

Do Inequality and Fiscal Redistribution Matter When Credit Bites Back?

Michal Škára, Ladislava Isever Grochová



The Working Paper Series of the Czech National Bank (CNB) is intended to disseminate the results of the CNB's research projects as well as the other research activities of both the staff of the CNB and collaborating outside contributors, including invited speakers. The Series aims to present original research contributions relevant to central banks. It is refereed internationally. The referee process is managed by the CNB Research Division. The working papers are circulated to stimulate discussion. The views expressed are those of the authors and do not necessarily reflect the official views of the CNB.

Distributed by the Czech National Bank, available at www.cnb.cz

Reviewed by: Jan Čapek (Masarykova univerzita)
Robert Ambriško (CNB)

Project Coordinator: Ivan Trubelík

Issued by: © Czech National Bank, September 2026

Do Inequality and Fiscal Redistribution Matter When Credit Bites Back?

Michal Škára and Ladislava Issever Grochová*

Abstract

This paper investigates the relationship between household debt and GDP at different levels of income inequality, with a particular focus on whether fiscal redistribution can provide additional liquidity to indebted households and thereby support economic activity. While household debt is known to stimulate economic activity in the short run and depress GDP in the medium run, the role of fiscal redistribution in moderating these effects remains underexplored. Using a panel dataset of 36 countries over the period 1980–2023 and employing panel local projection methods, the results reveal a countercyclical role for fiscal redistribution. Interestingly, the adverse impact of household debt on GDP is more pronounced in countries with lower income inequality. In these countries, overall redistribution moderates these effects, especially when debt-service burdens peak. This pattern, together with the stronger effects of overall redistribution, likely reflects structural differences in household indebtedness and the credit-market participation of low-income households. Overall, these findings underscore the importance of fiscal redistribution as a tool for reducing the macroeconomic costs of leverage, offering new insights into the pursuit of sustainable growth and inequality reduction.

JEL Codes: D14, D31, E21, E62, H24.

Keywords: Fiscal redistribution, GDP, household debt, income inequality, local projection.

* Michal Škára, Czech National Bank and Mendel University, e-mail: michal.skara@cnb.cz;
Ladislava Issever Grochová, Mendel University, Faculty of Business and Economics, e-mail:
ladislava.grochova@mendelu.cz.

The views expressed in this paper are those of the authors and not necessarily those of the Czech National Bank. We gratefully acknowledge the comments and suggestions from Jan Čapek, Róbert Ambriško, Petr Sklenář, Josef Švéda, Ivan Trubelík, Steven Yamarik, Boris Fišera and Dennis Nchor.

The authors acknowledge the use of ChatGPT 5.6 for language proofreading, editing, or other assistance. All errors and omissions remain the responsibility of the authors.

1. Introduction

Household debt can support economic growth in the short run (Mian et al., 2017; Lombardi et al., 2022; Müller and Verner, 2024) but it tends to be followed by a medium-run downturn (Schularick and Taylor, 2012; Jordà et al., 2013; Drehmann et al., 2017; Mian et al., 2017; Bernardini and Forni, 2020; Tunc and Kilinc, 2023), with more pronounced effects in countries with higher income inequality (Bahadir et al., 2020). However, existing research has not examined whether fiscal redistribution can moderate these adverse macroeconomic effects or how this moderating effect varies across different levels of income inequality. This paper addresses this gap by examining how fiscal redistribution moderates the impact of household debt on GDP across different levels of income inequality.

At the macroeconomic level, rising household debt, particularly following an expansionary phase of credit growth, constrains consumption and contributes to business cycle fluctuations (Mian et al., 2017). The macroeconomic impact of household debt further depends on income inequality, as low-income households are more sensitive to credit conditions and experience sharp consumption declines following adverse shocks, which are not offset by wealthier households with lower marginal propensities to consume (Eggertsson and Krugman, 2012; Korinek and Simsek, 2016; Biswas et al., 2017; Piao et al., 2023). As a result, income inequality can amplify the macroeconomic effects of household debt (Bahadir et al., 2020), although this relationship may also depend on differences in financial market participation and household indebtedness across countries. These adverse effects can be moderated through fiscal redistribution. By providing liquidity to constrained households (Duncan and Peter, 2016; Carbonell-Nicolau and Llavador, 2021), redistribution may alleviate budget pressures when debt-service burdens peak and thereby support economic activity. Focusing on the medium run, when debt-service burdens peak and household budgets are constrained the most, this paper contributes to the literature by examining whether fiscal redistribution can provide liquidity relief to indebted households and support aggregate demand, and how these effects vary across different levels of income inequality.

This paper confirms the conclusions of Mian et al. (2017) that household debt shocks generate a short-run expansion in GDP followed by a medium-run contraction. Importantly, the adverse medium-run effects are more pronounced in countries with lower income inequality, reflecting higher levels of household indebtedness and broader credit-market participation among low-income households, who are more vulnerable to adverse income shocks. Fiscal redistribution is found to alleviate these effects, particularly in the medium run when debt-service burdens peak. The alleviating effect is generally stronger for overall redistribution (measured by the Gini coefficient) and is particularly pronounced in countries with lower income inequality. In such settings, the same structural features, namely higher indebtedness and broader credit-market participation of low-income households, also increase the responsiveness of economic activity to redistributive policies. As a result, redistribution may provide liquidity relief to constrained households, thereby easing budget pressures and supporting aggregate demand and output. To capture differences in redistribution targeting, the analysis also employs top-to-bottom redistribution (measured by the Palma ratio), which places greater weight on changes at the tails of the income distribution. While redistribution targeted at the tails appears relatively more important in countries with higher income inequality, the estimated moderating effect of overall redistribution tends to be larger. This likely

reflects structural features of such economies, where limited credit-market participation among low-income households weakens the capacity of top-to-bottom redistribution to cushion the adverse effects of household debt.

These findings highlight the broader implications of household debt accumulation for macroeconomic stability. The escalating indebtedness of economic agents has emerged as a critical threat to global economic and financial stability. While the 2008 Global Financial Crisis, driven by the mortgage bubble and excessive leverage, vividly illustrated these dangers (Boone et al., 2022), rising household indebtedness may also increase systemic risk in the banking sector, as higher leverage amplifies default probabilities and weakens bank balance sheets (Andrieş et al., 2025). These mechanisms are consistent with the financial accelerator theory, according to which periods of relaxed lending standards lead to rapid credit expansion and rising leverage, ultimately amplifying adverse effects during downturns (Bernanke and Gertler, 1989). In this context, household debt accumulation represents a key concern for macroprudential policy and sustainable economic growth.

The remainder of this paper is organized as follows. Section 2 presents the theoretical background on the relationship between household debt and GDP, including the role of income inequality and fiscal redistribution. Section 3 describes the data and methodology. Section 4 presents the empirical results, Section 5 discusses the findings in relation to the existing literature, and Section 6 concludes.

2. Theoretical Background

While credit expansion may stimulate economic activity in the short run (Mian et al., 2017; Lombardi et al., 2022; Müller and Verner, 2024), it also increases the likelihood of deeper recessions and depresses economic activity in the medium run (Schularick and Taylor, 2012; Jordà et al., 2013; Mian et al., 2017; Bernardini and Forni, 2020), particularly as debt-service burdens rise (Drehmann et al., 2017; Tunc and Kilinc, 2023). According to Mian and Sufi (2018), the primary channel through which indebtedness influences the economy is household demand. Initially, a credit shock triggers an increase in the consumption of goods and services (Mian et al., 2020). However, once this expansionary phase concludes – typically within three years (Mian et al., 2017) – the repayment process begins. At this stage, highly indebted households must redirect resources toward debt service, causing their consumption spending to contract more sharply than that of households with lower debt burdens (Drehmann et al., 2017). This debt-induced contraction in expenditures exerts a persistent negative effect on GDP development. Because debt-service burdens usually peak four years after the initial borrowing surge, the most significant decline in economic activity typically occurs between the fourth and seventh years following the credit shock. While household debt primarily affects the economy through household demand (Mian and Sufi, 2018), credit expansions may also generate longer-term productivity losses (Müller and Verner, 2024) through labor reallocation toward less productive sectors (Mian et al., 2020), making it important to evaluate their impact on GDP rather than on consumption alone.

The severity of the medium-run downturn is fundamentally amplified by income inequality (Bahadir et al., 2020). First, the subsequent debt service burden is not distributed evenly. Low-

income households carry disproportionately higher debt-service-to-disposable-income ratios (Cynamon and Fazzari, 2016; Piao et al., 2023). These households are highly sensitive to credit conditions and negative income shocks (Eggertsson and Krugman, 2012; Korinek and Simsek, 2016), often lacking sufficient collateral (Todaro and Smith, 2020) to refinance when interest rates rise (Kumhof et al., 2015). Because wealthy households have a lower marginal propensity to consume, their stable spending cannot offset the sharp drop in consumption among poorer, credit-constrained groups (Biswas et al., 2017; Piao et al., 2023). In high-inequality nations, this dynamic can increase the amplitude of the business cycle and heighten macroeconomic volatility (Bahadir et al., 2020). Second, high inequality erodes the foundations of economic growth through its effects on capital accumulation and allocation. Societies with higher income inequality often generate lower private savings as the middle class diminishes, leading to weak capital accumulation (Todaro and Smith, 2020). Wealth concentration also increases the risk of inefficient institutions emerging, where lobbying and corruption lead to resource misallocation (Kouba and Grochová, 2012; Acemoglu and Robinson, 2012; Grochová and Otáhal, 2013; Todaro and Smith, 2020). Finally, high inequality is linked to higher fertility rates, which can reduce per capita investment in human capital, further constraining long-run GDP growth (Berg et al., 2018; Topuz, 2022).

Fiscal redistribution instruments, including personal taxes, social security contributions, and transfers, can support economic activity following a household debt shock by providing liquidity relief to indebted households (Christl et al., 2025). Therefore, fiscal redistribution may moderate the transmission of household debt shocks to economic activity. Proponents argue that redistribution enhances aggregate demand by shifting liquidity to households with high propensities to consume or by providing in-kind transfers, such as public spending on health and education (Martinez-Vazquez et al., 2012; Piketty, 2014; Babu et al., 2016; Berg et al., 2018; Oishi et al., 2018; Yildirim and Dibo, 2021; de Mendonça and Baca, 2022; Topuz, 2022). At the same time, the effectiveness of redistribution may be limited by implementation costs and inefficiencies associated with the transfer process, as emphasized by Okun's "leaky bucket" argument (Okun, 2015). Importantly, the effectiveness of redistribution also depends on its targeting. Recent evidence suggests that redistribution directed toward low-income households is more likely to support economic activity through the consumption channel, as it reallocates income toward households with a higher marginal propensity to consume and relaxes their budget constraints (Christl et al., 2025).

Taken together, these arguments suggest that fiscal redistribution may alleviate the negative impact of household debt on economic activity, particularly in periods when debt-service burdens peak, but that its effectiveness is likely to depend on its targeting. The empirical analysis therefore examines how fiscal redistribution moderates the medium-run effects of household debt on GDP, and whether these effects vary across different levels of income inequality and alternative redistributive frameworks.

3. Data and Methods

This section outlines the dataset used to explore the interplay between household debt, income inequality, and economic output, followed by a description of the local projection method employed for the empirical analysis.

3.1 Data

In this paper, an unbalanced panel dataset was constructed including information on GDP at constant prices obtained from the World Development Indicators database (World Bank, 2025b). Household debt data are drawn from the BIS Credit to the Non-Financial Sector dataset, which provides a comprehensive measure of household credit, including loans and debt securities from both bank and non-bank financial institutions. This dataset is widely used in the literature on credit cycles and household debt dynamics (e.g., Mian et al., 2017). Compared to broader datasets such as the IMF Global Debt Database (Mbaye et al., 2018), BIS data offer a more detailed and conceptually consistent measure of household credit, making them particularly suitable for analyzing the transmission of household debt shocks to economic activity. To assess robustness, data from the European Central Bank's Balance Sheet Items (BSI) statistics (ECB, 2025a) are used to examine whether the moderating effect of fiscal redistribution differs across types of household debt. The ECB data distinguish between debt for house purchase, consumption debt, other loans, and total household debt. As consumption debt is not available for all countries, the analysis focuses on mortgage debt (debt for house purchase) and non-mortgage debt, defined as total household debt minus housing debt. This residual category primarily captures consumption-related borrowing.

The dataset further includes a set of control variables: (i) long-term interest rates, defined as yields on government bonds with a ten-year maturity, capturing financing conditions and investor expectations; (ii) short-term interest rates, measured by money market rates (typically three-month interbank rates or Treasury bill rates), reflecting the cost of short-term financing and the monetary policy stance; and (iii) the consumer price index (CPI), capturing price dynamics. Interest rate data are obtained from the IMF International Financial Statistics (IMF, 2025a) and the OECD Economic Outlook (OECD, 2025), while CPI data are sourced from the WDI (World Bank, 2025b) and the IMF World Economic Outlook (IMF, 2025b). Additionally, to help explain the effect of household debt, data on the credit-market participation of households in the bottom 40 percent of the income distribution are used. These indicators of credit-market participation are drawn from the World Bank's Global Findex Database (World Bank, 2025a) and are available only for a limited set of years. Their limited coverage implies that these variables are used for descriptive purposes rather than as controls in the regression models. Finally, income inequality is measured using the Gini coefficient and the Palma ratio to primarily capture the effects of overall and top-to-bottom fiscal redistribution on income distribution.

In particular, the Gini coefficient offers broad availability and cross-country comparability, but its equal weighting across the income distribution makes it less sensitive to changes at the tails (Wood, 2020; Berisha and Meszaros, 2018; De Vita and Luo, 2021). The Palma ratio is therefore also included, as it compares the income share of the top 10 percent with that of the bottom 40 percent, where indebted households face the strongest budget constraints as debt-service burdens rise following adverse income shocks (Cobham and Sumner, 2014; Korinek and Simsek, 2016; Bahadir et al., 2020). Together, the two measures capture broad and tail-specific distributional changes and allow the analysis to assess whether differences in redistribution targeting generate heterogeneous moderating effects on the adverse impact of household debt on GDP.

Both inequality measures are available in pre-tax and post-tax national income versions, as defined by the World Inequality Database (WID; World Inequality Lab, 2025), which provides consistent

measures of income distribution across both concepts¹. This enables a clear distinction between inequality before and after fiscal redistribution. Pre-tax income captures inequality prior to the operation of the fiscal system, before personal taxes and government transfers, while still including pensions and unemployment benefits. In contrast, post-tax income reflects inequality after the operation of the fiscal system, accounting for personal taxes, social security contributions and incorporating both cash and in-kind transfers. This distinction is central to the empirical strategy, as the comparison of pre-tax and post-tax inequality measures allows the analysis to capture the effect of fiscal redistribution on the relationship between household debt and GDP. The WID also provides measures based on post-tax disposable income that exclude in-kind transfers. However, as these transfers also contribute to reducing income inequality (Martinez-Vazquez et al., 2012), they are therefore included in the analysis. In the empirical analysis, “pre-tax” and “post-tax” inequality refer to income distributions before and after fiscal redistribution, respectively, following WID conventions. To ensure comparability of results across inequality specifications in Equation (1), the same country and time sample is used for both inequality measures. Due to data availability for inequality measures and control variables, the sample is restricted to 36 countries (presented in Table A2 in the Appendix) observed annually over the period 1980–2023.

Table 1: Descriptive Statistics

Variables	Obs.	Mean	St. Dev.	Min	Q1	Med	Q3	Max
d^{HH}	1,143	56.07	27.88	5.00	35.50	53.60	70.20	135.00
$Palma_1$	1,143	3.72	3.68	0.99	2.02	2.62	3.43	23.73
$Palma_2$	1,143	2.07	2.05	0.55	1.02	1.39	1.99	13.68
$Gini_1$	1,143	47.51	9.49	27.82	41.50	46.03	50.20	75.61
$Gini_2$	1,143	36.15	12.30	14.70	27.47	34.11	40.02	72.60
<i>overall</i>	1,143	11.36	5.04	-2.16	8.94	11.58	14.86	27.31
<i>top-to-bottom</i>	1,143	1.65	1.92	-0.19	0.85	1.17	1.65	16.38
$\Delta_1 d^{hh}$	1,143	0.82	3.13	-21.30	-0.70	0.80	2.40	12.40
$\Delta_1 Gini_1$	1,136	0.09	1.17	-4.31	-0.36	0.04	0.64	4.71
$\Delta_1 Gini_2$	1,133	0.03	1.12	-6.49	-0.52	0.08	0.64	6.58
$\Delta_1 y$	1,143	2.53	3.02	-11.59	1.24	2.58	4.06	22.01
$\Delta_1 Palma_1$	1,136	0.01	0.53	-5.54	-0.06	0.00	0.10	9.14
$\Delta_1 Palma_2$	1,133	-0.01	0.27	-5.27	-0.04	0.01	0.04	1.88

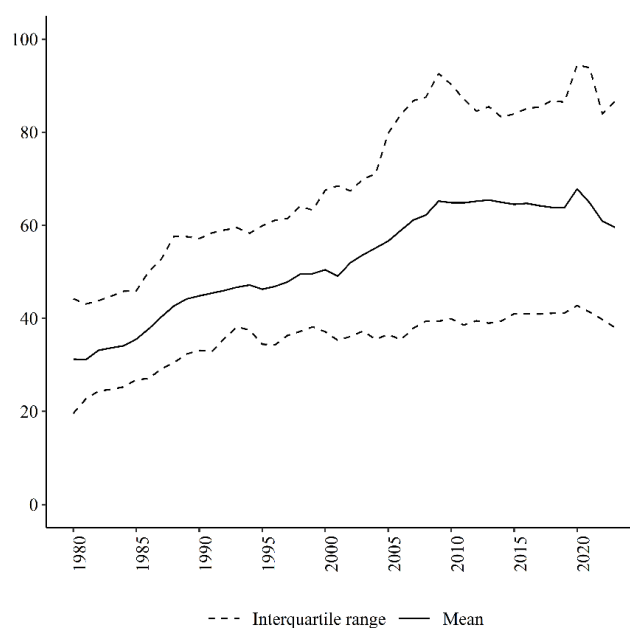
Note: The variables y , d^{HH} , $Gini_1$, $Gini_2$, $Palma_1$, $Palma_2$, *overall*, *top-to-bottom* denote the logarithm of GDP at constant local currency prices, household debt-to-GDP ratio in percent, the pre-tax and post-tax Gini coefficients, the pre-tax and post-tax Palma ratios and the levels of redistribution defined by Berg et al. (2018) as the difference between $Gini_1$ and $Gini_2$ and the difference between $Palma_1$ and $Palma_2$, respectively. GDP data are obtained from the World Development Indicators (WDI), household debt data from the BIS Credit to the Non-Financial Sector dataset, and income inequality measures from the World Inequality Database (WID).

¹ Alternative datasets present important limitations. While SWIID (Solt, 2020) offers consistent series for market and disposable income inequality, it is limited to Gini coefficients and does not allow the computation of distributional measures such as the Palma ratio. The UNU-WIDER WIID database (UNU-WIDER, 2025), including its Companion version, provides detailed distributional information but suffers from data gaps and heterogeneity across sources, and lacks a consistent distinction between pre-tax and post-tax income concepts. For these reasons, the analysis relies on the WID.

Descriptive statistics for the main variables used in the analysis are reported in Table 1. They indicate positive average GDP growth over the period under study. A notable finding is that the average increase in the pre-tax Gini coefficient is slightly larger than that in the post-tax Gini coefficient. This pattern suggests the effectiveness of fiscal redistribution in reducing income inequality, particularly through personal taxes, social security contributions, and transfers, as these mechanisms redistribute resources from higher-income to lower-income households and thereby alleviate disparities in national income (Duncan and Peter, 2016). A similar pattern is observed for the Palma ratio, where the post-tax change even exhibits a decline, indicating that redistribution could reduce income inequality at the tails of the distribution.

Table 1 indicates a general increase in household debt over the sample period, while also pointing to some volatility in its development. As shown in Figure 1, household debt generally increased from 1980 until the Global Financial Crisis in 2008. This was followed by a period of household deleveraging, which was temporarily interrupted by accommodative monetary policy during the COVID-19 period and subsequently followed by another phase of deleveraging (Boone et al., 2022). These changing dynamics may affect the results and are therefore further addressed in Section 4.1.

Figure 1: Household Debt Development



Note: The mean and quartiles were calculated separately for each year.

Source: BIS Credit to the Non-Financial Sector dataset; authors' calculations.

3.2 Methods

To analyze the dynamic effects of household debt on economic activity, the empirical framework follows the local projection approach of Jordà (2005), as applied in the context of household debt by Mian et al. (2017). To assess the role of fiscal redistribution, the analysis builds on Yildirim and Dibo (2021) by comparing specifications based on pre-tax and post-tax income inequality measures,

allowing the contribution of fiscal redistribution to the transmission of household debt shocks to be evaluated. Finally, to capture how these effects vary across levels of income inequality, the analysis follows Brambor et al. (2006) by estimating marginal effects at different values of the inequality measure.

Within this framework, the analysis focuses on the dynamic response of economic activity to household debt and fiscal redistribution across different time horizons. To estimate these relationships, the local projection (LP) method is employed, which has been widely used to capture the dynamic effects of debt on economic activity and financial stability (e.g., Jordà et al., 2013; Mian et al., 2017; Bahadir et al., 2020; Drehmann et al., 2017; Bernardini and Forni, 2020; Müller and Verner, 2024; Andrieş et al., 2025). Compared to traditional autoregressive frameworks, LP estimates responses at each horizon using separate regressions. In contrast, vector autoregressions (VARs) derive impulse responses from a single system of equations, imposing a common dynamic structure across horizons. The greater flexibility of LP reduces the risk that misspecification propagates over time and is particularly useful for distinguishing between short- and medium-run effects of household debt (Jordà, 2005). In addition, LP provides robust statistical inference in settings characterized by highly persistent data and long forecast horizons (Montiel Olea and Plagborg-Møller, 2021). As a single-equation framework, it also offers flexibility in incorporating interaction terms and state-dependent effects, enabling the analysis to capture how the effects of household debt vary across different levels of income inequality and how fiscal redistribution modifies these dynamics.

Based on Equation (1), the models are estimated using panel data to analyze how fiscal redistribution modifies the impact of household debt over time horizons $h = 1, \dots, 10$ years:

$$\begin{aligned} \Delta_h y_{it+h} = & \alpha_i^h + \sum_{j=0}^p \beta_{HH,j}^h * \Delta_1 d_{it-j}^{HH} + \sum_{j=0}^p \beta_{ineq_k,j}^h * d_{it-j}^{ineq_k} \\ & + \sum_{j=0}^p \beta_{int_k,j}^h * (\Delta_1 d_{it-j}^{HH} * d_{it-j}^{ineq_k}) + \sum_{j=0}^p \delta_j^h * \Delta_1 y_{it-j} \\ & + \sum_{j=0}^1 \Gamma_j^h * X_{it-j} + \sum_{j=0}^2 \theta_j^h * Z_{it-j} + \epsilon_{it+h}^h \end{aligned} \quad (1)$$

where i denotes the country, t the time period, and $j = 0, \dots, p$ indexes the lags. The variable y_{it} denotes the logarithm of real GDP. To capture the cumulative effect of household debt shocks, the dependent variable is expressed as the h -step-ahead long difference, defined as $\Delta_h y_{it+h} = y_{it+h} - y_{it}$. Further, d_{it}^{HH} denotes household debt-to-GDP ratio in percentage, $d_{it}^{ineq_k}$ represents the income inequality measure, where $k \in \{1, 2\}$ with $k = 1$ denoting the pre-tax measure and $k = 2$ the post-tax measure and $(\Delta_1 d_{it}^{HH} * d_{it}^{ineq_k})$ is the interaction term. The model includes two sets of control variables following Jordà et al. (2013)², but with a more detailed focus on the lag structure of monetary-policy controls Z_{it} including the long-term interest rate and the short-term

² Following Jordà et al. (2013), investment-to-GDP and the current-account-balance-to-GDP ratio were also considered as control variables but are excluded from the model, as they may constitute part of the transmission mechanism through which household debt affects economic activity. To assess the sensitivity of this modeling choice, the model was estimated using the specification of Jordà et al. (2013). The corresponding results, reported in Figures A11 and A12 in the Appendix, remain qualitatively consistent with the baseline findings.

interest rate. In line with the monetary policy horizon, which lasts from twelve to twenty-four months (Havránek and Rusnák, 2013), two-year lags of interest rate variables are included in addition to contemporaneous values and one-year lags. Second, X_{it} includes the CPI in contemporaneous form and with one-year lags, following Jordà et al. (2013). The model further includes country fixed effects α_i^h . In this paper, time fixed effects are not included in the model as their inclusion could over-control for economically meaningful variation by removing the global household debt cycle, that is, the synchronized rise and fall of household indebtedness across countries that helps explain co-movements in GDP (Mian et al., 2017)³. Finally, ϵ_{it} is the error term. Standard errors are computed using the Driscoll–Kraay estimator with a lag length of two, making them robust to heteroskedasticity, serial correlation, and cross-sectional dependence. Furthermore, the lag order is set to $p = 4$ based on the Akaike Information Criterion (AIC) and in line with previous studies (Mian et al., 2017). However, as demonstrated by Jordà (2005), LP is robust to misspecification of the lag structure.

To ensure a consistent interpretation of the estimated coefficients discussed below, this paragraph outlines the transformation of the variables included in the model. Control variables enter the model in levels, with the exception of CPI. Panel unit root tests indicate that these variables are stationary in levels, while the first difference of CPI captures the inflation rate and is also stationary. This specification is consistent with Jordà et al. (2013). Following Mian et al. (2017), household debt-to-GDP enters in first differences, allowing the estimated coefficients to capture responses to changes in household debt rather than to its level. The shock is defined as a one-standard-deviation increase in household debt growth, computed separately for each horizon. Using first differences also reduces concerns about non-stationarity and spurious regression. In contrast, income inequality enters in levels to assess how the effect of household debt varies across inequality environments.

Building on this specification, the analysis accounts for heterogeneity across income inequality levels by evaluating the effect of household debt on GDP as a conditional marginal effect following Brambor et al. (2006). This approach allows both the impact of household debt and the role of fiscal redistribution to differ across income inequality levels. Specifically, for a given level of income inequality d^{ineq} , representing the range of inequality levels observed in the dataset, including selected percentiles of the distribution, the effect at horizon h is computed as:

$$IRF_h^k = \frac{\partial \Delta_h y_{it+h}}{\partial \Delta_1 d_{it}^{HH}} = \beta_{HH,h} + \beta_{int_{k,h}} d^{ineq}, k \in \{1, 2\} \quad (2)$$

Where $\beta_{HH,h}$ denotes the coefficient on household debt growth and $\beta_{int_{k,h}}$ denotes the coefficient on the interaction term. The corresponding standard error is given by

³ Mian et al. (2017) show that the global household debt cycle operates through trade linkages. When household debt rises, imports fall and net exports improve. However, if many countries deleverage simultaneously, their ability to offset weaker domestic demand through exports diminishes, amplifying the global downturn. For robustness, year fixed effects were also included. The main findings remain unchanged, and IRF plots are reported in Figures A1 and A2 in the Appendix.

$$SE(IRF_h^k(d^{ineq})) = \sqrt{Var(\beta_{HH,h}) + d^{ineq}{}^2 Var(\beta_{int_k,h}) + 2d^{ineq} Cov(\beta_{HH,h}, \beta_{int_k,h})}. \quad (3)$$

These marginal effects of household debt are evaluated at selected income inequality levels d^{ineq} , yielding impulse response functions that vary across the range of income inequality. Specifically, the selected values are based on percentiles computed from the pooled distribution of the income inequality measure, combining both pre-tax and post-tax observations across all countries and time periods. This ensures that the same reference points are used for both specifications and that differences reflect the role of fiscal redistribution rather than differences in income inequality levels. The analysis focuses on the first quartile ($d^{ineq} = Q1$) and third quartile ($d^{ineq} = Q3$), which represent countries with lower and higher levels of income inequality, respectively⁴. This approach captures cross-country heterogeneity associated with differences in institutional quality and financial development (Badarinza et al., 2019; Kumhof et al., 2015). Such heterogeneity may, in turn, influence how household debt affects economic activity, a dimension not explicitly considered in the existing literature.

Within this framework, the moderating effect of fiscal redistribution is identified as the difference between post-tax and pre-tax responses for each horizon h and each income inequality level d^{ineq}

$$\Delta IRF_h(d^{ineq}) = IRF_h^2(d^{ineq}) - IRF_h^1(d^{ineq}). \quad (4)$$

Statistical inference for the estimated moderating effect is based on a paired country-cluster bootstrap with 1,000 replications (Cameron et al., 2008). In each replication, countries are sampled with replacement, while all available annual observations for each selected country are retained. Consequently, the resampling block corresponds to the complete country-specific time series rather than to a fixed-length moving time block. Because the panel is unbalanced, the length of each block equals the number of available observations for the corresponding country and therefore varies across countries. For each bootstrap sample, both the pre-tax and post-tax local-projection models are re-estimated at every horizon and the difference between the corresponding impulse responses is calculated within the same replication:

$$\Delta IRF_h^{*(b)}(d^{ineq}) = IRF_h^{2*(b)}(d^{ineq}) - IRF_h^{1*(b)}(d^{ineq}), \quad b=1, \dots, 1000, \quad (5)$$

where the superscript (b) denotes the bootstrap replication. Estimating both specifications on the same bootstrap sample and computing their difference within each replication preserves the covariance between the pre-tax and post-tax impulse responses. Pointwise 90% confidence intervals are then obtained from the empirical bootstrap distribution using the 5th and 95th percentiles:

$$CI_{0.90,h}(d^{ineq}) = [Q_{0.05}(\Delta IRF_h^{*(b)}(d^{ineq})), Q_{0.95}(\Delta IRF_h^{*(b)}(d^{ineq}))]. \quad (6)$$

⁴ To avoid bias arising from the choice of specific quartiles, Figures A7 and A8 in the Appendix report results for nearly the entire income distribution, excluding only extreme values by using the 5th and 95th percentiles as the minimum and maximum inequality levels. The results obtained using these broader inequality thresholds confirm that the main findings are unchanged relative to those based on the Q1 and Q3 inequality levels.

This approach allows the moderating effect of fiscal redistribution to be traced over time while enabling the transmission of household debt shocks to differ between countries with lower and higher levels of income inequality. A direct redistribution indicator, typically defined as the difference between pre-tax and post-tax inequality (Berg et al., 2018), is not included in the model. Such a measure would be mechanically linked to the underlying inequality measure and could introduce multicollinearity, leading to inflated standard errors and less precise estimates. As a result, using a direct redistribution measure would make it difficult to include the inequality level in the same framework and thus limit the ability to evaluate how the effects of household debt and fiscal redistribution vary across different inequality levels. Instead, the analysis relies on comparing impulse response functions across the pre-tax and post-tax specifications, allowing the contribution of fiscal redistribution to be assessed in a transparent and consistent manner across horizons and income inequality levels (Yildirim and Dibo, 2021).

The differences between post-tax and pre-tax responses reflect different concepts of redistribution depending on the inequality measure used. Overall redistribution is defined, following Berg et al. (2018), as the difference between the pre-tax and post-tax Gini coefficients. This definition captures the aggregate redistributive effect of the fiscal system across the entire income distribution and corresponds to the Reynolds–Smolensky Index. In contrast, top-to-bottom redistribution focuses on the extremes of the income distribution and is defined as the difference between the pre-tax and post-tax responses when the Palma ratio is used, reflecting how effectively taxes and transfers reduce the income gap between the top 10 percent and the bottom 40 percent of households. While redistribution defined using the Gini coefficient reflects overall redistribution, redistribution defined using the Palma ratio emphasizes changes at the tails of the distribution. Considering both perspectives allows the analysis to assess whether the role of fiscal redistribution differs depending on its distributional focus.

As household debt growth may be endogenous, the IV framework is employed primarily as a diagnostic tool to test its potential endogeneity. In this setup, household debt growth is instrumented using the Financial Development Index constructed by Svirydzienka (2016) and the banking net interest margin from the Global Financial Development Database (World Bank, 2022), both lagged by one period. The choice of instruments is motivated by their ability to capture credit supply conditions rather than contemporaneous macroeconomic demand. The Financial Development Index reflects the structural capacity of the financial system to intermediate credit, encompassing dimensions such as depth, access, and efficiency, and thus captures factors influencing credit supply. The banking net interest margin, in turn, captures the cost of financial intermediation and thus directly affects lending conditions and credit supply (Claessens et al., 2018). Both instruments are therefore expected to be correlated with household debt growth, while affecting future GDP only indirectly.

Endogeneity is formally tested using a GMM distance test (difference-in-Hansen test). The corresponding test statistics and p-values for all horizons are reported in Table A5 in the Appendix. The null hypothesis of exogeneity is not rejected for most horizons in both the pre-tax and post-tax specifications. However, evidence of potential endogeneity emerges at the sixth horizon in both specifications. Overall, the results suggest that household debt growth can be treated as exogenous within the empirical framework. At the same time, the main analysis focuses primarily on horizons

four to seven, where evidence of endogeneity appears only at the sixth horizon and at the 5% significance level, but not at the 1% level. This suggests that the core results are not substantially affected. Treating household debt growth as exogenous is also consistent with the underlying economic mechanism: household borrowing is likely to be influenced to a large extent by credit supply conditions rather than contemporaneous income fluctuations, while GDP, used here as a proxy for aggregate income, may not exert a strong immediate effect on household debt (Mian et al., 2017).

Finally, the robustness of the results is assessed by excluding the post-COVID-19 period, during which elevated volatility in household debt was driven by accommodative monetary policy and may influence the estimates (see Figure 1). Additional robustness checks consider pre- and post-Global Financial Crisis subsamples, advanced and emerging market economies, and the decomposition of household debt into mortgage and non-mortgage borrowing, where the latter primarily captures consumption-related loans that may affect economic activity differently. Although the ECB sample is limited to 22 European countries due to data availability (presented in Table A4 in the Appendix), it still provides a meaningful robustness check, as 16 of the 22 countries are also included in the main regressions. Moreover, the harmonized structure of the ECB dataset supports the methodological framework by allowing for a consistent decomposition of household debt across countries. As such, the results based on this dataset provide additional insight into how the moderating effect of fiscal redistribution differs across types of household debt.

4. Results

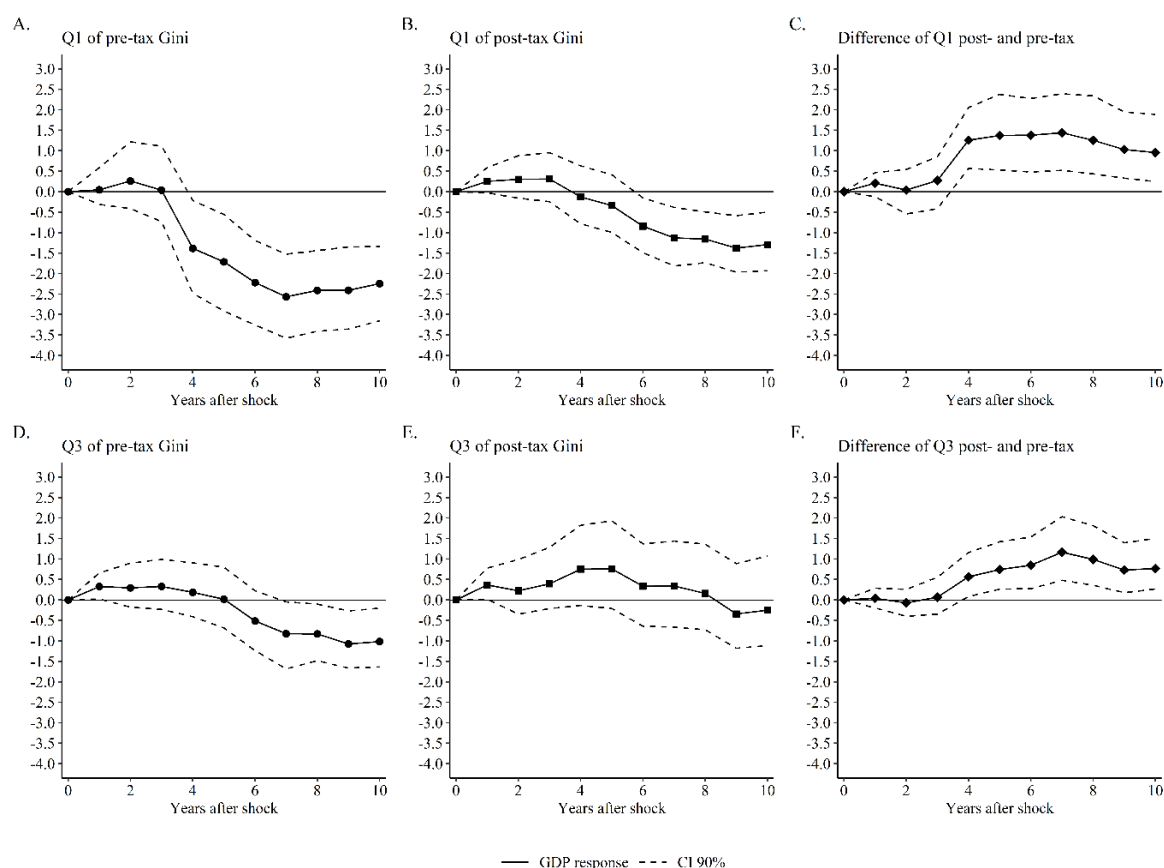
This paper examines how fiscal redistribution affects the impact of household debt on GDP and how these effects vary across different levels of income inequality. The comparison of results from pre-tax and post-tax models is used to test whether fiscal redistribution can moderate the adverse effect of household debt on economic activity. The analysis examines the responses across different levels of income inequality, represented here by the first (Q1) and third (Q3) quartiles of the Gini coefficient and Palma ratio. The potential moderating effect of fiscal redistribution is evaluated primarily in the medium run, at horizons 4 to 7. During this period, debt-service burdens rise and reach their peak, and the spending capacity of indebted households is most constrained, as discussed in Section 2. Fiscal redistribution may therefore help alleviate budget pressures on indebted households and support their consumption, potentially leading to a less pronounced decline in GDP.

The results are presented in Figures 2 and 4, where the top row (Panels A–C) reports the results for the first quartile (Q1) of income inequality, while the bottom row (Panels D–F) reports the corresponding results for the third quartile (Q3). Within each row, the columns present the results sequentially. The first column shows the GDP response to a household-debt shock when fiscal redistribution is not considered, the second column shows the response when fiscal redistribution is taken into account, and the third column reports the differences between the post-tax and pre-tax specifications, which are consistent with the moderating effect of fiscal redistribution.

As shown in Figure 2, the GDP response to a household debt shock is less negative, and in some cases may even turn positive when fiscal redistribution is considered, particularly in the medium run. This pattern is most pronounced around the seventh-year horizon, when debt-service payments

peak (see Figure 2, Panels C and F). The results indicate that overall redistribution helps relieve the strained budgets of indebted households, thereby supporting their spending capacity, consistent with a moderating effect of fiscal redistribution. The magnitude of this moderating effect indicates that GDP is 1.44 percentage points higher when overall redistribution is considered in countries with lower income inequality (see Figure 2, Panel C), and 1.17 percentage points higher in countries with higher income inequality (see Figure 2, Panel F), relative to the model based on the pre-tax Gini coefficient. The results point to three key findings. First, the GDP response following a credit shock appears to improve when the countercyclical role of overall redistribution is taken into account. Second, the magnitude of this effect may vary with the level of income inequality across countries. Third, the adverse impact of household-debt shocks on GDP is more pronounced in countries with lower levels of income inequality. This unanticipated result calls for closer examination to understand the underlying mechanisms.

Figure 2: Effect of Overall Redistribution on GDP after a Household Debt Shock (Gini-Based)



Source: Authors' calculations.

The key differences across levels of income inequality are summarized in Table 2⁵, which reports the medians of selected variables and offers a possible explanation for why the moderating effect

⁵ The values are based on observations from 2000 onward to ensure comparability in data coverage. For each country, the average income inequality measure over this period was then computed and used to assign countries to quartiles. Medians of the selected variables were subsequently calculated within each quartile group.

of overall redistribution and the impact of household debt shocks on GDP may differ between countries with lower and higher income inequality.

Table 2 reveals contrasts between the selected quartiles. Countries in the first quartile exhibit higher levels of household indebtedness, which are typically associated with higher debt-service ratios and greater budgetary pressure on indebted households. Countries with lower income inequality also display higher credit-market participation among low-income households, who are the most vulnerable to reductions in consumption during the debt-repayment period. Higher overall household indebtedness and broader credit-market participation among low-income households are consistent with a more pronounced negative effect of household debt on GDP in countries with lower income inequality than in those with higher income inequality. While differences in income inequality are evident, the magnitude of the moderating effect is also related to the degree of overall redistribution, which is 1.87 points higher in countries with lower income inequality (see Table 2, column 2). This disparity in redistributive capacity is likely to be one of the key mechanisms through which the moderating effect of overall redistribution becomes stronger in countries with lower levels of income inequality compared to those with higher income inequality.

Table 2: Variable Medians by Inequality Quartile (Gini-Based)

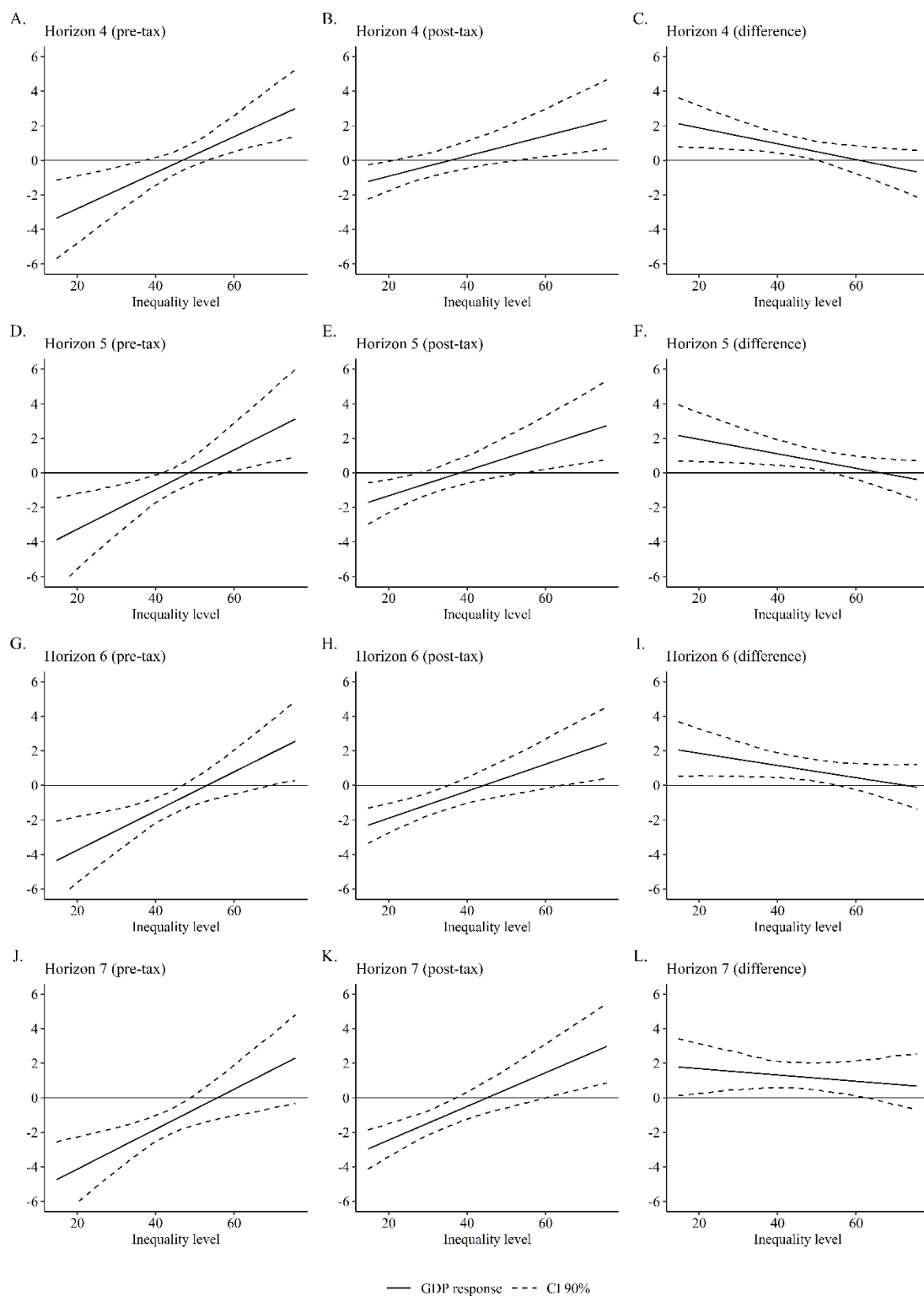
Quartile	d^{HH}	<i>overall</i>	$Gini_1$	$Gini_2$	<i>bottom_40</i>
1	76.60	13.22	39.60	25.94	40.98
3	63.15	11.35	49.49	36.73	33.12

Note: The variables d^{HH} , $Gini_1$, $Gini_2$, *overall*, *bottom_40* denote household debt-to-GDP ratio in percent, the Gini coefficient pre-tax and post-tax, the level of redistribution defined by Berg et al. (2018) as the difference between $Gini_1$ and $Gini_2$ and credit-market participation of individuals in the bottom 40 percent of the income distribution, respectively. Household debt data are from the BIS Credit to the Non-Financial Sector dataset, Gini coefficients from the World Inequality Database (WID) and credit-market participation data from the World Bank's Global Findex Database (World Bank, 2025a).

To examine the moderating effect of fiscal redistribution across the full spectrum of income inequality during the period in which debt-service burdens rise and reach their peak, Figure 3 presents GDP responses at horizons 4 to 7. Consistent with the previous results, the adverse effect of household debt weakens as income inequality increases, with GDP responses becoming less negative and eventually positive. However, the moderating effect of overall redistribution (third column of Figure 3) becomes less pronounced at higher inequality levels and remains statistically insignificant. The negative slope of the GDP-response difference further indicates that the moderating effect of overall redistribution is relatively stronger in countries with lower income inequality.

These results are consistent with the following mechanism. As shown in Table A1, higher income inequality is associated with lower household indebtedness and a lower degree of credit-market participation among low-income households. In such countries, the moderating effect of overall redistribution appears to be limited, as only a small share of low-income households is indebted and overall household indebtedness is relatively low, which may reduce the scope for redistribution to ease their budget constraints.

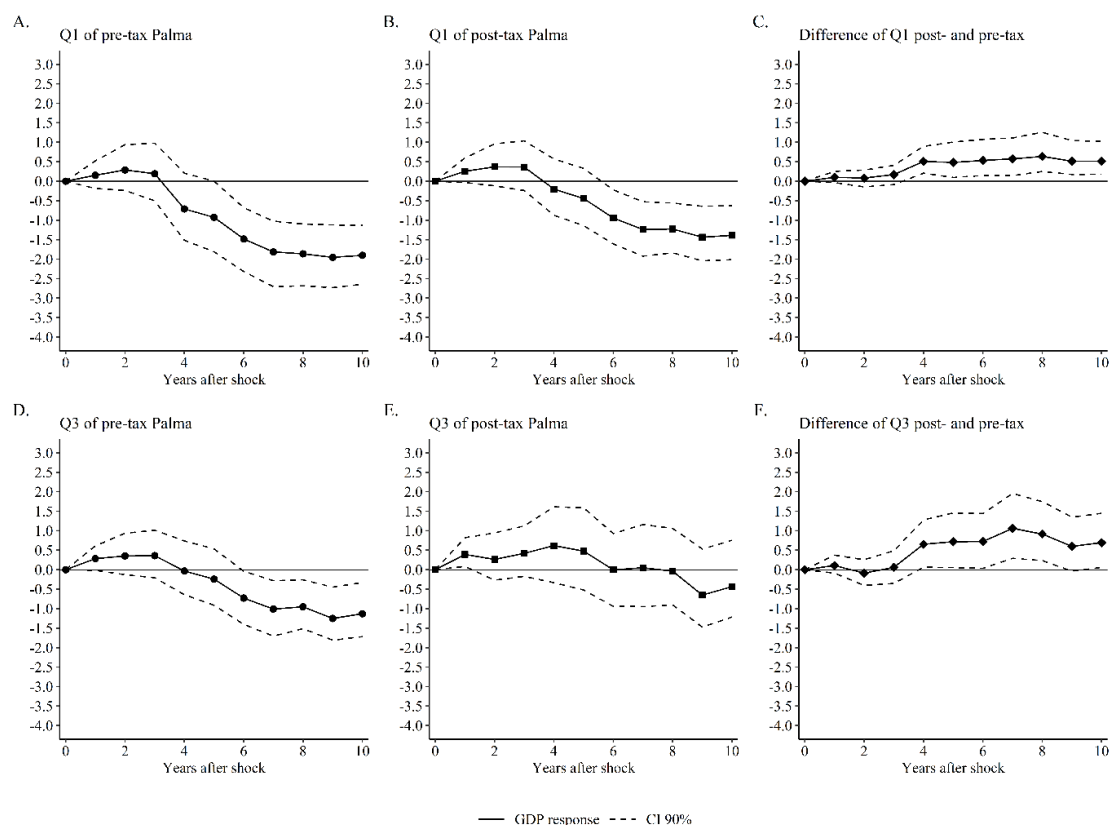
Figure 3: Effect of Overall Redistribution (Gini-Based) on GDP at Selected Horizons across the Full Range of Inequality Levels



Source: Authors' calculations.

The Gini-based results contrast with the prevailing literature, which generally associates higher income inequality with a stronger adverse effect of household debt on GDP. Instead, the findings are consistent with structural differences in household indebtedness and credit-market participation among low-income households. They also indicate that the moderating effect of overall redistribution is stronger in countries with lower income inequality. Because the Gini coefficient is less sensitive to changes at the tails of the income distribution, it cannot adequately reflect the moderating role of fiscal redistribution for low-income households. For this reason, the Palma ratio is also employed as a measure of income inequality. It is constructed as the ratio of the income share of the richest 10 percent to that of the poorest 40 percent and thus provides a different perspective for assessing distributional dynamics relevant to the transmission of household debt shock.

Figure 4: Effect of Top-to-Bottom Redistribution on GDP after a Household Debt Shock (Palma-Based)



Source: Authors' calculations.

When the Palma ratio is considered, results similar to those obtained from the Gini-based models emerge. The results suggest that top-to-bottom redistribution moderates the adverse effect of household debt on GDP, particularly in the medium run (see Figure 4, Panels C and F). The adverse impact of household debt on GDP appears stronger in countries with lower income inequality (see Figure 4, Panels A and D), as shown in Figure 2. However, the negative effect of household debt on GDP is less pronounced in the first quartile (Q1) when using the Palma ratio (see Figure 4, Panel A) than in the specification using the Gini coefficient (see Figure 2, Panel A).

This difference may reflect the lower level of household indebtedness in the first quartile (Q1) when using the Palma ratio, compared to the corresponding quartile based on the Gini coefficient, as shown in Table A1. Nevertheless, certain differences emerge between the models based on the Gini coefficient and those using the Palma ratio. The specifications employing the Gini coefficient indicate a stronger moderating effect of fiscal redistribution on the negative impact of household debt on GDP in countries with lower income inequality (see Figure 2, Panels C and F). In contrast, models incorporating the Palma ratio suggest that this alleviating effect, again most visible around the seventh horizon, tends to be stronger in countries with higher income inequality (1.06 percentage points; see Figure 4, Panel F) than in those with lower income inequality level (0.64 percentage points; see Figure 4, Panel C). This pattern stands in sharp contrast to the Gini-based results, where the moderating effect was stronger in countries with lower income inequality. In the Gini specification, the largest difference in the moderating effect of overall redistribution amounted to 0.27 percentage points in favor of low-inequality countries, whereas the corresponding difference using the Palma ratio, capturing the effect of top-to-bottom redistribution, reverses sign and widens to 0.42 percentage points in favor of the countries with higher income inequality. The results suggest that when controlling for changes at the tails of the income distribution, as captured by the Palma ratio, the alleviating effect appears stronger in countries with higher income inequality. However, a comparison of the two redistribution measures suggests that the estimated moderating effect of overall redistribution is generally larger than that of top-to-bottom redistribution across almost all horizons, irrespective of the level of income inequality (see Table A6). Table 3 helps clarify the key sources of variation underlying the differences in GDP responses between the first and third quartiles (Q1 and Q3) reported in Figure 4, as well as the differences between the Palma-based results in Figure 4 and the Gini-based results in Figure 2.

Table 3: Variable Medians by Inequality Quartile (Palma-Based)

Quartile	d^{HH}	<i>top-to-bottom</i>	$Palma_1$	$Palma_2$	<i>bottom_40</i>
1	68.70	0.86	1.84	0.95	39.69
3	66.55	1.61	3.23	1.58	36.25

Note: The variables d^{HH} , $Palma_1$, $Palma_2$, *top-to-bottom*, *bottom_40* denote household debt-to-GDP ratio in percent, the Palma ratio pre-tax and post-tax, the level of redistribution defined by Berg et al. (2018) as the difference between $Palma_1$ and $Palma_2$ and credit-market participation of individuals in the bottom 40 percent of the income distribution, respectively. Household debt data are from the BIS Credit to the Non-Financial Sector dataset, Palma ratios from the World Inequality Database (WID) and credit-market participation data from the World Bank's Global Findex Database (World Bank, 2025a).

In contrast to the redistribution based on the Gini coefficient (Table 2), redistribution measured by the Palma ratio⁶ (top-to-bottom redistribution) is substantially higher in countries with higher income inequality (Table 3). These differences suggest that countries with higher inequality target fiscal redistribution more directly at the tails of the income distribution. Indebted low-income households in these countries are also the most exposed to negative income shocks following household debt shocks, and redistribution aimed at the tails of income distribution can therefore

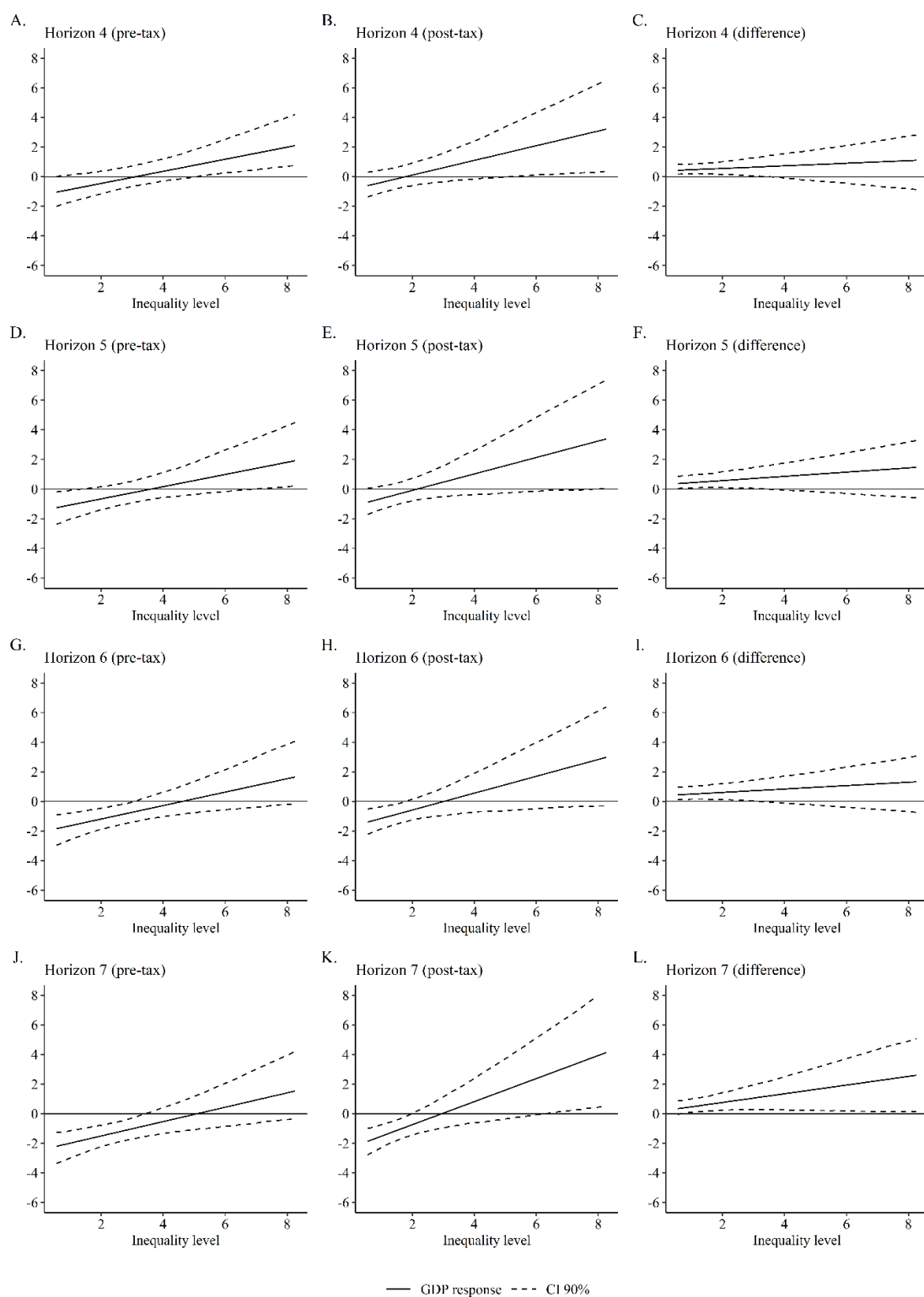
⁶ Following the definition of redistribution based on the Gini coefficient used by Berg et al. (2018), an analogous approach is applied to capture redistribution at the tails of the income distribution using the Palma ratio, defined as the difference between the pre-tax and post-tax Palma ratios.

play a more significant role in easing their strained budgets. This may explain why the alleviating effect of redistribution is more pronounced in countries with higher income inequality. In contrast, for countries with lower inequality, the scope for further redistribution is limited. Reducing the Palma ratio from 1.84 to 0.95 (see Table 3) is considerably more difficult than lowering it from 3.23 to 1.58 (see Table 3), as a Palma ratio close to or below 1 indicates a highly equal income distribution where the bottom 40 percent already receive a larger share of income than the top 10 percent (Cobham and Sumner, 2014). Hence, in countries with lower income inequality, the potential for additional reductions in inequality in the tails of income distribution through top-to-bottom redistribution is inherently smaller, which weakens its moderating effect.

Given these differences between countries with lower and higher income inequality, the subsequent analysis, as in the Gini-based specification, examines the marginal effects of household debt shocks on GDP across the full range of the Palma ratio (Figure 5). The GDP response following a household debt shock becomes statistically significant at selected horizons, particularly at the lower and upper ends of the Palma ratio distribution. However, in contrast to the Gini-based models, the slope of differences in GDP responses is positive (third column of Figure 5), suggesting that the moderating effect of top-to-bottom redistribution may become stronger at higher levels of income inequality. This pattern is consistent with redistribution being more strongly targeted toward low-income households in countries with higher income inequality. At the same time, the estimated moderating effect remains statistically significant up to approximately the third quartile of the Palma ratio, corresponding to a value of about 3 (see Table 3). At higher levels of income inequality, it is generally no longer statistically significant, with the exception of the seventh horizon. One plausible explanation is that countries at the upper end of the Palma distribution exhibit relatively low household indebtedness and limited credit-market participation among low-income households (see Table A1). As a result, top-to-bottom redistribution has fewer indebted households to support, limiting its ability to alleviate debt-service pressures and, consequently, its moderating effect. At lower levels of income inequality, the moderating effect is mostly statistically significant, but its economic magnitude remains limited. This may reflect the fact that these countries already exhibit relatively low Palma ratios and that redistribution operates in a more broad-based manner. Consequently, the scope for additional top-to-bottom redistribution directed specifically toward indebted vulnerable households is inherently limited, which helps explain why its overall stabilizing capacity remains weak.

The Palma-based models suggest that household debt may exert a more negative effect on GDP in countries with lower income inequality. Another key finding of the Palma-based model is that top-to-bottom redistribution can moderate the adverse effects of household debt more strongly in countries with higher income inequality than in countries with lower income inequality. However, this moderating effect remains statistically insignificant at the highest levels of the Palma ratio, likely because low-income households exhibit low credit-market participation and overall household indebtedness is limited in these countries.

Figure 5: Effect of Top-to-Bottom Redistribution (Palma-Based) on GDP at Selected Horizons across the Full Range of Inequality Levels

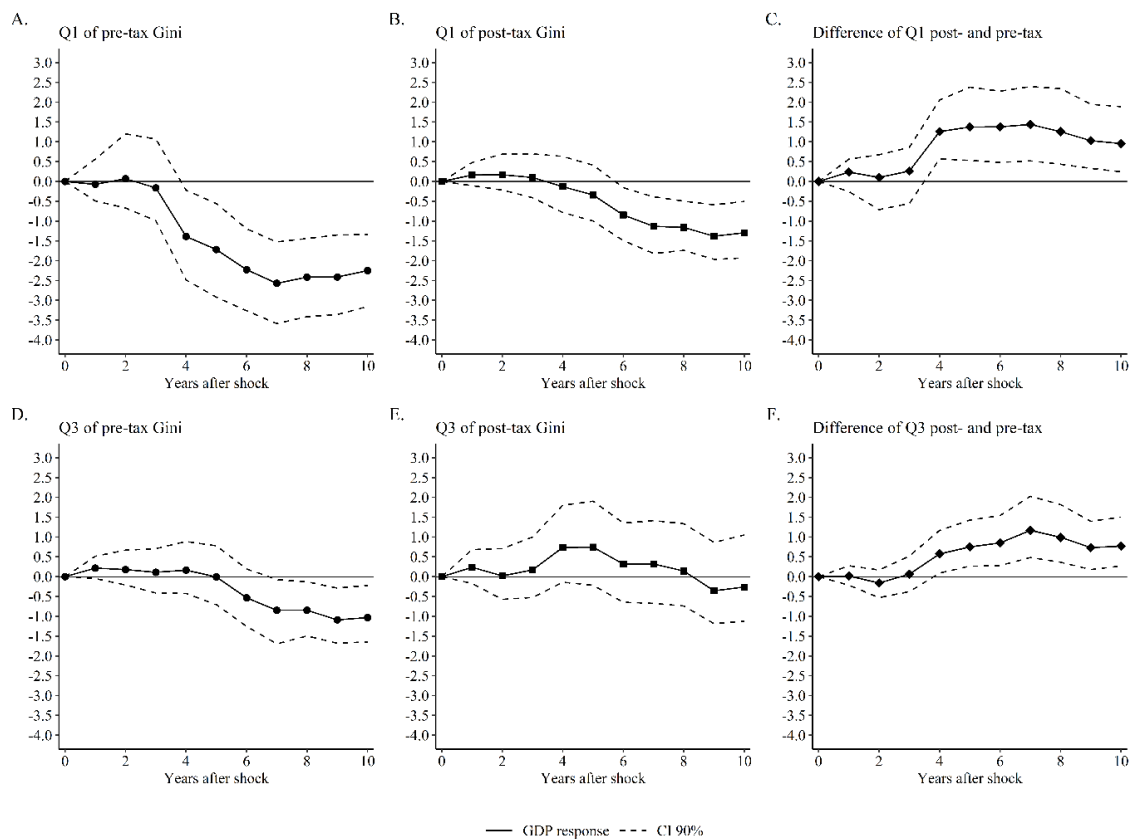


Source: Authors' calculations.

4.1 Robustness Check

To assess the robustness of the results obtained from Gini- and Palma-based models, Figures 6 and 7 present estimates excluding the COVID-19 period. The period of the COVID-19 pandemic was marked by a surge in household indebtedness (see Figure 1), during which the average level of household debt increased by 4 percentage points in 2020, compared to an average annual change of 0.8 percentage points before 2020. Because the high volatility of household debt at the outbreak of the pandemic and the subsequent deleveraging of the household sector could influence the estimates, all observations after 2019 were excluded from the regression.

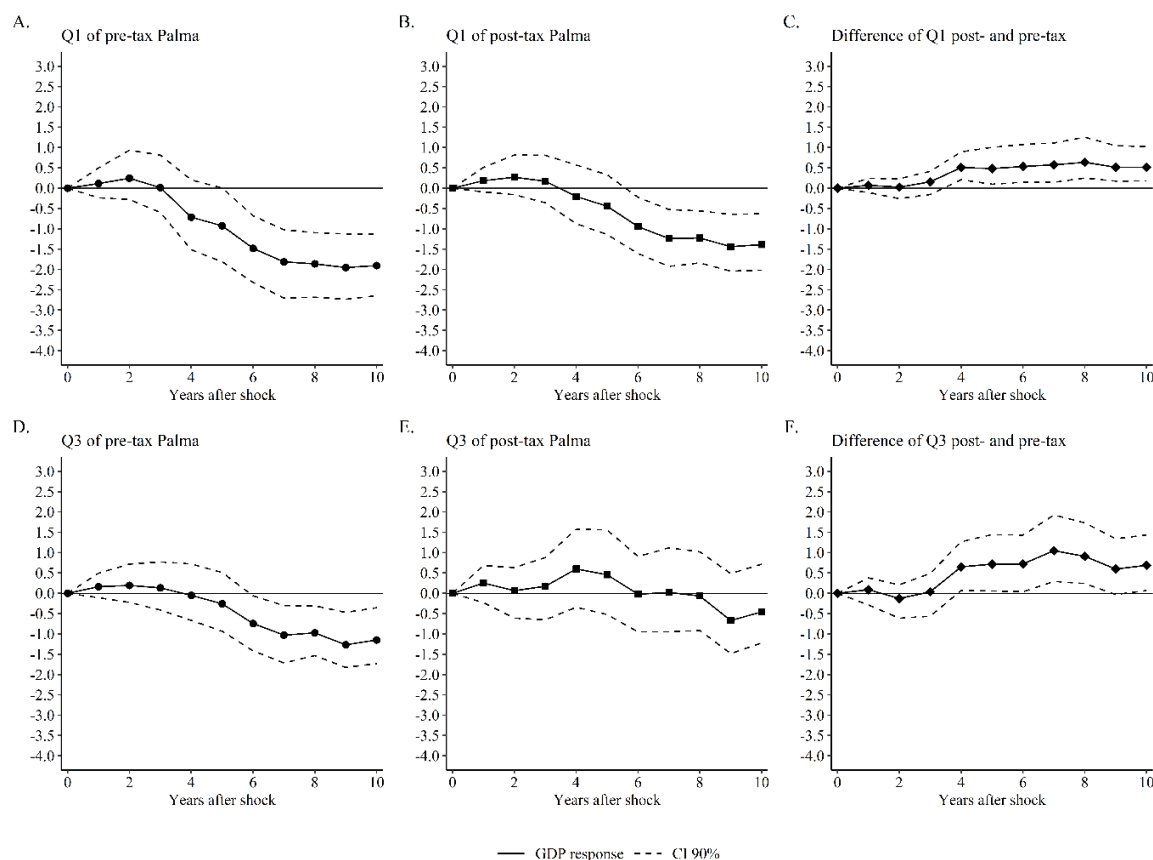
Figure 6: Effect of Overall Redistribution on GDP after a Household Debt Shock before COVID-19 (Gini-Based)



Source: Authors' calculations.

Figure 6 indicates that the main conclusions of the Gini-based model remain robust to the exclusion of the specific subperiod, confirming the stability of the estimated relationship. The patterns documented in the full sample persist. Household debt exerts a more pronounced negative effect on GDP in countries with lower income inequality (see Figure 6, Panel A), while fiscal redistribution moderates this effect primarily during the period when debt-service burdens rise and reach their peak (see Figure 6, third column). The moderating effect also remains stronger in countries with lower income inequality (see Figure 6, Panel C).

Figure 7: Effect of Top-to-Bottom Redistribution on GDP after a Household Debt Shock before COVID-19 (Palma-Based)



Source: Authors' calculations.

Similarly, the Palma-based model remains robust to the exclusion of the specific subperiod (see Figure 7). The main patterns observed in the full sample persist, with fiscal redistribution moderating the adverse effects of household debt primarily around the debt-service peak. In contrast to the Gini-based results, the moderating effect remains larger in countries with higher income inequality (see Figure 7, Panel F). Together, these results confirm the stability of the estimated relationships across specifications and subperiods.

The following robustness exercises focus on the Gini-based specification, as overall redistribution exhibits the strongest moderating effect in the baseline results. Owing to data limitations in the subsample analyses, the estimation is restricted to horizons $h = 0, \dots, 7$, which still cover the debt-service peak period.

The first robustness check divides the sample into pre- and post-Global Financial Crisis (GFC) periods to examine whether the baseline findings are sensitive to the structural changes in credit markets and banking regulation following the GFC (Boone et al., 2022). The subsample estimates (see Figures A3 and A4) are associated with wider confidence intervals and should therefore be interpreted with caution. Nevertheless, they preserve the same qualitative pattern as the baseline results. The loss of statistical significance likely reflects the substantial reduction in the effective

sample size, particularly at medium-run horizons, as the use of h-step-ahead differences and lagged controls considerably shortens the usable time dimension within each subsample.

The second robustness check divides the sample into advanced economies (AEs) and emerging market economies (EMEs; see Table A2), following the IMF (2023) classification. This distinction allows the estimated effects of household debt shocks to be evaluated separately in economies with deep credit markets and high financial inclusion and in economies characterized by more limited household credit penetration. The robustness check therefore assesses whether the baseline results are influenced by cross-country differences in financial development and credit-market participation. The estimates for AEs (see Figure A5) remain qualitatively consistent with the baseline results. For EMEs (see Figure A6), the estimates are associated with wider confidence intervals. With the exception of the early horizons and horizon 6 for countries with lower income inequality, both the GDP responses and the redistribution effects are mostly statistically insignificant and associated with wide confidence intervals, particularly during the debt-service peak period, although the estimated redistribution effect remains generally positive. These findings are consistent with the descriptive evidence in Table A1, which shows that EMEs are concentrated mainly in the highest Gini quartile, where household indebtedness and credit-market participation among low-income households are relatively low. This limits the scope for household debt shocks to generate pronounced debt-service pressures and, consequently, reduces the potential for fiscal redistribution to stabilize economic activity. Overall, the AE estimates remain qualitatively consistent with the baseline results, whereas the EME estimates should be interpreted with caution because of their wider confidence intervals.

4.2 Mortgage vs Non-Mortgage Debt in European Countries

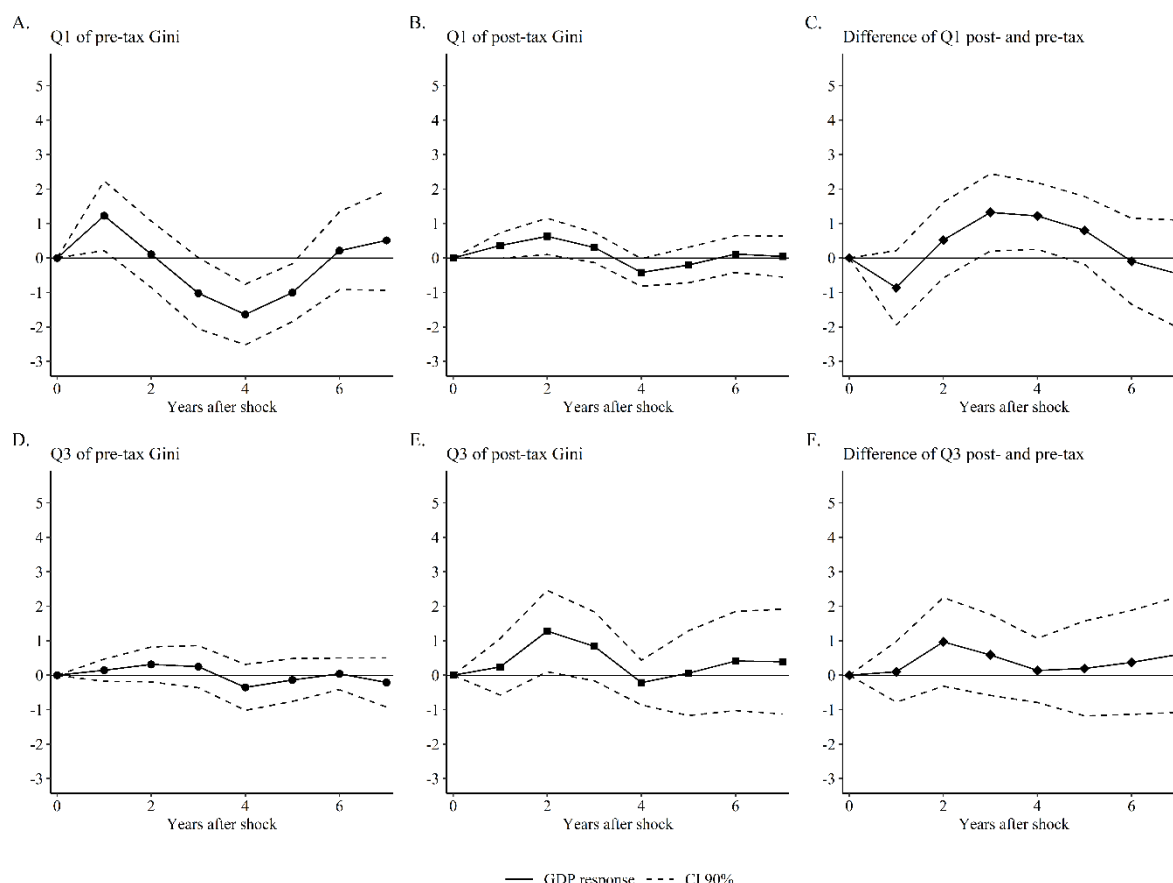
As fiscal redistribution and economic activity may interact differently across types of household debt, the analysis further distinguishes between mortgage and non-mortgage borrowing. Before presenting these results, the baseline specification is re-estimated for the European subsample using total household debt from the ECB dataset. This provides a benchmark with the same country coverage, time span, and data source as the subsequent debt-type analysis. The corresponding results, reported in Figures A9 and A10 in the Appendix, remain qualitatively consistent with the baseline findings, indicating that the differences discussed below primarily reflect the decomposition of household debt rather than changes in sample composition or data source. Descriptive statistics for the European estimation sample are reported in Table A3 in the Appendix.

Distinguishing between mortgage and non-mortgage debt is economically relevant because these debt types differ in their underlying purpose, contract structure, and implications for household balance sheets. Mortgage debt is primarily associated with housing investment and typically involves large, long-term, collateralized contracts, whereas non-mortgage debt largely consists of consumer credit characterized by smaller loan sizes and shorter maturities (Fulford, 2015; Kaplan et al., 2014). These differences imply that debt-service burdens may evolve differently across debt types, potentially leading to heterogeneous effects on economic activity.

To account for these differences, household debt is decomposed into mortgage and non-mortgage debt. Due to the shorter time span of the disaggregated data and the need to preserve degrees of

freedom, the analysis focuses on horizons $h=1, \dots, 7$, which still cover the period during which debt-service burdens rise and typically reach their peak.

Figure 8: Effect of Overall Redistribution on GDP after a Household Mortgage Debt Shock (Gini-Based)

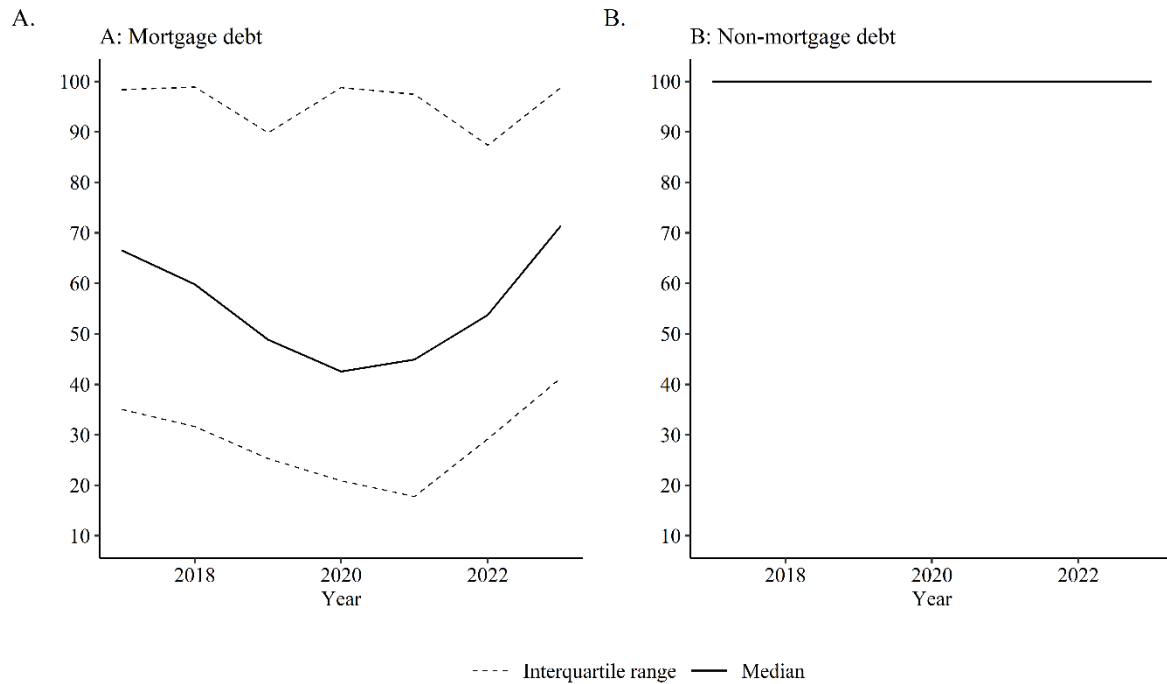


Source: Authors' calculations.

Figure 8 reports the GDP responses to a mortgage debt shock under the Gini-based specification. The results indicate a more pronounced negative effect of mortgage debt on GDP in countries with lower income inequality, peaking at the fourth horizon after the mortgage debt shock (see Figure 8, Panel A). At the same time, this adverse effect is moderated by overall redistribution (see Figure 8, Panel C), especially between the third and fifth horizons. This pattern suggests that redistribution is most effective in alleviating budget constraints when households are most constrained. In contrast, both the GDP response and the moderating effect of overall redistribution in countries with higher income inequality remain largely insignificant (see Figure 8, Panels D–F), potentially reflecting lower mortgage indebtedness and therefore weaker debt-service pressures on household budgets. By comparison, the more pronounced negative effect of mortgage debt in countries with lower income inequality likely reflects higher mortgage exposure and greater overall

household indebtedness (see Table 4)⁷. In addition, greater redistributive capacity in countries with lower income inequality, combined with higher debt exposure, creates greater scope for fiscal redistribution to alleviate budget pressures on indebted households. This supports the stronger moderating effect of overall redistribution in countries with lower income inequality (see Table 4).

Figure 9: Share of New Mortgage and Non-Mortgage Loans with a Fixed-Rate Period of up to Five Years



Note: The median and quartiles were calculated separately for each year. Fixation periods of up to five years include variable-rate loans as well as loans with interest rate fixation of up to one year and between one and five years. For non-mortgage debt, the interquartile range lies close to the median, indicating that nearly all non-mortgage debt is subject to interest rate fixation periods of up to five years.

Source: ECB MFI Interest Rate (MIR) statistics (ECB, 2025b).

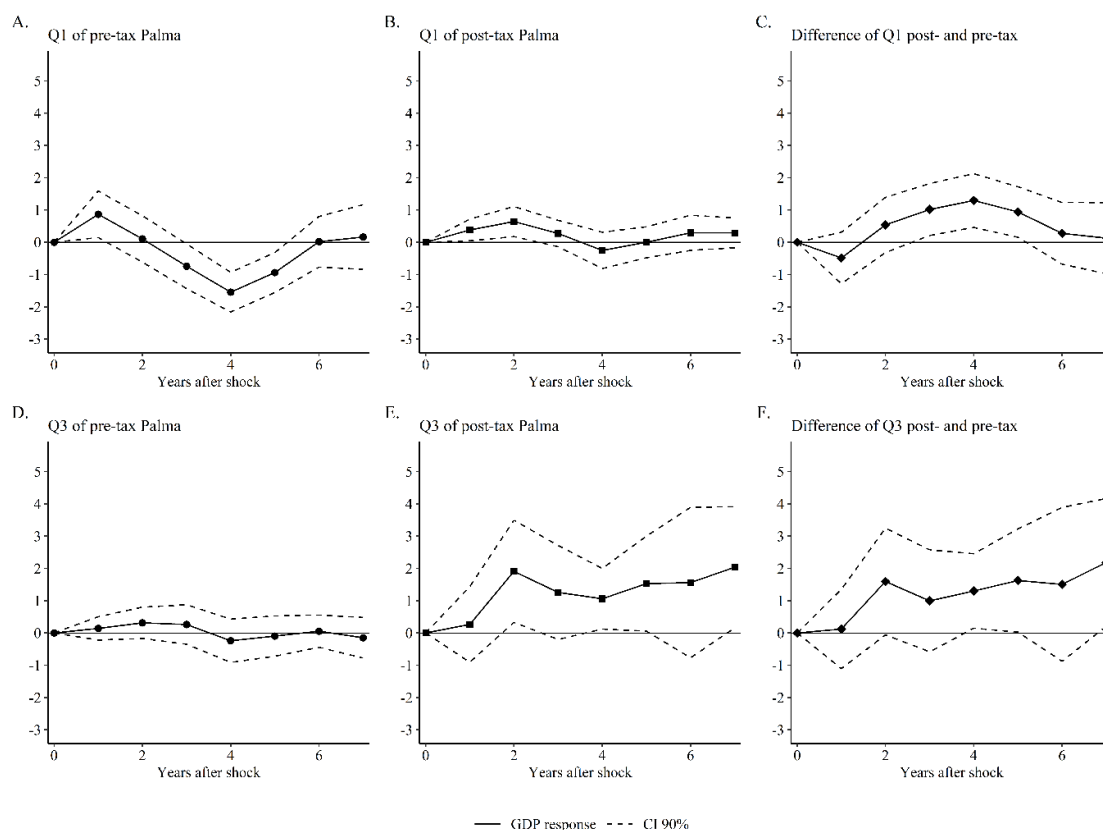
The negative GDP response to a mortgage debt shock reaches its peak earlier than in the aggregate specification (see Figures 2 and 8). While the debt-service ratio is expected to peak around the seventh year after the shock (Drehmann et al., 2017), mortgage debt exhibits a more pronounced negative impact around the fourth horizon. This earlier response likely reflects the prevalence of relatively short fixation periods in European mortgage markets, which are the only markets covered in the ECB sample, where a substantial share of loans is refixed within five years (see Figure 9, Panel A)⁸. As fixation periods expire, borrowing costs may rise, increasing debt-

⁷ For each country, the average value of the income inequality measure over the available sample period was calculated and used to assign countries to quartiles. Subsequently, median values of the selected variables were computed within each quartile group.

⁸ Information on interest rate fixation for new loans is available for all countries included in the sample except Czechia, Hungary, and Sweden, due to data limitations. Although the time span is relatively short, it covers the period 2017–2023, characterized by a low-interest-rate environment, particularly during the COVID-19 period (Boone et al., 2022). While such conditions increase households' incentives to lock in borrowing costs through

service burdens and reducing the spending capacity of indebted households. Fiscal redistribution begins to moderate these pressures between the third and fifth years after the shock, particularly in countries with lower income inequality, consistent with a medium-run adjustment driven by repayment pressures between the fourth and seventh years after the debt shock (Drehmann et al., 2017; Mian et al., 2017).

Figure 10: Effect of Top-to-Bottom Redistribution on GDP after a Household Mortgage Debt Shock (Palma-Based)



Source: Authors' calculations.

The results based on top-to-bottom redistribution (see Figure 10, Panels A–C) are broadly consistent with those obtained using overall redistribution in countries with lower income inequality (see Figure 8, Panels A–C). In both cases, fiscal redistribution moderates the adverse effect of mortgage debt between the third and fifth years after the shock, with the strongest negative impact occurring at the fourth horizon. This suggests that redistribution targeted at low-income households is able to alleviate budget pressures in a similar way to overall redistribution in countries with lower income inequality. However, some differences emerge in countries with higher income inequality. In these countries, the GDP response following a mortgage debt shock appears positive and

longer fixation periods (Campbell, 2013), the median share of fixation periods of up to five years remains close to 50%, indicating a substantial share of new loans with shorter fixation. Despite considerable cross-country variation, the median remains mostly above the 50% threshold, suggesting that in a substantial number of countries the majority of new loans have interest rate fixation of up to five years.

statistically significant at selected horizons when top-to-bottom redistribution is considered (see Figure 10, Panel E). The positive GDP response following a mortgage debt shock likely reflects lower mortgage exposure, which reduces pressure on household budgets and limits the negative impact on household consumption (see Table 4). The more positive GDP response further suggests that redistribution targeted at low-income households increases their spending capacity and supports economic activity, particularly at the fourth and fifth horizons. Moreover, the moderating effect of top-to-bottom redistribution is stronger in countries with higher income inequality, likely reflecting higher levels of top-to-bottom redistribution (see Table 4).

Table 4: Variable Medians by Inequality Quartile for the Mortgage and Non-Mortgage Debt Sample

Ineq. Measure	Quartile	total	mortgage	non- mortgage	redist	pre-tax	post-tax
<i>Gini</i>	1	50.07	37.81	8.56	12.73	38.93	26.05
<i>Gini</i>	3	35.81	20.40	12.18	12.04	46.55	33.75
<i>Palma</i>	1	50.07	37.81	8.56	0.80	1.75	0.95
<i>Palma</i>	3	35.81	20.40	12.18	1.25	2.66	1.38

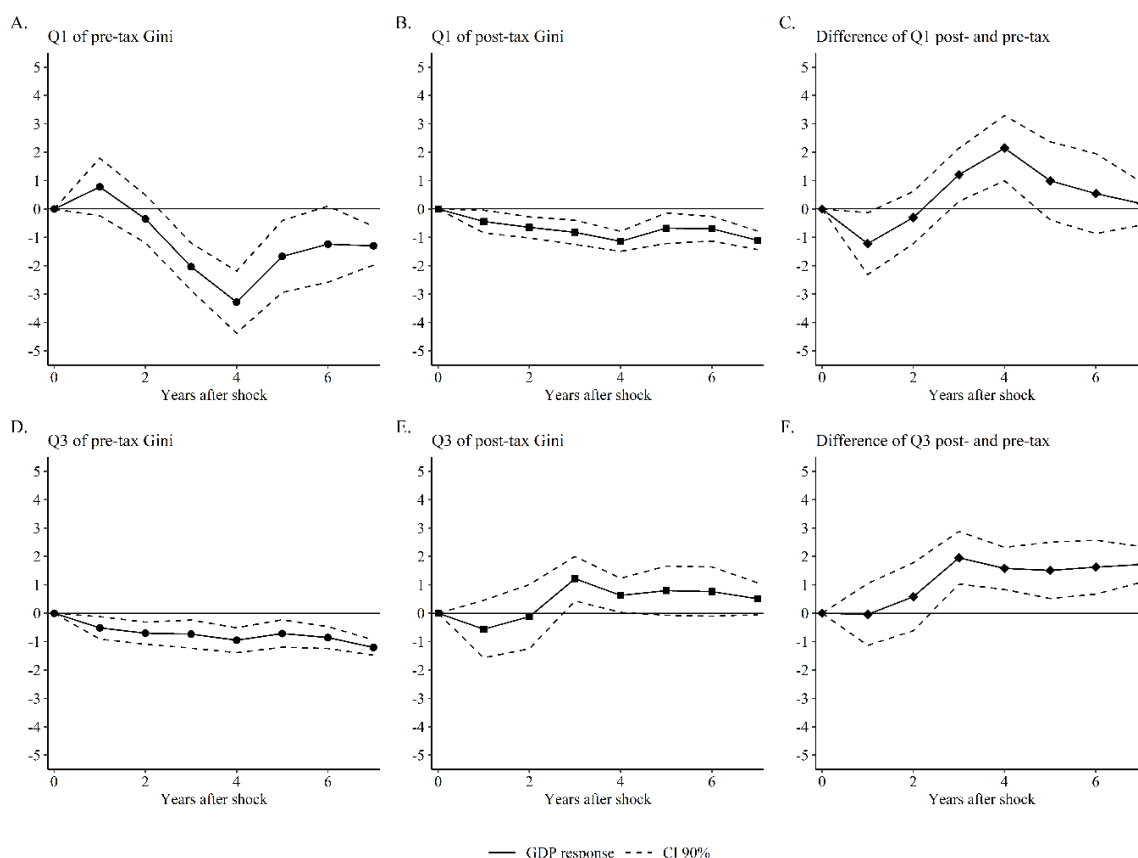
Note: The variables *Quartile*, *total*, *mortgage*, *non-mortgage*, *redist*, *pre-tax*, *post-tax* denote the Quartiles based on countries' average income inequality over the sample period, the total household debt-to-GDP ratio in percent, the mortgage debt-to-GDP ratio in percent, the non-mortgage debt-to-GDP ratio in percent, the level of redistribution defined by Berg et al. (2018) as the difference between the pre-tax and post-tax inequality measures, and the pre-tax and post-tax inequality measures, respectively. Debt statistics are obtained from the ECB Balance Sheet Items (BSI) statistics, while the inequality measures are obtained from the World Inequality Database (WID).

Turning to non-mortgage debt, the results presented in Figure 11 indicate that the adverse GDP response is again more pronounced in countries with lower income inequality. The negative response of GDP observed around the fourth year after the shock in countries with lower income inequality (see Figure 11, Panel A), followed by subsequent moderation, likely reflects the shorter maturities of non-mortgage debt relative to mortgage debt (Fulford, 2015; Kaplan et al., 2014). As these loans are repaid, the debt-service burden declines more rapidly, reducing pressure on household budgets and supporting household consumption. This interpretation is further reinforced by interest rate fixation periods, which indicate that almost all non-mortgage loans are subject to relatively short initial fixation periods, typically up to five years (see Figure 9, Panel B). As a result, debt-service pressures related to non-mortgage debt may arise around the fourth horizon, potentially contributing to the decline in GDP observed in the medium run.

When focusing on the moderating effect of overall redistribution, its peak effect is 0.2 percentage points larger in countries with lower income inequality (see Figure 11, Panels C and F), likely reflecting higher levels of overall redistribution in these countries (see Table 4). Furthermore, the moderating effect of overall redistribution peaks around the third or fourth horizon depending on the level of income inequality (see Figure 11, Panels C and F). This suggests that overall redistribution is most effective when households face the strongest debt-service pressures. However, compared to mortgage debt, the moderating effect of overall redistribution is statistically significant primarily in countries with higher income inequality (see Figure 11, Panel F). This pattern may reflect differences in non-mortgage indebtedness across income inequality levels.

Lower levels of non-mortgage debt in countries with lower income inequality tend to limit the scope for overall redistribution to ease budget constraints, while higher levels of non-mortgage debt in countries with higher income inequality increase the potential for overall redistribution to support household budgets (see Table 4).

Figure 11: Effect of Overall Redistribution on GDP after a Household Non-Mortgage Debt Shock (Gini-Based)



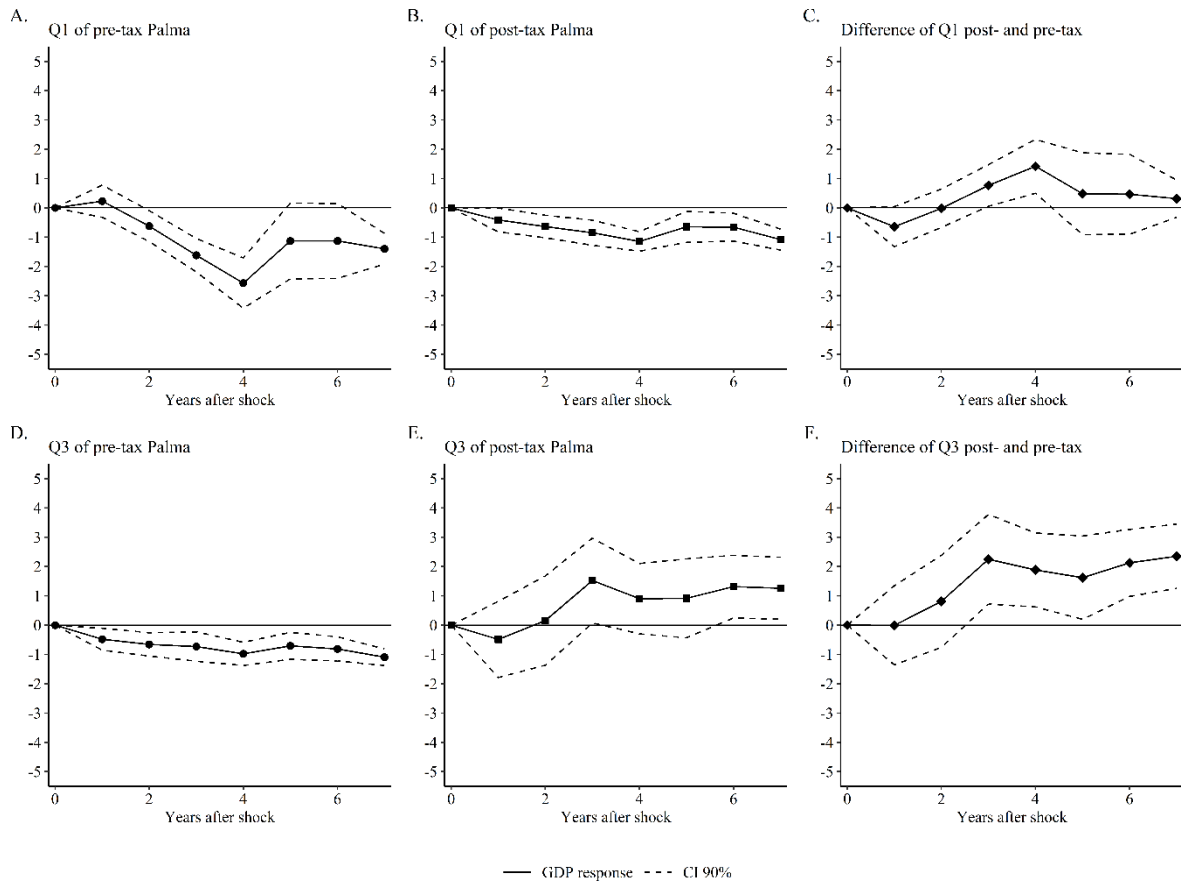
Source: Authors' calculations.

Results for non-mortgage debt with top-to-bottom redistribution are broadly consistent with those based on overall redistribution (see Figure 11), while the moderating effect of fiscal redistribution is more significant in countries with higher income inequality (see Figure 12, Panel F). This pattern can be explained by the same underlying mechanism as in the case of overall redistribution. Consistent with the mechanism observed for overall redistribution, the moderating effect of top-to-bottom redistribution appears stronger in countries with higher income inequality, likely reflecting higher levels of redistribution targeted at the tails of the income distribution (see Table 4).

The robustness check confirms the moderating effect of fiscal redistribution when accounting for different types of household debt by distinguishing between mortgage and non-mortgage borrowing, which primarily captures consumption debt. This distinction reflects differences in the underlying purpose, contract structure, and implications of these debt types for household balance sheets (Fulford, 2015; Kaplan et al., 2014). Such structural differences imply that debt-service

burdens may evolve differently across debt types, potentially leading to heterogeneous effects on economic activity.

Figure 12: Effect of Top-to-Bottom Redistribution on GDP after a Household Non-Mortgage Debt Shock (Palma-Based)



Source: Authors' calculations.

For both mortgage and non-mortgage debt, the results indicate a more pronounced negative effect on GDP in countries with lower income inequality, with the largest effects typically observed around the fourth horizon after the debt shock. While the debt-service ratio is generally expected to peak around the seventh year, the earlier response likely reflects the prevalence of relatively short interest rate fixation periods in European mortgage and non-mortgage markets, where a substantial share of loans is refinanced within five years. For non-mortgage debt, the earlier peak may also reflect its shorter maturities. As debt-service pressures decline more rapidly, part of the observed moderation may therefore reflect the natural repayment of these loans in addition to the effect of fiscal redistribution. By contrast, in the case of mortgage debt, fiscal redistribution may also operate through mortgage-specific policy instruments, such as mortgage interest deduction schemes (Vangeel et al., 2022; Van Hoenselaar et al., 2021). Importantly, while top-to-bottom redistribution appeared largely insignificant in the aggregate household debt specification, distinguishing between debt types reveals significant moderating effects, suggesting that redistribution targeted at low-

income households is more effective when debt exposure is concentrated in vulnerable groups and specific categories of household debt.

The more pronounced adverse effect of mortgage debt in countries with lower income inequality is consistent with their higher mortgage indebtedness and greater redistributive capacity (see Table 4), which together create more scope for fiscal redistribution to alleviate budget pressures. By contrast, for non-mortgage debt, the moderating effect is statistically significant primarily in countries with higher income inequality, likely reflecting their higher non-mortgage indebtedness.

5. Discussion

The theoretical literature shows that household debt affects economic activity differently across horizons (Mian et al., 2017). The same pattern documented in the literature also emerges from the present analysis when household debt is interacted with the pre-tax inequality measure, showing a short-run increase in GDP followed by a medium-run decline. This mirrors the benchmark results of Mian et al. (2017), who document a 1.92 percent fall in GDP at the seventh horizon, when debt-service burdens peak, following a one-standard-deviation household debt shock. In comparison, the present paper finds a GDP decline of 1.67 percent in the seventh year after a household-debt shock (see Figure A7 Panels G, H and I), evaluated at the median value of the pre-tax Gini coefficient to ensure comparability with Mian et al. (2017). Post-tax inequality measures are not used in this comparison, as they already incorporate the effects of fiscal redistribution. The magnitude of the response is therefore comparable, with the somewhat smaller estimate plausibly reflecting the more recent sample period (1980–2023) relative to that of Mian et al. (1960–2012), which may reflect the effects of tighter financial regulation introduced after the global financial crisis as shown by Boone et al. (2022). Overall, the results are broadly consistent with previous research in terms of the trajectory of the GDP response following a household debt shock.

While earlier studies primarily examined the relationship between income inequality and household debt itself (Wood, 2020; De Vita and Luo, 2021), relatively little attention has been devoted to how inequality alters the macroeconomic consequences of household debt. Bahadir et al. (2020) find that household debt has a more adverse effect on economic activity in countries with higher income inequality, emphasizing the role of binding credit constraints.

In contrast to their findings, this paper shows that the adverse effect of household debt on GDP is more pronounced in countries with lower income inequality. Beyond certain methodological differences, the results are consistent with structural characteristics that distinguish countries with lower income inequality from those with higher income inequality, particularly differences in the level of household indebtedness and the credit-market participation of low-income households. Countries with lower income inequality tend to exhibit higher household indebtedness (see Table A1). The more pronounced adverse effect of household debt in these countries is therefore consistent with Lombardi et al. (2022), who document a threshold effect whereby the negative impact of household debt on GDP becomes considerably stronger once the household-debt-to-GDP ratio exceeds 80 percent. As shown in Table A1, indebtedness in the first-quartile group measured by the Gini coefficient is close to this threshold, which may help explain why the negative effect of

household debt appears more pronounced in the Gini-based models. Evidence from the Palma-based models points in a similar direction, although the magnitude appears smaller.

A second potential explanation for the more pronounced adverse effect of household debt in countries with lower income inequality relates to credit-market participation. In countries with lower income inequality, low-income households tend to participate more extensively in credit markets (see Table A1). As this group is more sensitive to adverse income shocks, rising debt-service burdens may induce sharper reductions in consumption when repayments peak, thereby contributing to a more pronounced contraction in economic activity (Bahadir et al., 2020). By contrast, in countries with higher income inequality, income inequality may act as a negative signal for banks (Loschiavo, 2021; Vijverberg, 2024), which may perceive higher credit risk among low-income households and respond by tightening lending conditions or rejecting loan applications (Coibion et al., 2020; Todaro and Smith, 2020). As a result, low-income households in countries with higher income inequality are less likely to obtain credit and therefore remain less indebted (Loschiavo, 2021; Vijverberg, 2024). Existing research further suggests that emerging economies, which are disproportionately represented in the fourth quartile of the inequality distribution (see Table A1), tend to exhibit structurally lower household indebtedness and more limited access to credit (Badarinza et al., 2019; Kumhof et al., 2015). These patterns are commonly attributed to less developed financial markets (Badarinza et al., 2019), lower disposable incomes (Badarinza et al., 2019), and higher borrowing costs (Kumhof et al., 2015). Overall, these results suggest that limited credit-market participation among the most vulnerable households, together with lower overall household indebtedness, reduces the exposure of households to debt-service pressures in countries with higher income inequality. In this sense, income inequality does not appear to directly improve the macroeconomic consequences of household debt, but rather shapes an environment in which fewer households are exposed to these pressures. As a result, the aggregate GDP response to a household-debt shock appears less adverse in these economies.

These differences have important implications for the moderating role of fiscal redistribution. The results presented in this paper suggest that, in both the Gini-based and Palma-based models, fiscal redistribution that reduces income inequality may moderate the adverse effects of household debt primarily in the medium run, when debt-service burdens peak (Drehmann et al., 2017). During this period, the budgets of indebted households are most constrained, and fiscal redistribution may help ease these constraints by providing liquidity relief through taxes and transfers as in Duncan and Peter (2016) and Christl et al. (2025). The comparison between the Gini-based and Palma-based models further suggests that the effectiveness of fiscal redistribution depends on its design. Overall redistribution appears to play a relatively stronger moderating role in countries with lower income inequality, whereas top-to-bottom redistribution seems more relevant in countries with higher income inequality. At the same time, the estimated moderating effect of overall redistribution tends to be larger across most horizons.

In particular, results obtained from the Gini-based model reflect the effect of overall redistribution, which reduces inequality across the entire income distribution. As shown in Table A1, overall redistribution is higher in countries with lower income inequality, where overall household indebtedness and credit-market participation among low-income households are also higher. Therefore, overall redistribution may have the capacity to stabilize the budgets of indebted

households during the repayment period. Higher household indebtedness and greater credit-market participation among low-income households, together with higher levels of overall redistribution, may help explain both the stronger moderating effect of overall redistribution in countries with lower income inequality and the negative slope of the overall redistribution effect in Figure 3.

By contrast, top-to-bottom redistribution, which targets the tails of the income distribution more directly, tends to be higher in countries with higher income inequality (see Table A1). This pattern may be related to the relatively stronger moderating effect of top-to-bottom redistribution in the Palma-based models and to the positive slope of the top-to-bottom redistribution effect observed in Figure 5, which contrasts with the Gini-based results. However, despite the stronger focus on the poorest households, the estimated moderating effect of top-to-bottom redistribution tends to be smaller than that of overall redistribution. In countries with higher income inequality, overall household indebtedness is lower and credit-market participation among vulnerable households is more limited than in countries with lower income inequality (see Table A1), leaving top-to-bottom redistribution with limited scope to alleviate the adverse impact of rising debt-service burdens. Furthermore, the moderating effect of top-to-bottom fiscal redistribution appears weaker in countries with lower income inequality. This might be due to the fact that these economies already exhibit relatively low Palma ratios (see Table A1), often close to or below one, which may limit the scope for further redistribution toward the bottom of the income distribution. As a result, redistribution targeted at low-income households may have limited capacity to offset the negative effect of household debt in these countries, contributing to the weaker moderating effect.

Together, these results suggest that the effectiveness of fiscal redistribution depends on both the level of income inequality and the underlying structural characteristics of household balance sheets. While redistribution may alleviate the adverse effects of household debt in certain settings, its impact is not uniform across countries.

The main conclusions remain robust even after excluding the COVID-19 period and for advanced economies, confirming the stability of the estimated relationships. Although the pre- and post-GFC subsample estimates are generally not statistically significant, they remain qualitatively consistent with the baseline results. The estimates for emerging market economies should be interpreted with caution because of their wider confidence intervals. The robustness analysis further considers specifications distinguishing between mortgage and non-mortgage debt, in which fiscal redistribution continues to moderate the adverse effects of household debt. The scope of the analysis is deliberately focused on the aggregate effects of fiscal redistribution, rather than on decomposing the individual roles of personal taxes, social security contributions and transfers or on modeling the detailed structure and progressivity of tax schedules. These institutional features may interact with household debt dynamics in important ways, but examining them lies beyond the objectives of this paper. Furthermore, the empirical analysis does not employ a direct redistribution measure, as it is mechanically related to the underlying inequality indicator. Including both variables in the same specification would introduce substantial multicollinearity and complicate the identification of how household debt and fiscal redistribution interact across different levels of income inequality. Similarly, the empirical strategy is designed to characterize the dynamic relationship between household debt, income inequality, and GDP, rather than to identify exogenous credit-supply shocks using external instruments. Within this framework, the paper contributes to the literature by

providing evidence that fiscal redistribution can moderate the macroeconomic costs of household indebtedness and by highlighting how these costs depend on the level of income inequality.

6. Conclusion

This paper examined how income inequality and fiscal redistribution shape the macroeconomic consequences of household debt. Using a panel of 36 countries over the period 1980–2023, the analysis confirms that household debt shocks generate a short-run increase in GDP followed by a medium-run decline, consistent with the household-demand channel. Crucially, the results reveal that this adverse medium-run effect is more pronounced in countries with lower income inequality. This finding reflects a key structural difference: countries with lower income inequality exhibit higher overall indebtedness and greater credit-market participation among low-income households. Consequently, a larger share of households is exposed to rising debt-service burdens. In contrast, in countries with higher income inequality, credit exclusion limits borrowing among vulnerable groups, resulting in lower aggregate leverage and a weaker transmission of debt shocks to the economy.

Fiscal redistribution, encompassing personal taxes, social security contributions, cash transfers, and in-kind transfers, is shown to alleviate the adverse effects of household debt on economic activity, particularly during the medium run when debt-service burdens rise and reach their peak and household budgets are most constrained. These main conclusions remain robust even after excluding the COVID-19 period and extend to specifications distinguishing between mortgage and non-mortgage debt, confirming the stability of the estimated relationships across alternative samples and model specifications. Consistent with the structural channels identified above, this stabilizing effect is strongest in countries with lower income inequality, where overall indebtedness is higher and credit-market participation among low-income households is more widespread. In these environments, debt exposure affects a larger and more vulnerable share of the population, allowing fiscal redistribution to alleviate the liquidity constraints of a broad base of indebted households more effectively. Conversely, in countries with higher income inequality, the scope for redistribution to buffer debt shocks is limited; since low-income households in these environments are often excluded from credit markets and hold little debt to begin with, debt-targeted fiscal relief remains less effective.

From a policy perspective, these findings imply that in countries with lower income inequality, support should be broad-based rather than narrowly targeted. Since debt pressures in these economies affect a wider demographic, fiscal redistribution focusing exclusively on the poorest households would have a limited aggregate impact. A comprehensive approach supporting a wider range of indebted households can significantly strengthen economic resilience.

References

- ACEMOGLU, D. AND J. A. ROBINSON (2012): “Why Nations Fail: The Origins of Power, Prosperity, and Poverty.” *New York: Crown Business*.
- ANDRIEŞ, A. M., S. ONGENA, AND N. SPRINCEAN (2025): “Sectoral Credit Allocation and Systemic Risk.” *Journal of Financial Stability*, 76:101363.
- BABU, M. S., V. BHASKARAN, AND M. VENKATESH (2016): “Does Inequality Hamper Long Run Growth? Evidence from Emerging Economies.” *Economic Analysis and Policy*, 52:99–113.
- BADARINZA, C., V. BALASUBRAMANIAM, AND T. RAMADORAI (2019): “The Household Finance Landscape in Emerging Economies.” *Annual Review of Financial Economics*, 11:109–129.
- BAHADIR, B., K. DE, AND W. D. LASTRAPES (2020): “Household Debt, Consumption and Inequality.” *Journal of International Money and Finance*, 109:102240.
- BANK FOR INTERNATIONAL SETTLEMENTS (BIS) (2025): “Credit to the Non-Financial Sector.” BIS WS_TC 2.0 (dataset). Available at: https://data.bis.org/topics/TOTAL_CREDIT/data. Accessed: 2025-09-28
- BERG, A., J. D. OSTRY, C. G. TSANGARIDES, AND Y. YAKHSHILIKOV (2018): “Redistribution, Inequality, and Growth: New Evidence.” *Journal of Economic Growth*, 23:259–305.
- BERISHA, E. AND J. MESZAROS (2018): “Household Debt, Expected Economic Conditions, and Income Inequality.” *International Journal of Finance & Economics*, 23:283–295.
- BERNANKE, B. AND M. GERTLER (1989): “Agency Costs, Net Worth, and Business Fluctuations.” *American Economic Review*, 79(1):14–31.
- BERNARDINI, M. AND L. FORNI (2020): “Private and Public Debt Interlinkages in Bad Times.” *Journal of International Money and Finance*, 109:102239.
- BISWAS, S., I. CHAKRABORTY, AND R. HAI (2017): “Income Inequality, Tax Policy, and Economic Growth.” *The Economic Journal*, 127:688–727.
- BOONE, L., J. FELS, O. JORDÀ, M. SCHULARICK, AND A. M. TAYLOR (2022): “Debt: The Eye of the Storm.” Geneva Reports on the World Economy No. 24; CEPR Press, Paris & London.
- BRAMBOR, T., W. R. CLARK, AND M. GOLDR (2006): “Understanding Interaction Models: Improving Empirical Analyses.” *Political Analysis*, 14:63–82.
- CAMERON, A. C., J. B. GELBACH, AND D. L. MILLER (2008): “Bootstrap-Based Improvements for Inference with Clustered Errors.” *The Review of Economics and Statistics*, 90(3):414–427.
- CAMPBELL, J. Y. (2013): “Mortgage Market Design.” *Review of Finance*, 17(1):1–33.

- CARBONELL-NICOLAU, O. AND H. LLAVADOR (2021): “Elasticity Determinants of Inequality-Reducing Income Taxation.” *The Journal of Economic Inequality*, 19:163–183.
- CHRISTL, M., S. DE POLI, AND M. KÖPPL-TURYNA (2025): “Does Redistribution Hurt Growth? An Empirical Assessment of the Redistribution-Growth Relationship in the European Union.” *Economic Modelling*, 149:107104.
- CLAESSENS, S., N. COLEMAN, AND M. DONNELLY (2018): “‘Low-for-Long’ Interest Rates and Banks’ Interest Margins and Profitability: Cross-Country Evidence.” *Journal of Financial Intermediation*, 35:1–16.
- COBHAM, A. AND A. SUMNER (2014): “Is Inequality All About the Tails? The Palma Measure of Income Inequality.” *Significance*, 11:10–13.
- COIBION, O., Y. GORODNICHENKO, M. KUDLYAK, AND J. MONDRAGON (2020): “Greater Inequality and Household Borrowing: New Evidence from Household Data.” *Journal of the European Economic Association*, 18:2922–2971.
- CYNAMON, B. Z. AND S. M. FAZZARI (2016): “Inequality, the Great Recession and Slow Recovery.” *Cambridge Journal of Economics*, 40:373–399.
- DE MENDONÇA, H. F. AND A. C. BACA (2022): “Fiscal Opacity and Reduction of Income Inequality through Taxation: Effects on Economic Growth.” *The Quarterly Review of Economics and Finance*, 83:69–82.
- DE VITA, G. AND Y. LUO (2021): “Financialization, Household Debt and Income Inequality: Empirical Evidence.” *International Journal of Finance & Economics*, 26:1917–1937.
- DREHMANN, M., M. JUSELIUS, AND A. KORINEK (2017): “Accounting for Debt Service: The Painful Legacy of Credit Booms.” BIS Working Paper No. 645, Bank for International Settlements.
- DUNCAN, D. AND K. SABIRIANOVA PETER (2016): “Unequal Inequalities: Do Progressive Taxes Reduce Income Inequality?” *International Tax and Public Finance*, 23:762–783.
- EGGERTSSON, G. B. AND P. KRUGMAN (2012): “Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach.” *The Quarterly Journal of Economics*, 127:1469–1513.
- EUROPEAN CENTRAL BANK (ECB) (2025a): “Balance Sheet Items (BSI) Statistics.” Available at: <https://data.ecb.europa.eu/data/datasets/BSI>. Accessed: 2025-09-28
- EUROPEAN CENTRAL BANK (ECB) (2025b): “MFI Interest Rate (MIR) Statistics.” ECB Statistical Data Warehouse. Available at: <https://data.ecb.europa.eu/data/datasets/MFI>. Accessed: 2025-09-28
- FULFORD, S. L. (2015): “How Important Is Variability in Consumer Credit Limits?” *Journal of Monetary Economics*, 72:42–63.

- GROCHOVÁ, L. AND T. OTÁHAL (2013): “How Does Corruption in Central and Eastern Europe Hurt Economic Growth? Granger Test of Causality.” *Journal of Economics*, 61:563–577.
- HAVRÁNEK, T. AND M. RUSNÁK (2013): “Transmission Lags of Monetary Policy: A Meta-Analysis.” *International Journal of Central Banking*, 9(4):39–76.
- INTERNATIONAL MONETARY FUND (2023): “World Economic Outlook Database: Groups and Aggregates Information, April 2023.” International Monetary Fund. Available at: <https://www.imf.org/en/publications/weo/weo-database/2023/april/groups-and-aggregates>. Accessed: 2025-09-28
- INTERNATIONAL MONETARY FUND (2025a): “International Financial Statistics (IFS).” International Monetary Fund. Available at: <https://data.imf.org/>. Accessed: 2025-09-28
- INTERNATIONAL MONETARY FUND (2025b): “World Economic Outlook Database, April 2025.” International Monetary Fund. Available at: <https://www.imf.org/en/publications/weo/weo-database/2025/april>. Accessed: 2025-09-28
- JORDÀ, O. (2005): “Estimation and Inference of Impulse Responses by Local Projections.” *American Economic Review*, 95:161–182.
- JORDÀ, O., M. SCHULARICK, AND A. M. TAYLOR (2013): “When Credit Bites Back.” *Journal of Money, Credit and Banking*, 45:3–28.
- KAPLAN, G., G. L. VIOLANTE, AND J. WEIDNER (2014): “The Wealthy Hand-to-Mouth.” *Brookings Papers on Economic Activity*, 45(1):77–138.
- KORINEK, A. AND A. SIMSEK (2016): “Liquidity Trap and Excessive Leverage.” *American Economic Review*, 106:699–738.
- KOUBA, L., L. GROCHOVÁ, D. ŠTAVÁREK, AND P. VODOVÁ (2012): “Financial Crisis, Elite Political Instability and Economic Growth in Central and Eastern European Countries.” In *Proceedings of the 13th International Conference on Finance and Banking*, 184–195.
- KUMHOF, M., R. RANCIÈRE, AND P. WINANT (2015): “Inequality, Leverage, and Crises.” *American Economic Review*, 105:1217–1245.
- LOMBARDI, M. J., M. MOHANTY, AND I. SHIM (2022): “The Relationship of Household Debt and Growth in the Short and Long Run.” *Empirical Economics*, 63:1887–1911.
- LOSCHIAVO, D. (2021): “Household Debt and Income Inequality: Evidence from Italian Survey Data.” *Review of Income and Wealth*, 67:61–103.
- MARTINEZ-VAZQUEZ, J., B. MORENO-DODSON, AND V. VULOVIC (2012): “The Impact of Tax and Expenditure Policies on Income Distribution: Evidence from a Large Panel of Countries.” *Andrew Young School of Policy Studies Research Paper Series No. 12–30*.

- MBAYE, S., M. MORENO BADIA, AND K. CHAE (2018): “Global Debt Database: Methodology and Sources.” IMF Working Paper No. 2018/111, International Monetary Fund.
- MIAN, A. AND A. SUFI (2018): “Finance and Business Cycles: The Credit-Driven Household Demand Channel.” *Journal of Economic Perspectives*, 32:31–58.
- MIAN, A., A. SUFI, AND E. VERNER (2017): “Household Debt and Business Cycles Worldwide.” *The Quarterly Journal of Economics*, 132:1755–1817.
- MIAN, A., A. SUFI, AND E. VERNER (2020): “How Does Credit Supply Expansion Affect the Real Economy? The Productive Capacity and Household Demand Channels.” *The Journal of Finance*, 75:949–994.
- MONTIEL OLEA, J. L. AND M. PLAGBORG-MØLLER (2021): “Local Projection Inference Is Simpler and More Robust Than You Think.” *Econometrica*, 89(4):1789–1823.
- MÜLLER, K. AND E. VERNER (2024): “Credit Allocation and Macroeconomic Fluctuations.” *Review of Economic Studies*, 91:3645–3676.
- OECD. (2025): OECD Economic Outlook No. 117 (Edition 2025/1). OECD Data Explorer. Available at: [https://data-explorer.oecd.org/vis?df\[ds\]=dsDisseminateFinalDMZ&df\[id\]=DSD_EO%40DF_EO&df\[ag\]=OECD.ECO.MAD&df\[vs\]=1.3&dq=.GDPV_ANNPCT.A&lom=LAS_TNPERIODS&lo=5&to\[TIME_PERIOD\]=false](https://data-explorer.oecd.org/vis?df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_EO%40DF_EO&df[ag]=OECD.ECO.MAD&df[vs]=1.3&dq=.GDPV_ANNPCT.A&lom=LAS_TNPERIODS&lo=5&to[TIME_PERIOD]=false). Accessed: 2025-09-28.
- OISHI, S., K. KUSHLEV, AND U. SCHIMMACK (2018): “Progressive Taxation, Income Inequality, and Happiness.” *American Psychologist*, 73(2):157–168.
- OKUN, A. M. (2015): “Equality and Efficiency REV: The Big Tradeoff.” *Washington, DC: Brookings Institution Press*.
- PIAO, Y. A., M. LI, H. SUN, AND Y. YANG (2023): “Income Inequality, Household Debt, and Consumption Growth in the United States.” *Sustainability*, 15:3910.
- PIKETTY, T. (2014): “Capital in the Twenty-First Century.” *Cambridge: Harvard University Press*.
- SCHULARICK, M. AND A. M. TAYLOR (2012): “Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008.” *American Economic Review*, 102:1029–1061.
- SOLT, F. (2020): “Measuring Income Inequality across Countries and over Time: The Standardized World Income Inequality Database.” *Social Science Quarterly*, 101(3):1183–1199.
- SVIRYDZENKA, K. (2016): “Introducing a New Broad-Based Index of Financial Development.” IMF Working Paper No. 2016/005, International Monetary Fund.
- TODARO, M. P. AND S. C. SMITH (2020): “Economic Development” (13th ed.). Harlow: Pearson.
- TOPUZ, S. G. (2022): “The Relationship between Income Inequality and Economic Growth: Are Transmission Channels Effective?” *Social Indicators Research*, 162:1177–1231.

- TUNC, C. AND M. KILINC (2023): “Household Debt and Economic Growth: Debt Service Matters.” *Open Economies Review*, 34:71–92.
- UNU-WIDER (2025): “World Income Inequality Database (WIID).” Version 29 April 2025. Available at: <https://www.wider.unu.edu/project/wiid-world-income-inequality-database>. Accessed: 2025-09-28.
- VAN HOENSELAAR, F., B. COURNÈDE, F. DE PACE, AND V. ZIEMANN (2021): “Mortgage Finance across OECD Countries.” OECD Economics Department Working Papers No. 1693, OECD Publishing, Paris.
- VANGEEL, W., L. DEFAU, AND L. DE MOOR (2022): “The Influence of a Mortgage Interest Deduction on House Prices: Evidence across Tax Systems in Europe.” *The European Journal of Finance*, 28(3):245–260.
- VIJVERBERG, C. P. C. (2024): “Income Inequality and Household Debt: A US State-Level Spatial Analysis.” *Economic Modelling*, 138:106772.
- WOOD, J. D. (2020): “Can Household Debt Influence Income Inequality? Evidence from Britain: 1966–2016.” *The British Journal of Politics and International Relations*, 22:24–46.
- WORLD BANK (2022): “Global Financial Development Database (September 2022 version).” Available at: <https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database>. Accessed: 2025-09-28
- WORLD BANK (2025a): “The Global Findex Database 2025: Data Download and Documentation.” Washington, DC: World Bank. Available at: <https://www.worldbank.org/en/publication/globalfindex/download-data>. Accessed: 2025-09-28
- WORLD BANK (2025b): “World Development Indicators.” Available at: <https://databank.worldbank.org/source/world-development-indicators>. Accessed: 2025-09-28
- WORLD INEQUALITY LAB (2025): “World Inequality Database.” Available at: <https://wid.world>. Accessed: 2025-09-28
- YILDIRIM, A. E. AND M. DIBO (2021): “The Impacts of Income Inequality on the Gross Domestic Product under Direct Taxation: Evidence from Emerging Market Economies.” *International Journal of Social Economics*, 48:1516–1541.

Appendix A:

Table A1: Variable Medians by Inequality Quartile From 2000 Onward

Ineq. Measure	Quartile	EME	d^{HH}	<i>redist</i>	<i>pre-tax</i>	<i>post-tax</i>	<i>bottom_40</i>
<i>Gini</i>	1	1	76.6	13.22	39.60	25.94	40.98
<i>Gini</i>	2	1	57.2	13.98	45.25	30.26	42.86
<i>Gini</i>	3	1	63.15	11.35	49.49	36.73	33.12
<i>Gini</i>	4	7	36.5	6.24	63.62	59.45	20.28
<i>Palma</i>	1	1	68.7	0.86	1.84	0.95	39.69
<i>Palma</i>	2	1	58.6	1.23	2.57	1.27	43.58
<i>Palma</i>	3	1	66.55	1.61	3.23	1.58	36.25
<i>Palma</i>	4	7	36.5	2.76	7.40	5.14	20.28

Note: The variables EME, d^{HH} , *redist*, *pre-tax*, *post-tax*, *bottom_40* denote the number of emerging market economies in each inequality quartile, according to the IMF (2023) classification, the household debt-to-GDP ratio in percent, the level of redistribution defined by Berg et al. (2018) as the difference between the pre-tax and post-tax inequality measures, the pre-tax and post-tax inequality measures, and the credit-market participation among individuals in the bottom 40 percent of the income distribution, respectively. Household debt data are obtained from the BIS Credit to the Non-Financial Sector dataset, income inequality measures from the World Inequality Database (WID), and credit-market participation data from the World Bank's Global Findex Database (World Bank, 2025a).

Table A2: List of Countries Included in the Regression

Country	Time span	EME	d^{HH}	$\Delta_1 d^{HH}$	<i>Gini</i>	<i>Palma</i>
Australia	1980-2023		80.14	1.65	2	3
Austria	1996-2023		49.43	0.13	2	1
Belgium	1981-2023		44.93	0.57	2	2
Canada	1980-2023		72.51	1.17	3	3
Chile	2004-2023	X	37.98	1.14	4	4
Colombia	2003-2023	X	21.94	0.80	4	4
Czechia	2001-2023		25.56	0.98	1	1
Denmark	1995-2023		101.60	0.89	1	1
Finland	1980-2023		46.14	0.89	1	1
France	1980-2023		42.25	0.93	2	2
Germany	1991-2023		59.16	-0.04	2	2
Greece	1995-2023		42.83	1.22	3	3
Hungary	1999-2023	X	22.44	0.50	1	1
India	2008-2023	X	36.59	-0.07	4	4
Ireland	2003-2023		70.93	-1.07	2	2
Israel	1997-2023		38.72	0.29	4	4
Italy	1980-2023		28.21	0.51	3	3
Japan	1980-2023		62.50	0.48	3	3
Luxembourg	1996-2023		53.08	1.02	3	2
Malaysia	2010-2023	X	67.67	0.76	3	3
Mexico	2001-2023	X	13.21	0.39	4	4
Netherlands	1991-2023		100.99	1.25	1	1
New Zealand	1991-2023		74.96	1.88	3	3
Norway	1980-2023		70.66	0.96	1	1
Poland	2000-2023	X	26.66	0.73	2	2
Portugal	1980-2023		50.55	1.07	3	3
Singapore	1999-2021		54.27	0.54	3	3
South Africa	2009-2023	X	36.91	-0.49	4	4
South Korea	1980-2023		56.56	1.80	1	2
Spain	1981-2023		50.21	0.50	2	2
Sweden	1982-2023		63.84	0.90	1	1
Switzerland	2000-2023		114.85	0.93	1	1
Thailand	1999-2023	X	70.57	1.22	4	4
Turkey	2005-2023	X	14.63	0.33	4	4
United Kingdom	1980-2023		70.12	1.08	2	2
United States	1980-2021		71.74	0.65	4	4

Note: The variables EME, d^{HH} , *Gini*, *Palma* denote whether a country is classified as an emerging market economy according to the IMF (2023), the household debt-to-GDP ratio in percent, and the quartile classifications based on the Gini coefficient and the Palma ratio, respectively. Household debt data are obtained from the BIS Credit to the Non-Financial Sector dataset, while the quartiles are based on income inequality measures from the WID and correspond to those used in Tables 2, 3, and A1.

Table A3: Descriptive Statistics for Mortgage and Non-Mortgage Debt

Variables	Obs.	Mean	St. Dev.	Min	Q1	Med	Q3	Max
<i>mortgage</i>	422	34.29	22.64	0.97	16.90	29.73	45.26	114.92
<i>non-mortgage</i>	422	10.94	4.58	2.50	7.20	11.39	14.41	23.15
<i>Palma₁</i>	422	2.41	0.65	1.33	1.94	2.31	2.75	4.97
<i>Palma₂</i>	422	1.34	0.55	0.56	0.99	1.20	1.46	3.43
<i>Gini₁</i>	422	43.96	4.65	32.86	40.68	43.97	47.27	57.18
<i>Gini₂</i>	422	31.62	7.16	15.00	27.00	30.41	34.65	51.38
<i>overall</i>	422	12.35	4.77	-0.12	10.12	12.29	15.50	27.31
<i>top-to-bottom</i>	422	1.07	0.43	-0.02	0.79	1.08	1.31	2.37
$\Delta_1 y$	422	2.01	3.56	-16.06	0.70	2.26	3.85	22.01
$\Delta_1 Gini_1$	422	0.02	1.07	-4.13	-0.43	0.00	0.49	4.71
$\Delta_1 Gini_2$	422	0.05	1.02	-3.89	-0.49	0.09	0.64	5.09
$\Delta_1 Palma_1$	422	0.00	0.15	-0.95	-0.05	0.00	0.07	0.82
$\Delta_1 Palma_2$	422	0.00	0.10	-0.57	-0.03	0.00	0.04	0.54
$\Delta_1 mortgage$	422	0.33	2.63	-13.10	-0.87	0.30	1.66	13.87
$\Delta_1 non-mortgage$	422	-0.11	0.99	-4.04	-0.63	-0.22	0.27	6.47

Note: The variables *y*, *mortgage*, *non-mortgage*, *Gini₁*, *Gini₂*, *Palma₁*, *Palma₂*, *overall*, *top-to-bottom* denote the logarithm of real GDP at constant local currency prices, the mortgage debt-to-GDP ratio in percent, the non-mortgage debt-to-GDP ratio in percent, the pre-tax and post-tax Gini coefficients, the pre-tax and post-tax Palma ratios, and the corresponding measures of overall and top-to-bottom redistribution, defined as the differences between *Gini₁* and *Gini₂* and between *Palma₁* and *Palma₂*, respectively. GDP data are obtained from the World Development Indicators (WDI), mortgage and non-mortgage debt data from the ECB Balance Sheet Items (BSI) statistics (ECB, 2025a), and income inequality measures from the World Inequality Database (WID).

Table A4: List of Countries Included in the Regression with Mortgage and Non-Mortgage Debt

Country	Time span	In main regressions	<i>mortg</i>	$\Delta_1 \text{mortg}$	<i>non-mortg</i>	$\Delta_1 \text{non-mortg}$	<i>Gini</i>	<i>Palma</i>
Austria	2004-2023	X	26.57	0.53	16.66	-0.02	2	2
Belgium	2004-2023	X	30.04	0.70	6.22	-0.22	2	2
Croatia	2011-2023		15.86	-0.30	18.17	-0.50	3	3
Czechia	2003-2023	X	18.28	0.86	6.62	0.19	1	1
Denmark	2004-2023	X	100.11	0.23	12.46	-0.39	1	1
Finland	2004-2023	X	39.44	0.78	13.84	0.10	2	2
France	2004-2023	X	39.93	1.13	11.22	-0.13	3	3
Germany	2004-2023	X	37.43	-0.22	15.46	-0.57	3	3
Hungary	2004-2023	X	10.17	-0.05	9.53	0.12	2	2
Ireland	2004-2023	X	39.04	-1.09	9.95	-0.33	2	2
Italy	2004-2023	X	19.90	0.44	13.65	0.02	4	4
Latvia	2011-2023		18.17	-1.94	3.83	-0.51	4	4
Lithuania	2005-2023		17.09	0.57	5.03	0.04	3	3
Luxembourg	2004-2023	X	44.10	1.01	7.65	-0.10	4	4
Netherlands	2004-2023	X	59.45	-0.22	5.90	-0.27	1	1
Poland	2005-2023	X	16.96	0.56	13.00	-0.02	3	3
Portugal	2004-2023	X	52.50	-0.46	13.34	-0.07	4	4
Romania	2005-2023		5.95	0.32	8.62	-0.01	4	4
Slovakia	2007-2023		24.85	1.19	7.77	0.29	1	1
Slovenia	2005-2023		12.43	0.53	9.85	-0.12	1	1
Spain	2004-2023	X	50.04	-0.07	16.73	-0.23	2	2
Sweden	2002-2023	X	56.78	1.84	14.28	0.03	1	1

Note: The variables *In main regressions*, *mortg*, *non-mortg*, *Gini* and *Palma* denote whether a country is included in the main regression sample reported in Table A2, the mortgage debt-to-GDP ratio in percent, the non-mortgage debt-to-GDP ratio in percent, and the quartile classifications based on the Gini coefficient and the Palma ratio, respectively. Mortgage and non-mortgage debt data are obtained from the ECB Balance Sheet Items (BSI) statistics (ECB, 2025a), while the quartile classifications are based on income inequality measures from the World Inequality Database (WID). Quartile definitions correspond to those used in Table 2.

Table A5: Endogeneity Test of $\Delta_1 d_{it}^{HH}$ from Equation (1)

Horizon	Pre-tax		Post-tax	
	Test statistics	P-value	Test statistics	P-value
1	1.08	0.30	1.49	0.22
2	1.23	0.27	0.70	0.40
3	0.36	0.55	0.60	0.44
4	0.62	0.43	0.54	0.46
5	0.79	0.37	2.31	0.13
6	3.86	0.05	5.51	0.02
7	0.05	0.83	0.64	0.42
8	1.03	0.31	2.13	0.14
9	2.23	0.14	3.08	0.08
10	1.16	0.28	0.53	0.47

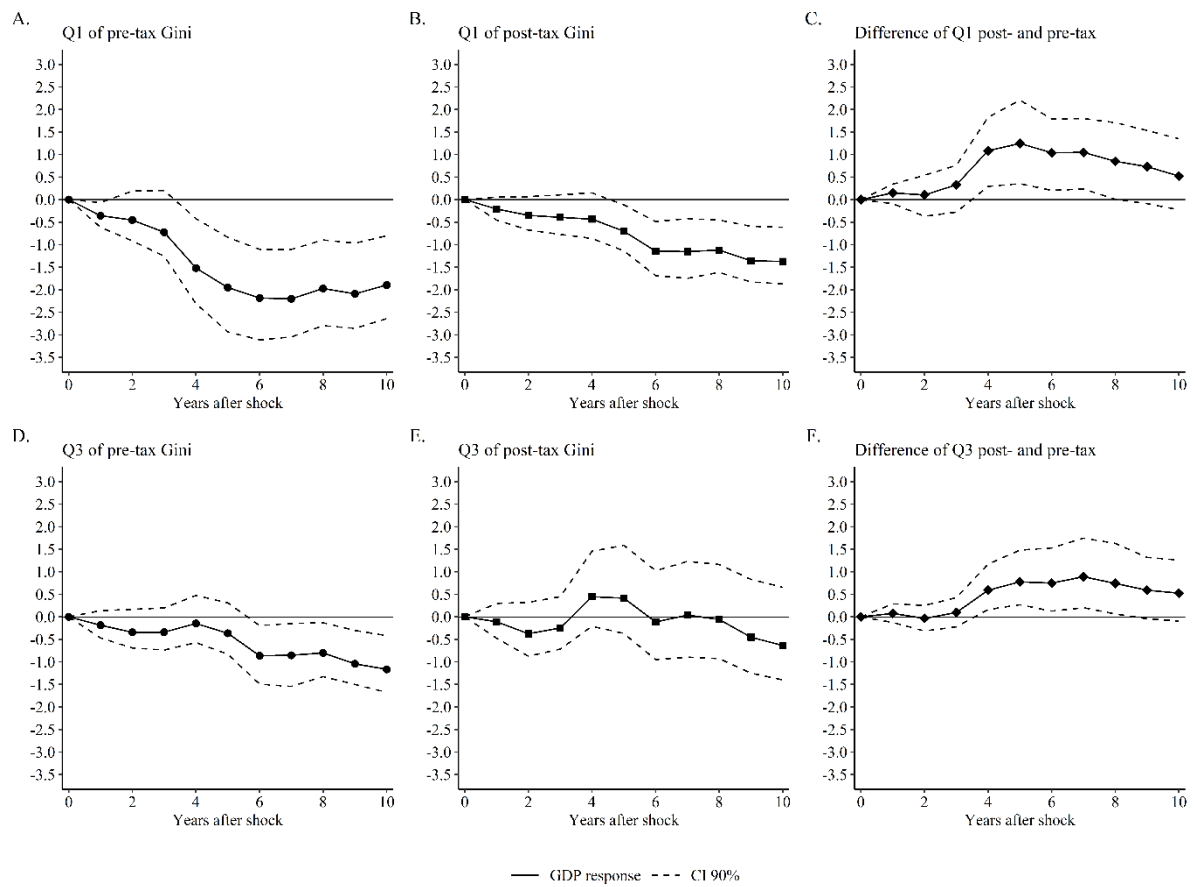
Note: The table reports the GMM distance test of endogeneity (difference-in-Hansen test). The null hypothesis is that the tested variable is exogenous. The alternative hypothesis is that it is endogenous. P-values are rounded to two decimal places.

Table A6: Comparison of the Moderating Effects of Overall and Top-to-Bottom Redistribution

Quartile	Horizon	<i>Overall redistribution</i>	<i>Top-to-bottom redistribution</i>	<i>Difference (Overall – Top-to-bottom)</i>
Q1	0	0.00	0.00	0.00
	1	0.21	0.10	0.10
	2	0.04	0.08	-0.04
	3	0.27	0.17	0.10
	4	1.26	0.51	0.75
	5	1.37	0.48	0.89
	6	1.38	0.54	0.84
	7	1.44	0.57	0.86
	8	1.25	0.64	0.62
	9	1.03	0.52	0.51
	10	0.95	0.51	0.44
Q3	0	0.00	0.00	0.00
	1	0.04	0.11	-0.07
	2	-0.07	-0.09	0.02
	3	0.06	0.06	0.00
	4	0.57	0.65	-0.09
	5	0.74	0.72	0.02
	6	0.85	0.73	0.12
	7	1.17	1.06	0.10
	8	0.99	0.92	0.07
	9	0.73	0.60	0.13
	10	0.77	0.69	0.07

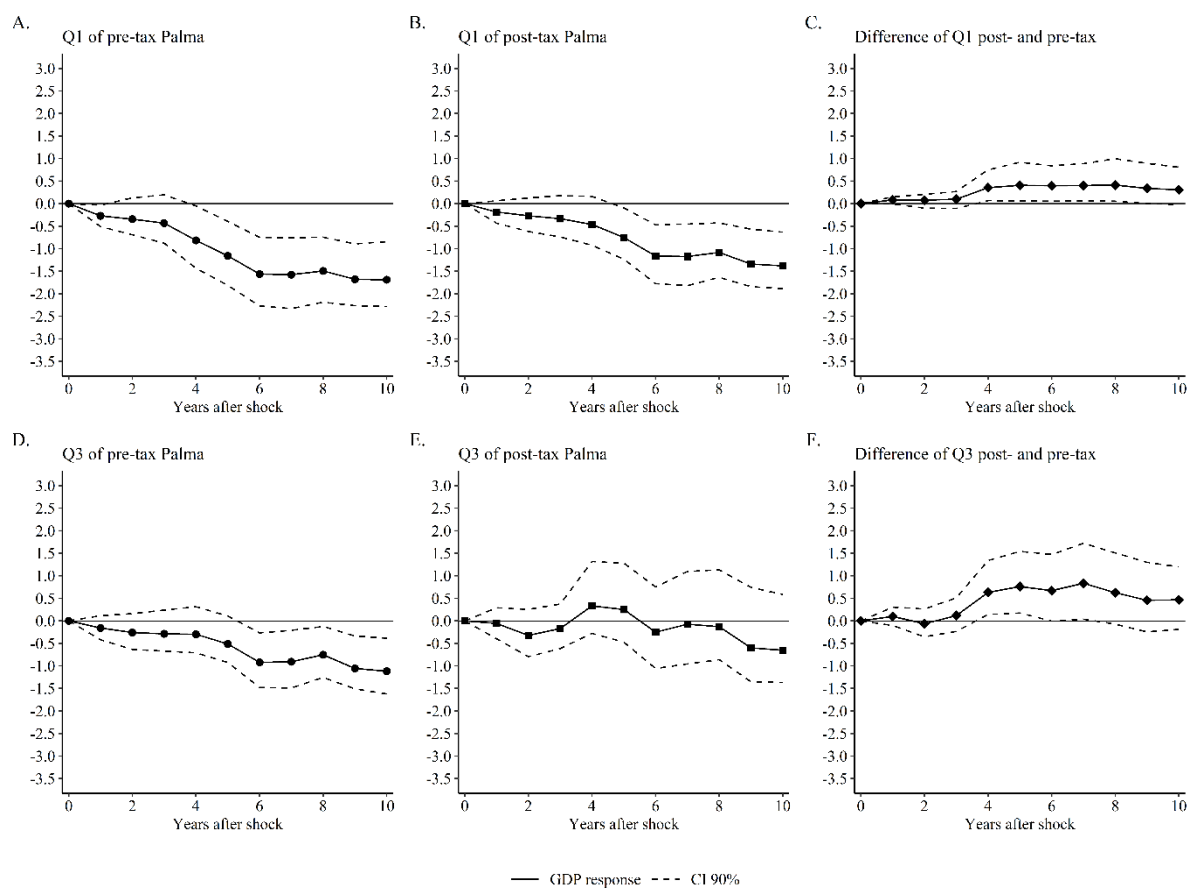
Source: Authors' calculations.

Figure A1: Effect of Fiscal Redistribution on GDP after a Household Debt Shock with Time Fixed Effects (Gini-Based)



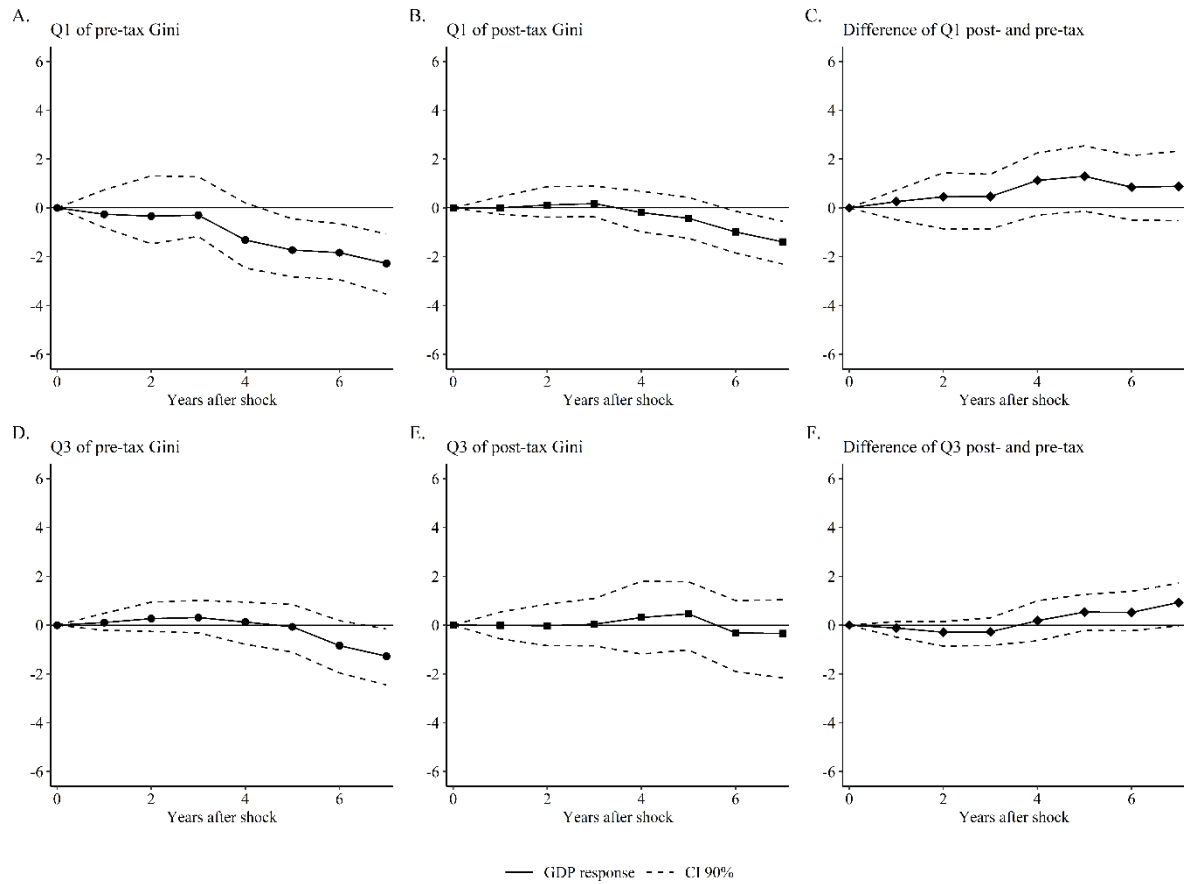
Source: Authors' calculations.

Figure A2: Effect of Fiscal Redistribution on GDP after a Household Debt Shock with Time Fixed Effects (Palma-Based)



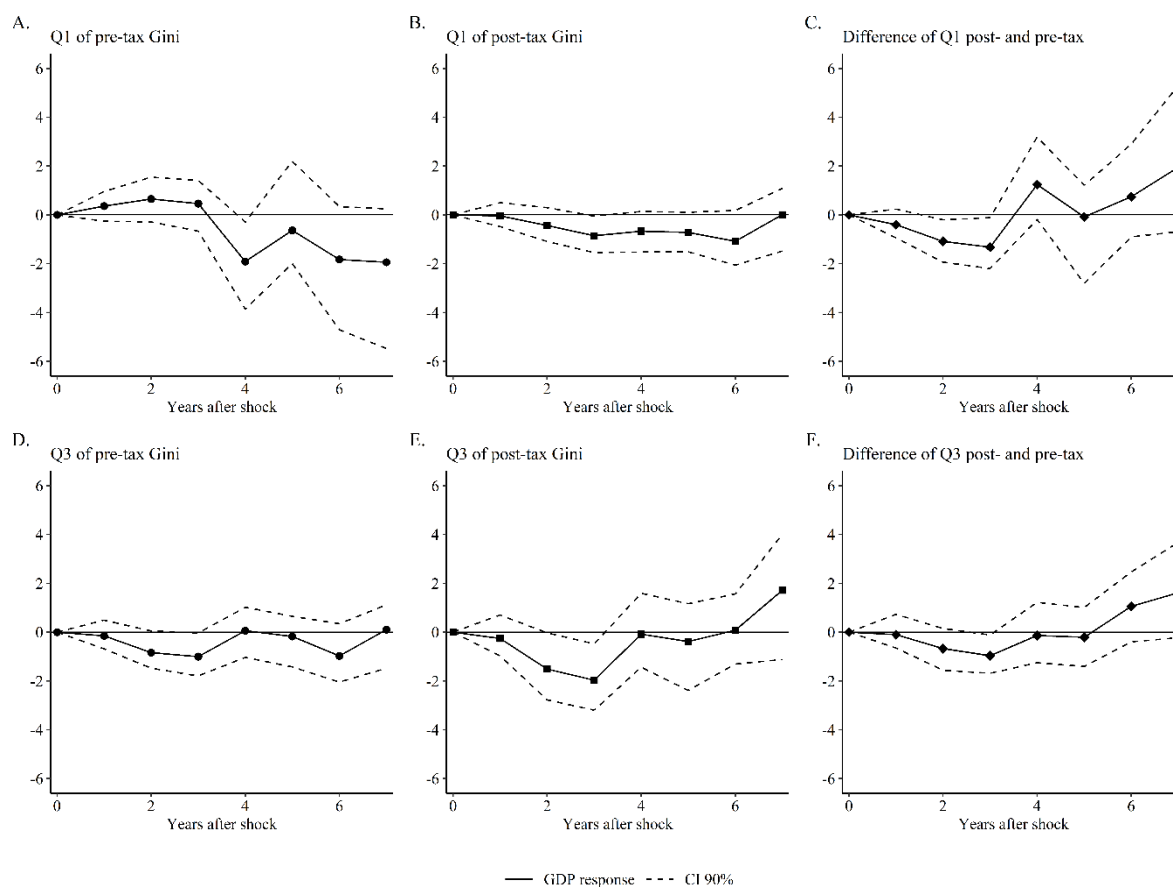
Source: Authors' calculations.

Figure A3: Effect of Fiscal Redistribution on GDP after a Household Debt Shock before 2008 (Gini-Based)



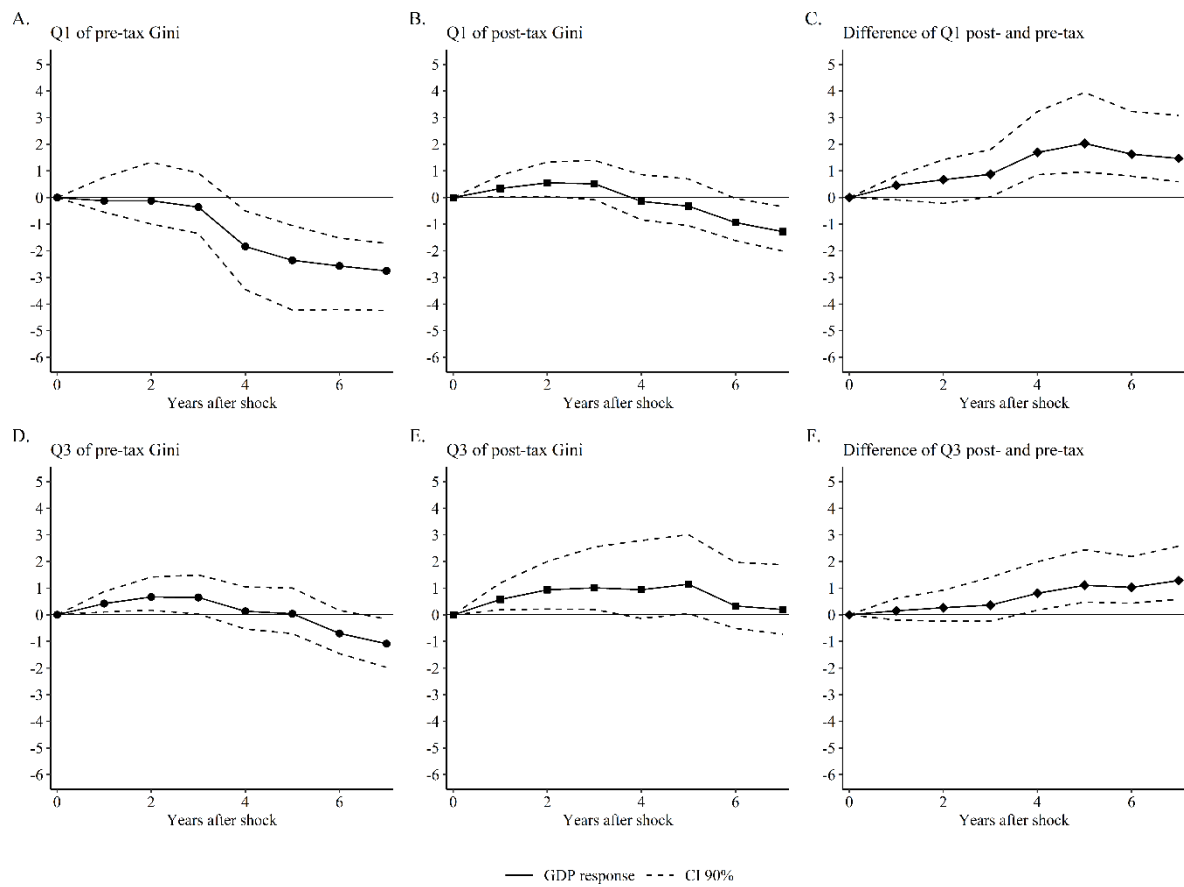
Source: Authors' calculations.

Figure A4: Effect of Fiscal Redistribution on GDP after a Household Debt Shock after 2008 (Gini-Based)



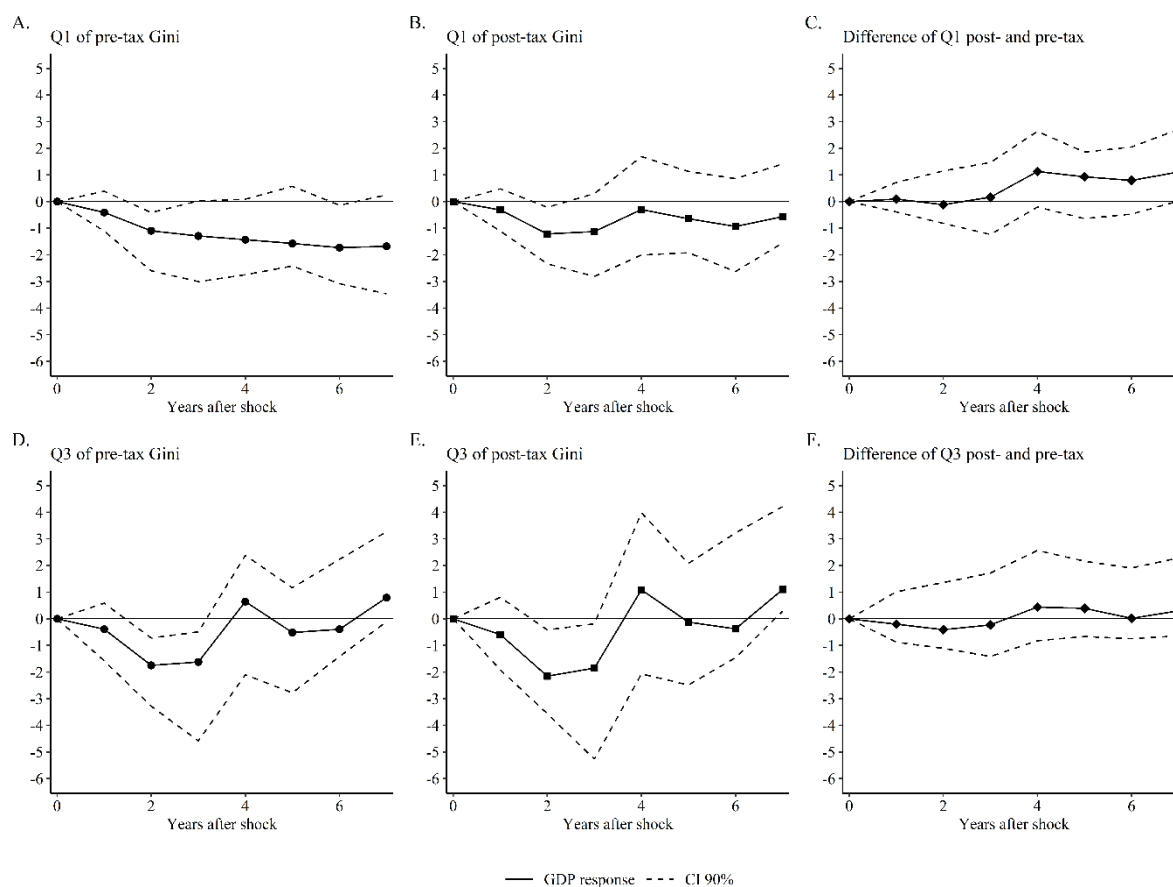
Source: Authors' calculations.

Figure A5: Effect of Fiscal Redistribution on GDP after a Household Debt Shock in Advanced Economies (Gini-Based)



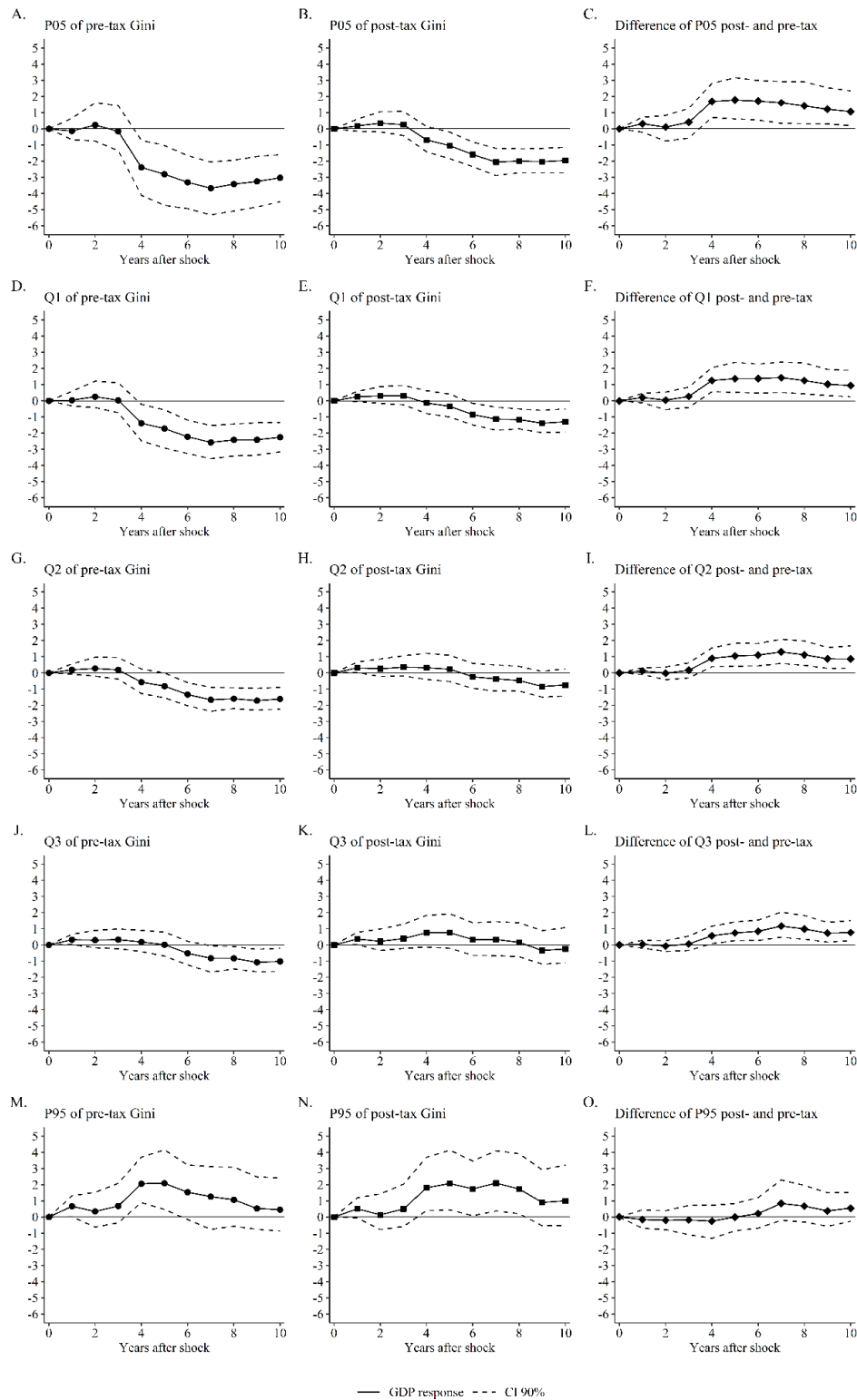
Source: Authors' calculations.

Figure A6: Effect of Fiscal Redistribution on GDP after a Household Debt Shock in Emerging Market Economies (Gini-Based)



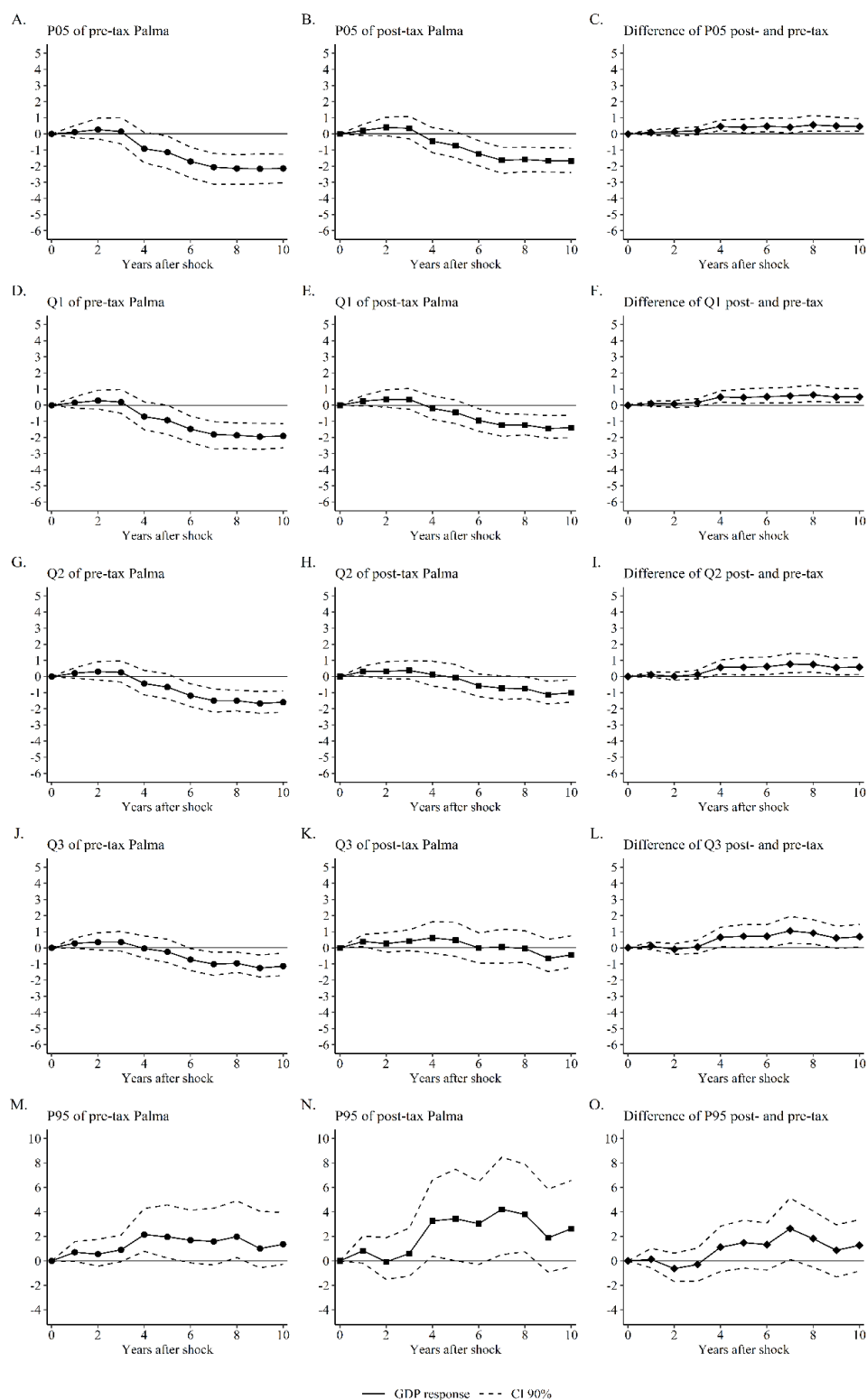
Source: Authors' calculations.

Figure A7: Effect of Fiscal Redistribution on GDP after a Household Debt Shock across the Income Inequality Distribution (Gini-Based)



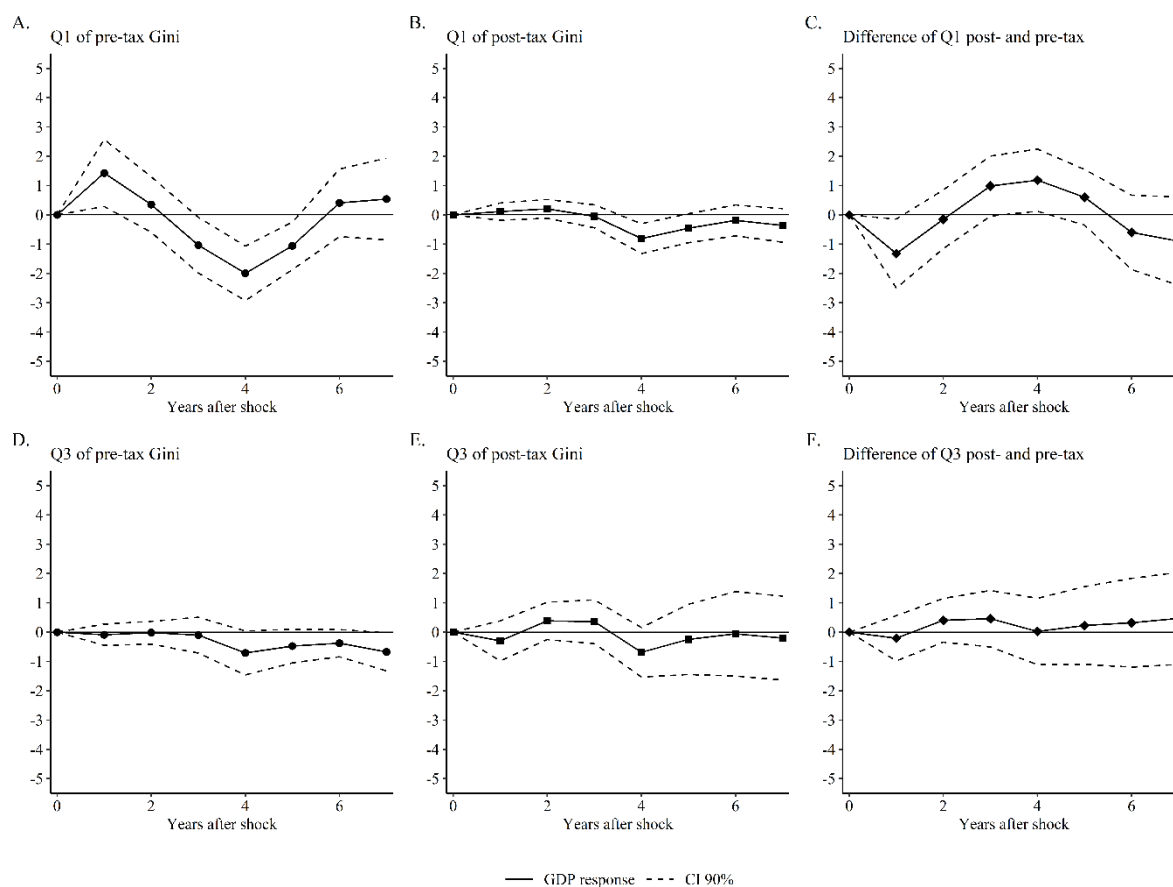
Source: Authors' calculations.

Figure A8: Effect of Fiscal Redistribution on GDP after a Household Debt Shock across the Income Inequality Distribution (Palma-Based)



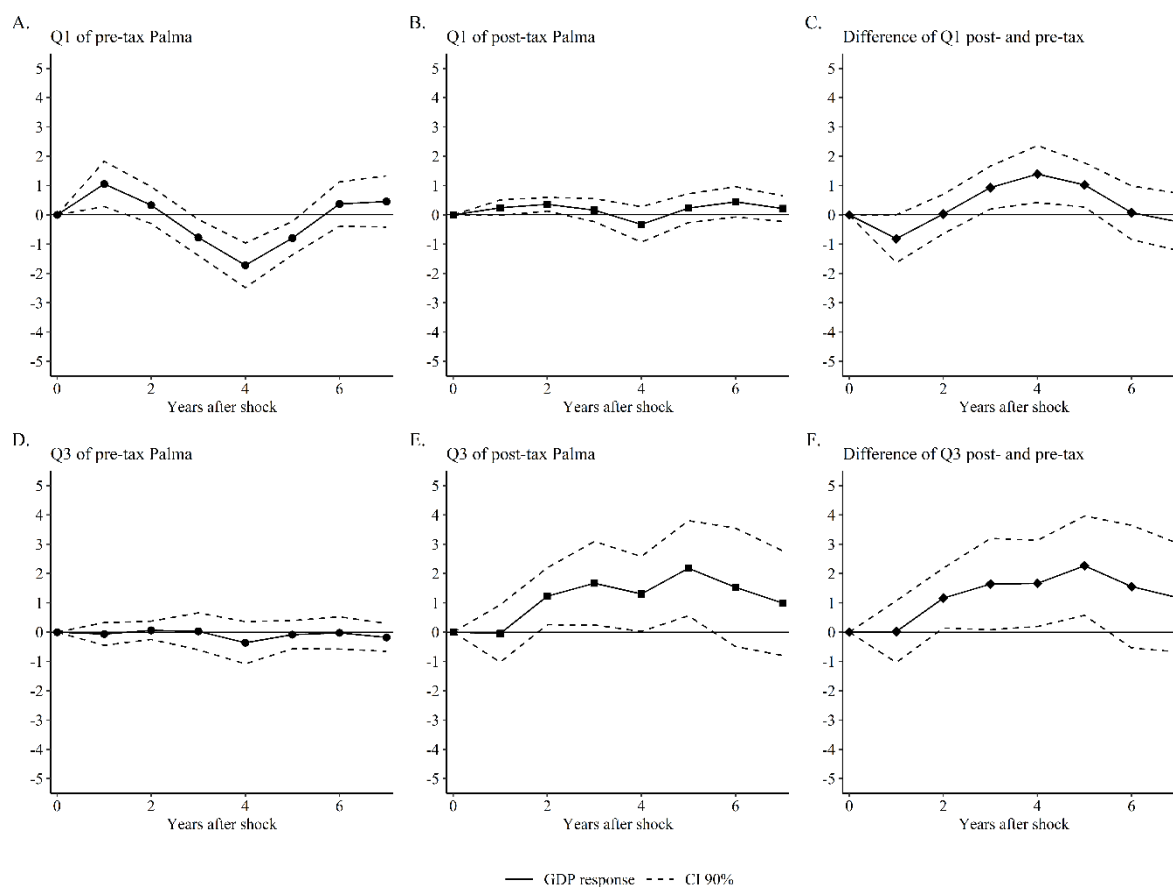
Source: Authors' calculations.

Figure A9: Effect of Overall Redistribution on GDP after a Household Debt Shock in European Countries (Gini-Based)



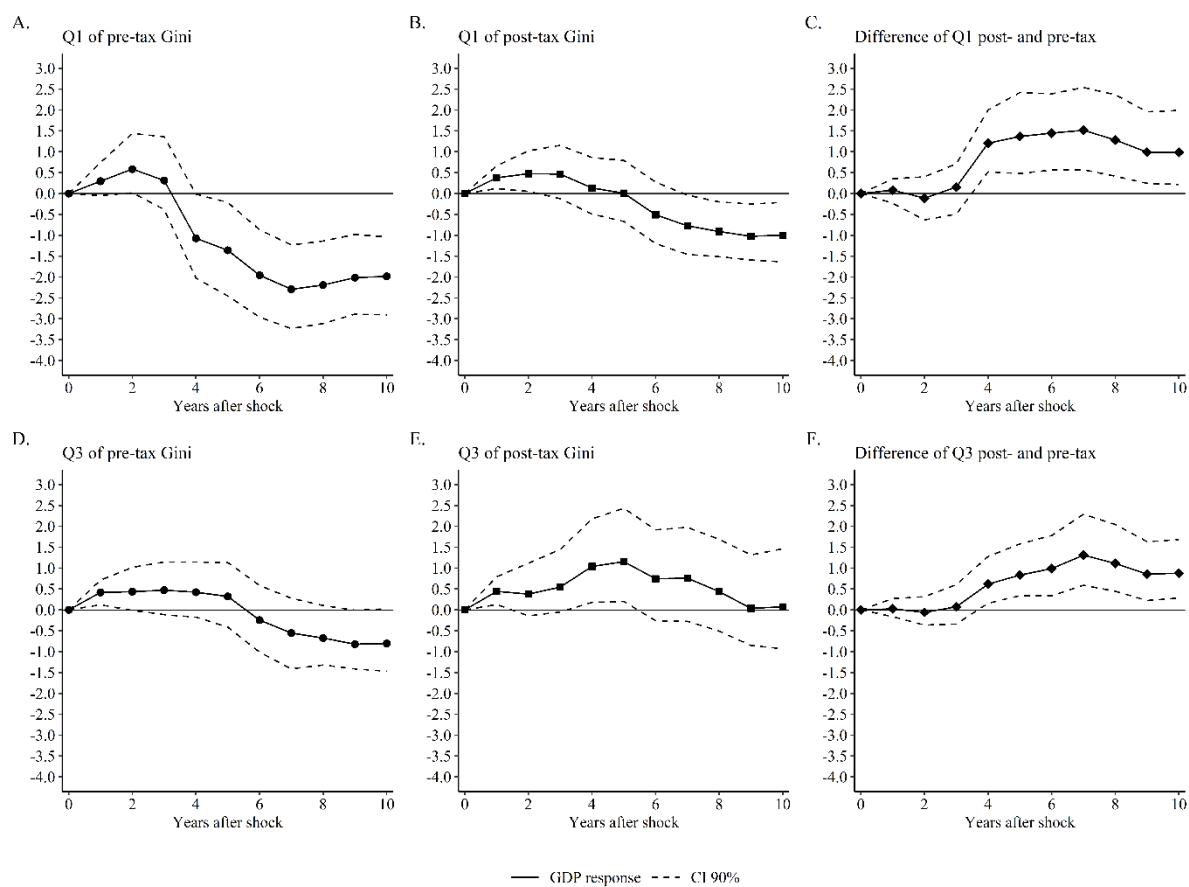
Source: Authors' calculations.

Figure A10: Effect of Top-to-Bottom Redistribution on GDP after a Household Debt Shock in European Countries (Palma-Based)



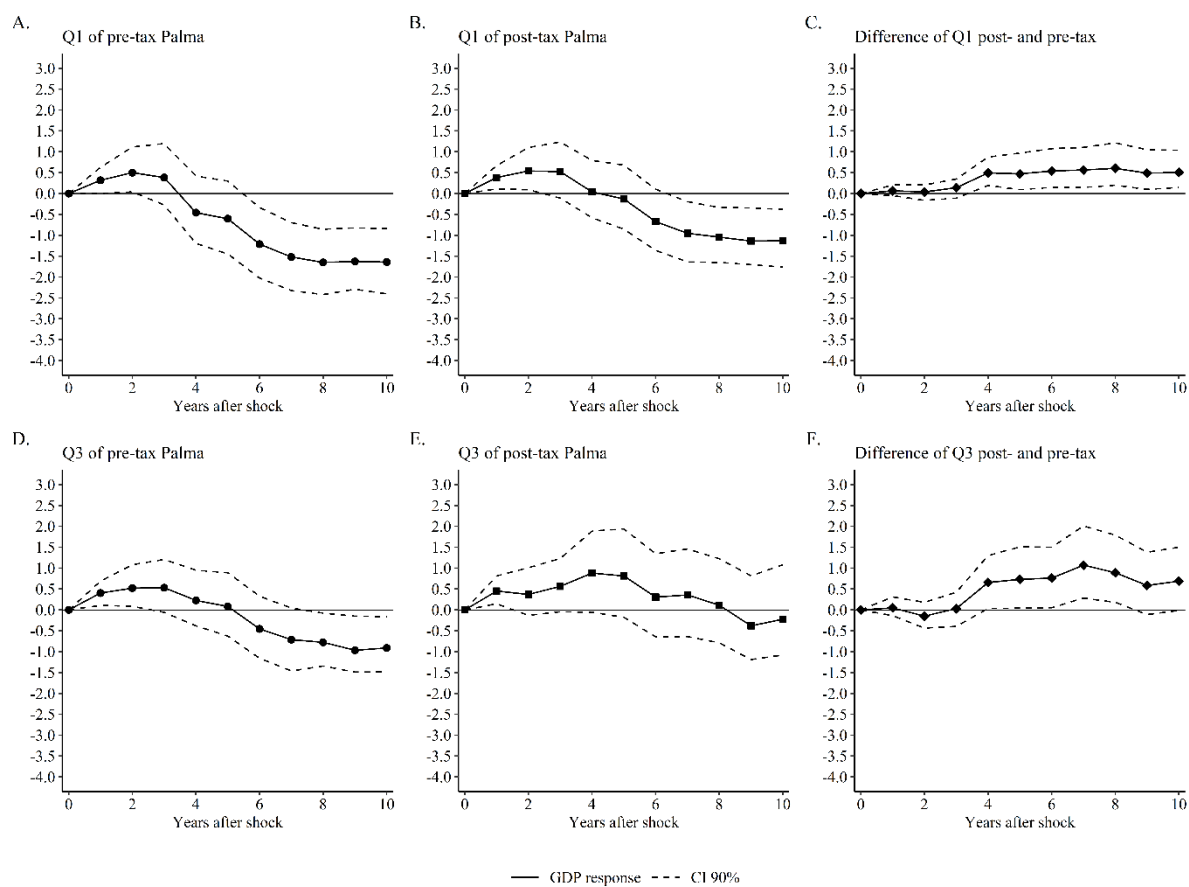
Source: Authors' calculations.

Figure A11: Effect of Fiscal Redistribution on GDP after a Household Debt Shock, Including Investment-to-GDP Ratio and Current-Account-Balance-to-GDP Ratio (Gini-Based)



Source: Authors' calculations.

Figure A12: Effect of Fiscal Redistribution on GDP after a Household Debt Shock, Including Investment-to-GDP Ratio and Current-Account-Balance-to-GDP Ratio (Palma-Based)



Source: Authors' calculations.

CNB Working Paper Series (since 2025)

WP 13/2026	Michal Škára, Ladislava Isever Grochová	<i>Do Inequality and Fiscal Redistribution Matter When Credit Bites Back?</i>
WP 12/2026	Dario Bonciani, František Mašek, Paolo Nanni, Giulio Tarquini	<i>Bounded Rationality, Monetary Policy, and the Scars of Supply Shocks</i>
WP 11/2026	Jan Janků, Tomáš Karhánek, Simona Malovaná, Ivan Trubelík	<i>Drying Up: The Effect of Drought on Corporate Loans with AnaCredit Data</i>
WP 10/2026	Zuzana Gric Simona Malovaná D.Ehrenbergerová	<i>Who Is Less Likely to Get a Mortgage When Borrowing Limits Tighten?</i>
WP 9/2026	Filip Blaha Jan Botka Josef Švéda Aleš Michl	<i>AI-Based Forecasting of Czech Inflation: Quantile Regression Forests with Dynamic Weights</i>
WP 8/2026	Martijn Boermans Laurens Swinkels	<i>Hedging Against Inflation: International Evidence on Investor Clientele Effects</i>
WP 7/2026	Zuzana Gric Jan Janků Simona Malovaná	<i>Euroisation and the Bank Lending Channel of Monetary Policy: Evidence from Czechia</i>
WP 6/2026	František Mašek	<i>Households' Inflation Expectations and Consumption in Macroeconomic Models: A Negative Real Income Channel</i>
WP 5/2026	Volha Audzei Michal Franta	<i>International Spillovers from Euro Area Monetary Policy to Advanced Small Open Economies: Investment Behavior of Czech Firms</i>
WP 4/2026	Josef Simpartl	<i>Social Media as a Monetary Policy Tool? Evidence from a Survey Experiment</i>
WP 3/2026	Tomáš Šestořád Jan Vlček Karel Musil	<i>Monetary Policy and the Output Gap in DSGE Models for Small Open Economies: Insights from the Czech Republic</i>
WP 2/2026	Martin Hodula Simona Malovaná Lukáš Pfeifer	<i>When Monetary and Macroprudential Policies Tighten Together: Evidence from the Czech Mortgage Market</i>
WP 1/2026	Jiří Gregor Jan Janků	<i>Chasing Lower Rates: How Households Balance Refinancing Incentives and Debt Constraints</i>
WP 13/2025	Oxana Babecká Kucharčuková Jan Brůha Petr Štěrba	<i>Web Reviews as a New Leading Indicator for Nowcasting Travel Expenditure in Balance of Payments Statistics</i>
WP 12/2025	Jan Janků Simona Malovaná Josef Bajzík Klára Moravcová Ngoc Anh Ngo	<i>Credit Shocks Fade, Output Shocks Persist: A Meta-Analysis of 2,600 VAR Estimates Across 63 Countries</i>
WP 11/2025	Martin Hodula Simona Malovaná	<i>When Foreign Rates Matter More: Domestic Investor Responses in a Small Open Economy</i>
WP 10/2025	Volha Audzei Jan Brůha Ivan Sutóris	<i>Does Firms' Financing in Foreign Currency Matter for Monetary Policy?</i>

CNB Working Paper Series (since 2025)

WP 9/2025	Volha Audzei Sergey Slobodyan	<i>Dynamic Sparse Adaptive Learning</i>
WP 8/2025	Michal Franta Jan Vlček	<i>Inflation at Risk: The Czech Case</i>
WP 7/2025	František Brázdík Karel Musil Tomáš Pokorný Tomáš Šestořád Jaromír Tonner Jan Žáček	<i>Upgrading the Czech National Bank's Core Forecasting Model g3+</i>
WP 6/2025	Raphael Auer David Köpfer Josef Švéda	<i>The Rise of Generative AI: Modelling Exposure, Substitution, and Inequality Effects on the US Labour Market</i>
WP 5/2025	Josef Švéda	<i>Navigating Banking Resilience: Bail-Ins & Bailouts in the Czech Banking Sector</i>
WP 4/2025	Ivan Trubelík Tomáš Karhánek Simona Malovaná Aleš Michl	<i>Instant Payments in Czechia: Adoption and Future Trends</i>
WP 3/2025	Daniel Štödt	<i>Non-Linearity of Government Spending Multiplier: The Case of a Small Open Economy</i>
WP 2/2025	Soňa Benecká	<i>Forecasting Disaggregated Producer Prices: A Fusion of Machine Learning and Econometric Techniques</i>
WP 1/2025	Martin Hodula Lukáš Pfeifer	<i>Payment Holidays, Credit Risk, and Borrower-Based Limits: Insights from the Czech Mortgage Market</i>

CZECH NATIONAL BANK

Na Příkopě 28

115 03 Prague 1

Czech Republic

RESEARCH DIVISION

www.cnb.cz

research@cnb.cz

ISSN 1803-7070

