Mendel University in Brno

MENDELU Working Papers in Business and Economics

108/2025

Do inequality and fiscal redistribution matter when credit bites back?

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MENDELU Working Papers in Business and Economics
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Citation

Škára, M., Issever Grochová, L. (2025). Do inequality and fiscal redistribution matter when credit bites back?. *MENDELU Working Papers in Business and Economics* 108/2025. Mendel University in Brno. Cited from: http://ideas.repec.org/s/men/wpaper.html

Abstract

Michal Škára and Ladislava Issever Grochová: **Do inequality and fiscal redistribution matter when credit bites back?**

This paper examines the relationship between household debt and economic output in the context of income inequality, emphasizing the role of fiscal redistribution through personal taxes and social transfers. Based on an unbalanced panel dataset of 36 countries covering the period 1980–2023, the study employs panel local projection (LP) methods to analyze the dynamic effects of household debt on GDP growth, assessing how this effect is influenced by the degree of income redistribution achieved through the tax system and transfers. While existing research shows that household debt may initially stimulate economic activity, it constrains consumption and exacerbates downturns in the medium run, especially in economies with high inequality. The results suggest that fiscal redistribution dampens the negative effects of household debt associated with inequality, with the strongest mitigating impact observed at the seventh horizon after a debt shock, when debt-service burdens peak. The findings underline the importance of an effective system of fiscal redistribution – encompassing both personal taxes and transfers – in reducing the macroeconomic costs of household indebtedness and contributing to the debate on sustainable growth and inequality reduction.

Key words

Income inequality, direct taxes, GDP growth, household debt

JEL: D14, D31, E21, E62, H24

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Acknowledgements

This paper is an output of a research project funded by the Internal Grant Agency of the Faculty of Business and Economics, Mendel University in Brno, project no. IGA25-PEF-DP.

Introduction

The escalating level of indebtedness among economic agents has emerged as a central concern for global economic stability. While the dangers of excessive leverage were dramatically underscored by the 2008 Global Financial Crisis – largely fueled by the inflating and subsequent collapse of the mortgage bubble (Boone et al., 2022) – the current surge in debt is part of a much longer historical trajectory. Although the 21st-century crisis prompted a renewed and deeper focus on the relationship between debt and economic output, the overarching trend of rising global debt levels has been consistently traceable since the end of World War II (Jordà, Schularick, and Mian, 2017). Increased debt liabilities of economic agents have had important implications for economic policy, including changes in the monetary policy regime. In the 1980s, the relationship between monetary aggregates and real and nominal income weakened, leading central banks to shift from money supply targeting to an inflation targeting regime (Friedman and Kuttner, 1992; Mishkin, 2001; Schularick and Taylor, 2012).

The importance of indebtedness for national economic output has therefore drawn attention to the analysis of the relationship between debt obligations and the business cycle. Research by Bernardini and Forni (2020), Jordà, Schularick, and Taylor (2013) and Schularick and Taylor (2012) shows that increased credit activity is associated with lower output volatility in the short run, but also with a higher probability of a financial crisis that subsequently deepens the recession. Thus, more indebted countries are more susceptible to supply and demand shocks and face more pronounced fluctuations in the expectations of economic agents (Jordà, Schularick, and Taylor, 2013). While credit expansion may stimulate economic activity in the short run (Mian, Sufi, and Verner, 2017; Müller and Verner, 2023; Lombardi, 2022), rising debtor liabilities are eventually found to constrain budgets, leading to a decline in economic activity and affecting the course of the business cycle (Tunc and Kilinc, 2023). The effect of rising indebtedness on economic output varies with the sectors indebted (Mian, Sufi, and Verner 2017; Lombardi, 2022; Müller and Verner, 2023; Tunc and Kilinic, 2023). Several studies have described the different impacts of non-financial corporations and household debt on GDP growth or changes in the riskiness of the banking sector. For example, Drehmann, Juselius and Korinek (2017), Mian, Sufi, and Verner (2017), Müller and Verner (2023), Tunc and Kilinc (2023) described household debt as limiting GDP growth, particularly in the medium run, and the debt of non-financial corporations having a slight negative or insignificant impact on economic activity. A key counterpart to rising indebtedness is debt service. Empirical evidence shows that higher household debt service associated with debt accumulation can dampen GDP growth even in the short run (Drehmann, Juselius and Korinek 2017 and Tunc and Kilinc, 2023). Andrieş, Ongena, and Sprincean (2025) and Karlström (2025) further point to the growing systemic risk to the banking sector associated with the accumulation of household debt

and the negligible change in systemic risk during the boom in non-financial corporate debt. Due to the significance of household debt for future GDP development, this article focuses on the debt of the household sector.

Previous research has also focused on the factors that affect the ultimate impact of household debt obligations on economic growth such as monetary regime (Mian, Sufi, and Verner 2017; Alter, Feng, and Valckx 2020 and Kim and Zhang 2021), financial sector development (Alter, Feng, and Valckx 2020 and Bahadir, De, and Lastrapes 2020) and its regulation (Mian, Sufi, and Verner, 2020), openness of the economy (Kim and Zhang 2021), degree of economic development (Mian, Sufi, and Verner 2017; Alter, Feng, and Valckx 2020 and Kim and Zhang 2021) and income inequality (Bahadir, De and Lastrapes, 2020; Alter, Feng, and Valckx 2020).

Regarding income inequality, countries with unequal income distribution face deeper economic downturns when credit shocks occur compared to countries with lower income inequality (Bahadir, De and Lastrapes, 2020) This is because high inequality leads to greater household debt accumulation among lower-income groups, making the economy more vulnerable to these credit shocks (Bahadir, De and Lastrapes, 2020).

An unequal distribution of income thus exacerbates the negative effect of debt on economic activity. This adverse effect of income inequality can be mitigated through various instruments aimed at reducing inequality among which personal taxes and transfers are key channel and the focus of this article. Fiscal policy enables governments to raise resources through taxation that can be redistributed to less well-off households via transfers, thereby reducing income inequality (Duncan and Peter, 2016; Carbonell-Nicolau and Llavador, 2021; Yildirim and Dibo, 2021). However, the full causal chain – from personal taxes and transfers through inequality, household debt, and ultimately, to economic activity – has not been fully explored.

While a part of this relationship – specifically the link between rising household debt, income inequality, and taxes – was examined by Berisha and Meszaros (2018), their findings were limited. They included personal income taxes, measured as the maximum tax rate, in the regression as control variables and found that personal income taxes do not provide important information for the development of household debt and income inequality. However, using the maximum tax rate is not an optimal measure for monitoring the impact of the tax system on selected variables, as it blurs the differences in tax progression (Duncan and Peter, 2016). Any further study exploring the whole process is lacking, at least to the best of our knowledge.

The main objective of this paper is to analyze the ultimate impact of household debt on economic output in the context of income inequality, with particular reference to the role of the tax system. Specifically, it focuses on direct taxes that reduce income inequality and thus mitigate the negative effects of debt associated with unequal income distribution.

The rest of the paper is organized as follows. Section 2 focuses on explaining the impact of rising household debt on future economic performance and discusses the impact of income inequality on the ultimate effect of debt on economic activity, highlighting the role of the personal tax system and transfers. Section 3 describes the methods used and section 4 presents the results. The final section summarizes the key findings and formulates conclusions.

1 Theoretical background

Rising debt levels can stimulate output in the short run but limit economic activity in medium and long run (Mian, Sufi, and Verner 2017). Mian and Sufi (2018) argue that the primary channel through which household debt affects economic activity is household demand. In response to a credit shock, an increase in household consumption of goods and services is observed, fueling an inflationary environment. (Mian, Sufi, and Verner 2020). Nevertheless, once the expansion phase, lasting about three years, concludes (Mian, Sufi, and Verner, 2017), the process of repayment is typically initiated by households with higher debt burdens, which reduces the capacity for consumer spending and tends to peak three to four years after the credit expansion phase (Drehmann, Juselius, and Korinek, 2017).

Additionally, during a credit expansion, consumption rises significantly, particularly in the non-tradable sector, where consequently employment, wages, and prices grow faster than in the tradable sector, because the consumption boom associated with the credit shock is disproportionately allocated to the non-tradable sector closely linked to domestic demand, reinforcing inflationary pressures (Mian, Sufi, and Verner 2020). Moreover, the non-tradable sector is characterized by lower productivity due to limited competition (Müller and Verner, 2023). As the expansion draws labor into the lower productive non-tradable sector, aggregate labor and capital productivity decline, thereby constrains long-run GDP growth (Müller and Verner, 2023). This together with nominal rigidities increase firm's costs, leading to layoffs and rising unemployment, which in turn further weaken household demand and contribute to a downturn in GDP (Schmitt-Grohé and Uribe 2016). Thus, in the medium run, household credit booms lead to a decline in GDP through the channel of rising debt service and wage rigidities, effects which then spill over into the long run. Therefore, in the context of household credit shocks, it is necessary to observe not only the response of consumption but also the overall response of GDP, since the expansion of the non-tradable sector draws labor into less productive industries. This reallocation

of human capital lowers aggregate productivity and ultimately directly constrains long-run economic growth.

The initial surge in household debt temporarily increases demand but subsequently creates a debt service burden. This burden is not distributed equally. Wealthier households typically face lower debt burdens, and their consumption is less sensitive to negative income shocks compared to poorer households, who carry a disproportionately higher debt service-to-disposable income ratio (Cynamon and Fazzari, 2016; Piao et al., 2023). For low-income households, even small negative income changes quickly lead to budget constraints and reduced consumption (Eggertsson and Krugman, 2012; Korinek and Simsek, 2016). As this group is highly sensitive to changes in credit conditions, consumption rises when credit is eased but falls sharply when interest rates increase or credit tightens, generating a negative income shock (Mian, Straub, and Sufi, 2021). When credit tightens, poorer individuals have limited access to credit, mainly due to a lack of collateral (Todaro and Smith, 2020). Furthermore, loans are typically offered at relatively higher borrowing rates, which place additional constraints on the budgetary capacity of lower-income households (Kumhof, Ranciere, and Winant, 2015) ultimately leading to an even more pronounced drop in consumption. Crucially, this decline in consumption by poorer households is not offset by increased spending from wealthier groups, as the rich have a lower propensity to consume and are less susceptible to fluctuations in credit conditions (Piao et al., 2023; Biswas, Chakraborty, and Hai, 2017). Because low-income households – who are more vulnerable to income fluctuations – are more prevalent in countries with high income inequality, these nations are particularly susceptible to the adverse effects of household debt.

The ultimate result of a household debt boom in an environment of high inequality is more volatile consumption, which increases the amplitude of the economic cycle (Alter, Feng, and Valckx 2020; Bahadir, De, and Lastrapes 2020 and Mian, Straub, and Sufi 2021). These studies conclude that debt serves as an amplifying factor for negative shocks on GDP growth when inequality is high, but none has focused on instruments and their effectiveness that may mitigate this adverse effect of household debt on GDP growth. As noted in previous studies (Alter, Feng, and Valckx, 2020; Bahadir, De and Lastrapes, 2020; Mian, Straub, and Sufi, 2021), debt thus serves as an amplifying factor for negative shocks on GDP growth when inequality is high. None of these studies, however, has focused on instruments that may mitigate adverse effect of household debt on GDP growth.

The amplification of the negative effect of household debt on changes in GDP is not the only channel through which an unequal distribution of income affects future output, high inequality also constrains economic growth through its impact on capital accumulation, allocation, and intensity. Regarding capital accumulation, unequal society on average generates lower private savings, as savings are

mostly made up of the middle class, which is often diminished in highly unequal economies (Rajan, 2011). This condition scarcity of private savings leads to poorer capital accumulation accumulation (Todaro and Smith, 2020), which in turn limits long-run economic growth (Rajan, 2011). Furthermore, concerning capital allocation, higher income inequality also undermines social, political and economic stability and solidarity (Doyle and Sriglitz, 2014). The concentration of wealth among the richest classes is often associated with the emergence of inefficient institutions, where power is abused through lobbying, subsidies, and corruption, resulting in an inefficient allocation of capital that further constrains long-run economic growth. (Acemoglu and Robinson, 2012; Todaro and Smith, 2020). Finally, in terms of capital intensity, income inequality is also associated with higher fertility rates, which increase the number of dependents relative to available resources, thereby reducing per capita investment in human capital and constraining long-run economic growth (Topuz, 2022; Berg et al., 2018). The findings confirm that income inequality reduces GDP growth and is harmful to the future development of the national economy. As a persistent challenge in economic development, rising inequality continues to pose significant political, economic, and social risks (Blanchard and Rodrik, 2023). It is further associated with low productivity, economic inefficiency, reduced aggregate demand, and the risk of political or economic instability (Doyle and Stiglitz, 2014).

A range of policy instruments may be employed to mitigate the adverse effects of income inequality, including investments in health and education to enhance the quality of human capital (Martinez-Vazquez, Moreno-Dodson, and Vulovic, 2012), as well as income redistribution through higher taxation of the rich and the provision of social transfers (Berg et al., 2018; Topuz, 2022; Babu, Bhaskaran, and Venkatesh, 2016). While some studies confirm the positive impacts of income redistribution on GDP growth through personal taxes, redistribution and enhanced demand (Berg et al., 2018; Topuz, 2022; Babu, Bhaskaran, and Venkatesh, 2016), the overall conclusions remain mixed. Proponents argue that fiscal redistribution reduces inequality by reallocating income from the rich to the poor through personal taxation, direct transfers, social benefits, or public spending on health and education (Piketty, 2014; Oishi, Kushlev, and Schimmack, 2018; Yildirim and Dibo, 2021; de Mendonça, Ferreira, and Baca, 2022). Conversely, the opposing view highlights a potential drawback. Higher taxation on successful individuals may reduce their incentive to invest (Djankov et al., 2010). This reduction in investment can ultimately lead to a decline in productivity and a deterioration of economic conditions, particularly for the poorer classes (Djankov et al., 2010). Such losses represent the trade-off described by Okun's "leaky bucket" concept, whereby redistribution results in inefficiencies such as reduced investment incentives and administrative costs (Okun, 2015).

Despite this focus on mitigating income inequality through personal taxes and transfers, no previous study has, however, fully investigated the specific transmission mechanism of personal taxes and transfers through the household debt channel to ultimately impact GDP. This omission is where this article contributes to the existing literature. The aim of this study is to examine whether fiscal redistribution operating through personal taxation and transfers designed to reduce income inequality can also mitigate the adverse effects of household debt liabilities on aggregate output in the context of unequal income distribution. Understanding this relationship is essential, as household indebtedness has repeatedly been identified as a source of macroeconomic vulnerability, while income inequality shapes both the capacity of households to bear debt and the transmission of fiscal policy. By addressing the potential moderating role of fiscal redistribution, the study contributes to the debate on how fiscal instruments can enhance economic resilience and promote more sustainable long-run GDP growth.

2 Data and methods

This section provides an overview of the data used to explore the relationship between household debt, income inequality, and economic output, and describes the local projection used for the empirical analysis presented in the following sections.

2.1 Data

For this paper, an unbalanced panel dataset was constructed including information on GDP at constant local currency prices, household debt, and the Gini coefficient and Palma ratio measured both pre-tax and post-tax. The pre-tax measures capture income inequality before the impact of the fiscal system, which is prior to the payment of personal taxes and the receipt of government transfers, while still including replacement income such as pensions and unemployment benefits. In contrast, the post-tax measures reflect income inequality after the operation of the fiscal system, accounting for the effects of personal taxation and cash transfers that redistribute income among households.

This distinction allows the analysis to differentiate between inequality generated by market outcomes and inequality after fiscal redistribution. The dataset also contains control variables, including long-run and short-run interest rates, the consumer price index (CPI), the investment-to-GDP ratio, and the current-account-to-GDP ratio. The list of countries included in the main regression is presented in Table III in the Appendix. The sample covers 36 countries at an annual frequency over the period 1960–2023.

GDP data are obtained from the World Development Indicators (World Bank, 2025) database. Household debt data are drawn from the BIS's Credit to the non-financial sector data set. Debt takes the form of loans, debt securities, and currency and deposits, provided by domestic banks, foreign banks, and other financial institutions. Income inequality information is obtained from the World Inequality Database (World Inequality Lab, 2025). Long-run interest rates are taken from IMF International Financial Statistics (IFS) and OECD Main Economic Indicators, defined as yields on government bonds with a ten-year maturity. Short-run interest rates are taken from the IFS and the OECD Main Economic Indicators, defined as money market rates, typically three-month interbank rates or treasury bill rates. The current account balance and investment-to-GDP ratios are obtained from IMF World Economic Outlook (WEO). Consumer price index data are obtained from the World Development Indicators and IMF WEO (World Bank, 2025). In Table I, descriptive statistics for the main variables used in the analysis are reported.

Table I Descriptive statistics household debt

	(1)	(2)	(3)	(5)	(6)	(7)
Variables	N	Mean	St. Dev.	Q1	Med	Q3
d^{HH}	1,143	56.07	27.88	35.5	53.6	70.2
$Palma_1$	1,143	3.72	3.68	2.02	2.62	3.43
$Palma_2$	1,143	2.07	2.05	1.02	1.39	1.99
$Gini_1$	1,143	47.51	9.49	41.5	46.03	50.2
$Gini_2$	1,143	36.15	12.3	27.47	34.11	40.02
$\Delta_1 d^{hh}$	1,143	0.82	3.13	-0.7	0.8	2.4
$\Delta_1 Gini_1$	1,136	0.09	1.17	-0.36	0.04	0.64
$\Delta_1 Gini_2$	1,133	0.03	1.12	-0.52	0.08	0.64
$\Delta_1 y$	1,143	2.53	3.02	1.24	2.58	4.06
$\Delta_1 Palma_1$	1,136	0.01	0.53	-0.06	0	0.1
$\Delta_1 Palma_2$	1,133	-0.01	0.27	-0.04	0.01	0.04

Note: Variables y, $d^{HH}, Gini_1, Gini_2, Palma_1 and\ Palma_2$ represent the logarithm of GDP at constant local currency prices, household debt to GDP in percent, the Gini coefficient pre-tax and post-tax and the Palma ratio pre-tax and post-tax.

Descriptive statistics in Table I indicate continuous GDP growth and rising household debt over the period under study. A notable finding is that the increase in the pre-tax Gini coefficient is slightly larger than the post-tax Gini coefficient. This pattern suggests the effectiveness of fiscal redistribution in reducing income inequality, particularly through personal taxes and transfers, as these mechanisms redistribute resources from higher-income to lower-income households and thereby mitigate disparities in disposable income (Duncan and Peter 2016).

The theoretical part explained the decline in GDP following a household debt shock, associated with rising debt-service burdens that constrain the consumption expenditures of indebted households. To test this channel, data on household debt service from the BIS Debt Service Ratios dataset are employed, where information is available for only 17 economies from 2000 onward compared to the previous dataset. As a result, the number of observations is reduced to 406.

Table II Descriptive statistics DSR

	(1)	(2)	(3)	(5)	(6)	(7)
Variables	N	Mean	St. Dev.	Q1	Med	Q3
d^{HH}	406	75.2	23.83	58.8	70.6	92.2
d^{DSR}	406	10.1	4.06	6.88	9.36	12.65
$Palma_1$	406	2.72	0.89	2.03	2.58	3.22
$Palma_2$	406	1.35	0.54	0.96	1.24	1.57
$Gini_1$	406	45.49	5.21	41.51	45.65	49.35
$Gini_2$	406	31.48	7.52	26.08	31.41	36.41
$\Delta_1 d^{HH}$	406	0.77	3.69	-1.2	0.7	3.1
$\Delta_1 d^{DSTI}$	406	0.05	0.58	-0.25	0.01	0.28
$\Delta_1 Gini_1$	406	0.09	1.01	-0.33	0	0.56
$\Delta_1 Gini_2$	406	0.01	0.9	-0.39	0.05	0.57
$\Delta_1 cons$	406	1.74	2.24	0.92	1.69	2.92
$\Delta_1 Palma_1$	406	0.01	0.13	-0.05	0	0.09
$\Delta_1 Palma_2$	406	0	0.07	-0.03	0	0.03

Note: Variables y, $d^{HH}, d^{DSR}, Gini_1, Gini_2, Palma_1 and\ Palma_2$ represent the logarithm of GDP at constant local currency prices, household debt to GDP in percent, share of income used to service debt for households, the Gini coefficient pre-tax and post-tax and the Palma ratio pre-tax and post-tax.

Table II indicates, compared to the previous dataset, very low variability of the Palma ratio, implying low within-country variation that makes identification of its effect more difficult in a fixed-effects panel regression. For this reason, only the Gini coefficient is employed as the measure of income inequality in the subsequent analysis.

2.2 Empirical strategy

In the course of the research, first differences of the selected variables. To capture the cumulative effect of shocks, the dependent variable GDP was transformed into the h-step-ahead long difference, defined as:

$$\Delta_h y_{it+h} = y_{it+h} - y_{it}$$

where y_{it} denotes the logarithm of GDP of country i in period t.

To analyze the effect of household debt on future economic activity in the context of income inequality and the fiscal redistribution, a method inspired by the work of Yildirim and Dibo (2021) is employed. Two regressions are estimated. The first specification includes the pre-tax income inequality measure on the right-hand side of the equation, while the second incorporates the post-tax income inequality. To implement this framework, local projection models (Jorda, 2005) are estimated on panel data, through which the effect of the fiscal redistribution on the impact of household debt over time is traced. Moreover, following the method of Brambor, Clark, and Golder (2006), the marginal effects of income inequality at different levels of household debt are examined – an aspect not addressed in Yildirim and Dibo (2021). Once the results are obtained, the two models are compared in order to evaluate and interpret the role of the fiscal redistribution in shaping the overall impact of a household debt or debt service ratio shock on economic activity. The shock is defined as an increase by one standard deviation, calculated separately for each horizon.

Income inequality is measured using the Gini coefficient and the Palma ratio. The advantages of the Gini coefficient lie in its availability and ease of cross-country comparison, but its limitation is its focus on the entire income distribution, making it less sensitive to changes in the lower and upper quantiles of income distribution (Wood, 2016; Berisha and Meszaros, 2018; De Vita and Luo, 2021). Since movements at the lower end of the distribution are crucial for this research – as the budgets of indebted low-income households are most constrained by rising debt service in the event of a negative income shock (Bahadir, De and Lastrapes, 2020 and Korinek and Simsek, 2016) – the Palma ratio is also included in the models. This measure captures the ratio of the income share of the top 10 percent to that of the bottom 40 percent (Cobham and Sumner, 2014). Furthermore, reducing income inequality by shifting households from the lower end of the distribution to the middle class has been shown to promote economic growth more effectively than shifting individuals from the middle class to the upper end, as it reallocates resources to households with a higher propensity to consume (Biswas, Chakraborty, and Hai, 2017). This mechanism may explain a stronger negative effect of the interaction between the Palma ratio and household debt on final output.

Subsequently, output from local projection models will be impulse-response functions (IRFs) and the results obtained from both models will be compared. In detail, two local projection models specifications were considered to study the relationship between GDP, household debt and the income inequality represented by Gini coefficient or Palma ratio pre-tax and post-tax (indexed as 1 and 2, respectively) for horizons h = 1, ..., 10 years:

$$\Delta_h y_{it+h} = \alpha_i^h + \sum_{j=0}^{1} \Gamma_j^h * X_{it-j} + \sum_{j=0}^{2} \theta_j^h * Z_{it-j} + \sum_{j=0}^{p} \beta_{HH,j}^h * \Delta_1 d_{it-j}^{HH} + \sum_{j=0}^{p} \beta_{ineq_1,j}^h * d_{it-j}^{ineq_1} + \sum_{j=0}^{p} \beta_{HH*ineq_1,j}^h * (\Delta_1 d_{it-j}^{HH} * d_{it-j}^{ineq_1}) + \sum_{j=0}^{p} \delta_j^h * \Delta_1 y_{it-j} + \epsilon_{it+h}^h \quad (1)$$

$$\Delta_h y_{it+h} = \alpha_i^h + \sum_{j=0}^{1} \Gamma_j^h * X_{it-j} + \sum_{j=0}^{2} \theta_j^h * Z_{it-j} + \sum_{j=0}^{p} \beta_{HH,j}^h * \Delta_1 d_{it-j}^{HH} + \sum_{j=0}^{p} \beta_{ineq_2,j}^h * d_{it-j}^{ineq_2} + \sum_{j=0}^{p} \beta_{HH*ineq_2,j}^h * (\Delta_1 d_{it-j}^{HH} * d_{it-j}^{ineq_2}) + \sum_{j=0}^{p} \delta_j^h * \Delta_1 y_{it-j} + \epsilon_{it+h}^h \quad (2)$$

To test the channel of rising debt-service burdens, which in the medium run begin to constrain the consumption expenditures of indebted households following a household credit shock and thereby limit GDP growth, a similar model is constructed. In this specification y_{it} on the left-hand side of the equation is replaced by $cons_{it}$ and on right hand side d_{it}^{HH} is replaced by d_{it}^{DSR}:

$$\Delta_h cons_{it+h} = \alpha_i^h + \sum_{j=0}^{1} \Gamma_j^h * X_{it-j} + \sum_{j=0}^{2} \theta_j^h * Z_{it-j} + \sum_{j=0}^{p} \beta_{HH,j}^h * \Delta_1 d_{it-j}^{DSR} + \sum_{j=0}^{p} \beta_{ineq_1,j}^h * d_{it-j}^{ineq_1} + \sum_{j=0}^{p} \beta_{HH*ineq_1,j}^h * (\Delta_1 d_{it-j}^{DSR} * d_{it-j}^{ineq_1}) + \sum_{j=0}^{p} \delta_j^h * \Delta_1 cons_{it-j} + \epsilon_{it+h}^h \quad (3)$$

$$\Delta_h cons_{it+h} = \alpha_i^h + \sum_{j=0}^{1} \Gamma_j^h * X_{it-j} + \sum_{j=0}^{2} \theta_j^h * Z_{it-j} + \sum_{j=0}^{p} \beta_{HH,j}^h * \Delta_1 d_{it-j}^{DSR} + \sum_{j=0}^{p} \beta_{ineq_2,j}^h * d_{it-j}^{ineq_2} + \sum_{j=0}^{p} \beta_{HH*ineq_2,j}^h * (\Delta_1 d_{it-j}^{DSR} * d_{it-j}^{ineq_2}) + \sum_{j=0}^{p} \delta_j^h * \Delta_1 cons_{it-j} + \epsilon_{it+h}^h \quad (4)$$

Equations (1) to (4) are specified in an almost identical way where α_i^h is a country fixed effect, Z_{it} denotes control variables, which include the long-term interest rate, reflecting financing conditions and investor expectations and the short-term interest rate, capturing the cost of short-term financing and the monetary policy stance. X_{it} include another control variables like the CPI, measuring price stability; investment to GDP, distinguishing whether credit booms are driven by consumption or capital formation; and the current account balance to GDP, capturing the role of international capital flows. All control variables, with the exception of the current account balance to GDP, were differenced, and contemporaneous values as well as one-year lags were included. For interest rate variables no

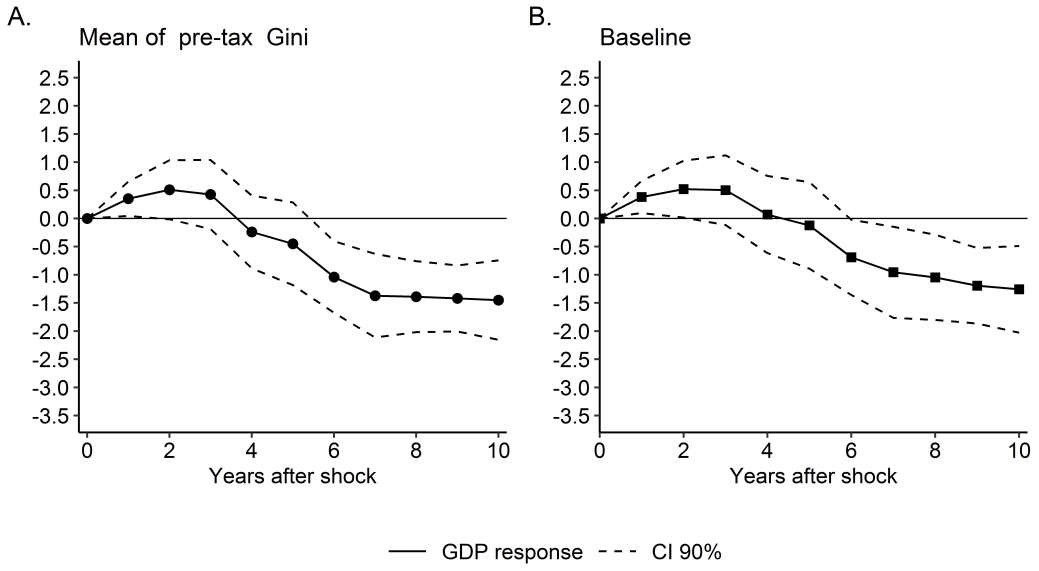
differencing was applied. In line with the monetary policy horizon, two-year lags were added in addition to contemporaneous values and one-year lags. This specification follows the method of Jorda, Schularick, and Taylor (2013). y_{it} is the logarithm of real GDP, $cons_{it}$ is the logarithm of real consumption, d_{it}^{DSR} is household debt service ratio (DSR), d_{it}^{HH} is household debt, and $d_{it}^{ineq_1}$ and $d_{it}^{ineq_2}$ stand for pre-tax and post-tax income inequality measure, respectively, $\left(\Delta_1 d_{it}^{HH} * d_{it}^{ineq_1}\right)$ and $(\Delta_1 d_{it}^{HH} * d_{it}^{ineq_2})$, $\left(\Delta_1 d_{it}^{DSTI} * d_{it}^{ineq_1}\right)$ and $(\Delta_1 d_{it}^{DSTI} * d_{it}^{ineq_2})$ are interaction terms. Following the method of Brambor et al. (2006), the marginal effect of household debt is calculated at specific values of the inequality measure, which are computed from the entire dataset. Identical values of the inequality measure are employed when computing the effects based on equations (1) to (4). This approach ensures that the results are not driven by differences in the absolute level of the income inequality measure pre-tax and post-tax, but instead reflect the role of fiscal redistribution in moderating the impact of household debt (DSR) on GDP (consumption). Specifically, the first quartile, the mean, and the third quartile are used as values of income inequality in order to account for the importance of its level. This approach is taken because countries with lower and higher income inequality also differ in institutional quality or the development of the financial sector, and, as a result, rising household indebtedness or debt-service burdens may affect economic activity differently and through distinct transmission channels in these economies. Finally ϵ_{it} is the error term, which is clustered by both country and time. Clustering the standard errors in this way accounts for potential correlation of shocks within countries over time as well as across countries at a given point in time, thereby providing more robust inference. The lag order was set to p = 4 based on the Akaike Information Criterion (AIC) and in line with previous studies (Mian, Sufi, and Verner 2017). Confidence intervals for the interaction terms were further recalculated following the method of Brambor, Clark, and Golder (2006). The dynamic effects of household debt in the context of income inequality and fiscal redistribution on GDP are investigated using this approach across different time horizons, while the robustness of the results is additionally tested with alternative inequality measures and across various subperiods.

3 Results

The first empirical models were estimated to examine whether household debt exacerbates contractions in GDP growth in high-inequality environments. To confirm or reject this claim, a model including an interaction term with the pre-tax Gini coefficient and a baseline model without the interaction term are employed. Both models are described in greater detail below. In line with Bahadir, De, and Lastrapes (2020), household debt is expected to stimulate economic activity in the short run,

as liquidity-constrained, low-income households raise consumption during credit booms. As the initial impulse fades and debt-service burdens increase, consumption falls and GDP growth deteriorates, because the decline in low-income consumption is not offset by the consumption of high-income households, who are characterized by a lower marginal propensity to consume and are less sensitive to changes in credit supply (Korinek and Simsek, 2016; Drehmann, Juselius, and Korinek, 2017). Accordingly, when the interaction term is included in the regression, the IRF can be expected to display greater amplitude, characterized by a higher increase in GDP in the short run and a deeper decline in GDP in the medium run compared to the baseline model.

Figure I Comparison between baseline model and the pre-tax-Gini model



The results are shown in Figure I. Panel A shows the response of GDP to a shock in household debt with the mean pre-tax Gini coefficient[1]. Panel B shows the response of GDP to a household debt shock, abstracting from income inequality level. To obtain the IRF in panel B, equation (1) was modified by removing the independent variable of income inequality $d_{it-j}^{ineq_1}$ and interaction term ($\Delta_1 d_{it-j}^{HH} * d_{it}^{ineq_1}$). Results obtained from these models are consistent with the existing literature, as Bahadir, De, and Lastrapes (2020) document an increase in aggregate consumption in the short run followed by a decline in the medium run. Since aggregate consumption accounts for the largest share of GDP in most economies, our findings can be meaningfully compared with those of Bahadir, De, and Lastrapes

[1] The pre-tax Gini coefficient was chosen, as opposed to the post-tax Gini coefficient, in order to abstract from the potential positive effect of fiscal redistribution on the relationship between household debt and GDP, which is addressed later in the article.

(2020). Our results do not replicate the short-run increase in GDP reported by Bahadir, De, and Lastrapes (2020). Their approach relies on country-specific VAR models, from which they derive impulse responses of aggregate consumption to household credit shocks, and then regress these responses at selected horizons on country-level variables such as the average post-tax Gini coefficient. By contrast, our analysis employs local projection models on panel data in the spirit of Brambor et al. (2006) and focuses directly on the response of GDP growth to household debt shocks. This allows us to compute the marginal effects of income inequality using the average pre-tax Gini coefficient from the entire dataset, thereby providing a different perspective both in terms of methods and outcome variable. Instead, the amplification effect emerges in the medium run. At the seven-year horizon, the model with the interaction term (Panel A) shows GDP 0.42 percentage points lower relative to the baseline (Panel B). The results confirm a stronger amplification of the business cycle through the impact of household debt on GDP in an environment of higher income inequality, and it is therefore important to address the reduction of income inequality in order to mitigate the adverse effects of household debt on economic activity in the medium run. One of the instruments used to moderate income inequality are personal taxes and transfers (fiscal redistribution). The research will further focus on the effect of household debt on GDP growth in the context of income inequality and fiscal redistribution, comparing results from models that incorporate inequality measures pre-tax and post-tax. This approach will indicate whether fiscal redistribution can mitigate the adverse effect of household debt on economic activity in the medium run, specifically at horizons 4 to 7. The reasons for focusing on these horizons are outlined below. As already mentioned in section 2 credit boom lasts 3 years (Mian, Sufi, and Verner 2017) and during the same period, household debt supports GDP growth (Mian, Sufi, and Verner 2017; Drehmann, Juselius and Korinek 2017; Müller and Verner, 2023; Tunc and Klinic 2023). However, after this period ends, debt begins to constrain economic activity (Mian, Sufi, and Verner 2017; Drehmann, Juselius and Korinek 2017; Müller and Verner, 2023; Tunc and Klinic 2023). The cause of the negative impact of the household credit shock in the medium run was described by Drehmann, Juselius and Korinek (2017), who found that repayments peak 4 years after the credit boom. From these findings, we can conclude that indebted households will most severely restrict their economic activity between the 4th and 7th year after the credit boom, as they will have to meet their obligations and repay their debt. Therefore, over the 4–7-year horizon, reducing income inequality through fiscal redistribution should help ease the strain on the budgets of low-income households caused by increased debt repayments

To confirm the channel through which increasing repayments constrain the consumption expenditures of indebted households, the model represented by equations (3) and (4) is constructed, with emphasis placed on the level of income inequality and the role of the fiscal redistribution.

Figure II Effect of fiscal redistribution on debt service shock in short and medium run with Gini

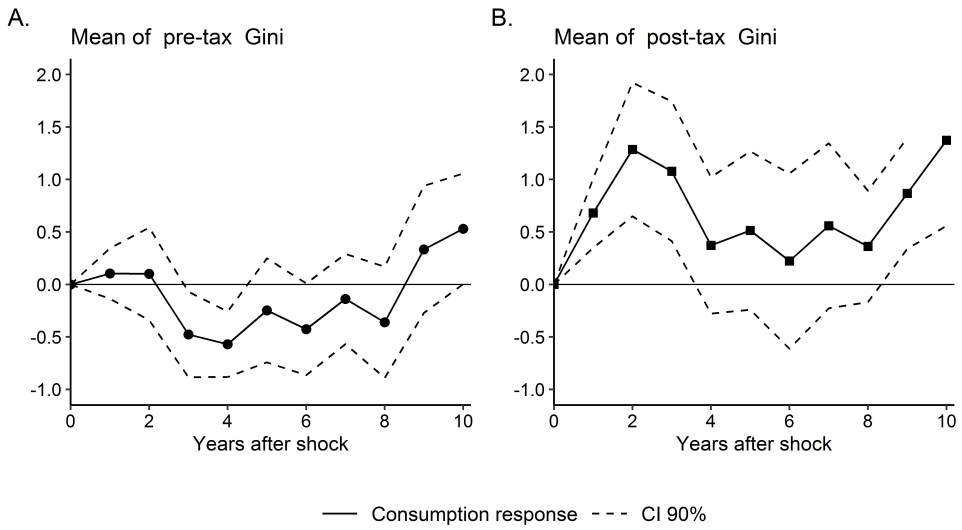
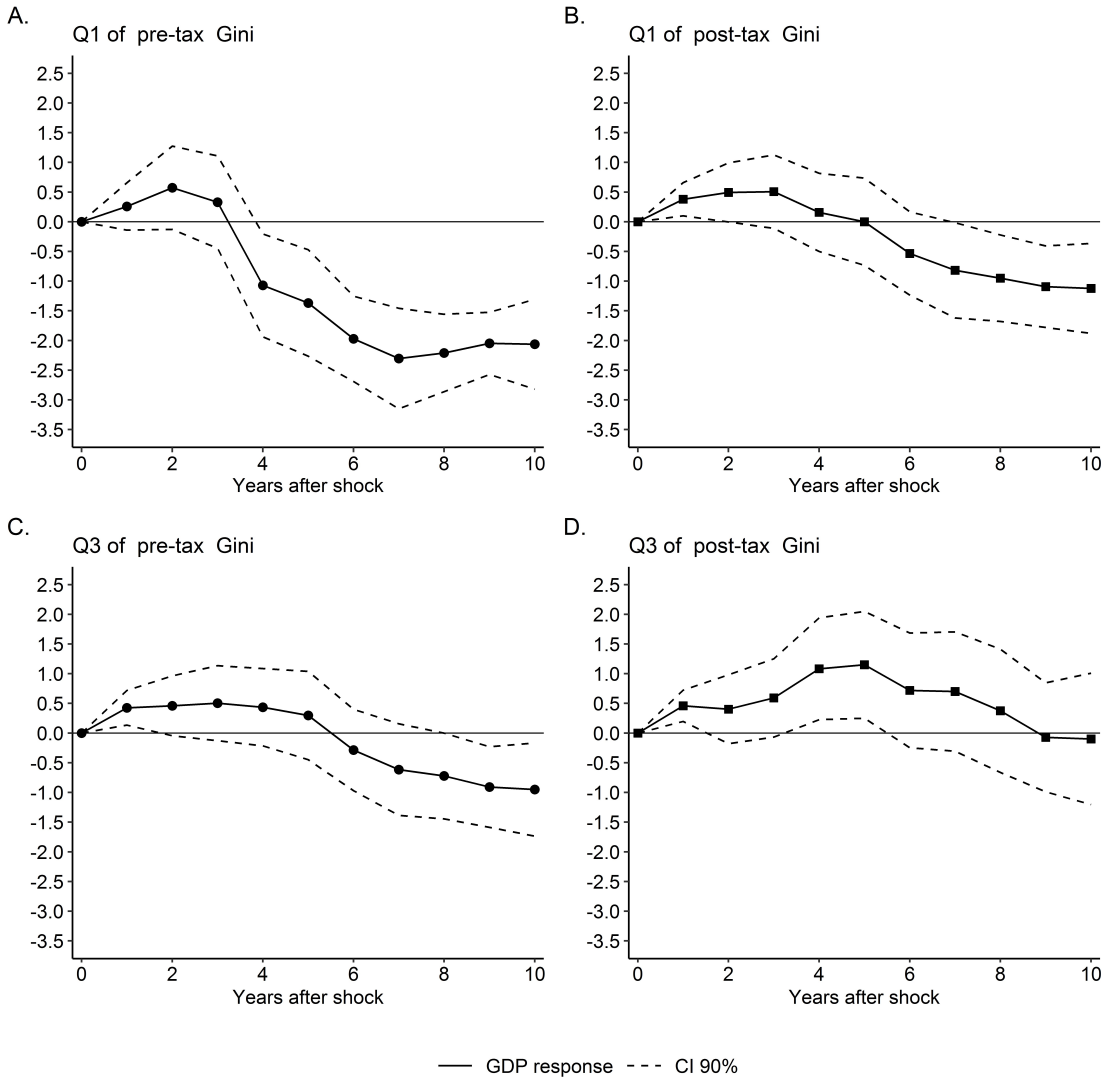


Figure II Panel A shows the consumption response to a household debt-service ratio (DSR) shock with the mean pre-tax Gini coefficient. The results confirm the channel of rising debt-service burdens, as consumption declines sharply and reaches its trough in the fourth year after the shock. Since consumption constitutes the largest component of GDP, this finding supports the interpretation that household debt affects aggregate output primarily through the repayment channel. By contrast, Figure B, which includes the post-tax Gini coefficient, shows different dynamics. The negative effect on consumption is substantially alleviated when the fiscal redistribution is taken into account. This suggests that fiscal redistribution, through the reallocation of resources to indebted low-income households, helps to ease budgetary constraints and dampen the contraction in consumption. The magnitude of the effect is non-trivial. According to the descriptive statistics in Table II, the standard deviation of the change in consumption is 2.24 percent, with an average change of 1.74 percent. Against this benchmark, the decline of 0.57 percentage points observed when inequality is measured by the pre-tax Gini coefficient represents a considerable contraction. These results underscore that the debt-service channel is an important transmission mechanism through which household debt influences long-run economic growth.

After confirming the importance of the interaction between household debt and income inequality, as well as the relevance of the debt-service channel that constrains consumption and thereby economic activity, the analysis proceeds to quantify the mitigating effect of fiscal redistribution. This effect is examined over horizons 1 to 10, with results presented for the first and third quartile of the inequality measure. Panels A and C display the response of GDP to a household debt shock when the fiscal redistribution is abstracted from, whereas Panels B and D present the effect when fiscal redistribution

is taken into account. Since the fiscal redistribution, through the redistribution of collected resources toward low-income households, is expected to alleviate the adverse effect of debt on economic activity, the response of the dependent variable in Panels B and D is anticipated to be shifted upward.

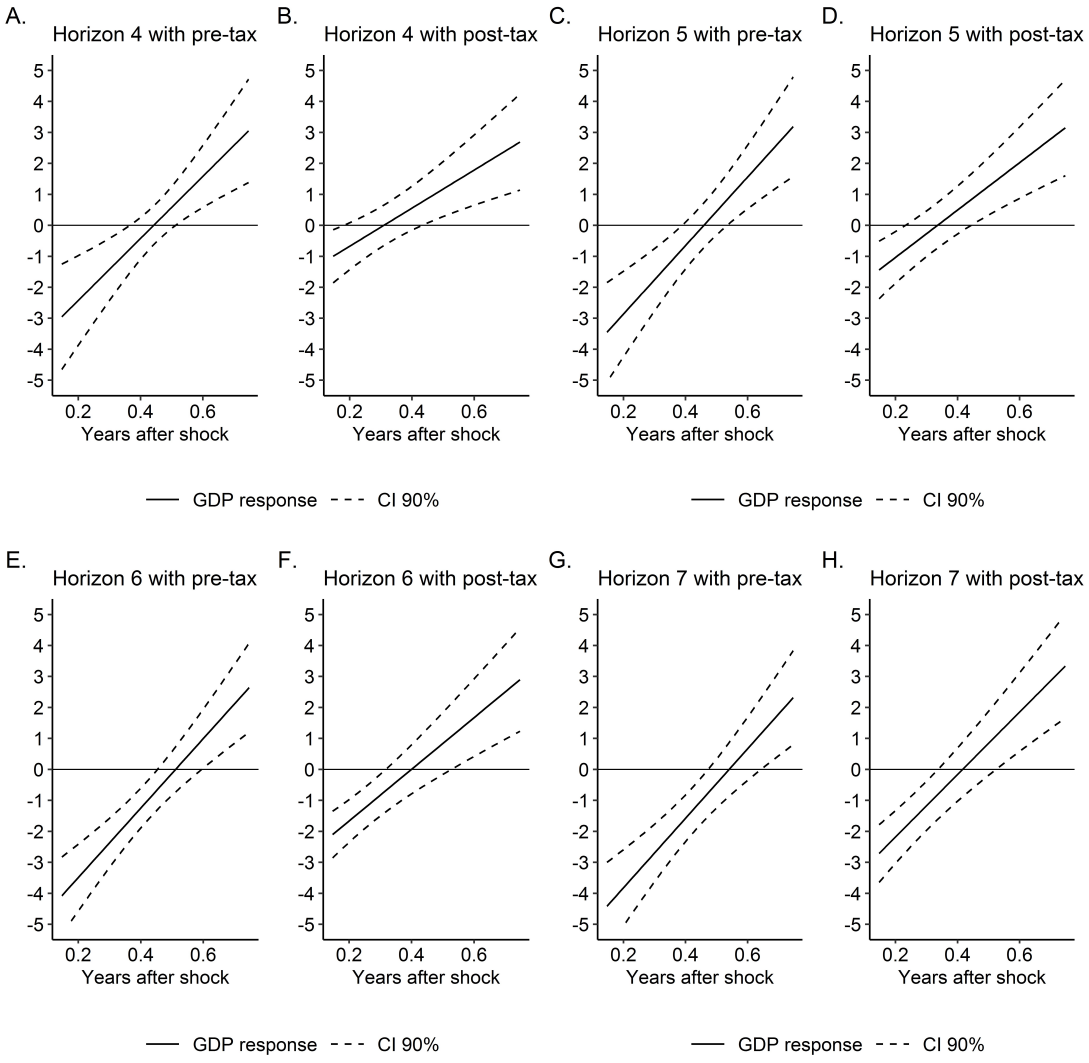
Figure III Effect of fiscal redistribution after debt shock in short and medium run with Gini



When comparing the results in Panels A and B and subsequently in Panels C and D, an upward shift in the GDP response to a household debt shock is observed, particularly in the medium run. This confirms that higher tax revenues and their subsequent redistribution via transfers are able to alleviate the negative effect of household debt on GDP. The positive effect of fiscal redistribution is the strongest at the seventh horizon, when debt-service payments peak and redistribution can relieve the strained budgets of indebted low-income households. In countries with low income inequality (Panel A in Figure

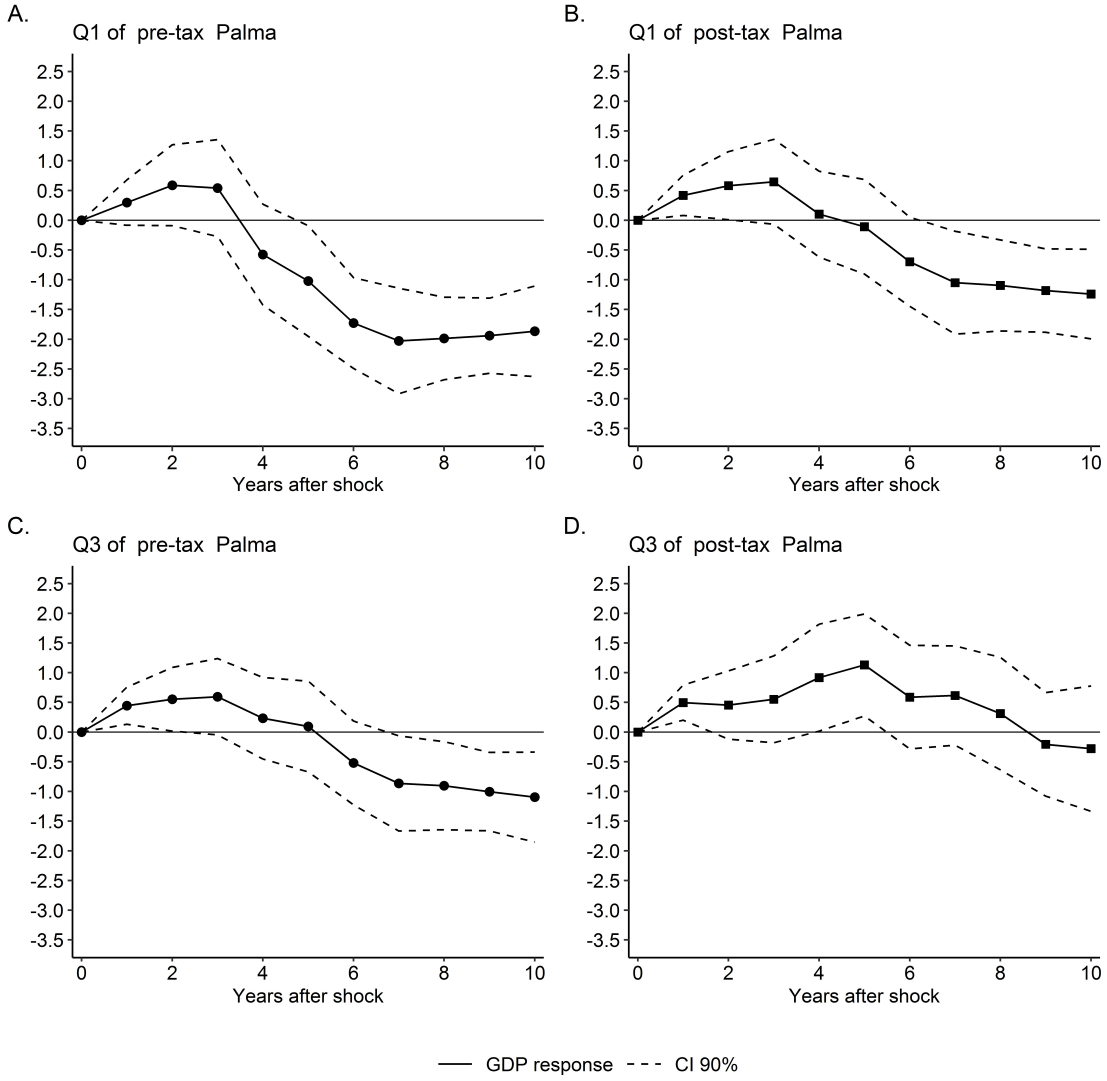
III), GDP is 2.3 percentage points lower seven years after the household debt shock. When the impact of fiscal redistribution is taken into account, the decline is reduced by 1.48 percentage points to 0.82 percentage points. In countries with higher income inequality, the dampening effect of fiscal redistribution is somewhat smaller, but GDP remains 1.32 percentage points higher when the impact of fiscal redistribution is taken into account, compared to regression that does not take fiscal redistribution into account. However, in these countries, the impact of household debt on GDP is statistically insignificant in most cases. To confirm or reject this claim, Figure IV presents GDP responses at horizons 4 to 7, which are examined more closely due to the increase in debt-service burdens during this period. This allows us to determine whether in countries with higher income inequality fiscal redistribution significantly reduces the negative effect of household debt on GDP in the medium run.

Figure IV Effect of fiscal redistribution with Gini coefficient in selected horizon



In Figure IV the x-axis displays the full range of Gini coefficients from the minimum to the maximum observed in the dataset, and for these values the GDP response to a household debt shock is calculated at horizons 4 to 7. The results are shown separately for the pre-tax and post-tax Gini coefficients, paired in Panels A and B, and so forth. The figure indicates that at higher levels of the Gini coefficient, above the third quartile depicted in Figure III, the GDP response moves into a range of values significantly different from zero. A positive effect of fiscal redistribution is also observed, since the response line of GDP in the panels with the post-tax Gini coefficient is shifted upward at horizons 4 to 6. Moreover, in the seventh year after the household credit shock, when debt-service burdens peak, the response line of GDP across different levels of post-tax income inequality is located at a higher level and exhibits a steeper slope, indicating a stronger change across inequality levels than in the case of the pre-tax Gini coefficient. The results presented in Figure III and Figure IV support the conclusion that fiscal redistribution is able to dampen the negative effect of rising household indebtedness regardless of the level of income inequality. To assess the robustness of these results, the Gini coefficient is replaced by the Palma ratio, as the Gini index does not adequately capture changes at the tails of the income distribution, while the Palma ratio is designed to do so.

Figure V Effect of fiscal redistribution after debt shock in short and medium run with Palma ratio

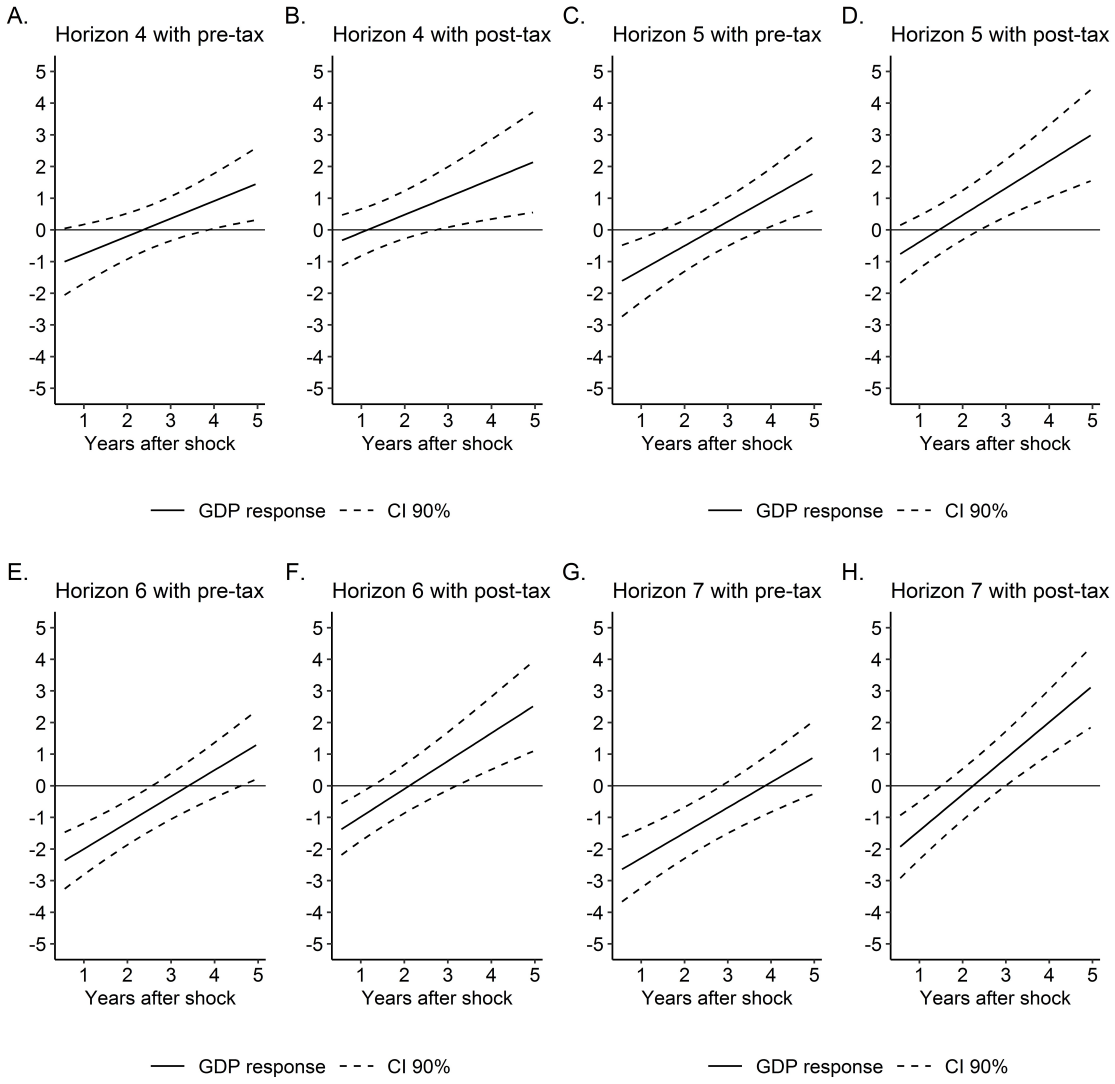


When the Palma ratio is included in the regression instead of the Gini coefficient, almost identical results are obtained and the interpretation remains the same (see Figure V). This confirms that fiscal redistribution is able to mitigate the negative effect of household debt on GDP in the medium run. The dampening effect of fiscal redistribution is again more pronounced in countries with lower income inequality, as shown in Panels A and B of Figure III, with the largest differences occurring seven years after the household debt shock. Moreover, when fiscal redistribution is abstracted from the regression, the effect of household debt becomes significant from the fifth year after the shock. Moreover, when fiscal redistribution is abstracted from the regression, the effect of household debt becomes significant from the fifth year after the shock. When fiscal redistribution is included, the results become statistically significant only from the sixth horizon, but the effect of debt shifts from strongly negative

to insignificant, which also represents a positive effect of the fiscal redistribution. A similar interpretation applies to countries with higher income inequality, where the negative effect of household debt on GDP becomes statistically significant from the seventh year after the shock when fiscal redistribution are abstracted from, while in the regression including fiscal redistribution the coefficients are positive, though insignificant, except at the first and fifth horizons.

The results are therefore robust to the choice of inequality measure, and the marginal effect of the level of income inequality on the overall impact of household debt on economic activity is also examined.

Figure VI Effect of fiscal redistribution with Palma ratio in selected horizon

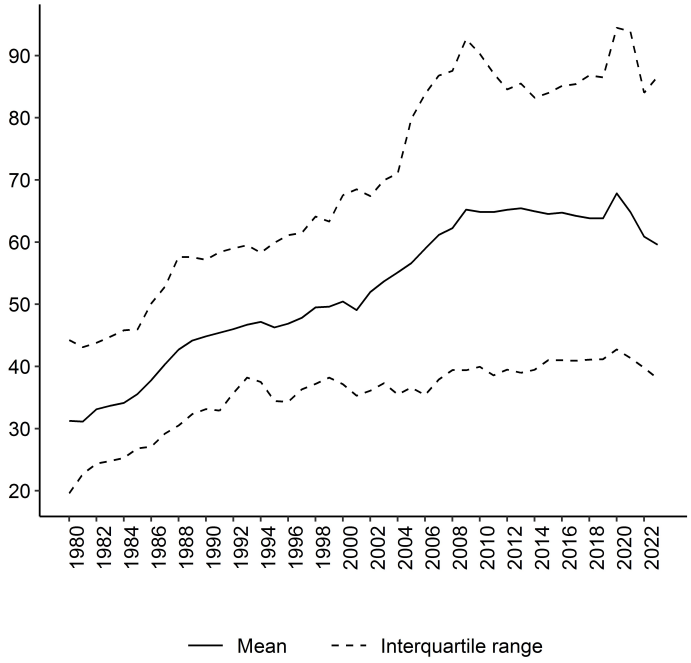


As in the regression including the Gini coefficient, the response lines of GDP at horizons 4 to 7, when debt-service burdens peak, constraining the budgets of indebted households and thereby their

consumption, are shifted upward. This demonstrates the effective dampening of the negative impact of household debt on economic activity across different levels of the Palma ratio, with the largest difference observed at the seventh horizon, when debt-service burdens culminate and redistribution supports higher consumption expenditures. Since the results are almost identical when different measures of income inequality are employed, the subsequent analysis proceeds with the Gini coefficient due to its better comparability and data availability, as the dataset for the regression with the Palma ratio is reduced by five countries.

To assess the robustness of the results, alternative inequality measures were previously employed, and Figure VIII further examines robustness by excluding the period of the Covid-19 pandemic.

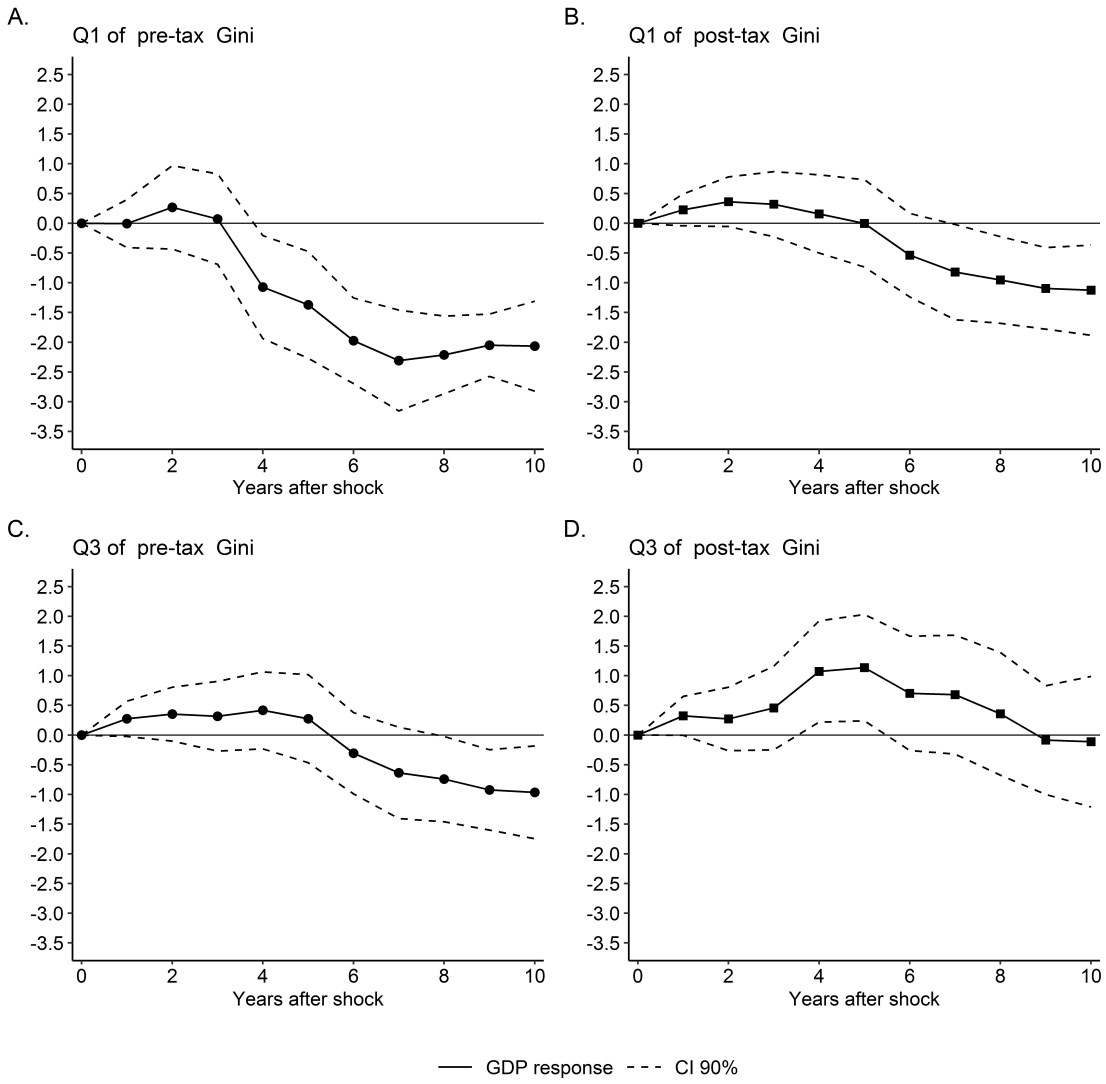
Figure VII Household debt development



Source: BIS Credit to the Non-Financial Sector dataset; only the countries included in the regression with the Gini coefficient are considered; author's calculations. The mean and quartiles were calculated separately for each year.

Since the period of the Covid-19 pandemic was marked by a surge in household indebtedness, as illustrated in Figure VIII, where 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, the data from this period may bias the results. Because the high dynamics 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 VIII Effect of fiscal redistribution with Gini coefficient in short and medium run before Covid-19



The results displayed in Figure VIII indicate that the main conclusions remain robust both to the choice of inequality measure and to the exclusion of specific subperiods, confirming the stability of the estimated relationship.

4 Discussion

The evidence presented in the paper indicates that the macroeconomic effects of household debt shocks are conditioned by the distribution of income and by the capacity of fiscal redistribution to reallocate resources. First, the repayment (debt-service) channel emerges clearly. In specifications based on pre-tax inequality, consumption falls and reaches a trough around the fourth year after a DSR shock, consistent with debt-service burdens tightening household budgets. Because consumption is

the largest component of GDP, this mechanism provides a direct link from household leverage to aggregate activity. The magnitude of the decline – about 0.57 percentage points in the pre-tax specification – represents a non-trivial contraction relative to the typical annual change and dispersion in consumption growth (mean 1.74 percent; standard deviation 2.24 percent). Nevertheless, fiscal redistribution is able to mitigate the effect of rising debt-service burdens to such an extent that household debt even supports final consumption expenditure, fully transforming the original negative effect of increasing debt service on consumption into a positive one.

Second, when GDP responses to household debt shocks are compared across models with and without the interaction term, short-run output gains are not confirmed. Instead, the amplification effect materializes in the medium run. At the seven-year horizon, the interaction model shows GDP lower by 0.42 percentage points relative to the baseline model without inequality measure, indicating that higher inequality strengthens the transmission of household debt shocks to output. This pattern is in line with the theoretical channel whereby growing debt-service burdens constrain the budgets of indebted households, ultimately depressing aggregate demand and medium-run growth.

Third, the role of fiscal redistribution is evidenced by systematically higher (less negative) IRFs when inequality is measured after personal taxes and transfers. In countries with low income inequality, the GDP decline seven years after a household debt shock is reduced from 2.3 percentage points to 0.82 percentage points once the fiscal redistribution is taken into account, implying a substantial attenuation of the contraction. In higher-inequality countries, the dampening is smaller, yet GDP remains 1.32 percentage points higher when taxation is considered compared with regressions abstracting from personal taxes and transfers. In these countries, the effect of household debt on GDP is statistically insignificant across most horizons. However, as income inequality rises, the effect becomes statistically significant, indicating that higher inequality amplifies the transmission of household debt shocks to output.

Robustness analyses reinforce these conclusions. Substituting the Palma ratio for the Gini coefficient yields very similar responses, suggesting that the results do not hinge on a particular inequality measure. Moreover, excluding post-2019 observations to remove the Covid-19 episode – when household debt levels rose fast and were followed by deleveraging – does not materially alter the main patterns, indicating stability across subperiods.

Several limitations should be acknowledged. The analysis does not distinguish between the separate effects of personal taxes and transfers, nor does it account for the degree of tax progressivity or the detailed structure of tax schedules, all of which could interact with the mechanisms studied here.

Furthermore, the identification strategy does not employ external instruments to isolate exogenous household debt shocks, which may limit the causal interpretation of the results. These limitations suggest scope for future research that links household-level data with national accounts, incorporates external instruments for credit-supply shocks, and explicitly models the role of progressive versus flat tax systems.

Conclusions

The paper demonstrates that fiscal redistribution – achieved through higher personal taxation and social transfers – mitigates the negative impact of household debt on GDP by easing the budget constraints of indebted low-income households and by performing a reallocative function of transfers toward these households, especially around the seventh year following a credit shock, when debt-service burdens typically peak. The results are robust across inequality measures and time periods, confirming that fiscal redistribution through personal taxation and social transfers can cushion medium-run output losses. From a policy perspective, strengthening personal taxation and its redistributive function through transfers should be prioritized as an effective tool to reduce the macroeconomic costs of household indebtedness.

References

Acemoglu, D., and Robinson, J. A. (2012). Why Nations Fail: The Origins of Power, Prosperity, and Poverty. New York: Crown Business.

Alter, A., Feng, A., and Valckx, N. (2020). Understanding the macro-financial effects of household debt: A global perspective. In O. Mitchell and A. Lusardi (Eds.), Remaking Retirement: Debt in an Aging Economy (pp. 245–268). Oxford: Oxford University Press.

Andrieş, A. M., Ongena, S., and Sprincean, N. (2025). Sectoral credit allocation and systemic risk. Journal of Financial Stability, 76, 101363.

Babu, M. S., Bhaskaran, V., and Venkatesh, M. (2016). Does inequality hamper long-run growth? Evidence from emerging economies. Economic Analysis and Policy, 52, 99–113.

Bahadir, B., De, K., and Lastrapes, W. D. (2020). Household debt, consumption, and inequality. Journal of International Money and Finance, 109, 102240.

Bank for International Settlements. (2025). Credit to the Non-Financial Sector (BIS WS_TC 2.0 data set). [cit. 2025-01-10]. Retrieved from https://data.bis.org/topics/TOTAL_CREDIT/data

Bank for International Settlements. (2025). Debt Service Ratios (BIS WS_DSR 1.0 data set). [cit. 2025-01-10]. Retrieved from https://data.bis.org/topics/DSR/data

Berg, A., Ostry, J. D., Tsangarides, C. G., and Yakhshilikov, Y. (2018). Redistribution, inequality, and growth: New evidence. Journal of Economic Growth, 23(3), 259–305.

Berisha, E., and Meszaros, J. (2018). Household debt, expected economic conditions, and income inequality. International Journal of Finance and Economics, 23(3), 283–295.

Bernardini, M., and Forni, L. (2020). Private and public debt interlinkages in bad times. Journal of International Money and Finance, 109, 102239.

Biswas, S., Chakraborty, I., and Hai, R. (2017). Income inequality, tax policy, and economic growth. The Economic Journal, 127(601), 688–727.

Blanchard, O., and Rodrik, D. (eds.) (2023). Combating Inequality: Rethinking Government's Role. Cambridge, MA: MIT Press.

Boone, L., Fels, J., Jorda, O., Schularick, M., and Taylor, A. M. (2022). Debt: The Eye of the Storm. Geneva: ICMB International Center for Monetary and Banking Studies.

Brambor, T., Clark, W. R., and Golder, M. (2006). Understanding interaction models: Improving empirical analyses. Political Analysis, 14(1), 63–82.

Carbonell-Nicolau, O., and Llavador, H. (2021). Elasticity determinants of inequality-reducing income taxation. The Journal of Economic Inequality, 19(1), 163–183.

Cobham, A., and Sumner, A. (2014). Is inequality all about the tails? The Palma measure of income inequality. Significance, 11(1), 10–13.

Cynamon, B. Z., and Fazzari, S. M. (2016). Inequality, the Great Recession and slow recovery. Cambridge Journal of Economics, 40(2), 373–399.

de Mendonça, H. F., and Baca, A. C. (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 Luo, Y. (2021). Financialization, household debt and income inequality: Empirical evidence. International Journal of Finance and Economics, 26(2), 1917–1937.

Doyle, M. W., and Stiglitz, J. E. (2014). Eliminating extreme inequality: A sustainable development goal, 2015–2030. Ethics and International Affairs, 28(1), 5–13.

Drehmann, M., Juselius, M., and Korinek, A. (2017). Accounting for debt service: The painful legacy of credit booms. BIS Working Paper No. 645. Basel: Bank for International Settlements. https://doi.org/10.2139/ssrn.2993859

Duncan, D., and Peter, K. S. (2016). Unequal inequalities: Do progressive taxes reduce income inequality? International Tax and Public Finance, 23(5), 762–783.

Eggertsson, G. B., and Krugman, P. (2012). Debt, deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach. Quarterly Journal of Economics, 127(3), 1469–1513.

Friedman, B. M., and Kuttner, K. N. (1992). Money, income, prices, and interest rates. The American Economic Review, 82(3), 472–492.

Jorda, O. (2005). Estimation and inference of impulse responses by local projections. American Economic Review, 95(1), 161–182. https://doi.org/10.1257/0002828053828518

Jorda, O., Schularick, M., and Taylor, A. M. (2013). When credit bites back. Journal of Money, Credit and Banking, 45(s2), 3–28.

Jorda, O., Schularick, M., and Taylor, A. M. (2017). Macrofinancial history and the new business cycle facts. NBER Macroeconomics Annual, 31(1), 213–263.

Karlström, P. (2025). Macroprudential policy and systemic risk: The role of corporate and household credit booms. Journal of Financial Stability, 78, 101390.

Kim, Y. J., and Zhang, J. (2021). The relationship between debt and output. IMF Economic Review, 69(1), 230–257.

Korinek, A., and Simsek, A. (2016). Liquidity trap and excessive leverage. The American Economic Review, 106(3), 699–738.

Kumhof, M., Ranciere, R., and Winant, P. (2015). Inequality, leverage, and crises. American Economic Review, 105(3), 1217–1245. https://doi.org/10.1257/aer.20130607

Lombardi, M. J., Mohanty, M., and Shim, I. (2022). The relationship of household debt and growth in the short and long run. Empirical Economics, 63(2), 367–392.

Martinez-Vazquez, J., Moreno-Dodson, B., and Vulovic, V. (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, 12(30). Atlanta: Georgia State University.

Mian, A., Sufi, A., and Verner, E. (2017). Household debt and business cycles worldwide. Quarterly Journal of Economics, 132(4), 1755–1817.

Mian, A., Sufi, A., and Verner, E. (2020). How does credit supply expansion affect the real economy? The productive capacity and household demand channels. The Journal of Finance, 75(2), 949–994.

Mian, A., and Sufi, A. (2018). Finance and business cycles: The credit-driven household demand channel. Journal of Economic Perspectives, 32(3), 31–58.

Mian, A., Straub, L., and Sufi, A. (2021). Indebted demand. The Quarterly Journal of Economics, 136(4), 2243–2307. https://doi.org/10.1093/qje/qjab007

Mishkin, F. S. (2001). From Monetary Targeting to Inflation Targeting. Washington, D.C.: World Bank Publications.

Müller, K., and Verner, E. (2023). Credit allocation and macroeconomic fluctuations. Review of Economic Studies, 90(5), 2067–2105.

Oishi, S., Kushlev, K., and Schimmack, U. (2018). Progressive taxation, income inequality, and happiness. American Psychologist, 73(2), 157–168.

Okun, A. M. (2015). Equality and Efficiency: The Big Tradeoff. Washington, D.C.: Brookings Institution Press.

Piao, Y., et al. (2023). Income inequality, household debt, and consumption growth in the United States. Sustainability, 15(5), 3910.

Piketty, T. (2014). Capital in the Twenty-First Century. Cambridge, MA: Harvard University Press.

Rajan, R. G. (2011). Fault Lines: How Hidden Fractures Still Threaten the World Economy. Princeton: Princeton University Press.

Schmitt-Grohé, S., and Uribe, M. (2016). Downward nominal wage rigidity, currency pegs, and involuntary unemployment. Journal of Political Economy, 124(5), 1466–1514. https://doi.org/10.1086/688175

Schularick, M., and Taylor, A. M. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870–2008. American Economic Review, 102(2), 1029–1061.

Todaro, M. P., and Smith, S. C. (2020). Economic Development. Harlow: Pearson Education UK.

Topuz, S. G. (2022). The relationship between income inequality and economic growth: Are transmission channels effective? Social Indicators Research, 162(3), 1177–1231.

Tunc, C., and Kilinç, M. (2023). Household debt and economic growth: Debt service matters. Open Economies Review, 34(1), 71–92.

Wood, J. D. G. (2020). Can household debt influence income inequality? Evidence from Britain, 1966–2016. The British Journal of Politics and International Relations, 22(1), 24–46.

World Bank. (2025). World Development Indicators. [cit. 2025-01-10]. Retrieved from https://databank.worldbank.org/source/world-development-indicators

World Inequality Lab. (2024). World Inequality Database. [cit. 2025-01-10]. Retrieved from https://wid.world

Yildirim, A. E., and Dibo, M. (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(10), 1516–1541.

Appendix

Table III List of countries included in the regression with household debt

Country	Time span	d^{HH}	$\Delta_1 d^{HH}$	$Gini_1$	$Gini_2$
Australia	1980-2023	80.14	1.65	46.44	35.44
Austria	1996-2023	49.43	0.13	41.93	30.41
Belgium	1981-2023	44.93	0.57	43.83	28.30
Canada	1980-2023	72.51	1.17	47.58	35.51
Chile	2004-2023	37.98	1.14	72.30	65.75

Colombia	2003-2023	21.94	0.80	71.02	61.90
Czechia	2001-2023	25.56	0.98	34.72	26.84
Denmark	1995-2023	101.60	0.89	39.79	17.14
Finland	1980-2023	46.14	0.89	39.85	24.22
France	1980-2023	42.25	0.93	43.53	28.49
Germany	1991-2023	59.16	-0.04	44.64	30.81
Greece	1995-2023	42.83	1.22	48.27	38.20
Hungary	1999-2023	22.44	0.50	40.88	31.57
India	2008-2023	36.59	-0.07	60.07	60.24
Ireland	2003-2023	70.93	-1.07	44.23	28.43
Israel	1997-2023	38.72	0.29	59.51	49.04
Italy	1980-2023	28.21	0.51	47.93	34.40
Japan	1980-2023	62.50	0.48	49.20	39.55
Luxembourg	1996-2023	53.08	1.02	47.76	37.22
Malaysia	2010-2023	67.67	0.76	49.83	49.50
Mexico	2001-2023	13.21	0.39	73.46	70.36
Netherlands	1991-2023	100.99	1.25	38.09	24.52
New Zealand	1991-2023	74.96	1.88	47.82	33.82
Norway	1980-2023	70.66	0.96	35.14	23.35
Poland	2000-2023	26.66	0.73	47.17	35.69
Portugal	1980-2023	50.55	1.07	48.36	35.35
Singapore	1999-2021	54.27	0.54	50.09	49.31
South Africa	2009-2023	36.91	-0.49	72.80	59.66

South Korea	1980-2023	56.56	1.80	41.32	38.61
Spain	1981-2023	50.21	0.50	45.55	34.27
Sweden	1982-2023	63.84	0.90	37.63	19.85
Switzerland	2000-2023	114.85	0.93	40.26	26.46
Thailand	1999-2023	70.57	1.22	64.04	59.08
Turkey	2005-2023	14.63	0.33	57.54	54.43
United Kingdom	1980-2023	70.12	1.08	45.39	27.92
United States	1980-2021	71.74	0.65	53.91	45.30

Note: Variable $d^{HH}, Gini_1, Gini_2, represent$ mean of household debt to GDP in percent and the Gini coefficient pre-tax and post-tax.

Table IV List of countries included in the regression with DSR

Country	Time span	d^{HH}	$\Delta_1 d^{HH}$	Gini$_1$	Gini$_2$
Australia	2000-2023	107.36	1.75	48.17	35.85
Belgium	2000-2023	52.41	0.65	43.47	28.20
Canada	2000-2023	89.20	1.55	49.88	36.92
Denmark	2000-2023	107.71	0.52	40.29	17.49
Finland	2000-2023	55.57	1.38	41.26	25.84
France	2000-2023	52.42	1.15	45.17	28.06
Germany	2000-2023	58.83	-0.80	45.99	31.97
Italy	2000-2023	37.54	0.67	50.27	35.41
Japan	2000-2023	63.35	-0.24	51.41	41.12
Netherlands	2000-2023	112.86	0.20	38.69	25.56
Norway	2000-2023	81.69	1.29	38.12	25.36
Portugal	2000-2023	75.01	0.09	49.01	34.25
South Korea	2000-2023	74.59	2.09	45.43	40.79
Spain	2000-2023	66.10	0.16	44.41	32.63
Sweden	2000-2023	74.50	1.64	38.56	21.69
United Kingdom	2000-2023	86.48	0.64	47.29	27.98
United States	2000-2021	83.52	0.34	56.81	47.32

Note: Variable $d^{HH}, Gini_1, Gini_2, represent$ mean of household debt to GDP in percent and the Gini coefficient pre-tax and post-tax.