)	0.774*** (0.011)
Inflation	-0.004*** (0.0003)	0.012*** (0.003)		
HDI	-1.103*** (0.084)		-6.761*** (0.223)	-0.230*** (0.017)
Constant	5.047*** (0.398)	1.722*** (0.041)	5.569*** (0.152)	0.219*** (0.013)
Obs.	836	846	836	836
N	47	47	47	47
Wald [p-value]	22625.40 [0.00]	25976.39 [0.00]	69991.74 [0.00]	23000.17 [0.00]

Note: In Column 4, the inclusive growth index is the dependent variable. Standard errors are in parentheses and */**/*** indicate significance at the 1/5/10% level. I report results for the model for which the estimated threshold is statistically significant.

Table A3.7: List of countries and Inclusive Growth Index (IGI) ranking

S/N	Country	IGI	S/N	Country	IGI	S/N	Country	IGI
1	Belarus	0.017	40	Mongolia	0.167	79	Bhutan	0.273
2	Slovenia	0.023	41	Latvia	0.167	80	Philippines	0.275
3	Denmark	0.027	42	Russia	0.171	81	Venezuela	0.279
4	Czech Republic	0.035	43	Kyrgyzstan	0.175	82	El Salvador	0.285
5	Slovakia	0.036	44	Algeria	0.177	83	Nepal	0.294
6	Norway	0.037	45	Israel	0.178	84	Sao Tome and Principe	0.297
7	Finland	0.038	46	Pakistan	0.186	85	China	0.297
8	Sweden	0.039	47	Jordan	0.191	86	Sudan	0.299
9	Netherlands	0.048	48	Lebanon	0.192	87	Tajikistan	0.299
10	Belgium	0.051	49	Moldova	0.195	88	Dominican Republic	0.318
11	Iceland	0.062	50	Vietnam	0.200	89	Nicaragua	0.320
12	Hungary	0.066	51	Armenia	0.201	90	Costa Rica	0.320
13	Austria	0.067	52	Mauritius	0.204	91	Indonesia	0.322
14	Kazakhstan	0.068	53	Bangladesh	0.206	92	Mexico	0.324
15	Malta	0.068	54	Tonga	0.206	93	Chile	0.338
16	Ukraine	0.070	55	United States	0.212	94	Sri Lanka	0.340
17	Luxembourg	0.070	56	Montenegro	0.213	95	Djibouti	0.343
18	Germany	0.078	57	Bosnia and Herzegovina	0.217	96	Ecuador	0.344
19	Croatia	0.080	58	Albania	0.220	97	Ghana	0.345
20	France	0.086	59	Uruguay	0.223	98	St. Lucia	0.357
21	Switzerland	0.088	60	Maldives	0.224	99	Paraguay	0.360
22	Cyprus	0.100	61	Iran	0.226	100	Guatemala	0.365
23	Poland	0.104	62	Laos	0.231	101	Panama	0.371
24	Ireland	0.109	63	Fiji	0.234	102	Peru	0.376
25	Canada	0.115	64	Tunisia	0.236	103	Brazil	0.377
26	Japan	0.118	65	Timor-Leste	0.242	104	Cape Verde	0.385
27	Korea	0.122	66	Turkey	0.245	105	Cameroon	0.399
28	New Zealand	0.130	67	Malaysia	0.246	106	Bolivia	0.401
29	Romania	0.132	68	Georgia	0.249	107	Senegal	0.403
30	Spain	0.133	69	Morocco	0.252	108	Zimbabwe	0.404
31	Australia	0.133	70	Thailand	0.252	109	India	0.416
32	Greece	0.141	71	Yemen	0.252	110	Gambia	0.420
33	Estonia	0.142	72	Jamaica	0.257	111	Colombia	0.420
34	Portugal	0.148	73	Mauritania	0.258	112	Belize	0.441
35	United Kingdom	0.148	74	Egypt	0.259	113	Guinea	0.443
36	Italy	0.150	75	Ethiopia	0.261	114	Mali	0.447
37	Lithuania	0.157	76	Gabon	0.262	115	Liberia	0.458
38	Serbia	0.159	77	Argentina	0.267	116	Honduras	0.458
39	Bulgaria	0.163	78	Samoa	0.270	117	Kenya	0.478

S/N	Country	IGI	S/N	Country	IGI	S/N	Country	IGI
118	Comoros	0.491	127	Benin	0.529	136	Swaziland	0.645
119	Niger	0.495	128	Angola	0.541	137	Malawi	0.667
120	Suriname	0.496	129	Botswana	0.545	138	Namibia	0.672
121	Burkina Faso	0.497	130	Cote d'Ivoire	0.551	139	Haiti	0.684
122	Uganda	0.500	131	Tanzania	0.567	140	Rwanda	0.704
123	Sierra Leone	0.514	132	Guinea-Bissau	0.599	141	Madagascar	0.704
124	Papua New Guinea	0.515	133	Lesotho	0.608	142	Mozambique	0.706
125	Nigeria	0.520	134	South Africa	0.619	143	Zambia	0.763
126	Togo	0.524	135	Burundi	0.632	144	Central African Republic	0.826

Table A4.1 Countries Covered, by Type

Economy type	*Countries*
HIPC/ Other Developing economy (51)	Afghanistan; Bangladesh; Benin; Bolivia; Burkina Faso; Burundi; Cambodia; Cameroon; Central African Republic; Chad; Comoros; Congo, Dem. Rep.; Congo, Rep; Côte d'Ivoire; Djibouti; Ethiopia; The Gambia; Ghana; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Kenya; Kyrgyz Republic; Liberia; Madagascar; Malawi; Mali; Mauritania; Moldova; Mozambique; Nepal; Nicaragua; Niger; Nigeria; Rwanda; São Tomé and Príncipe; Senegal; Sierra Leone; Solomon Islands; Sudan; Tajikistan; Tanzania; Togo; Uganda; Uzbekistan; Vietnam; Yemen; Zambia; Zimbabwe
Emerging economy (35)	Albania; Algeria; Angola; Argentina; Brazil; Bulgaria; Cabo Verde; Costa Rica; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Fiji; Gabon; Georgia; Grenada; Guatemala; Indonesia; Jamaica; Jordan; Kazakhstan; Morocco; North Macedonia; Pakistan; Paraguay; Peru; Philippines; Russian Federation; Serbia; Sri Lanka; Tunisia; Turkmenistan; Ukraine; Venezuela

Note: The country classifications are based on IMF income group classifications

Figure A4.1a: Debt forgiveness and sovereign default

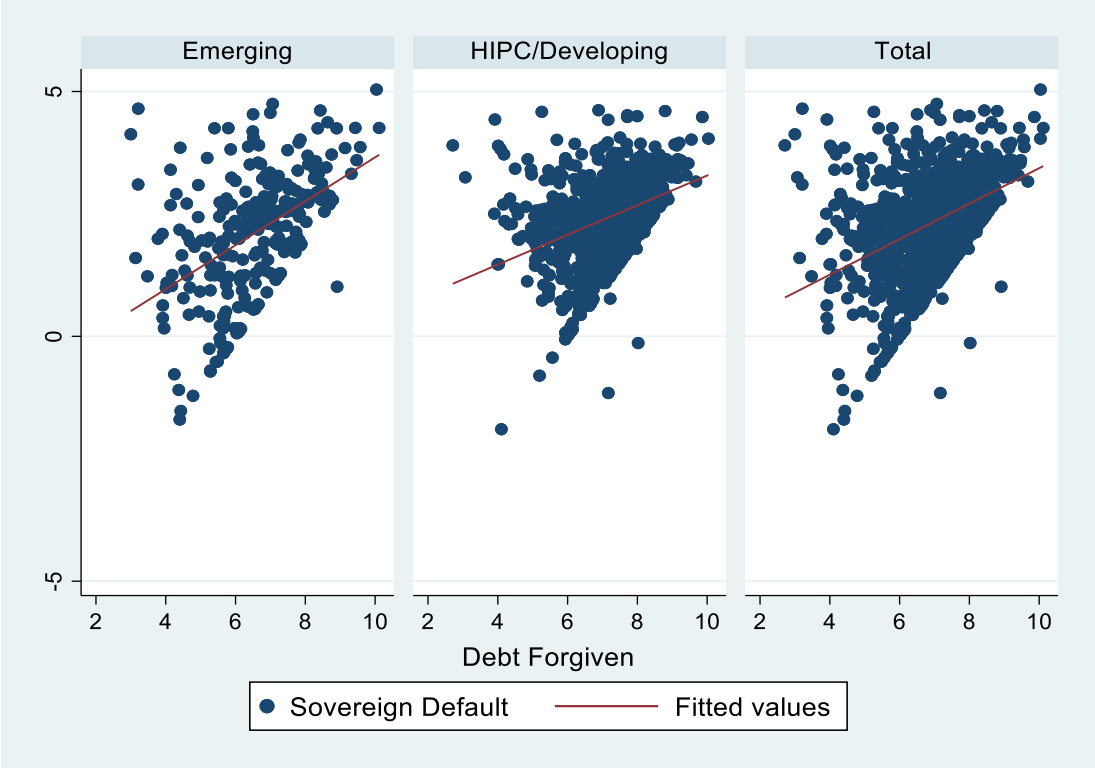

Figure A4. 1b: Debt rescheduling and sovereign default

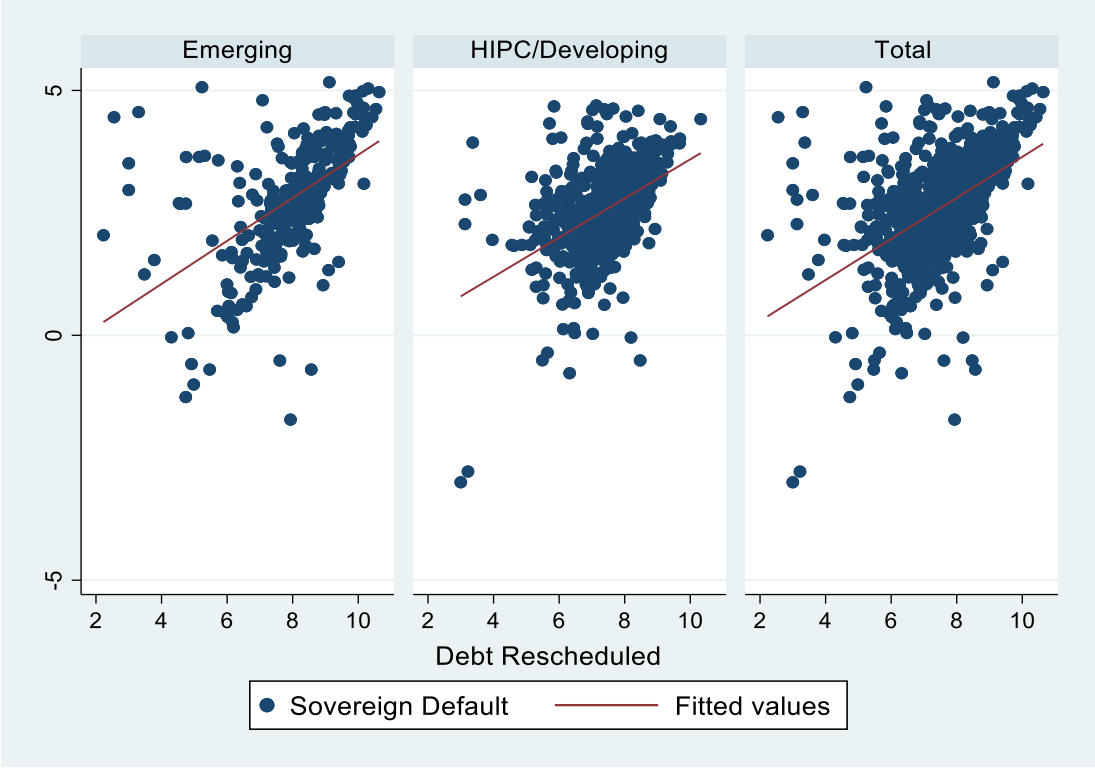

Figure A4. 2a: Debt forgiveness and average maturity

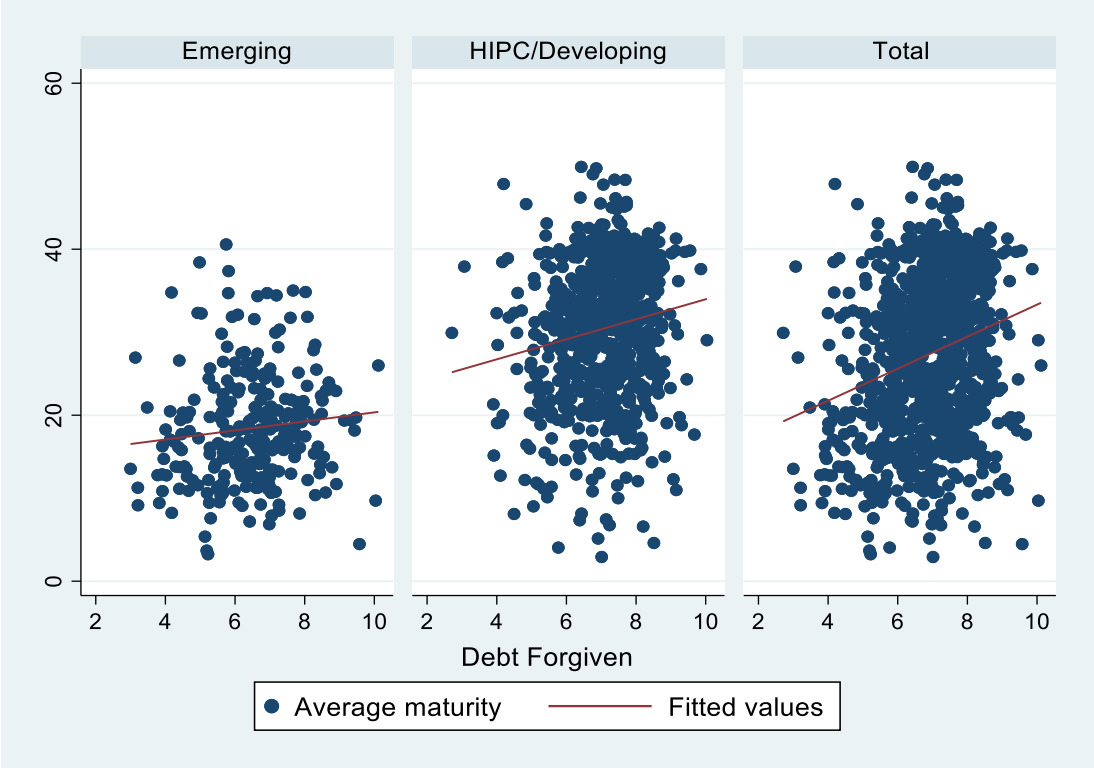

Figure A4. 2b: Debt rescheduling and average maturity

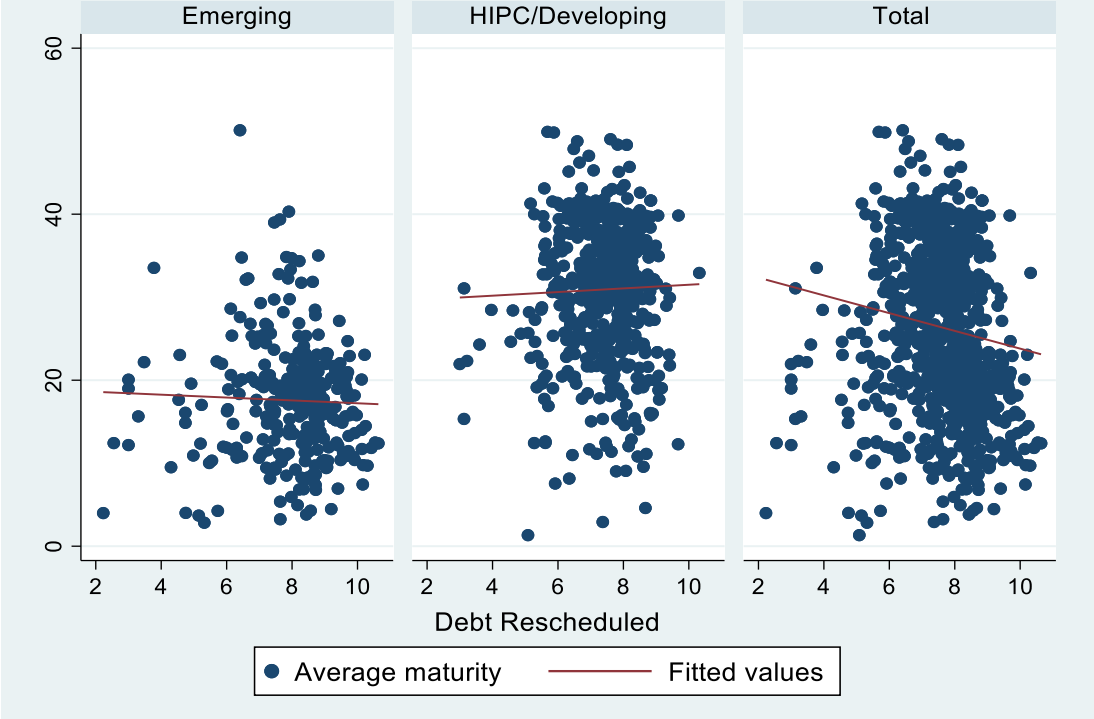

Figure A4.3a: Debt forgiveness and average interest rates

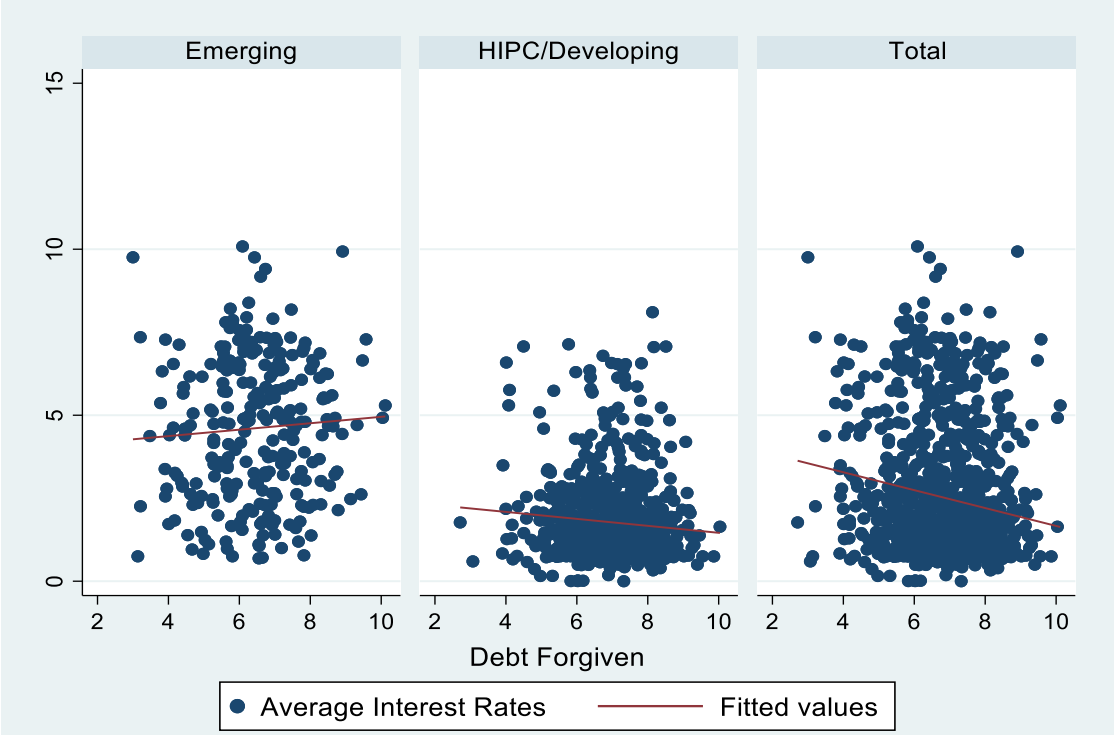

Figure A4.3b: Debt rescheduling and average interest rates